GW - ____28____

PIPELINE

2018 - Present



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Pipeline Safety Regulations

September 20, 2022 | Online :: Central Time

"This course is an excellent overview of DOT/PHMSA Pipeline Regulations and the historical context in which they were developed. Great opportunity to learn compliance at scale for us as Reliable Operators." – Williams

"I have worked in the pipeline industry for over 20 years and this training and trainers enlightened and educated a pipeline veteran!"— Alyeska Pipeline Services Company

"EUCI hosted a great event with well-versed experts in DOT code compliance." - Williams

"I felt this course provided an excellent overview. The speakers kept the pace up all day. They covered hours of CFR provisions and somehow made it engaging and informative. They answered questions completely and provided tremendous content." – Transportation Safety Specialist, National Transportation Safety Board

The pipeline industry is under heightened scrutiny by regulators, the media, and the public. The NTSB highlighted aging pipelines as a concern in its 2019-2020 Most Wanted List of Transportation Safety Improvements. Likewise, Congress has ongoing interest in the safety of older transmission pipelines and in the replacement of leaky and deteriorating cast iron pipe in natural gas distribution systems.

The Pipeline Safety Regulations course will highlight changes in the law and explain how companies can address compliance challenges in the context of stricter regulator interpretations of current regulatory requirements and increased enforcement. The course will dive into developing an increased awareness of the scope and content of regulations and how to best comply with those rules.

Objectives:

- What is the scope of 49 CFR Parts 191 195?
- What facilities and products are covered?
- How are Federal and State jurisdictional boundaries determined?
- What does compliance look like?
- What enforcement tools can be used and by whom?
- · What sorts of civil penalties can be levied?
- What are an operator's options for responding to an enforcement action?

How do prescriptive and management-based regulations differ?

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NGS facilities?

wnat aids and resources are available to neip operators comply?

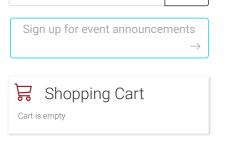
Learning Outcomes

- Review an introduction to regulation of pipelines and LNG facilities in the U.S.
- State the current perspective on heightened scrutiny regarding pipeline safety
- Delineate the statutory and jurisdictional framework for PSA for natural gas and hazardous liquids
- Discuss PHMSA's regulatory and enforcement processes
- Identify what makes up a regulatory framework and enforcement framework
- Review the regulatory provisions in Parts 191, 192, 194, and 195
- Explain Safety Management Systems (SMS) API RP 1173
- Elaborate on gas distribution pipelines and LNG facilities
- Discuss hazardous liquid, gas transmission, and gathering pipeline safety
- Dissect new regulations and developments and new understandings with underground natural gas storage, gas gathering, and LNG facilities
- Review important terms, definitions, and interpretations
- Develop increased awareness of the scope and content of regulations based on program area
- Explain regulatory inspections and enforcement trends
- Describe Natural and Other Gas Pipeline Safety Regulations 49 CFR 192
- Review Hazardous Liquid Pipeline Safety Regulations 49 CFR 195
- Describe LNG Safety Regulations 49 CFR 193

Agenda TUESDAY, SEPTEMBER 20, 2022 : CENTRAL TIME



8:45 – 9:00 a.m. Log In and Welcome



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12:30 - 1:15 p.m. Lunch Break

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9:00 a.m. – 4:30 p.m. Course Timing

Course Overview

Historical Overview

- Enactment of legislation for federal pipeline safety program
- Subsequent legislation that reauthorized and amended the program
- · Factors that led to the creation and evolution of pipeline safety laws and regulations

Principles of Pipeline Safety Regulation

- Framework for the regulation of gas pipeline and hazardous liquid pipeline facilities
- Role of the federal government and states in regulating pipeline safety, federal preemption, non-retroactivity, rulemaking, and special permits (or waivers)
- Powers, authorities, and principles that guide federal and state pipeline safety programs

Gas Pipeline Safety Regulations

- Overview of the minimum federal safety standards for gas pipeline facilities in 49 C.F.R. Part 192
- · Requirements that apply to regulated gathering, transmission, and distribution lines
- · Significant rulemaking proceedings that could impact those requirements

Hazardous Liquid Pipeline Safety Regulations

- Minimum federal safety standards for hazardous liquid pipeline facilities in 49 C.F.R. Part 195
- Requirements that apply to regulated pipelines
- Rulemaking proceedings that could impact those requirements in the future.

Safety During COVID



Closing Remarks

Instructors

Keith Coyle, Attorney, Babst Calland

Keith Coyle is a member of the Firm's Washington, D.C. office and a shareholder in the Energy and Natural Resources, Environmental and Transportation Safety groups and Pipeline and HazMat Safety practice. Mr.

Coyle advises clients throughout the United	d States on energy matters, but his practice focuses primarily on the
Du elieking A cont or election this process you concern	ansportation of hazardous materials.
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James Curry, Managing Shareholder, Babst Calland

Jim Curry is the Managing Shareholder of the Firm's Washington, D.C. office. Jim is an energy lawyer with years of experience in government service and private practice helping clients navigate difficult regulatory and strategic challenges throughout the energy sector. His clients include pipelines, utilities, energy producers, LNG terminals, investors, technology companies, chemical makers, and hydrogen infrastructure developers. Jim takes a pragmatic, business-minded approach, informed by an understanding of the energy markets and regulatory policy. Applying his experience from day-to-day safety regulatory counseling, dozens of enforcement matters, internal and government investigations, rulemakings, energy projects and in appellate litigation, Jim identifies and executes creative legal and strategic pathways to help clients achieve their objectives.

Brianne Kurdock, Shareholder, Babst Calland

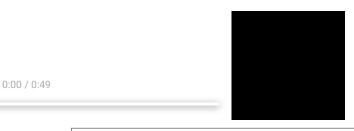
Brianne Kurdock is a member of the Firm's Washington, D.C. office and a shareholder in the Energy and Natural Resources, Environmental and Transportation Safety groups and Pipeline and HazMat Safety practice.

Ms. Kurdock represents clients in pipeline safety matters at the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), state commissions, and the federal courts. Her nationwide practice covers compliance and strategic counseling, audit preparation, incident response, enforcement proceedings, regulatory comment preparation, and litigation. Ms. Kurdock has significant experience in these areas as a former PHMSA attorney and as regulatory counsel to the Interstate Natural Gas Association of America, an industry trade association. She has experience in all sectors of the pipeline industry, including gas transmission, gathering, distribution, oil, natural gas liquid, and product pipelines, liquefied natural gas facilities, and products and chemicals terminals. Ms. Kurdock also has experience in handling environmental regulatory issues affecting pipeline construction and operational activities.

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- IMPORTANT NOTE: After November 30 you will not be able to join a Teams meeting using Internet Explorer
 11. Microsoft recommends <u>downloading and installing the Teams app</u> if possible. You may also use the
 Edge browser or Chrome.
- You will receive a meeting invitation will include a link to join the meeting.
- Separate meeting invitations will be sent for the morning and afternoon sessions of the course.
 - You will need to join the appropriate meeting at the appropriate time.
- If you are using a microphone, please ensure that it is muted until such time as you need to ask a question.
- The remote meeting connection will be open approximately 30 minutes before the start of the course. We encourage you to connect as early as possible in case you experience any unforeseen problems.



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Pack of 10 attendees - \$ 6,265.00 (30% discount)	0	+ -
Pack of 20 attendees - \$ 10,740.00 (40% discount)	0	+ -
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Program field of study: Specialized Knowledge

Program Level: Basic

Delivery Method: Group Internet Based

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From: Chavez, Carl J, EMNRD

Sent: Thursday, August 22, 2019 2:40 PM

To: Denton, Scott (Scott.Denton@HollyFrontier.com)

Cc: Griswold, Jim, EMNRD; Brancard, Bill, EMNRD; Ames, Eric, EMNRD

Subject: Effluent Pipeline

Scott, hi.

FYI: Click here.

Just wanted to follow-up with you about the fiberglass pipeline upgradient from the WDWs and historical releases.

The pipeline has been in place now for more than 10 years. HFNR indicated there are no current plans to replace the pipeline. This pipeline may someday handle a WDW-4 hazardous waste stream.

HFNR held a communication meeting with OCD yesterday, and OCD brought up the pipeline so you know OCD is concerned about the releases upgradient from the WDWs. It may be prudent for HFNR to think about the pipeline and it can even be used to transport hazardous wastewater to WDW-4 someday.

Please click <u>here</u> to review OCD HST Guidance. Because the refinery is under a WQCC DP, it would need to meet the technical requirements of the guidance; however, the HST fluids could be returned back into the refinery WWTS and/or refining process...

Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Chavez, Carl J, EMNRD

Sent: Thursday, October 4, 2018 11:15 AM

To: Denton, Scott (Scott.Denton@HollyFrontier.com); Combs, Robert

(Robert.Combs@hollyfrontier.com)

Cc: Griswold, Jim, EMNRD

Subject: Artesia Refinery (GW-28) Pipeline

Scott and Robert:

Good morning.

FYI: EMNRD Legal Counsel has determined that the pipeline shall remain under the above subject WQCC Discharge Permit.

Also, OCD is looking into the releases along the pipeline again as part of its C-141 review. OCD will likely require routine annual HSTs be performed on the entire pipeline (especially under the Pecos River) and/or proposal as part of the operator's final C-141 to install a device(s) to prevent back pressure and blow out of FG collars along the pipeline during power failures, upset, etc., etc. It appears that backpressure on the fiberglass line is causing blowouts along the pipeline collars and this should be prevented by the operator.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: <u>CarlJ.Chavez@state.nm.us</u>

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GW - 028

GENERAL CORRESPONDENCE

YEAR(S):

2006 - Present

From: Chavez, Carl J, EMNRD

Sent: Thursday, August 10, 2017 3:05 PM

To: Denton, Scott (Scott.Denton@HollyFrontier.com); Combs, Robert

(Robert.Combs@hollyfrontier.com)

Cc: Griswold, Jim, EMNRD; Tsinnajinnie, Leona, NMENV

Subject: HollyFrontier Navajo Refining, LLC Artesia Refinery (GW-028) Notification of Change of

Discharge Location (7/21/17) and Closure Plan (7/21/17) Documents Communication

Meeting

Gentlemen:

Please find below OCD's notes in red text based on the HollyFrontier Navajo Refining, LLC 7/21/17 submittals, and 8/9 telephone communication call. Carl agreed to submit notes to the parties to ensure we are proceeding according to the intent of the discharge permit. Action items are highlighted in yellow.

Meeting attendants, please feel free to add any of your comments for communication purposes.

Thank you.

Introduction

A Notification of Change to Discharge Location (HF 7/21/17 Document) (approved by OCD)

- 1) Phytoremediation Pilot Project (call it "feasibility project" instead) within South RO Reject Field (OCD location approval of 7/28) (Ok)
 - a. Phytoremediation Work Plan needed (Scott Denton will address)
 - b. Abatement Plan (AP) submittal (Pre-closure) (AP in this instance is for stopping discharge in RO Reject Farm Fields. No DP modification required for phytoremediation project- JG.
 - c. Navajo's reference to past reports, i.e., RO Reject Field Reports, Background GW Report, etc. (Permittee only mentioning for AP required within 60 days from cessation of discharge into RO farm fields per A2a.)
 - i. To be included in AP submittal? (May or likely be considered in AIc and A2c)
 - ii. OCD will consider, but may require other COAs as needed to complete AP (Same as A1c above)
- 2) Abatement Plan Schedule
 - a. OCD Modif. Approval of Submittal 60 days after cessation of discharge to RO Reject Fields (No Modif. Required, but an AP is required at that time)
 - b. OCD Discharge Permit Modification of 6-29-17 (Ok. OCD issued Admin. Modif.)
 - c. Confusion w/ Phyto-remediation Pilot Project and No. A1b above. (Phyto-remediation project may factor into AP under A2a above depending on work plan end goals or criteria indicating it is a viable standalone abatement or complimentary abatement?)

B Closure Plan (HF 7/21/2017 Document)

1) Phytoremediation Pilot (Abatement under DP)- AP Confusion (See 2A1 above. This is a feasibility project that may become part of the AP 60 days after cessation of discharge to RO Reject farm fields)

- a. AP Considerations in cost projection(s) needed now (Address stoppage of discharge to RO Reject farm fields for now. The AP required 60 days after cessation of discharge will need to be addressed with that submittal)
- b. Closure Plan is different and costs may be projected now w/ modification as needed later (Submit with AP due 60 days after cessation of discharge to RO Reject farm fields.)
- 2) Navajo's reference to past reports, i.e., RO Reject Field Reports, Background GW Report, etc. assoc. w/ abatement (Yes, this is to be expected)
 - a. Use in AP submittal A2a above. (Yes)
- 3) Abatement Plan Schedule
 - a. OCD Modif. Approval of Submittal 60 days after cessation of discharge to RO Reject Fields (OCD agrees per A2a)
 - i. Use in cost estimates now (Cost estimates may need to be adjusted later as more information becomes available and as per B3a)
- 4) Detailed or itemized list of closure actions with cost estimates (To be addressed
- 5) Financial Assurance (FA) Amount is too Low \$3K (Function of No. B4 above)
 - a. What is basis for \$3K (Estimated cost for ending discharge to RO Farm Fields per DP. More cost details are needed as basis for cost estimate.)
 - b. FA needed now with modifications as needed (FA submittal for final AP required separate from 5a above. On a separate note: Financial Assurance- FA for each UIC Class I (NH) Disposal well must be revisited and adjusted based on the effluent pipeline leading to each well for disposal, i..e, WDW-I pipeline extends back to the refinery ~ 12 miles. Scott Denton will address.)

Path Forward (As described herein)

Miscel.

- VOC plume capture system hypothetical: Injection stds. must meet the greater of WQCC water quality standards or background GW quality.
- How will OCD permit Class V remediation injection wells? Since facility is under WQCC DP, Permittee will be required to meet the technical requirements of OCD's UIC Program, i.e., C-108, Fed. Class V Well Form,...
- Gross hydrocarbon removal with GACs. Permittee currently not concerned with general chemistry constituents of concern. i.e., Cl, SO4,... If water discharged to GW is of better quality then there should be no issues, but monitoring will be required to verify that discharge is better quality than existing GW at the discharge location.
- OSE Water Rights: Permittee discussed a year ago with OSE. If Permittee injects/removes gal/gal, no permit needed. No water rights issue(s) as Permittee has procured shallow GW leased rights (~ 80% plume reinjection/plume capture). About 20% may be reinjected outside of capture zone, but must meet diff. WQ stds. OCD is in discussions with NMED on this plume capture matter. OCD is thinking HF will soon be submitting final hydrogeologic pump test report with perhaps a work plan for extraction/injection wells to address dissolved phase plume migration, PSH, etc. OCD is in communication with NMED on the above. OCD and NMED both agree they need to seek further clarification from Permittee based on this topic and future plans of the Permittee.
- Lovington Refinery GW sampling event start date is Wed. instead of Thurs.
- WDW-4 Disposal Well: OCD UIC Class I Haz. Well Regulations still under review by EPA. EPA Attorneys left, and OCD/EPA Primacy issues still linger. EPA Reg. 6 now aware of situation and will be working with OCD Attys.

Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Chavez, Carl J, EMNRD

Sent: Friday, April 21, 2017 8:45 AM

To: Combs, Robert (Robert.Combs@hollyfrontier.com)

Cc: Griswold, Jim, EMNRD

Subject: FW: Artesia Refinery (GW-28) 2015 Effluent Pipeline Release Follow-up

Robert:

Re: Pipeline Releases 2015 and 2016

Good morning. OCD is following up on C-141 Final submittals for the pipeline releases South of the evaporation ponds west of the Pecos River.

The communique below was the last OCD msg. sent to Navajo regarding the 2015 release. Later in 2016 there was another release.

OCD is requesting an update on releases within the next two weeks or on or before May 5, 2017.

Thank you.

From: Chavez, Carl J, EMNRD

Sent: Tuesday, November 15, 2016 3:19 PM

To: Combs, Robert (Robert.Combs@hollyfrontier.com) < Robert.Combs@hollyfrontier.com>

Cc: Holder, Mike (Michael.Holder@hollyfrontier.com) < Michael.Holder@hollyfrontier.com>; Denton, Scott

(Scott.Denton@HollyFrontier.com) < Scott.Denton@HollyFrontier.com>; Griswold, Jim, EMNRD

<Jim.Griswold@state.nm.us>

Subject: Artesia Refinery (GW-28) 2015 Effluent Pipeline Release

Robert, et al.:

Good afternoon. The New Mexico Oil Conservation Division (OCD) has re-evaluated the release information from the July 27, 2016 Investigation Report, subsequent to the telephone communication call on Nov. 9th. OCD comments and requirements are provided below based on a review of information to date.

OCD comments:

- 1) The water table is less than 10 ft. bgl and the release location is within the Pecos River Flood Plain Watershed area.
- 2) The soil removed to repair the line is estimated to be 50-60 cubic yards, and were not sampled for waste determination because HF was not convinced that the removed sols were actually waste. The excavated soils are stockpiled on land surface, and clean fill was used to backfill the excavation area.
- 3) Two soil borings were advanced (TMW-WWL1 and TMW-WWL2) in areas believed to have been unimpacted by the pipeline release with soil samples taken at depths of 1, 6 and 12 feet bgs in each boring. The 12 foot samples would have been in the capillary fringe or saturated zone. Those soil samples were analyzed for the constituents provided in Table 2. These "background" soils appear

- elevated in iron and sulfate, at a minimum. No sampling was done upon the 50 to 60 yards of excavated soils and no sampling was done on the sides or at the base of the excavation.
- 4) The approach used on this 2015 effluent line release appears to be what is also needed on 2016 effluent pipeline release; however, OCD requires sampling along the sidewalls and base of excavations in order to verify soil remediation is acceptable, and the waste must also be sampled for a waste determination. Consequently, HF must not re-emplace excavated soils back into the excavation until the analytical data is reviewed and a determination is made by OCD.
- 5) OCD generally relies on soil screening limits DAF1 and DAF20 for evaluation of soil contamination and protection of groundwater when and where feasible. Establishment of background soil quality does simplify the final cleanup criteria for parameters lacking a DAF1 or DAF20.
- 6) For soil reuse proposals related to the effluent pipeline, submittals to OCD is in order. OCD will likely use a similar approach as the NMED for final determination.

OCD requirements:

- 1) OCD requires that the excavated soils be sampled and similarly analyzed for the constituents in Table 2. OCD requires at least 3 discreet grab samples (no composites), one sample for every ~20 yards of material. Environmental analyses shall consist of Organics by Method 8260 <u>full list</u>; Method 8015 <u>extended range</u>; Iron and Manganese by Method 6010; along with Chloride, Fluoride, and Sulfate by Method 300. If the excavation is still open, a sample from the base of excavation should also be collected and analyzed.
- 2) HF shall submit the environmental analytical data with QA/QC to OCD to compare with the background information to decide on the next step (if any) on or before December 31, 2016.
- 3) HF shall follow EPA QA/QC and DQOs for all field and laboratory work.

Please contact me if you have questions. Thank you.

GW - 028

C-141s

From:

Combs, Robert [Robert.Combs@hollyfrontier.com]

Sent:

Wednesday, September 21, 2011 4:28 PM

To:

Chavez, Carl J, EMNRD; Cobrain, Dave, NMENV; Hill, Larry, EMNRD; Dade, Randy, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny; Strange, Aaron

Subject:

C-141 Spill--NRC effluent pipeline leak near Chukka Federal injection well

Attachments:

2011-09-16 Spill-Effluent pipeline leak at Chukka junction box--initial report pdf; Chukka Leak

Carl, Dave, Randy, and Larry,

Please see the attached C-141 for the treated waste water spill located near the Chukka injection well that occurred 9/16/11. A final C-141 will follow and will include sample analyses (bottom hole, background, and excavated soil) and photos.

If there are any questions, please contact me at 575-746-5382.

Thanks,

Robert

Robert Combs

Environmental Specialist

The HollyFrontier Companies

P.O. Box 159

Artesia, NM 8\$211-0159

office: 575-746-5382

cell: 575-308-2718

fax: 575-746-5451

Robert.Combs@HollyFrontier.com

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From: Chavez, Carl J, EMNRD

Sent: Friday, September 24, 2010 9:54 AM

To: Hill, Larry, EMNRD; Dade, Randy, EMNRD; Perrin, Charlie, EMNRD

Cc: VonGonten, Glenn, EMNRD

Subject: Refinery Meetings in Santa Fe October 6, 2010

Hey guys.

Just wanted to let you know OCD- SF is meeting with Navajo Refining Company (NRC) and Western Refining SW, Inc. (Western) on the above subject date in case you would like to participate by telephone conference. OCD- SF will go over the discharge permit with operators to make sure we are moving forward to address the permit. OCD- SF is under travel restriction; thus, meetings to discuss facility issues makes sense at this time.

The meetings are as follows:

1) NRC from 10 to Noon: Lovington or Lea Refinery- GW-014 (particularly interested in the environmental site investigation and GW quality information from the recently installed series of MWs) at the facility within Lovington's Well Head Protection Area.

An agenda item for the NRC- Artesia Refinery (GW-028) is included in this meeting, but another meeting to discuss the permit in more detail will likely be scheduled at a later date. Some current issues are: free-product recovery system is down and a work plan will be submitted by 11/2010 to construct a functional system for product recovery. Issues with the effluent line east of the facility, across Pecos River and to their 3 UIC Class I (NH) disposal wells. Randy Dade will be inspecting the line, recent releases with repair, hydrostatic testing requirements, and requesting a work plan for complete replacement of the effluent line by March of 2011. The Artesia refinery was assessed a fine by NM OSHA for over \$700K for the March 2010 tank explosion that resulted in loss of life of 2 workers from TX.

2) Western from 1 to 3 p.m.: Gallup Refinery- GW-028 (particularly interested in the tank construction, waste water pond construction and any permit deadlines). Facility-Wide GW Monitoring Plan will replace the GW sampling portion of the permit in the upcoming renewal of the discharge permit. The refinery is installing a new waste water treatment system for the refinery under an EPA CAFO.

A request for a meeting on Western's Bloomfield Refinery- GW-001 was made today. There is a UIC Class I (NH) Well within the facility (UICI-009) where a hearing request was received on the discharge permit renewal and the Director is currently assessing the hearing request. Bloomfield was allowed to idle or shut-in operations under a recently issued discharge permit renewal. The bulk storage and transportation units are in operation and the UIC Class I well is used for disposal of recovered product behind the remediation barrier wall and the river. The voluntary biovent remediation project at the river terrace is still in progress with ground water and surface quality monitoring.

Let me know if you want to listen in and participate or if you have any issues that OCD-SF needs to discuss during the meetings that would work too. Please contact me if you have questions or wish to discuss any issues you may have before the meeting.

Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD

Sent: Thursday, August 07, 2008 5:03 PM

To: 'Moore, Darrell'

Cc: 'Lackey, Johnny'; Resinger, Jim; Price, Wayne, EMNRD; Gum, Tim, EMNRD

Subject: Navajo Refining Company Thursday, August 7, 2008 Praxair Technologies & Other Refinery Issues

Meeting Summary

Darrell, et. al:

Thanks for setting up the Praxair presentation today and for the opportunity to communicate in a meeting about the Navajo Refineries.

Summary of requested items from the OCD based on the meeting:

- 1) WDWs: Congrats you passed the MITs (dynamic) conducted on Tuesday morning. Submit monthly monitoring reports for pressure limit devices (PLDs) for each WDW. Update OCD on cause for fluid loss in the PLD at WDW# 3. Continue to track the levels closely until we can determine the cause.
- 2) Test Plan for annual Fall-Off Test for WDWs # 1, 2 & 3 is requested by November 15, 2008. Navajo will check with Subsurface to see if this date is ok. The OCD informed Navajo that the provisions for the Test Plan may be viewed online at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf. Navajo will need to follow suggested moving the date of the next Fall-Off test to May 2009.
- 3) Not discussed during the meeting, but of equal importance: when is Navajo going to conduct the hydrostatic test on the effluent line to the WDWs? Were you going to propose the Ultra-sonic Long Wave Technology combined w/ CScan?

Summary of requested items from OCD on Navajo Refining Company agenda items:

- 1) Praxair leak detection technology as alternative to liners for tanks and bermed areas within the refinery? Navajo will want to perform its due diligence of the technology to ensure that it will meet the OCD requirement(s). A listing of tanks w/ denotations of the tank test methods w/ dates will need to be submitted within 3 months of discharge permit issuance. Based on the meeting, the OCD may approve. Navajo will need to propose a frequency of testing to the OCD, i.e, all tanks tested before the expiration date of the permit; or 20% of tanks each year for 5 years, etc. I will search the OCD file for the May 20, 2008 letter mentioned by Johnny Lackey apparently requesting approval to use the Praxair method(s). It is important to note that while the OCD may approve the procedure, if the technology proves to be ineffective on a trial basis, Navajo will need to keep its options open for new or other technologies that may prove more effective than standard hydrostatic testing.
- 2) Discuss Praxair's leak detection technology for underground piping. Is this approved by OCD as an alternative to hydrotesting? Yes, on a case-by-case approval process only. Navajo will need to propose the frequency of testing, i.e., Navajo may be able to test all lines at one time before the end of the expiration date on the permit; or every 5 years; or 20% of the piping annually each year.
- 3) Clarify 24 month approval process for the sanitary effluent to the waste water treatment plant. Submit proposed language for discharge permit that may address concerns of Navajo and OCD by Tuesday, 8/12/2008. I want to finalize the discharge permit for the Navajo Artesia Refinery next week.
- 4) Discuss API Separator use issue. OCD language in discharge permit related to this subject appears to be ok, but propose suggested language if Navajo would still like to request a change and OCD will consider. The OCD is considering the API Separator currently being used as a decanting tank for the FCC scrubber reject water as a below grade tank that requires secondary containment. The OCD may require an "Other Requirement" item in the final discharge permit, but will consider Navajo's opinion on this. Submit opinion or suggested language for discharge permit by Tuesday, August 12, 2008.

Let OCD know if this does not accurately reflect items discussed and please note that there was a new topic item on the effluent line above. Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3491 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

<u>District 1</u> 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88210 District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fc, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Form C-141 Revised August 8, 2011

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

			Rele	ease Notific	catio	n and Co	orrective A	ction	l			
					OPERATOR Initial Report Final Report							
Name of Company Navajo Refining Company, L.L.C.						Contact Robert Combs						
Address 501 E. Main St, Artesia, NM 88210 Facility Name Artesia Refinery						Telephone No. 575-746-5382						
Facility Nai	me Artesia	Refinery				Facility Typ	e Petroleum	Refine	ery			
Surface Ow	ner			Mineral C	wner				API No).		
	.,			LOCA	TIO	N OF RE	LEASE			-i		
Unit Letter Section Township Range Feet from the North						n/South Line Feet from the East/Wes			Vest Line	Line County		
		La	titude_	32° 45' 50.46"	N	Longitu	ıde <u>104° 14'</u>	17.57	<u>'W</u>			
				NAT	URE	OF REL	EASE					
Type of Rele	-	eated Waste V					Release >25 bb			Recovered	>25 bt	bl
Source of Re	lease Eff	luent pipeline	junction			Date and F 9/17/11 ~	lour of Occumenc	c	Date and 9/17/11 -	Hour of Disc	covery	
Was Immedia	ate Notice (Yes [No Not Re	equired	If YES, To NMED (50 OCD—Art		83); left	nail messag voicemail	e message		
By Whom?	Estefani l	Tammond					$\frac{112 \cdot 12 \cdot 13}{10 \text{ ur}} = \frac{1303 - 470 - 3}{10 \cdot 13}$		it voiceina	ii iiiessage _		
Was a Water	course Read	· , , , , , , , , , , , , , , , , , , ,	Yes 🗵	1 No.			olume Impacting t		ercourse.			
		pacted, Descr										
At ~19:30 on ~415 psig an down the pip waste water p	Describe Cause of Problem and Remedial Action Taken.* At ~19:30 on 09/16/2011 the FCC Division Control Room Boardman noticed that the pipcline discharge pressure (80Pl011) dropped from ~1021 psig to ~4.15 psig and the flow (80FlC011) increased from ~500 gpm to ~647 gpm. At ~19:33, the operator contacted the shift foreman and was instructed to shut down the pipeline pumps (P-849/854). A contract employee was dispatched to inspect the pipeline and determined that there was a breach in the treated waste water pipeline line inside a junction box located near the Chukka Federal injection well (see attachment for exact location). Once the location was known, the spill was reported to the agencies listed above.											
The spill was the excavated was >25 bbl, will be include	s contained of d area. A value which included ded in the find	ncuum truck wades material t	ction box, vas used to from insid e the inve	but when the con o remove the liquid the the pipeline that stigation is compl	d volum t emptie ete.	ne from both indicated into the jun	nside and outside ction box when th	the jund te flango	ction box. e was open	The recovered. The tota	ed liquic I volume	d volume e recovered
Several soil s analytical res		e submitted fo	or analysis	s; please see the at	ttachme	nt for location	is. The excavated	l dirt wa	is transferre	ed to roll-off	bins aw	vaiting
excavation w	ill be partia	lly filled with	sand temp	ng failed and cause porarily to prevent	t filling	with rainwate	er and eliminate th	ne safety	hazard of	an open hole	e (cattle	in area).
regulations a public health should their o or the environ	II operators or the envir operations h nment. In a	are required to ronment. The ave failed to a	o report ar acceptand idequately ICD accep	e is true and comp nd/or file certain r ce of a C-141 repo v investigate and r otance of a C-141	elease nort by the emediat	otifications a e NMOCD m e contaminati	nd perform correct arked as "Final Roon that pose a throet te the operator of the	etive act eport" of eat to go respons	ions for rel loes not rel round wate ibility for c	eases which ieve the oper r, surface wa compliance w	may end rator of later, hum with any	danger liability nan health
Signature:	Phy	Kn .					OIL CON	<u>SERV</u>	'ATION	DIVISIO	<u>)N</u>	
Printed Name	Robert C	Combs				Approved by	Environmental Sp	pecialis	t:	_		
Title: Environmental Specialist Approval Date:									Expiration Date:			

E-mail Address:	robert.combs@hollyfrontier.com	Conditions of Approval:	Attached
Date: 9/20/11	Phone: 575-308-2718		

^{*} Attach Additional Sheets If Necessary

From:

Strange, Aaron [Aaron.Strange@hollyfrontier.com]

Sent:

Monday, September 19, 2011 3:27 PM

To:

Combs, Robert

Cc:

Price, Doug; Lackey, Johnny; Moore, Darrell; Rhodes, Glen

Subject:

Chukka Leak

Attachments:

Chukka Leak (Google Earth).mdi

Robert,

Please see the attachment. Also, below are the coordinates for the leak and samples that are shown on the attachment.

Junction Box (Leak/Spill): 32°45'50.46"N 104°14'17.57"W.

Bottom Hole Sample: 32°45'50.53"N 104°14'17.58"W.

Background Sample: 32°45'50.68"N 104°14'16.67"W.

Excavated Soil Sample: No Coordinates.

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

C-141 Notification (3/17/2011)

Navajo Refining Company- Artesia Refinery (GW-028):

Gabriela Combs of Navajo Refining Company called on 3/17/2011 17:45 to report treated waste water release from effluent line (line) to Gaines Disposal Well. The release was greater than 5 bbls. The line leaked along reducer where pipeline size decreased. The spill was contained and a vacuum truck had been contacted to remove fluids. A C-141 Form with more details will be submitted soon.

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, February 18, 2011 4:51 PM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

C-141

Attachments:

2011-02-13 Spill Waste Water Effluent.pdf

Hope, Carl, Randy, and Buddy,

Please see the attached C-141

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

						OPERATOR Initial Report Fin					Final Report	
Name of Company: Navajo Refining Co. LLC						Contact: Aaron Strange						
Address: 501 E. Main Street Artesia, N.M. 88210						Telephone No. 575-748-3311						
Facility Name: Artesia Plant						Facility Type: Petroleum Refinery						
Surface Ow	ner			Mineral O	wner				Lease N	٧o.		
				LOCA	OIT	N OF REI	EASE					
Unit Letter	Section	Township	Range	Feet from the	North/	h/South Line Feet from the East/West Line				County		
	Latitude ~N32°45'54.5" Longitude ~W104°14'17.4"											
				NAT	URE	OF RELI	EASE					
Type of Rele Treatment)	ase: Spill of	Treated Was	ter Water	(by Aggressive Bi	io.	Volume of	Release: Unknov	vn	Volume I	Recovered: ~	0 bar	rels
Injection We	lls (~50 yard	ds south of the		e Chukka and Gai n 01/28/2011).	nes	02/13/2011			~ 09:00			r: 02/13/2011
Was Immedi	ate Notice C		Yes [No □ Not Re	equired	(505-476-3	Whom? Left a voice	mail wi	th OCD Ar	tesia Office (575-7	48-1283 ext.
By Whom? A	aron Strane	7.P.		****			eft a voicemail wi					
by Wilom: P	taron on ang	30				Date and Hour: 02/13/2011 at ~09:32 to the OCD Santa Fe office, 02/13/2011 at ~09:33 to OCD Artesia office, and 02/13/2011 at ~09:36 to NMED Haz Waste Bureau.						
Was a Watercourse Reached?						If YES, Volume Impacting the Watercourse.						
			Yes 🛚	No		NA NA						
If a Watercou												
	1 at $\sim 09:00$ line was blo	a leak was focked in at the	ound betw	n Taken.* een the Chukka al ater Treater (insid								
Describe Are									· · · · · · · · · · · · · · · · · · ·			
				he Chukka and Gall be disposed of.								
regulations all public health should their of or the environ	I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.											
Signature:	Tom		77-7	·		OIL CONSERVATION DIVISION						
Signature.	word											
Printed Name	: Aaron Str	ange				Approved by	District Supervise	or:				
Title: Sr. Env	rironmental	Technician				Approval Dat	e:		Expiration	Date:		
E-mail Addre	ess: aaron.sti	range@hollyc	orp.com		(Conditions of Approval:			ed 🔲			
Date: 02/18/2	101		Phone: 575-703-5	057								

From:

Moore, Darrell [Darrell.Moore@hollycorp.com]

Sent:

Monday, January 31, 2011 2:23 PM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD

Cc:

Strange, Aaron; Lackey, Johnny

Subject:

Effluent Line Leak 1/28/11

Attachments:

2010-12-03 Effluent Line Leak.doc; CIMG0077.jpg; CIMG0078.jpg; CIMG0079.jpg

Attached, please find the C-141 and associated photos for the effluent line leak we reported on 1/28/11.

Darrell Moore

Environmental Manager for Water and Waste Navajo Refining Company, LLC Phone Number 575-746-5281 Cell Number 575-703-5058 Fax Number 575-746-5451

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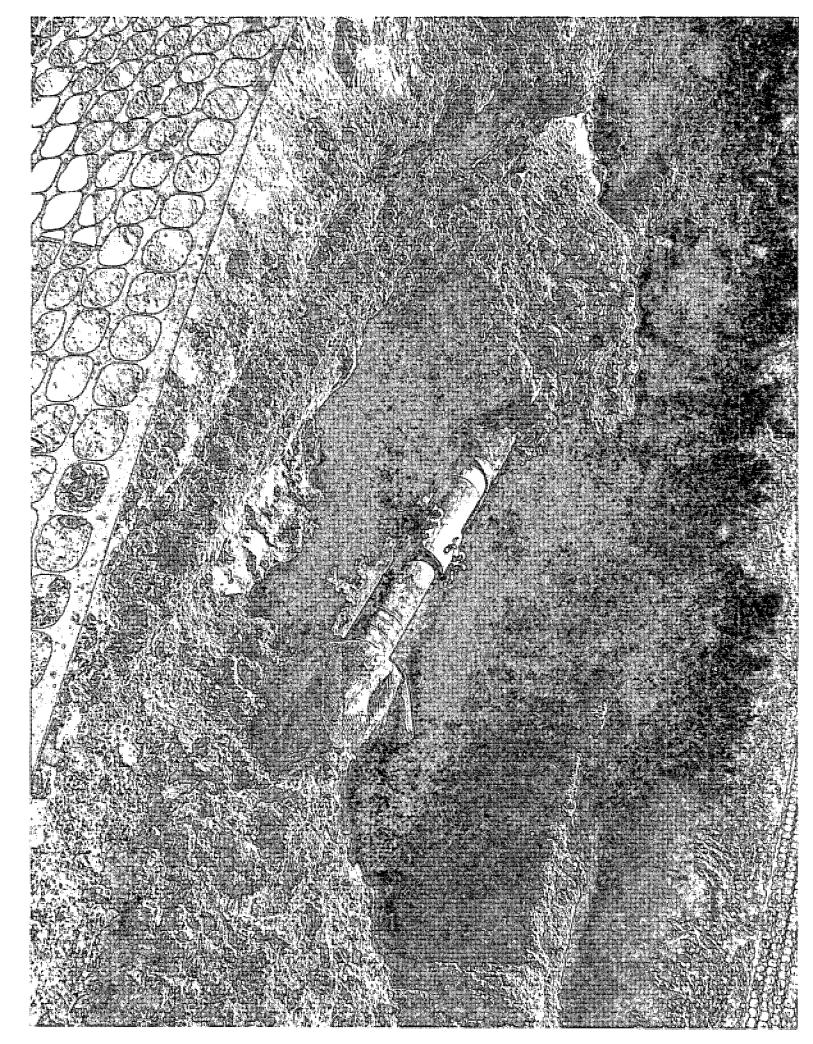
State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Form C-141 Revised October 10, 2003

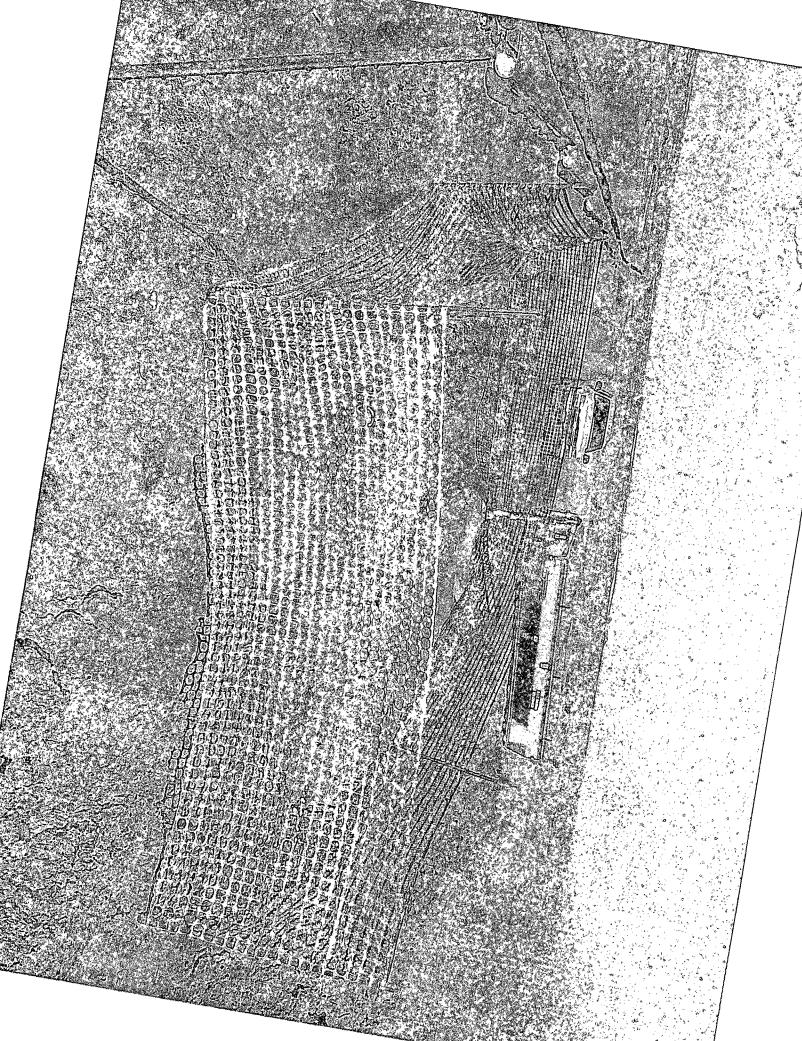
Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

						OPERA	TOR		Initia	ıl Report		Final Report	
Name of Company: Navajo Refining Co. LLC						Contact: Aa							
Address: 501 E. Main Street Artesia, N.M. 88210						Telephone No. 575-748-3311							
Facility Name: Artesia Plant						Facility Type: Petroleum Refinery							
Surface Owi			Mineral Ov	vner				Lease N	Io.				
Trineta ovii								-	Bouse				
						OF REI	LEASE						
Unit Letter Section Township Range Feet from the North						South Line	Feet from the	East/W	Vest Line	County			
			L	e ~W104°13'42.	. <u>9"</u>								
				NATI	JRE	OF RELI	EASE						
Type of Releatment)	ase: Spill of	Treated Wasi	ter Water	(by Aggressive Bio			Release: Unknow	vn	Volume R	lecovered: -	-0 barre	els .	
Source of Rel	ease: Efflu	ent line leak b	etween th	e Chukka and		Date and H	our of Occurrenc	e:	Date and	Hour of Disc	covery:	12/03/2010	
			of the leak	from 05/03/2010)		12/03/2010			~ 14:10				
Was Immedia	te Notice C		Yes [No Not Red	juired		Whom? Sent em o Hope Monzegli						
By Whom? D	arrell Moo	re				Date and Hour: 12/03/2010 at ~14:26 to Carl Chavez (OCD Santa Fe), and 12/03/2010 at ~14:26 to NMED Haz Waste Bureau.							
Was a Watero	course Reac					If YES, Volume Impacting the Watercourse.							
			Yes 🛚	No		NA							
If a Watercou	rse was Im	pacted, Descri	be Fully.*	· NA					, , ,				
	0 at ~ 14:2	6 a leak was f	ound betw	n Taken.* reen the Chukka an le the refinery) to s									
W104°13'42.	cted was the 9". The lea	e effluent line k was excavat	between t ed to mak	en.* he Chukka and Me e repairs. The leak ollected and tested	did no	t stain the soi	l; however Navajo						
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.									idanger Tiability man health				
Signature:						OIL CONSERVATION DIVISION							
Printed Name: Aaron Strange						Approved by District Supervisor:							
Title: Sr. Env	ironmental	Technician				Approval Dat	e:	Expiration Date:					
E-mail Addre	ss: aaron.st	range@hollyc	corp.com			Conditions of Approval: Attached				ŀ			
Date: 12/07/2010 Phone: 575-703-5057					57								







From:

Chavez, Carl J. EMNRD

Sent:

Wednesday, December 08, 2010 8:04 AM

To:

'Strange, Aaron'; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny; VonGonten, Glenn, EMNRD

Subject:

RE: C-141 Initial Report

Aaron:

Good morning.

OCD is in receipt of the e-mail with documentation of clamp emplacement and work associated with the effluent line releases.

OCD has requested the engineering design plan submittal date from NRC for the complete replacement of the effluent lines to the 3 UIC Class I (NH) Disposal Wells, which OCD has been informed NRC would like to replace by 3/2011. As we discussed early on in the initial effluent line leaks where we reviewed the quarterly monitoring reports (OCD Online GW-028) for effluent flowing through the line to identify the environmental magnitude of the releases to the environment and where they occur along the line transect, the effluent water is freshwater with the most immediate concern being elevated sulfate and of course monitoring shows that it is not characteristically hazardous. Navajo should continue to drive the lines 2x per day until the line is replace and continue documentation of cleanup and waste manifests until OCD can approve the engineering design work plan and the line is replaced. Any leakage near the Pecos, OCD and NMED shall be notified immediately!

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe. New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Strange, Aaron [mailto:aaron.strange@hollycorp.com]

Sent: Tuesday, December 07, 2010 4:40 PM

To: Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry, EMNRD

Cc: Moore, Darrell; Lackey, Johnny **Subject:** C-141 Initial Report

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/03/2010.

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Tuesday, December 07, 2010 5:03 PM

To:

Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD;

Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

RE: C-141 initial report

Attachments:

effluent leaks 035.jpg; effluent leaks 037.jpg; effluent leaks 038.jpg; effluent leaks 039.jpg

Attached is the other half of the photos for the event below.

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Tuesday, December 07, 2010 4:59 PM

To: Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; randy.dade@state.nm.us; larry.hill@state.nm.us

Cc: Moore, Darrell; Lackey, Johnny

Subject: C-141 initial report

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/02/2010. I will send a reply to this email with the other half of the photos.

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

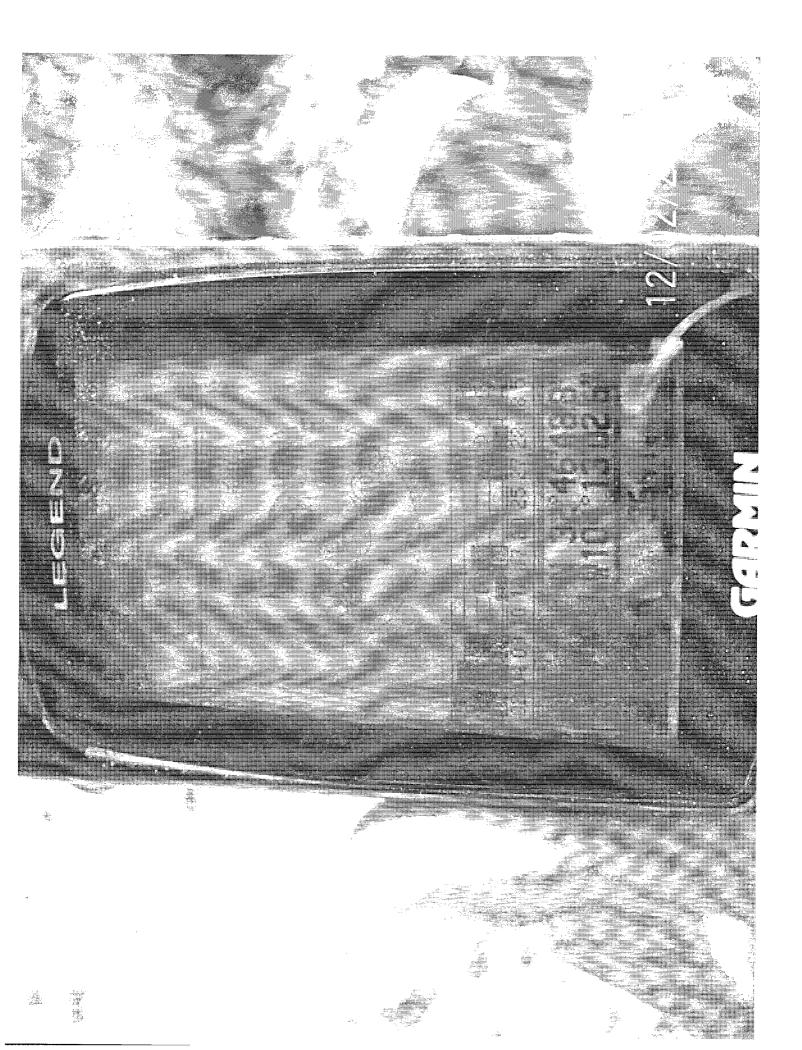
Environmental Department Navajo Refining Co, LLC Artesia NM

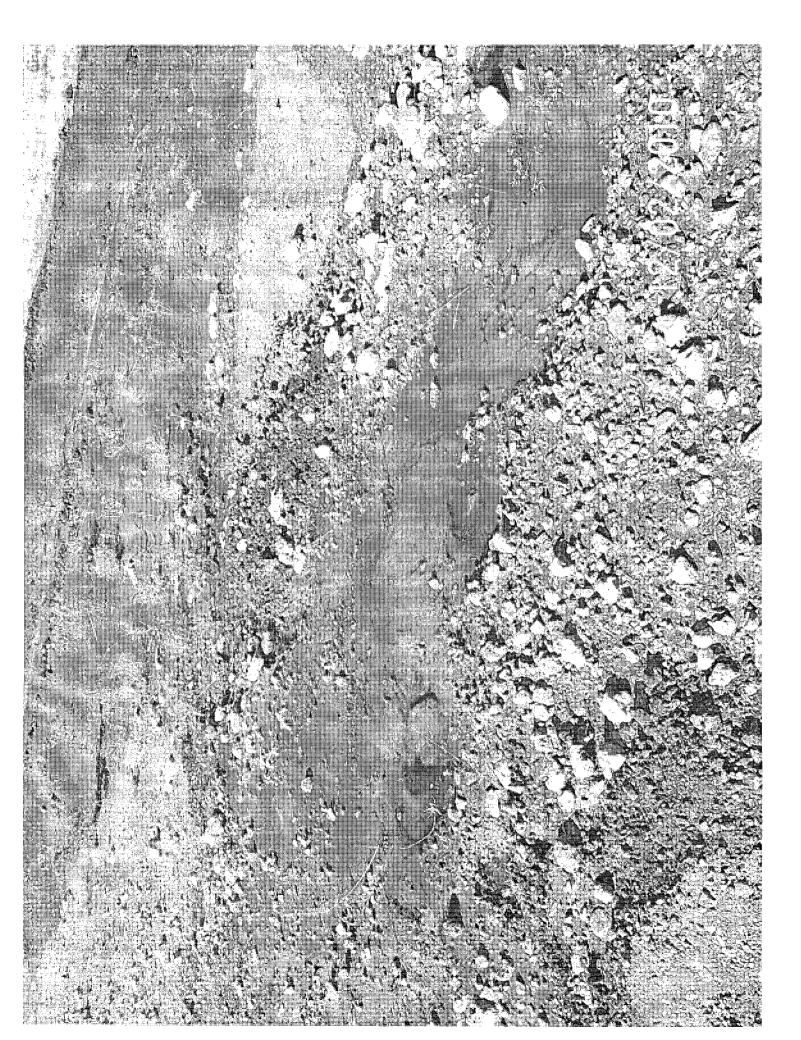
Off: (575) 746-5468 Cell: (575) 703-5057

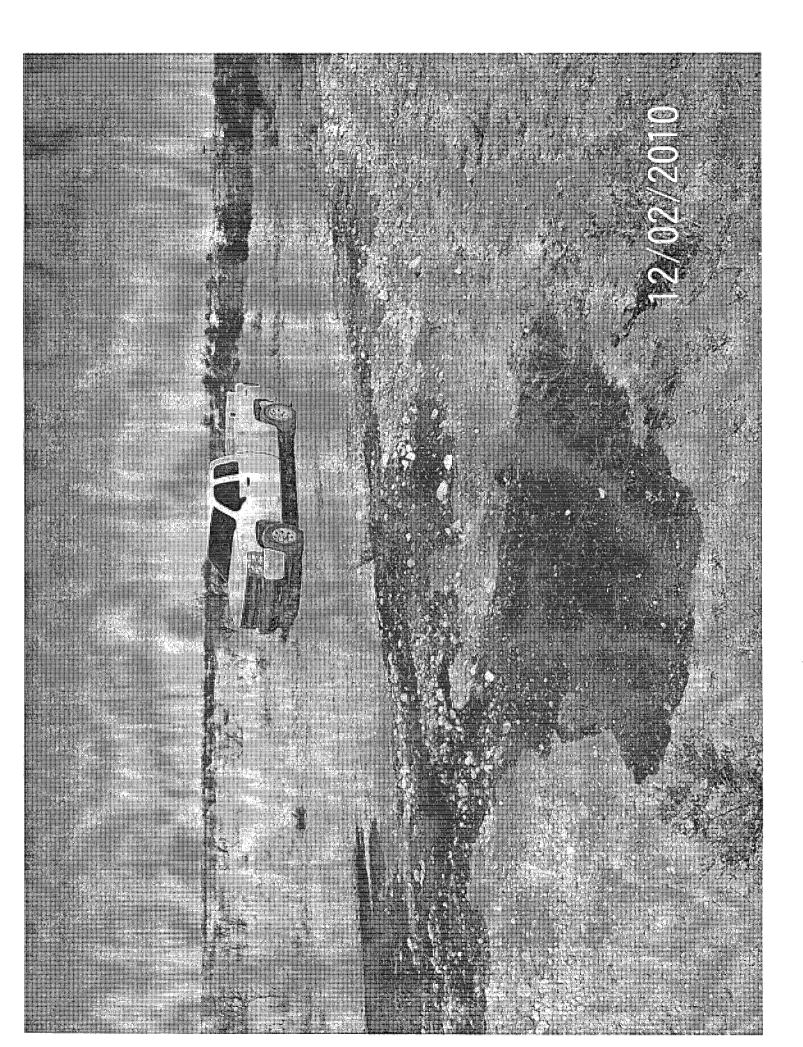
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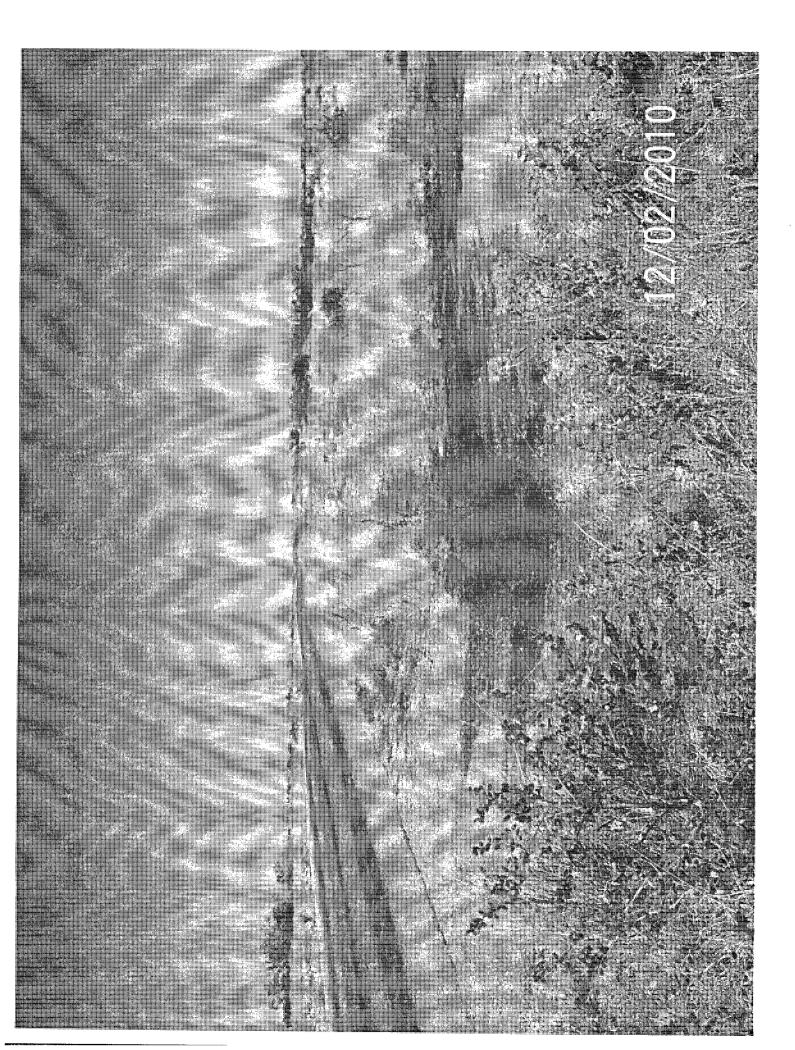
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From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Tuesday, December 07, 2010 4:59 PM

To:

Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD;

Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

C-141 initial report

Attachments:

2010-12-02 Effluent Line Lead.pdf; effluent leaks 040.jpg; effluent leaks 041.jpg; effluent leaks

042.jpg; effluent leaks 036.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/02/2010. I will send a reply to this email with the other half of the photos.

Thank you, Aaron

Aaron Strange Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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1000 Rio Brazos Road, Aztec, NM 87410

District IV

1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 12/07/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

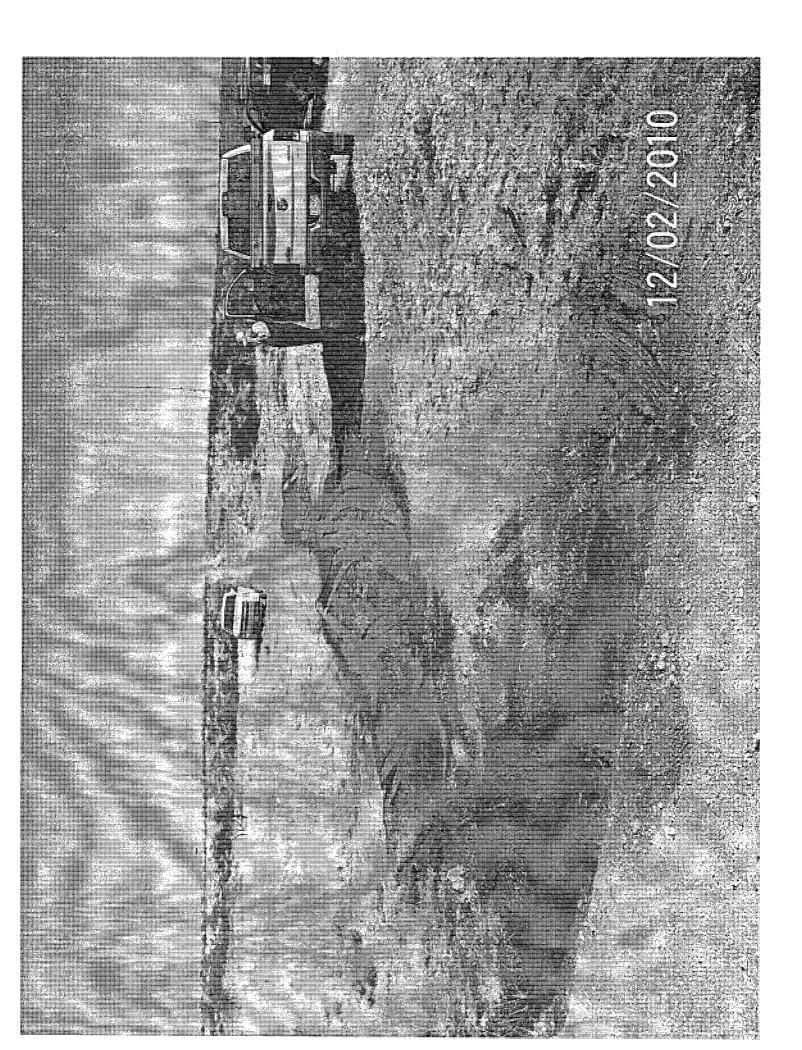
Form C-141 Revised October 10, 2003

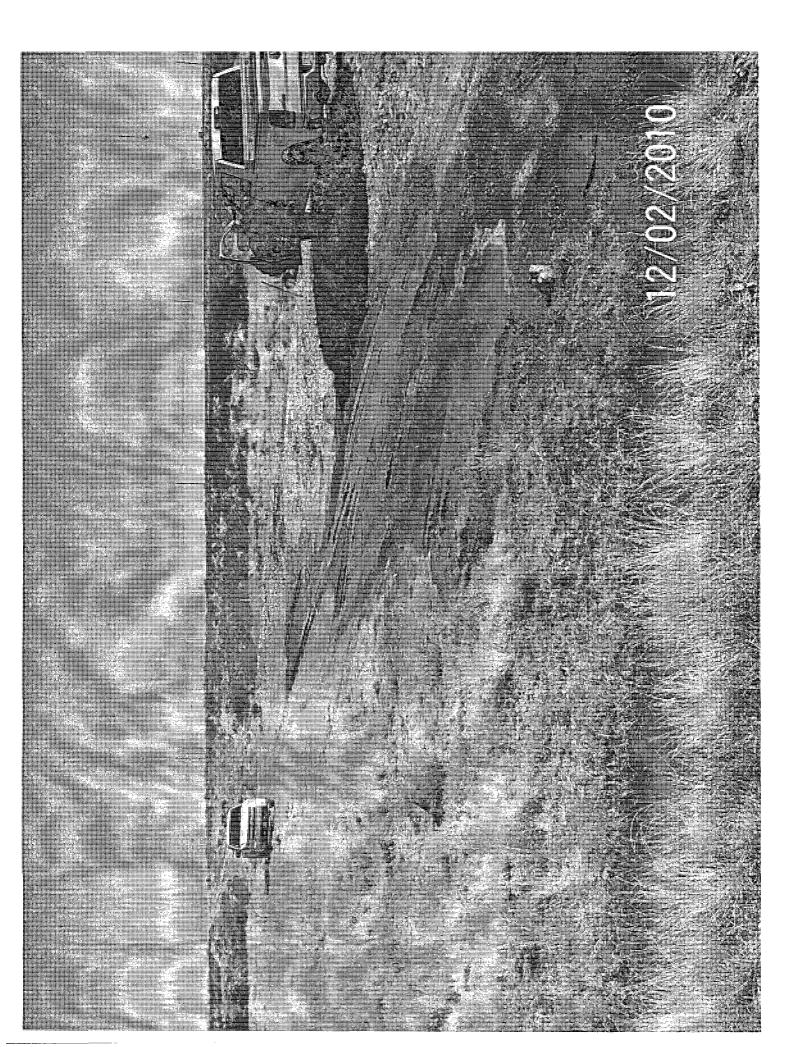
Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

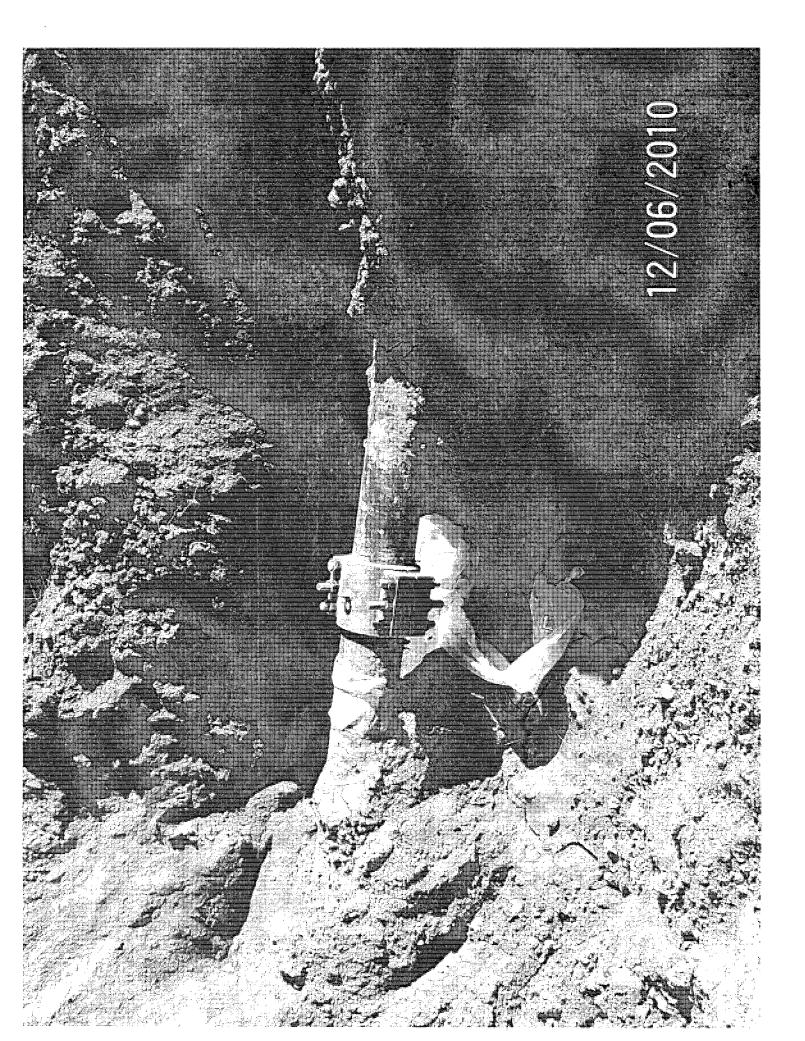
Attached

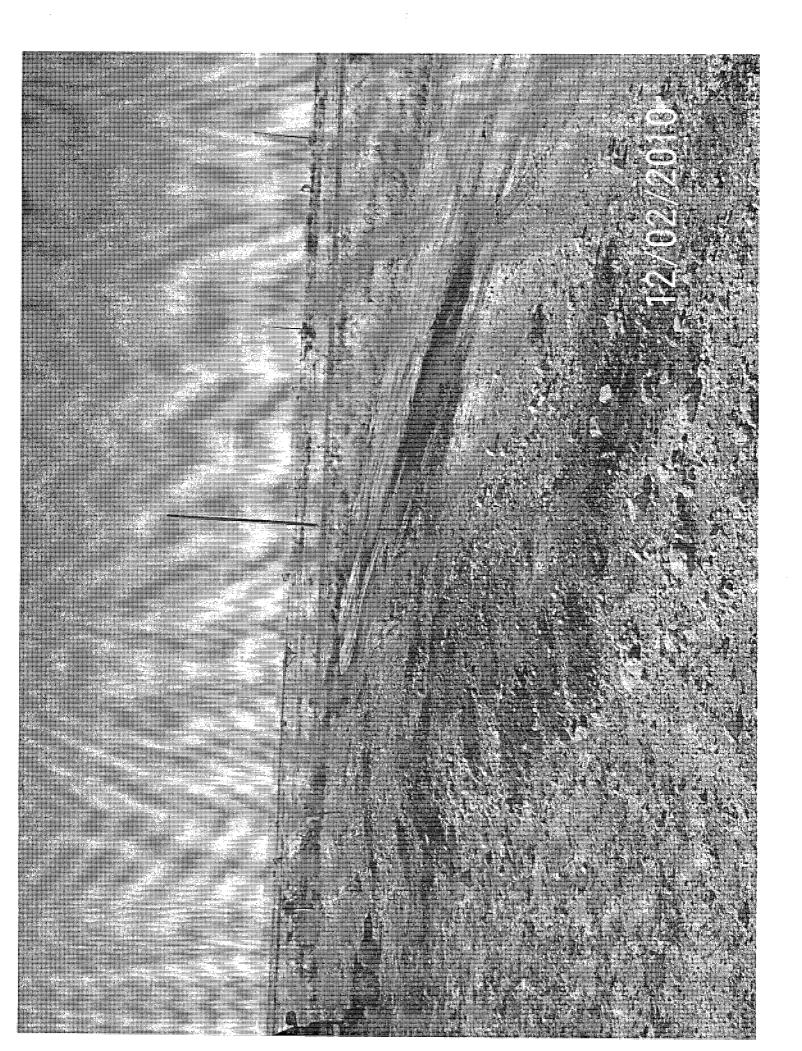
			Rele	ease Notific	catio	n and Co	rrective A	ction					
						OPERA?	OPERATOR Initial Report I						
		avajo Refini				Contact: Aaron Strange							
		Street Artes	ia, N.M.	88210		Telephone No. 575-748-3311							
Facility Na	me: Artesia	a Plant				Facility Type: Petroleum Refinery							
Surface Owner Mineral Owner									Lease N	No.			
LOCATION							LEASE						
Unit Letter Section Township Range Feet from the North							Feet from the	East/We	est Line	County			
Latitude ~N32°46'48.8" Longitude ~W104°13'02.6"													
				NAT	URE	OF REL	EASE						
Treatment)	-			(by Aggressive B	io.	Volume of	Release: Unknow	vn V	Volume F	Recovered:	~0 ba	rrels	
(~ 40 yards I	East of CR20	04).	near the M	ewbourne injection	on well	12/02/2010		~	~ 09:00		our of Discovery: 12/02/2010		
Was Immedi	ate Notice (Yes [] No □ Not R	equired	If YES, To Whom? Sent email to Carl Chavez from OCD in Santa Fe, and sent and email to Hope Monzeglio from the NMED Haz Waste Bureau.							
By Whom? I	Darrell Moo	re				Date and Hour: 12/02/2010 at ~09:14 to Carl Chavez (OCD Santa Fe), and 12/02/2010 at ~09:14 to NMED Haz Waste Bureau.							
Was a Water	course Read		Yes 🗵] No		If YES, Volume Impacting the Watercourse. NA							
If a Waterco	urse was Im	pacted, Descr	ibe Fully.	* NA		_1	·						
		em and Reme 0 a leak was f			injectio	n well (~ 40 ya	ords East of CR20	04). The Ef	ffluent li	ne was block	ced in	at the Waste	
Water Treate	r (inside the	refinery) to s	top the lea	ak and repair the	line. Th	e leak was exc	avated and the lir	ne was clai	mped and	d is holding.			
Describe Area Affected and Cleanup Action Taken.* The area affected was the effluent line near the Mewbourne injection well (~ 40 yards East of CR204) at ~ N32°46'48.8", W104°13'02.6". The leak was excavated to make repairs. The leak did not stain the soil; however Navajo will dispose of the excavated soil as non-hazardous waste. Bottom Hole samples will be collected and tested for BTEX, Metals, and Anions.													
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human healt or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.									endanger of liability iuman health				
Signature: C	Signature: Clour Brown						OIL CONSERVATION DIVISION						
Printed Name	e: Aaron Str	ange		·		Approved by District Supervisor:							
Title: Sr. Env	rironmental	Technician				Approval Date: Expiration Date:							
E-mail Addre	E-mail Address: aaron.strange@hollycorp.com					Conditions of Approval:							

Phone: 575-703-5057









From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Tuesday, December 07, 2010 4:52 PM

To:

Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD;

Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

RE: C-141 Initial Report

Attachments:

effluent leaks 048.jpg; effluent leaks 045.jpg; effluent leaks 046.jpg

Here is the other half of the photos for the event below.

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Tuesday, December 07, 2010 4:48 PM

To: Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; randy.dade@state.nm.us; larry.hill@state.nm.us; <a href

Cc: Moore, Darrell; Lackey, Johnny **Subject:** C-141 Initial Report

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/03/2010. I will send a reply to this email with the other half of the photos.

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

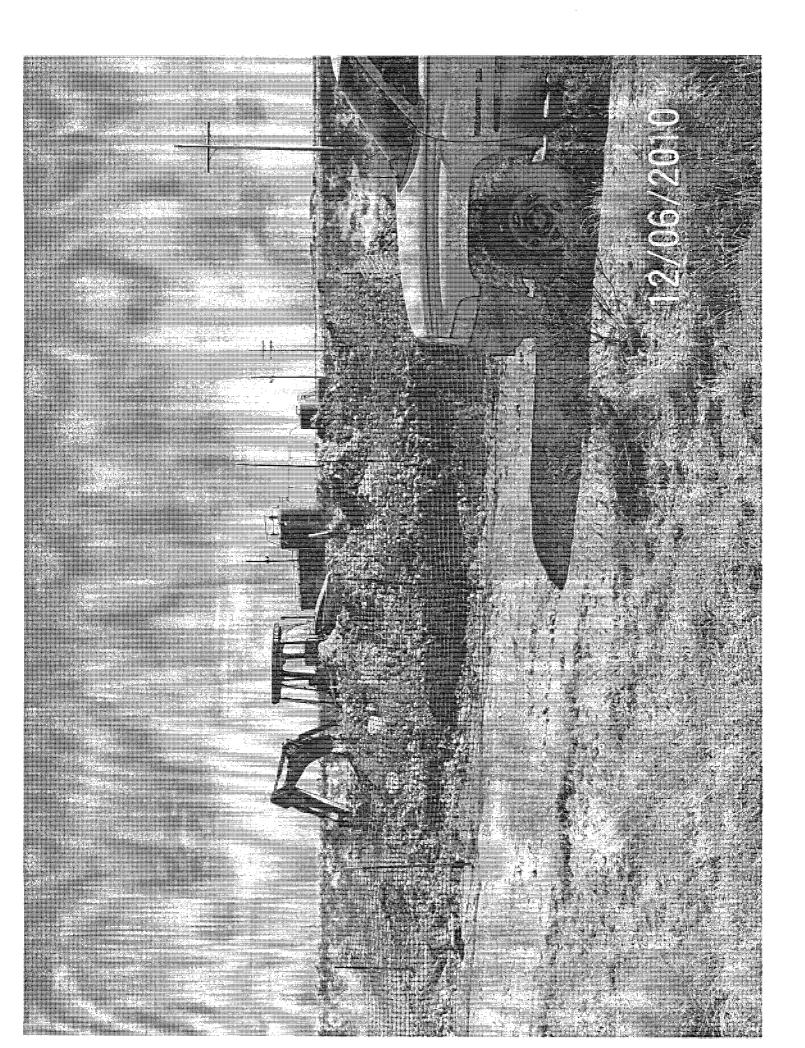
Environmental Department Navajo Refining Co, LLC Artesia NM

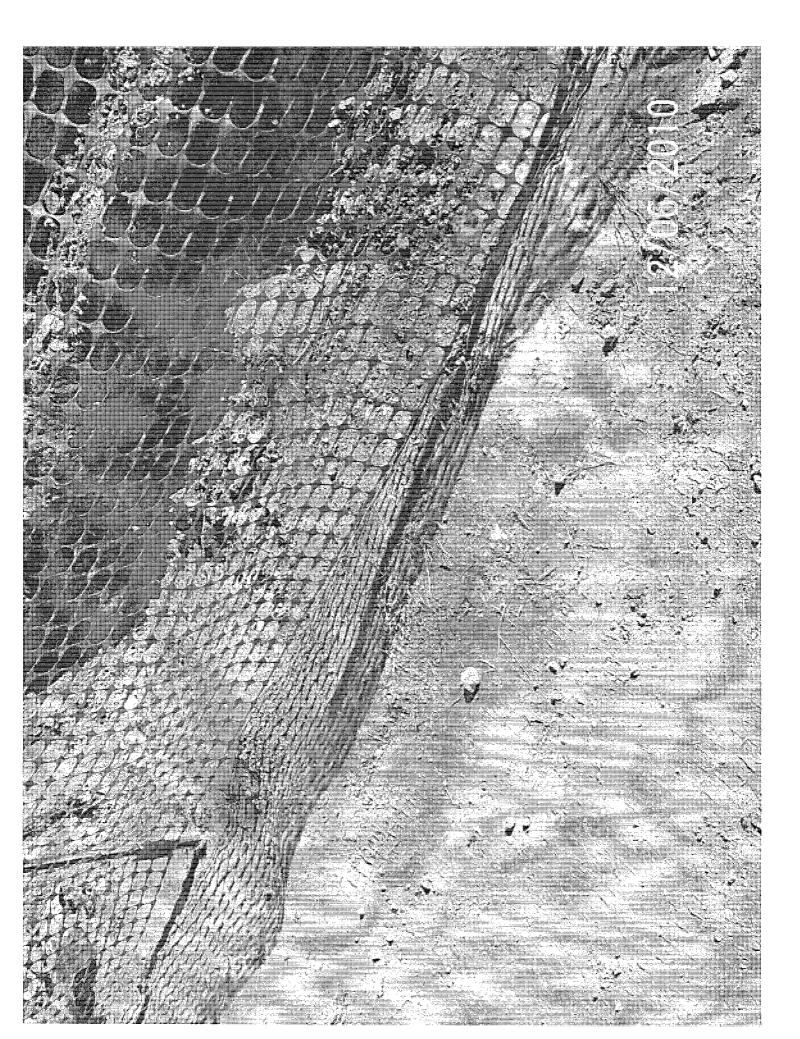
Off: (575) 746-5468 Cell: (575) 703-5057

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From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Tuesday, December 07, 2010 4:48 PM

To:

Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD;

Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

C-141 Initial Report

Attachments:

2010-12-03 Effluent Line Leak.pdf; effluent leaks 047.jpg; effluent leaks 043.jpg; effluent leaks

044.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/03/2010. I will send a reply to this email with the other half of the photos.

Thank you, Aaron

Aaron Strange Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM Off: (575) 746-5468

Off: (575) 746-5468 Cell: (575) 703-5057

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State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

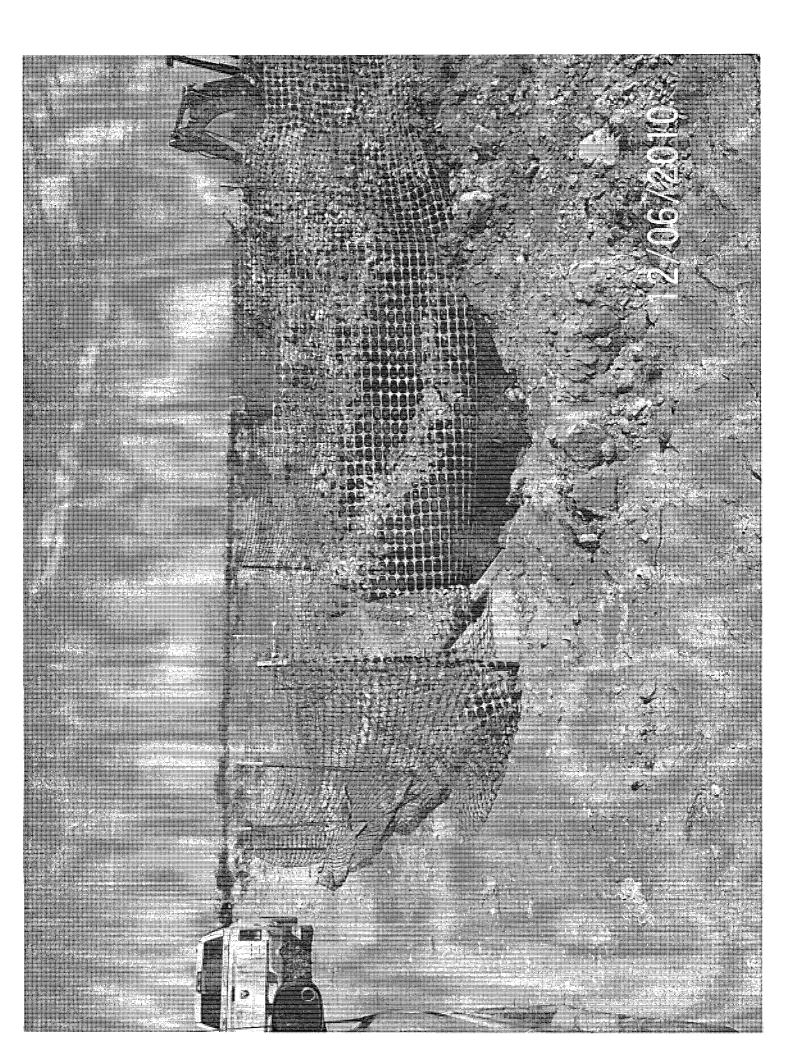
Form C-141

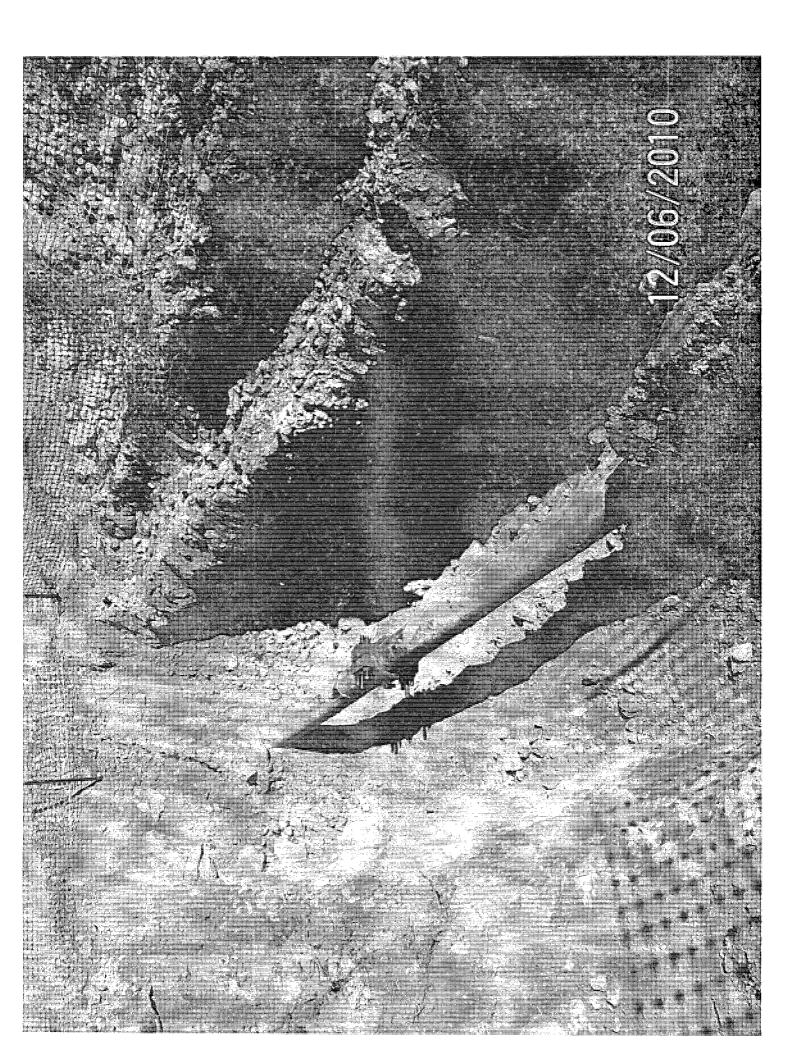
Revised October 10, 2003

Release Notification and Corrective Action

			OPERATOR Initial Report Final Re					al Report					
Name of Co			Contact: Aaron Strange										
							Telephone No. 575-748-3311						
Facility Nar			-			Facility Type: Petroleum Refinery							
Surface Owner Mineral Owner						Lease No.							
LOCATION							EASE						
Unit Letter	Section	Township	Range	Feet from the		th/South Line Feet from the East/West Line County							
						roodii ziiiz							
			L	atitude <u>~N32°4</u>	16'05.3	<u>"</u> Longitude	~W104°13'42	2.9"					
						OF RELI	EASE						
Type of Rele Treatment)	ase: Spill of	Treated Was	ter Water	(by Aggressive B	io.	Volume of	Release: Unknov	wn		Recovered: ~0			
1				e Chukka and from 05/03/2010)).	Date and H 12/03/2010	lour of Occurrent Unknown	ce:	Date and ~ 14:10	Hour of Disco	/ery: 12/0)3/2010	
Was Immedia	ate Notice (Yes [No Not Re	equired		Whom? Sent en o Hope Monzegl					and sent	
By Whom? I	Darrell Moo	re				Date and Hour: 12/03/2010 at ~14:26 to Carl Chavez (OCD Santa Fe), and 12/03/2010 at ~14:26 to NMED Haz Waste Bureau.						and	
Was a Water	course Read	hed?	Yes 🗵	l No	***************************************	If YES, Volume Impacting the Watercourse. NA							
If a Watanaa	I												
If a Watercourse was Impacted, Describe Fully.* NA Describe Cause of Problem and Remedial Action Taken.* On 12/03/2010 at ~ 14:26 a leak was found between the Chukka and Mewbourne Injection Wells (just east of the leak from 05/03/2010). The Effluent lin was blocked in at the Waste Water Treater (inside the refinery) to stop the leak and repair the line. The leak was excavated and the line was clamped and holding.													
Describe Area Affected and Cleanup Action Taken.* The area affected was the effluent line between the Chukka and Mewbourne Injection Wells (just east of the leak from 05/03/2010) at ~ N32°46'05.3", W104°13'42.9". The leak was excavated to make repairs. The leak did not stain the soil; however Navajo will dispose of the excavated soil as non-hazardous waste. Bottom Hole samples will be collected and tested for BTEX, Metals, and Anions.													
regulations al public health should their c	I operators or the envir operations h nment. In a	are required to comment. The ave failed to a ddition, NMC	report ar acceptant dequately CD accep	is true and comp ad/or file certain re te of a C-141 repo investigate and re stance of a C-141	elease n ort by th emediat	notifications and le NMOCD ma le contamination	nd perform correcarked as "Final Room that pose a thi	ctive act Report" or reat to g	ions for rel- loes not rel- round water	eases which ma leve the operater, surface water	ny endang or of liabi r, human l	ger ility health	
Signature: Moura Borry					OIL CONSERVATION DIVISION								
signature. Comment of the signature of t													
D'ALANDARA CARACA					Approved by District Supervisor:								
Title: Sr. Env	ironmental	Technician		,		Approval Date: Expiration			Date:				
E-mail Addre	ss: aaron.st	range@hollyc	orp.com			Conditions of Approval:			Attached				
Date: 12/07/2010 Phone: 575-703-5057													







From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Tuesday, December 07, 2010 4:40 PM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

C-141 Initial Report

Attachments:

2010-12-03 Effluent Line Leak.pdf; effluent leaks 047.jpg; effluent leaks 048.jpg; effluent leaks

043.jpg; effluent leaks 044.jpg; effluent leaks 045.jpg; effluent leaks 046.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached C-141 and photos for spill on 12/03/2010.

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 12/07/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Form C-141 Revised October 10, 2003

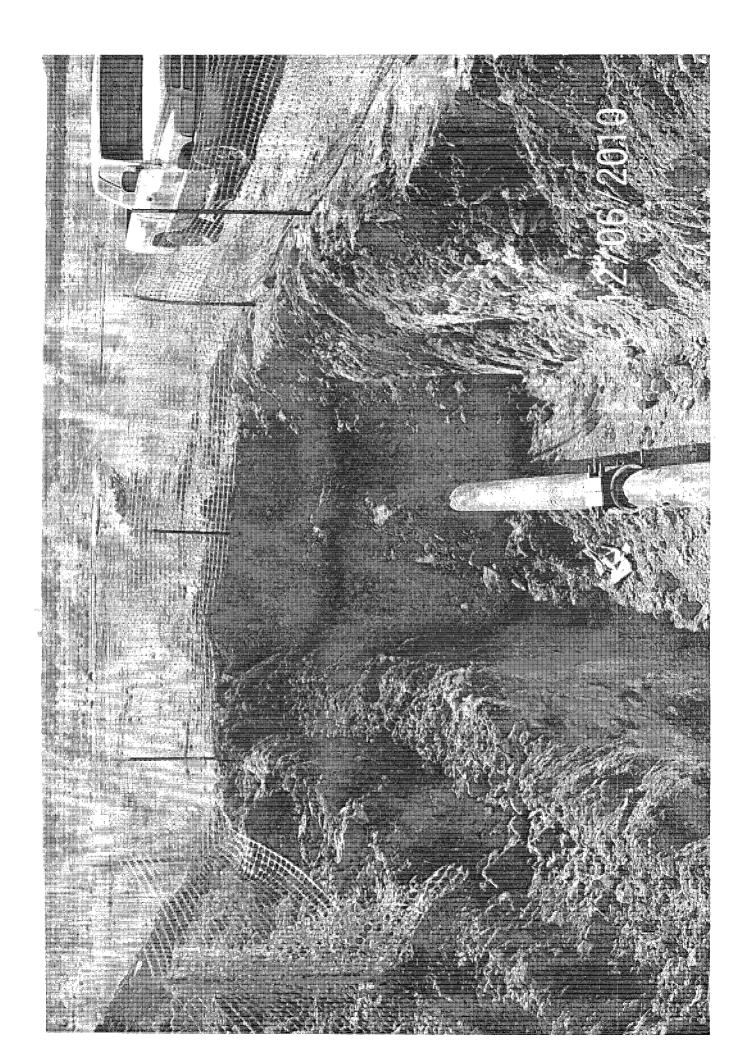
Submit 2 Copies to appropriate
District Office in accordance
with Rule 116 on back
side of form

Attached

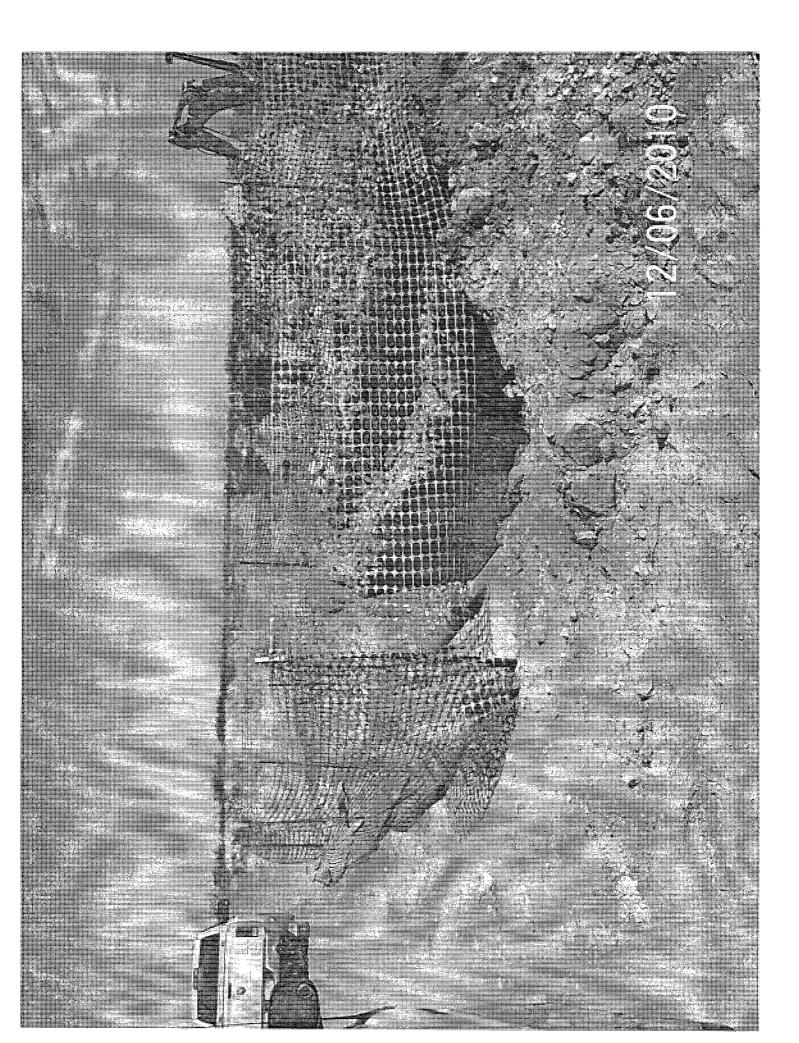
Release Notif	ication and Corrective A	ection	
	OPERATOR	Initial Report	Final Repor
Name of Company: Navajo Refining Co. LLC	Contact: Aaron Strange	24	
Address: 501 E. Main Street Artesia, N.M. 88210	Telephone No. 575-748-33	11	
Facility Name: Artesia Plant	Facility Type: Petroleum R	efinery	
1 dointy (value: 7) resid 1 lane	Tuomey Type, Tenereum Te		

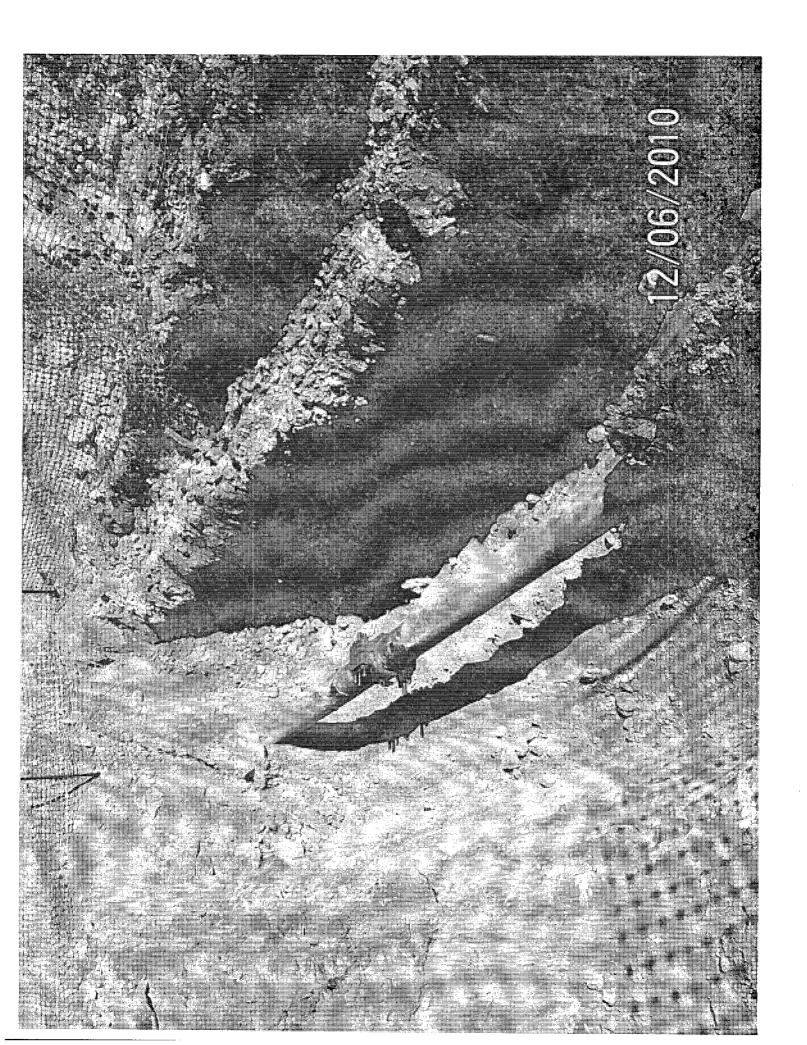
Address: 501 E. Main Street Artes Facility Name: Artesia Plant Mineral Owner Lease No. Surface Owner LOCATION OF RELEASE East/West Line Feet from the North/South Line Feet from the County Unit Letter Section Township Range Latitude ~N32°46'05.3" Longitude ~W104°13'42.9" NATURE OF RELEASE Type of Release: Spill of Treated Waster Water (by Aggressive Bio. Volume of Release: Unknown Volume Recovered: ~0 barrels Treatment) Date and Hour of Discovery: 12/03/2010 Date and Hour of Occurrence: Source of Release: Effluent line leak between the Chukka and Mewbourne Injection Wells (just east of the leak from 05/03/2010) 12/03/2010 Unknown ~ 14:10 If YES, To Whom? Sent email to Carl Chavez from OCD in Santa Fe, and sent Was Immediate Notice Given? and email to Hope Monzeglio from the NMED Haz Waste Bureau. By Whom? Darrell Moore Date and Hour: 12/03/2010 at ~14:26 to Carl Chavez (OCD Santa Fe), and 12/03/2010 at ~14:26 to NMED Haz Waste Bureau. Was a Watercourse Reached? If YES, Volume Impacting the Watercourse. ☐ Yes ⊠ No NA If a Watercourse was Impacted, Describe Fully.* NA Describe Cause of Problem and Remedial Action Taken.* On 12/03/2010 at ~ 14:26 a leak was found between the Chukka and Mewbourne Injection Wells (just east of the leak from 05/03/2010). The Effluent line was blocked in at the Waste Water Treater (inside the refinery) to stop the leak and repair the line. The lcak was excavated and the line was clamped and is holding. Describe Area Affected and Cleanup Action Taken.* The area affected was the effluent line between the Chukka and Mewbourne Injection Wells (just east of the leak from 05/03/2010) at ~ N32°46'05.3", W104°13'42.9". The leak was excavated to make repairs. The leak did not stain the soil; however Navajo will dispose of the excavated soil as nonhazardous waste. Bottom Hole samples will be collected and tested for BTEX, Metals, and Anions. I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. OIL CONSERVATION DIVISION Printed Name: Aaron Strange Approved by District Supervisor: Approval Date: **Expiration Date:** Title: Sr. Environmental Technician E-mail Address: aaron.strange@hollycorp.com Conditions of Approval:

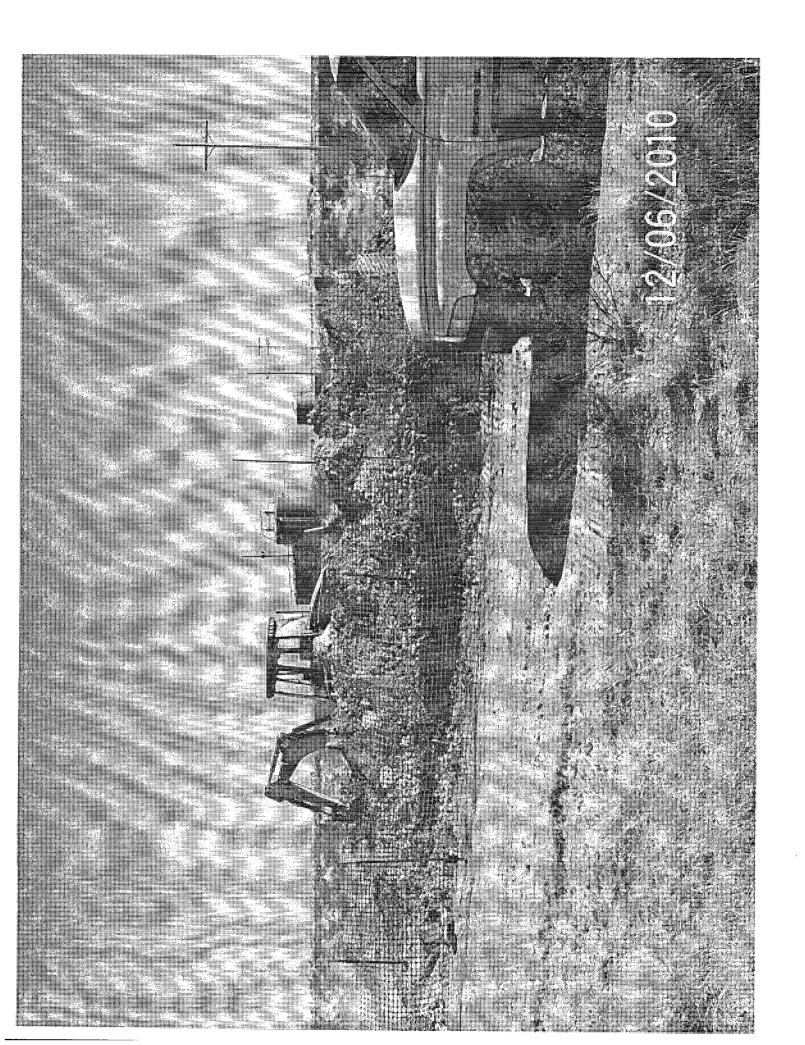
Phone: 575-703-5057

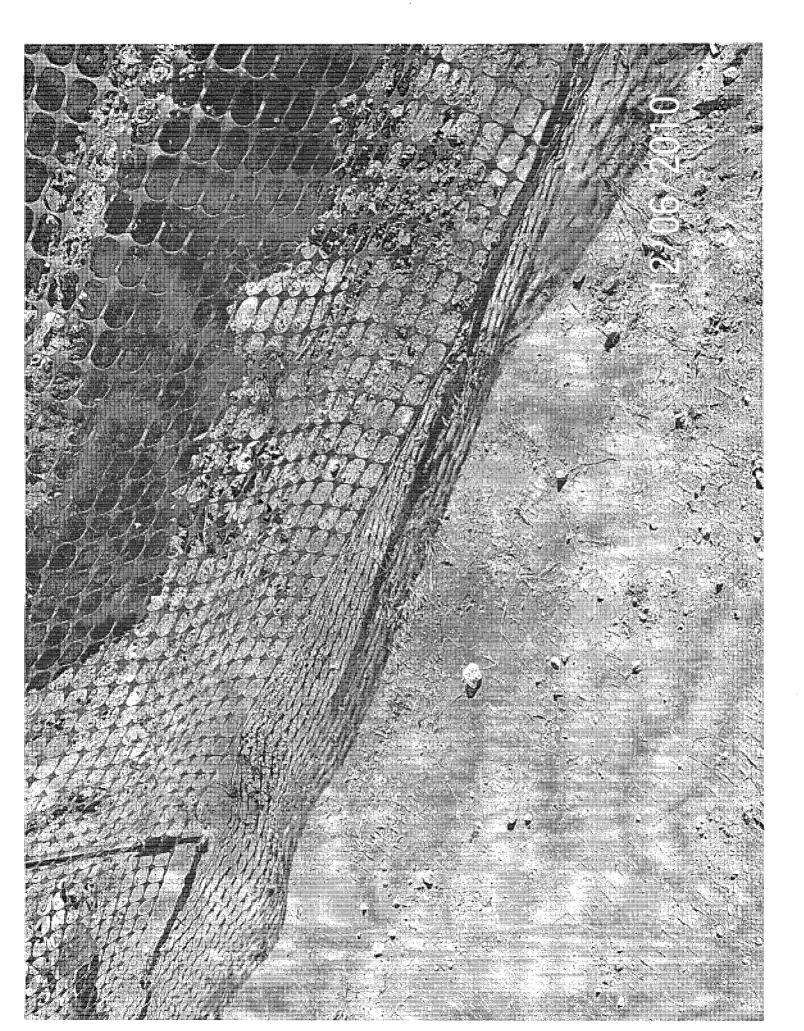












From:

Chavez, Carl J, EMNRD

Sent:

Tuesday, December 07, 2010 6:27 AM

To:

Moore, Darrell; 'Lackey, Johnny'

Cc:

Dade, Randy, EMNRD: VonGonten, Glenn, EMNRD: 'Strange, Aaron'

Subject:

Effluent Line Design Work Plan Submittal Date Request

Darrell and Johnny:

Good morning. The OCD continues to notice problems with leakage at various locations along the effluent line to the UIC Class I (NH) Wells. Navajo Refining Company (NRC) should provide GPS coordinates for all releases on the C-141 form.

OCD hereby requests the official submittal date to the OCD for the effluent line design work plan that NRC has indicated it wants to replace my March of 2011.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From:

Moore, Darrell [Darrell.Moore@hollycorp.com]

Sent:

Friday, December 03, 2010 2:26 PM

To: Subject:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Envir

Second effluent line leak

Carl and Hope

Today at 2:10 pm, a second leak in our effluentline was discovered. The line has been shut in and crews are mobilizing to repair the leak.

Aaron Strange will send the C-141 with details as soon as possible.

Sent from my Palm Pre on the Now Network from Sprint

On Dec 2, 2010 9:18 AM, Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us > wrote:

Hope:

Good morning. Before I forget, did NMED receive the Arcadis Work Plan for the free-product recovery system design from Navajo Refining Company? I think we were supposed to receive it in mid-November of 2010. Thanks.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490

Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm

(Pollution Prevention Guidance is under "Publications")

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From: Moore, Darrell [Darrell.Moore@hollycorp.com]

Sent: Thursday, December 02, 2010 9:14 AM

To: Monzeglio, Hope, NMENV; Chavez, Carl J, EMNRD

Cc: Strange, Aaron; Lackey, Johnny

Subject: Leak on Effluent Line

Carl and Hope

At 9 am this morning, during our daily inspection of our Effluent Line, a leak was discovered on the far east end of the line near our Mewbourne (WDW-1) Injection well. The line has been shut in and crews are mobilizing to repair the line. We will get more details as to exact location (GPS), extent of spill and photos and Aaron Strange will be sending the initial C-141 in a timely manner.

Darrell Moore

Environmental Manager for Water and Waste Navajo Refining Company, LLC Phone Number 575-746-5281 Cell Number 575-703-5058 Fax Number 575-746-5451

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From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Thursday, November 11, 2010 10:53 AM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

C-141 final report

Attachments:

2010-05-03 Effluent Line Leak Final.pdf; effluent leaks 015.jpg; effluent leaks 016.jpg; effluent

leaks 017.jpg; 1010346 WW Effluent Final 5-3-2010.pdf; effluent leaks 014.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached final C-141 for the effluent leak from 5/3/2010. Also attached are the associated photos and analytical results.

Thank you,

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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State of New Mexico Energy Minerals and Natural Resources

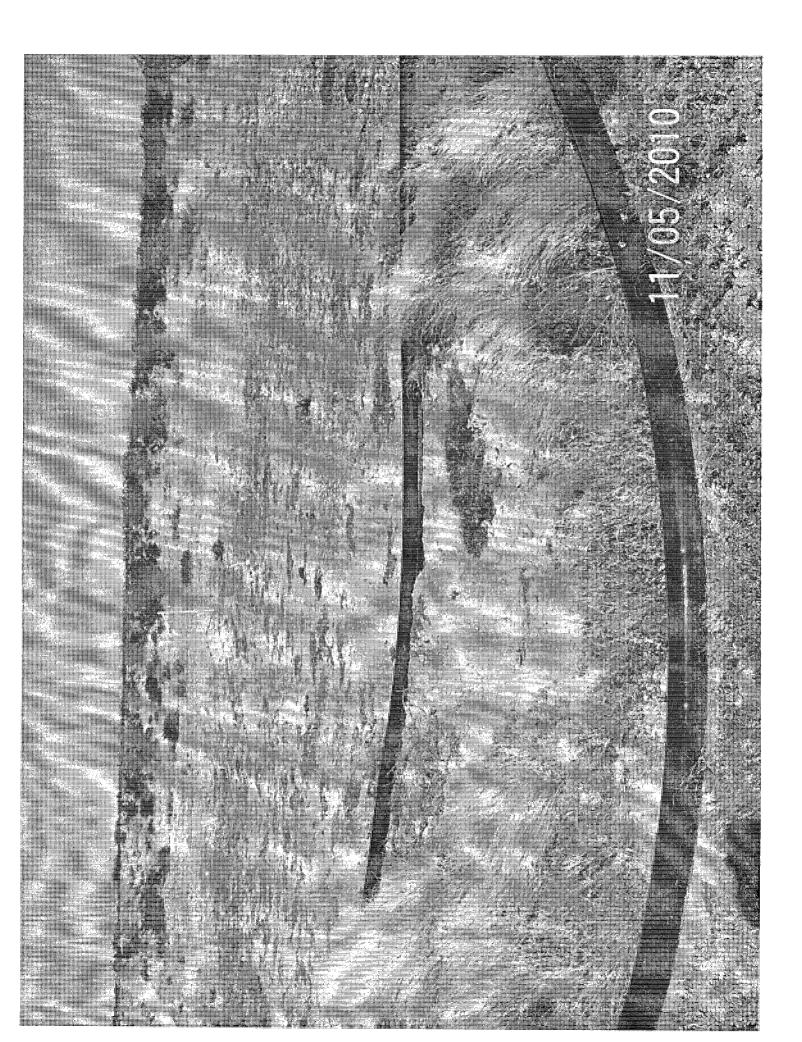
Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back

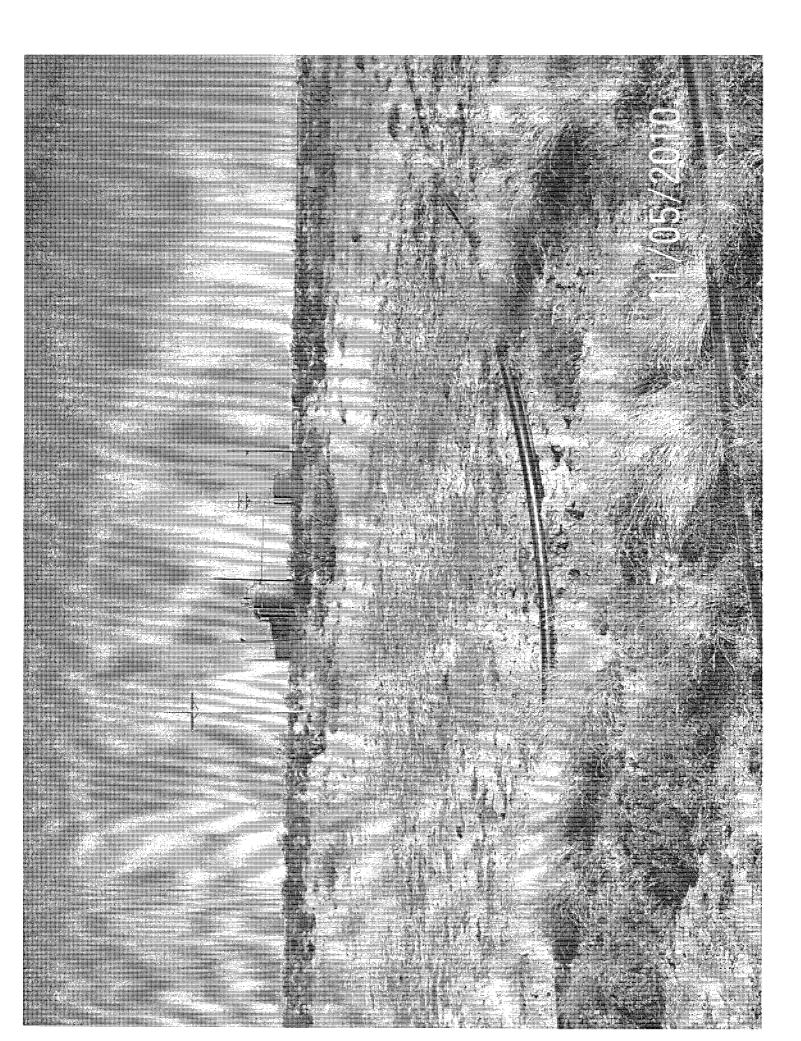
Form C-141 Revised October 10, 2003

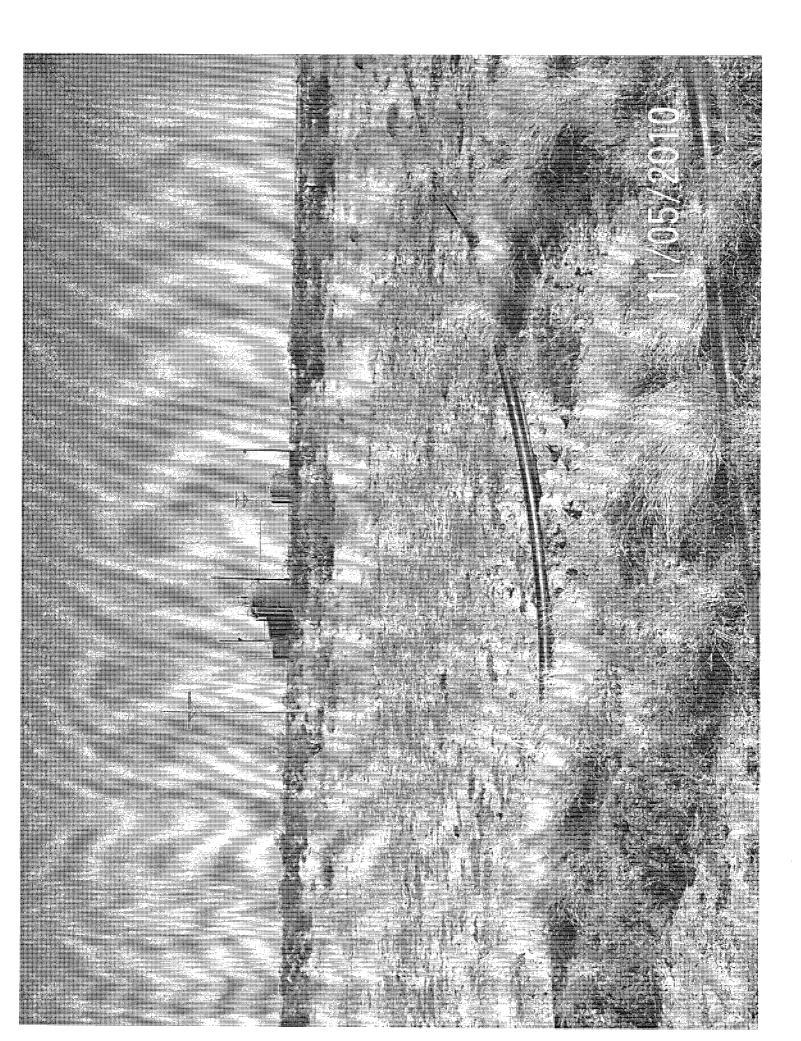
Oil Conservation Division Santa Fe, NM 87505

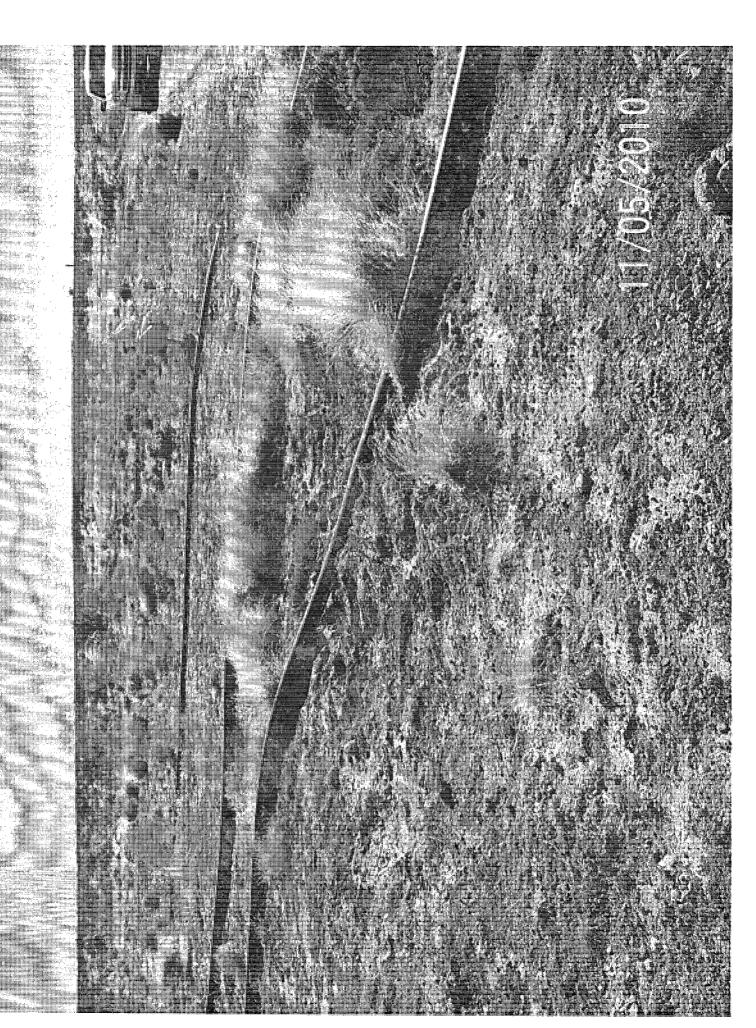
1220 South St. Francis Dr. side of form Release Notification and Corrective Action

			Kele	ase Notificat				CHOIL	-		F 7 .		
N CC	NT	:- D - C:	C- II			PERAT			Initia	al Report		Final Report	
		avajo Refini Street Artes				Contact: Aaron Strange Telephone No. 575-748-3311							
Facility Na			ia, 14.1v1.	56210		Facility Type: Petroleum Refinery							
Surface Ow	ner			Mineral Own	er				Lease N	Vo			
				LOCAT	ION (OF REI	LEASE						
Unit Letter	Section	Township	Range	Feet from the No	orth/So	outh Line	Feet from the	East/We	est Line	County			
			L	atitude <u>~N32°46'(</u>)3.8" I	Longitude	~W104°13'44	.4"					
				NATUI	RE O	F RELI	EASE						
Type of Rele Treatment)	ase: Spill of	Treated Was	tc Water (1	oy Aggressive Bio.		Volume of	Release: Unknow	vn	Volume I	Recovered: -	-0 barre	ls	
		ent line leak b	etween the	Chukka and		Date and H 05/03/2010	our of Occurrenc		Date and ~ 15:00	Hour of Disc	covery: (05/03/2010	
Was Immedi							Whom? Notified			OCD in Sar	nta Fe (5	05-476-	
		\boxtimes	Yes [No 🔲 Not Requi			D Artesia office (. z Waste Bureau (d Hope Mon	zeglio w	ith the	
By Whom? I	Darrell Mooi	re]	Date and Hour: 05/032010 at ~18:06 to Carl Chavez (OCD Santa Fe),							
						05/03/2010 at ~18:10 to the OCD Artesia office, and 05/03/2010 at ~18:08 to NMED Haz Waste Bureau.							
Was a Water	course Reac					If YES, Volume Impacting the Watercourse.							
		Ц	Yes 🛚	No	1	NA							
		pacted, Descr											
On 04/15/20	10 at ~ 09:40	em and Reme 0 a leak was f ry) to stop the	ound betw	n Taken.* een the Chukka and I repair the line. The le	Mewbo ak was	orne Injections excavated	on Wells. The Eff and the line was	fluent line clamped	was bloo and is ho	cked in at the Iding.	e Waste	Water	
Describe Are	a Affected a	nd Cleanup A	Action Tak	en.*									
The area affe	cted was the	e effluent line	between t	he Chukka and Mewl k did not stain the so									
I hereby certi	fy that the i	nformation gi	ven above	is true and complete	to the	best of my	knowledge and u	nderstand	that purs	suant to NM	OCD rul	les and	
public health should their o	or the envir	onment. The ave failed to a	acceptanc dequately	d/or file certain relea e of a C-141 report b investigate and reme tance of a C-141 repo	y the Nadiate c	NMOCD maticontamination	arked as "Final R on that pose a thre	eport" doe	es not relaund water	ieve the oper r, surface wa	ator of later, hum	liability nan health	
federal, state,													
Signature: C	Rom	~ ~	Lu	200			OIL CON	SERV <i>A</i>	ATION	DIVISIO	<u>N</u>		
Printed Name	: Aaron Str	ange			Ap	proved by	District Supervise	or:					
Title: Sr. Env	rironmental	Technician			Ap	proval Dat	e:	E	xpiration	Date:			
E-mail Addre	ess: aaron.sti	range@hollyc	orp.com		Co	onditions of	Approval:			Attached			
Date: 11/10/2	010			Phone: 575-703-5057				_					









ALS Environmental

Date: 18-Oct-10

Client:

Navajo Refining Company

Project:

WW Effluent

Leak from 5-3-10

Sample ID: Collection Date: 10/7/2010 01:34 PM Work Order: 1010346

Lab ID: 1010346-06

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
BTEX			SW8021	В		Analyst: IGF
Benzene	ND		0.0010	mg/Kg	1	10/12/2010 03:05 PM
Toluene	ND		0.0010) mg/Kg	1	10/12/2010 03:05 PM
Ethylbenzene	ND		0.0010	mg/Kg	1	10/12/2010 03:05 PM
Xylenes, Total	ND		0.0030	mg/Kg	1	10/12/2010 03:05 PM
Surr: 4-Bromofluorobenzene	94.9		75-13	1 %REC	1	10/12/2010 03:05 PM
Surr: Trifluorotoluene	92.1		73-130	%REC	1	10/12/2010 03:05 PM
MERCURY			SW7471	A	Prep Date: 10/	14/2010 Analyst: JCJ
Mercury	9.44		3.46	β μg/Kg	1	10/14/2010 03:52 PM
METALS			SW6020		Prep Date: 10/	13/2010 Analyst: SKS
Aluminum	10,600		99.0	mg/Kg	100	10/14/2010 10:04 PM
Antimony	ND		0.495	mg/Kg	1	10/14/2010 07:12 AM
Arsenic	3.41		0.495	i mg/Kg	1	10/14/2010 07:12 AM
Barium	210		2.48	mg/Kg	5	10/14/2010 07:48 PM
Beryllium	0.521		0.495	mg/Kg	1	10/14/2010 07:12 AM
Cadmium	ИD		0.495	mg/Kg	1	10/14/2010 07:12 AM
Calcium	7 6, 70 0		4,950	mg/Kg	100	10/14/2010 10:04 PM
Chromium	7.65		0.495	mg/Kg	1	10/14/2010 07:12 AM
Cobalt	3.57		0.495	mg/Kg	1	10/14/2010 07:12 AM
Copper	7.92		0.495	mg/Kg	1	10/14/2010 07:12 AM
Iron	6,720		49.5		1	10/14/2010 07:12 AM
Lead	6.74		2.48	mg/Kg	5	10/14/2010 07:48 PM
Magnesium	4,130		49.5	mg/Kg	1	10/14/2010 07:12 AM
Manganese	178		0.495	mg/Kg	1	10/14/2010 07:12 AM
Nickel	7.72		0.495	mg/Kg	1	10/14/2010 07:12 AM
Potassium	2,730		49.5	mg/Kg	1	10/14/2010 07:12 AM
Selenium	1.73		0.495	mg/Kg	1	10/14/2010 07:12 AM
Silver	ND		0.495	mg/Kg	1	10/14/2010 07:12 AM
Sodium	93.6		49.5	mg/Kg	1	10/14/2010 07:12 AM
Strontium	79.6		0.495	mg/Kg	1	10/14/2010 07:12 AM
Thallium	ND		2.48	mg/Kg	5	10/14/2010 07:48 PM
Vanadium	12.5		0.495	mg/Kg	1	10/14/2010 07:12 AM
Zinc	35.1		0.495	mg/Kg	1	10/14/2010 07:12 AM
ANIONS			E300		Prep Date: 10/1	13/2010 Analyst; DM
Chloride	6.93		4.99	mg/Kg	1	10/14/2010 03:06 PM
Sulfate	30.6		4.99	mg/Kg	1	10/14/2010 03:06 PM
Surr: Selenate (surr)	109		85-115	%REC	1	10/14/2010 03:06 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: 18-Oct-10

Client:

Navajo Refining Company

Project: Sample ID: WW Effluent

Background N32 45' 54.3"-W104 14' 13.0"

Collection Date: 10/7/2010 01:40 PM

Work Order: 1010346

Lab ID: 1010346-07

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
втех			SW8021	В		Analyst: IGF
Benzene	ND		0.001	0 mg/Kg	1	10/12/2010 04:00 PM
Toluene	ND		0.001	0 mg/Kg	1	10/12/2010 04:00 PM
Ethylbenzene	ND		0.001	0 mg/Kg	1	10/12/2010 04:00 PM
Xylenes, Total	ND		0.003	0 mg/Kg	1	10/12/2010 04:00 PM
Surr: 4-Bromofluorobenzene	96.3		75-13	1 %REC	1	10/12/2010 04:00 PM
Surr: Trifluorotoluene	93.4		73-13	%REC	1	10/12/2010 04:00 PM
MERCURY			SW7471	Α	Prep Date: 1	0/14/2010 Analyst: JCJ
Mercury	11.7		3.5	5 µg/Kg	1	10/14/2010 03:54 PM
METALS			SW6020		Prep Date: 1	0/13/2010 Analyst: SKS
Aluminum	7,760			3 mg/Kg	100	10/14/2010 10:22 PM
Antlmony	ND		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Arsenic	2.40		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Barium	70.3		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Beryllium	ND		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Cadmium	ND		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Calcium	39,100		4,720	mg/Kg	100	10/14/2010 10:22 PM
Chromium	6.82		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Cobalt	2.61		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Copper	6.24		0.47	2 mg/Kg	1	10/14/2010 07:18 AM
Iron	5,520		47.2	2 mg/Kg	1	10/14/2010 07:18 AM
Lead	6.07		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Magnesium	7,550		47.2	2 mg/Kg	1	10/14/2010 07:18 AM
Manganese	149		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Nickel	5.84		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Potassium	1,340		47.2	2 mg/Kg	1	10/14/2010 07:18 AM
Selenium	ND		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Silver	ND		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Sodium	ND		47.2	2 mg/Kg	1	10/14/2010 07:18 AM
Strontium	107		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Thallium	ND		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Vanadium	10.7		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
Zinc	18.4		0.472	2 mg/Kg	1	10/14/2010 07:18 AM
ANIONS			E300		Prep Date: 1	0/13/2010 Analyst: DM
Chloride	ND		4.96	mg/Kg	1	10/14/2010 03:27 PM
Sulfate	7,510		49.€	mg/Kg	. 10	10/14/2010 05:37 PM
Surr: Selenate (surr)	108		85-115	%REC	10	10/14/2010 05;37 PM
Surr: Selenate (surr)	109		85-115	%REC	1	10/14/2010 03:27 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

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10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887

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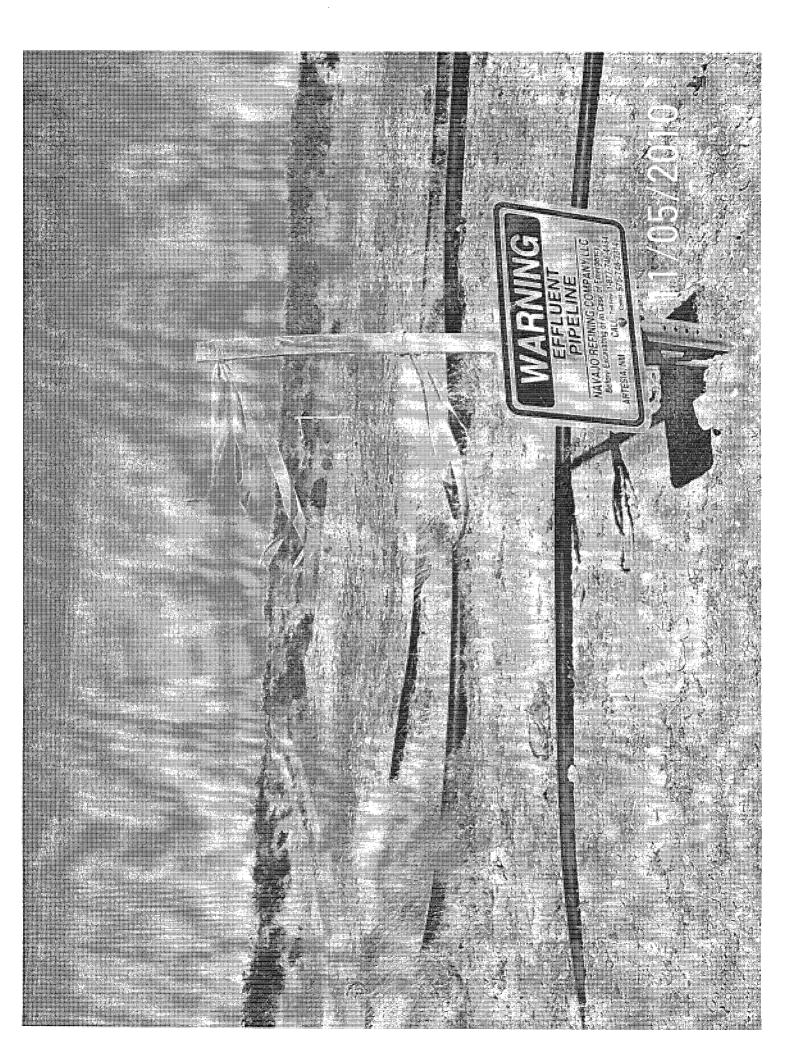
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🗆 ALS Laboratory Group 3352 128th Ave. Holland, MI 49424-9263 Tel: +1 616 399 6070 Fax: +1 616 399 6185

		Service Stranger Project Manager Seesan	2.0
Customer Information		Project Information	Parameter/Method Request for Analysis
*Purchase Order	z sproject Names	the literal way	イバーのイン
in the state of th	S Project Number	प	B MPLAIS
Company Name: Navajo Refining Company	Bill To Company	Navajo Refuing Company	A HIONG (CHIOLIDIOSESUICH& 1C)
Send Report To-	involce: Attn	Aaron Strange	
Anton Recognition of the state	19. 19. 19. 19. 19. 19. 19. 19. 19. 19.	P.O. Box 159	
CIWState/Zip: Aresia, NM 86211	Civisian Zine	p. Artesia, NM 88211	191
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3 Leak from 9-27-10 #3		17:49	\ \ \ \ \
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Sampler(s) Please Print & Sign	Shipment Method	Requir	ed Turnargund Time (Check Box) [a] Dinar a server Recults Duc Date: Sid 10 WK Days [a] 5 Wir Days [b] 2WK Days [b] 24 Hour
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3. The Chain of Castody is a legal document. All information must be completed accurately.



Chavez, Carl J, EMNRD

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, November 12, 2010 7:27 AM

To:

Strange, Aaron; Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD;

Hill, Larry, EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

RE: C-141 final report

Attachments:

0057.jpg; New Image.jpg; 0058.jpg; CIMG0060.jpg; CIMG0061.jpg; CIMG0065.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached photos per the email below. I have attached about 1/3rd of the photos and will send the rest in two other emails following this email.

Thank you,

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Thursday, November 11, 2010 11:36 AM

To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us'; 'larry.hill@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny

Subject: C-141 final report

Hope, Carl, Randy, and Buddy,

Please see the attached final C-141s from the effluent leaks on 2/20/2010, 4/14/2010, and 9/27/2010. These are the three leaks that were very close together. Also attached are the associated analytical results. I am also sending the associated photos on another email following this.

Thank you,

Aaron Strange

Environmental Technician, Senior

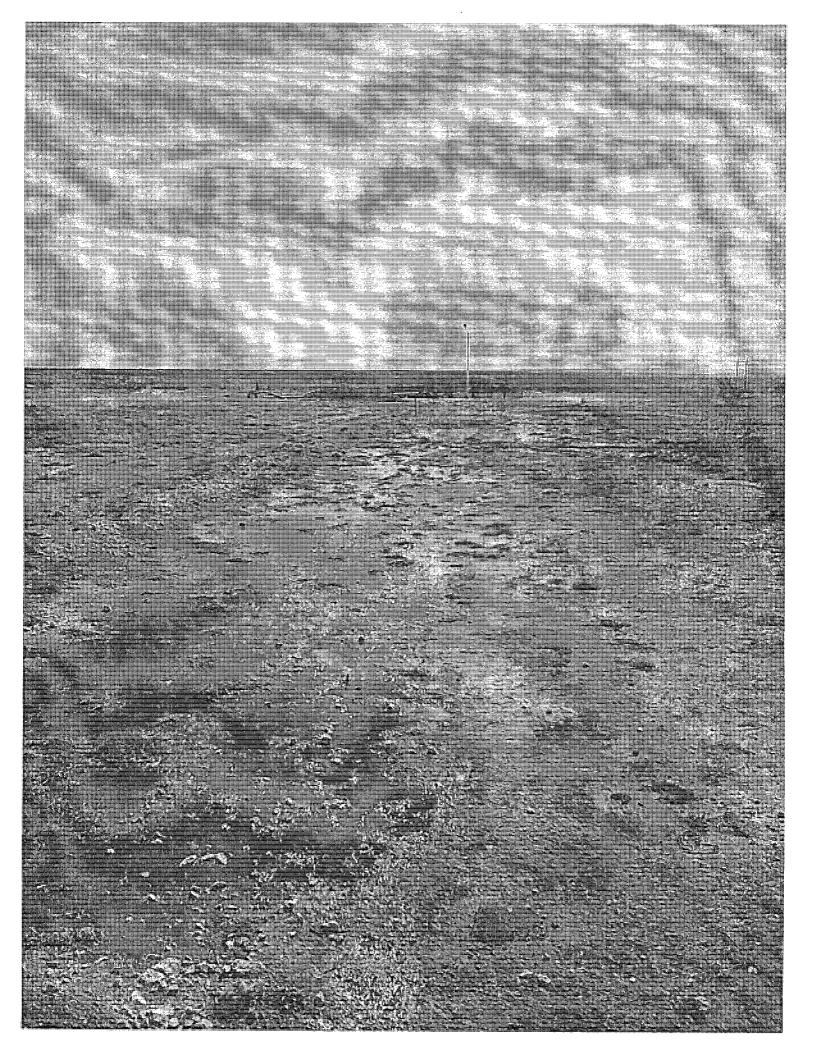
Environmental Department Navajo Refining Co, LLC Artesia NM

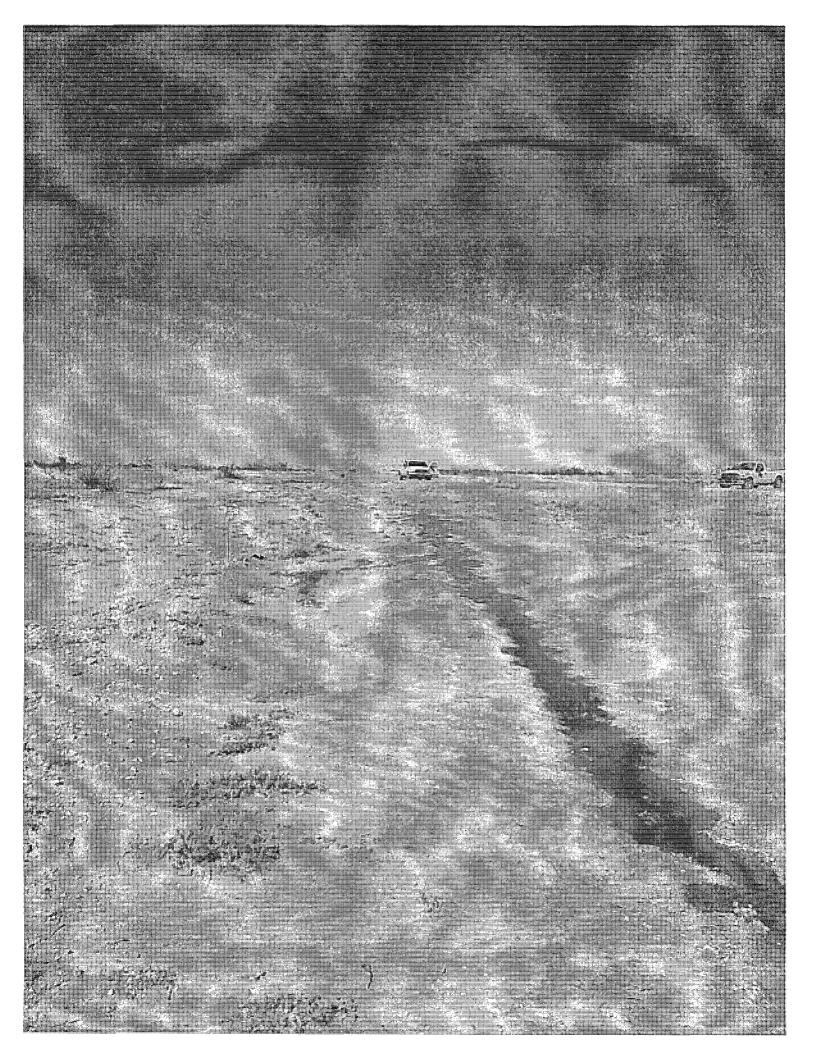
Off: (575) 746-5468 Cell: (575) 703-5057

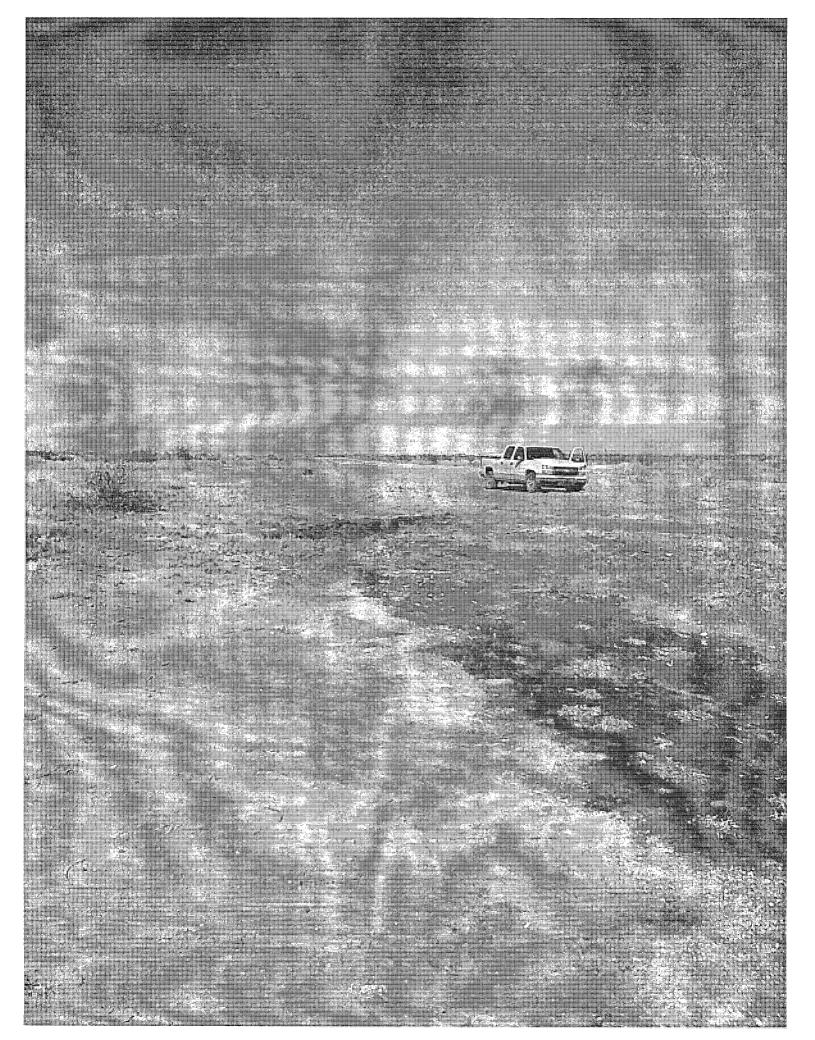
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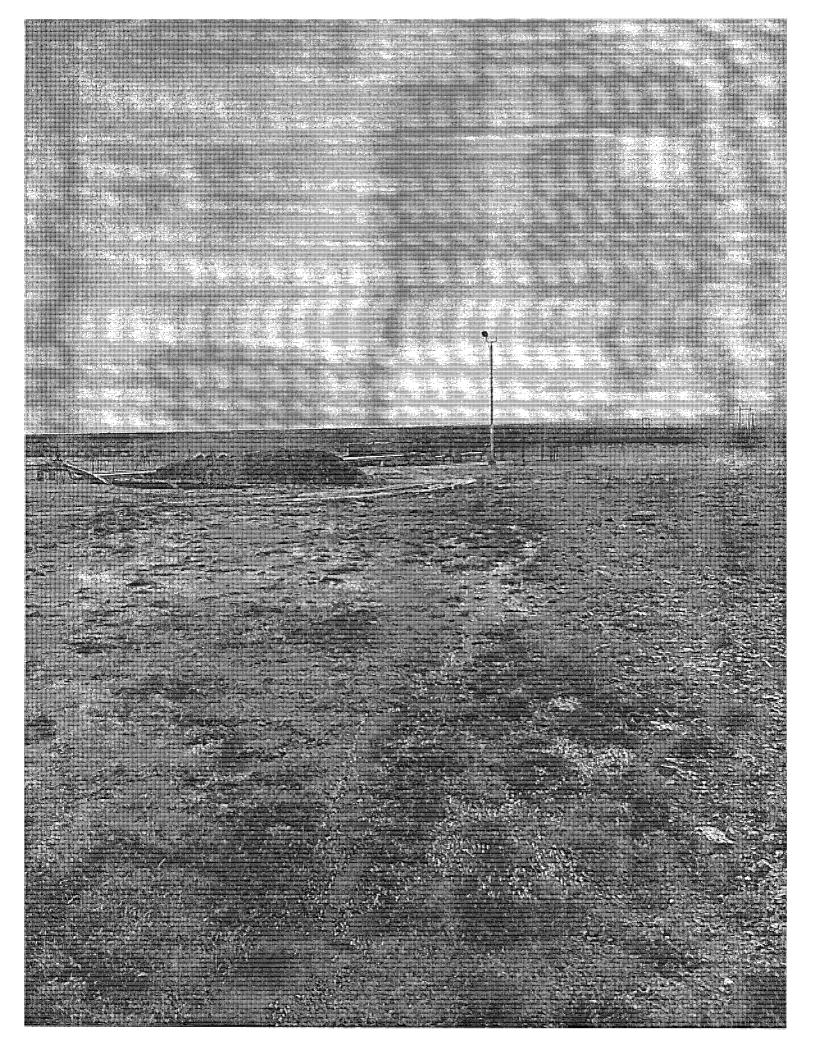
attachments. Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.













Chavez, Carl J, EMNRD

From: Strange, Aaron [aaron.strange@hollycorp.com]
Sent: Thursday, November 11, 2010 11:36 AM

Sent: Thursday, November 11, 2010 11:36 AM

To: Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc: Moore, Darrell; Lackey, Johnny

Subject: C-141 final report

Attachments: 2010-02-20 Effluent Line Leak Final.pdf; 1003452 Bottom Hole Final.pdf; 1003356 Disposal

Final.pdf; 1007504 Bottom Hole Final.pdf; 2010-04-15 Effluent Line Leak Final.pdf; 2010-09-27 Effluent Line Leak Final.pdf; 1010346 WW Effluent Final 9-27-2010.pdf;

10091037 Disposal Final.pdf

Hope, Carl, Randy, and Buddy,

Please see the attached final C-141s from the effluent leaks on 2/20/2010, 4/14/2010, and 9/27/2010. These are the three leaks that were very close together. Also attached are the associated analytical results. I am also sending the associated photos on another email following this.

Thank you,

Aaron Strange Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM Off: (575) 746-5468

Cell: (575) 703-5057

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<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 <u>District II</u> 1301 W. Grand Avenue, Artesia, NM 88210 District III
1000 Rio Brazos Road, Aztec, NM 87410 <u>District IV</u> 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Form C-141 Revised October 10, 2003

1220 South St. Francis Dr. Santa Fe, NM 87505

			Rele	ease Notificati	ion and C	orrective A	ction				
					OPERA	ГOR		Initi	al Report 🛛 Final Report		
		avajo Refini				ron Strange					
		Street Artes	ia, N.M.	88210		Telephone No. 575-748-3311					
Facility Na	me: Artesia	a Plant			Facility Type: Petroleum Refinery						
Surface Ow	ner			Mineral Own	er		Le	ase l	No.		
				LOCATI	ON OF RE	LEASE					
Unit Letter	Section	Township	Range	Feet from the No	orth/South Line	Feet from the	East/West I	line	County		
			L	atitude ~N32°45'5	4.3" Longitud	e ~W104°14'17	.4"				
				NATUF	RE OF REL	EASE					
Type of Rele Treatment)	ase: Spill of	f Treated Was	te Water (by Aggressive Bio.	Volume of	Release: Unknov	vn Vol	ıme	Recovered: ~0 barrels		
Source of Re Injection We		ent line leak b	etween th	e Chukka and Gaines	Date and I 02/20/201	Hour of Occurrence 0 ~ 12:10	ce: Date ~ 12		Hour of Discovery: 02/20/2010		
Was Immedi	ate Notice (If YES, To Whom? Left a voicemail with Carl Chavez with OCD in Santa Fe (505-476-3490), left a voicemail with Hope Monzeglio from the NMED Haz					
		\boxtimes	Yes _	No 🗌 Not Requir	red (505-476-	(505-476-3490), left a voicemail with Hope Monzeglio from the NMED Haz Waste Bureau (505-476-6045), and left a voicemail with the OCD Artesia					
D. W. D. HM											
By Whom? Darrell Moore					E .	Office (575-748-1283 extension 104). OCD (Artesia) called back. Date and Hour: 02/20/2010 at ~13:50 to Carl Chavez (OCD Santa Fe),					
						0 at ~14:15 to Hop 0 at ~14:17 to the			IED Haz Waste Bureau), and		
Was a Watercourse Reached?						olume Impacting			-		
			Yes 🏻	No	NA						
Describe Cat On 02/20/20 the Waste W clamped and	use of Proble 10 at ~ 12:39 ater Treater is holding.	(inside the ref	dial Action ater efflue finery) at -	n Taken.* nt line began to leak b - 13:04 on 02/20/2010					effluent line was blocked in at cavated and the line was		
The area affe make repairs Hazardous W Anions after	cted was the and the soil aste per and the leak that	was placed in alytical results t occurred on	between to six roll between to six roll between 1 between 1 between 1 between 1 between 1 between to six roll between t	he Chukka and Gaine off bins. The leak did Hole samples were co D. This leak was just a	I not stain the so llected and teste I few feet from t	il; however Navaj d for TPH. This sa ne leaks that occu	o has dispose ame location rred on 04/15	of th was to /2010			
regulations a public health should their o or the environ	If operators or the environment of the operations had not been the contract of	are required to conment. The ave failed to a	o report an acceptance dequately ICD accep	d/or file certain release e of a C-141 report by investigate and remed	se notifications a y the NMOCD m diate contaminat	nd perform correct arked as "Final Rition that pose a three the operator of	ctive actions f cport" does n eat to ground responsibility	or rel ot rel wate for o	suant to NMOCD rules and leases which may endanger lieve the operator of liability or, surface water, human health compliance with any other		
Signature:	Lan	کے برید	2			OIL CON	SERVAT)	ON	DIVISION		
o.ga.a.e.	0000		*	nge	7						
Printed Name	e: Aaron Str	ange			Approved by	District Supervis	or:				
Title: Sr. Env	vironmental	Technician			Approval Da	te:	Expir	ation	Date:		
E-mail Addre	ess: aaron.st	range@hollyc	orp.com		Conditions o	f Approval:			Attached		
Date: 11/10/2	2010		I	Phone: 575-703-5057							

Client: Navajo Refining Company

Project: Bottom Hole

Sample ID: WW Effluent #1
Collection Date: 3/16/2010 02:13 PM

Work Order: 1003452

Lab ID: 1003452-01

Date: 25-Mar-10

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TEXAS TPH			TX1005	•	Prep Date: 3/19/2010	Analyst: KMB
nC6 to nC12	ND			0 mg/Kg	1	3/20/2010 09:53 PM
>nC12 to nC28	ND			0 mg/Kg	1	3/20/2010 09:53 PM
>nC28 to nC35	ND		5	i0 mg/Kg	1	3/20/2010 09:53 PM
Total Petroleum Hydrocarbon	ND		5	0 mg/Kg	1	3/20/2010 09:53 PM
Surr: 2-Fluorobiphenyl	89.9		70-13	30 %REC	1	3/20/2010 09:53 PM
Surr: Trifluoromethyl benzene	90.1		70-13	30 %REC	1	3/20/2010 09:53 PM

Note:

Client:

Navajo Refining Company

Project:

Note:

Bottom Hole

Sample ID:

WW Effluent #2

Collection Date: 3/16/2010 02:18 PM

Date: 25-Mar-10

Work Order: 1003452

Lab ID: 1003452-02

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TEXAS TPH			TX1005		Prep Date: 3/19/2010	Analyst: KMB
nC6 to nC12	ND		5	0 mg/Kg	1	3/21/2010 12:49 AM
>nC12 to nC28	ND		5	0 mg/Kg	1	3/21/2010 12:49 AM
>nC28 to nC35	ND		5	0 mg/Kg	1	3/21/2010 12:49 AM
Total Petroleum Hydrocarbon	ND		5	0 mg/Kg	1	3/21/2010 12:49 AM
Surr: 2-Fluorobiphenyl	99.4		70-13	0 %REC	1	3/21/2010 12:49 AM
Surr: Trifluoromethyl benzene	97.5		70-13	0 %REC	1	3/21/2010 12:49 AM

Collection Date: 3/16/2010 02:22 PM

Client: Project:

Note:

Navajo Refining Company

Project: Sample ID: Bottom Hole

WW Effluent #3

Work Ord

Work Order: 1003452

Lab ID: 1003452-03

Date: 25-Mar-10

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TEXAS TPH			TX1005		Prep Date: 3/19/2010	Analyst: KMB
nC6 to nC12	ND		5	i0 mg/Kg	1	3/21/2010 01:18 AM
>nC12 to nC28	ND		5	i0 mg/Kg	1	3/21/2010 01:18 AM
>nC28 to nC35	ND		5	i0 mg/Kg	1	3/21/2010 01:18 AM
Total Petroleum Hydrocarbon	ND		5	i0 mg/Kg	1	3/21/2010 01:18 AM
Surr: 2-Fluorobiphenyl	77.1		70-13	0 %REC	1	3/21/2010 01:18 AM
Surr: Trifluoromethyl benzene	77.1		70-13	0 %REC	1	3/21/2010 01:18 AM

10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5867

Chain of Custody Form

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Page

☐ ALS Laboratory	3352 128th Ave.	Holland, MI 49424-9263	Tel: +1 616 399 6070	Fax: +1 616 399 6185

	· 电电子 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	ALS Project Manager;	**************************************
Customer Information		Project Information	Parameter/Method Request for Analysis
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See Work Order?	Project Number		<u> </u>
Company Name March Refund Company	Bill Tocompany Revajo R	Mavajo Relining Company	
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3 WW EFFLUENT#3	W 1422	9 1	×
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Date: 29-Mar-10

Client:

Navajo Refining Company

Project: Sample ID: Disposal

Waste Water Effluent Soil

Collection Date: 3/12/2010 11:42 AM

Work Order: 1003356

Lab ID: 1003356-02

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TCLP MERCURY			SW7470		Prep Date: 3/19/2010	Analyst: JCJ
Mercury	ND		0.000200) mg/L	1	3/19/2010 04:13 PM
TCLP METALS			SW1311	/6020	Prep Date: 3/19/2010	Analyst: SKS
Arsenic	ND		0.0500) mg/L	10	3/19/2010 07:06 PM
Barium	0.131		0.050	mg/L	10	3/19/2010 07:06 PM
Cadmium	ND		0.0500	0 mg/L	10	3/19/2010 07:06 PM
Chromium	ND		0.0500	0 mg/L	10	3/19/2010 07:06 PM
Lead	ND		0.0500	0 mg/L	10	3/19/2010 07:06 PM
Selenium	ND		0.0500) mg/L	10	3/19/2010 07:06 PM
Silver	ND		0.0500) mg/L	10	3/19/2010 07:06 PM
TCLP SEMIVOLATILES			SW1311	/8270	Prep Date: 3/19/2010	Analyst: ACN
2,4,5-Trichlorophenol	ND		5.0) μg/L	1	3/22/2010 05:10 PM
2,4,6-Trichlorophenol	ND		5.0) μg/L	1	3/22/2010 05:10 PM
2,4-Dinitrotoluene	ND		5.0) μg/L	1	3/22/2010 05:10 PM
Cresols, Total	ND		15	5 μ g /L	1	3/22/2010 05:10 PM
Hexachlorobenzene	ND		5.0) μg/L	1	3/22/2010 05:10 PM
Hexachlorobutadiene	ND		5.0) μg/L	1	3/22/2010 05:10 PM
Hexachloroethane	ND		5.0) μg/L	1	3/22/2010 05:10 PM
Nitrobenzene	ND		5.0) µg/L	1	3/22/2010 05:10 PM
Pentachlorophenol	ND		5.0) µg/L	1	3/22/2010 05:10 PM
Pyridine	ND		5.0	ρμg/L	1	3/22/2010 05:10 PM
Surr: 2,4,6-Tribromophenol	93.8		42-12	4 %REC	1	3/22/2010 05:10 PM
Surr: 2-Fluorobiphenyl	70.7		48-120	%REC	1	3/22/2010 05:10 PM
Surr: 2-Fluorophenol	63.6		20-12	%REC	1	3/22/2010 05:10 PM
Surr: 4-Terphenyl-d14	76.4		51-13	5 %REC	1	3/22/2010 05:10 PM
Surr: Nitrobenzene-d5	69.3		41-12	%REC	1	3/22/2010 05:10 PM
Surr: Phenol-d6	65.2		20-120	%REC	1	3/22/2010 05:10 PM
TCLP VOLATILES			SW1311	/8260B	Prep Date: 3/19/2010	Analyst: PC
1,1-Dichloroethene	ND		100) μg/L	20	3/22/2010 03:51 PM
1,2-Dichloroethane	ND		100) μg/L	20	3/22/2010 03:51 PM
1,4-Dichlorobenzene	ND		100) μg/L	20	3/22/2010 03:51 PM
2-Butanone	ND		200	D μg/L	20	3/22/2010 03:51 PM
Benzene	ND		100	ρμg/L	20	3/22/2010 03:51 PM
Carbon tetrachloride	ND		100	D μg/L	20	3/22/2010 03:51 PM
Chlorobenzene	ND		100	ρμg/L	20	3/22/2010 03:51 PM
Chloroform	ND		100	ρμg/L	20	3/22/2010 03:51 PM
Tetrachloroethene	ND		100	ρμg/L	20	3/22/2010 03:51 PM
Trichloroethene	ND		100) μg/L	20	3/22/2010 03:51 PM

See Qualifiers Page for a list of qualifiers and their explanation. Note:

Date: 29-Mar-10

Client:

Navajo Refining Company

Project:

Note:

Sample ID:

Disposal

Collection Date: 3/12/2010 11:42 AM

Waste Water Effluent Soil

Work Order: 1003356

Lab ID: 1003356-02

Analyses	Result Q	Report Qual Limit Units	Dilution Factor	Date Analyzed
Vinyl chloride	ND	100 μg/L	20	3/22/2010 03:51 PM
Surr: 1,2-Dichloroethane-d4	89.5	70-125 %REC	20	3/22/2010 03:51 PM
Surr: 4-Bromofluorobenzene	101	72-125 %REC	20	3/22/2010 03:51 PM
Surr: Dibromofluoromethane	92.4	71-125 %REC	20	3/22/2010 03:51 PM
Surr: Toluene-d8	98.0	75-125 %REC	20	3/22/2010 03:51 PM
REACTIVE CYANIDE		SW-846		Analyst: HN
Reactive Cyanide	ND	40.0 mg/Kg	1	3/17/2010
REACTIVE SULFIDE		SW-846		Analyst: HN
Reactive Sulfide	ND	40.0 mg/Kg	1	3/17/2010
IGNITABILITY		SW1030		Analyst: JBA
Ignitability, Solid	Negative	no unit	1	3/23/2010 03:00 PM
PH		SW9045B		Analyst: TDW
Нq	7.96	0.100 pH Units	1	3/23/2010 04:00 PM



10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887

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O ALS Laboratory Group Holland, MI 49424-9263 Tel: +1 616 399 6070 Fax: +1 616 399 6185 3352 128th Ave.

		AND THE REAL PROPERTY OF THE PROJECT	Manager:	· · · · · · · · · · · · · · · · · · ·	ALS Work Order #: (0) SSS
Customer Information		Project Information		Paran	Parameter/Wethod Request for Analysis
Purchase Order	Project Name	105005) Jishos	Z. A. P. 1.	A -TKH (350)-	TCLP Vogs
E E E E WORK OF dell'	Project Number		. 3 . 4.4	-dob-	TCLP Spailogs
Company Name Navajo Refining Company	Bill to Company	Navajo Refining Company		(C 80p (410.1)	- TCLP Metals
Send Report 10.	invoice Attn	Aaron Strange		D - Phenolics (420)	RCT
Property of State of	20 (501 E. Main		<u> </u>	
A CONTROL OF THE CONT	7			Ĩ.	
City/State/Zip	City/State/Zip		-3. 4	6	
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T-124 Excavated Soil	3-11-10	1420 5 1	7	メメス	
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3 Waste Water Ettluent Soil	3-17-10	11:42 5 Y	-1	イイス	
24 W-55 Blast Media	3-12-10	1313 5 1	-4	メメメ	
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Samplet(s) Please Print & Sign (A. M. F. M. M. F. T. M. M.	Shipment/Method	\	round Time: (C	Required Turnaround Times (Check-Box) (B) Std 10 Wike pays (1) 3 Wike pays (1) 24 Hour	Pesuits Due Date: Opsja t.[_24Hour
Resignation by: Grand Day: 12.0 Time.	12	Received by:	,	Notes: 10 Day TAT.	АТ.
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Preservative Key. 11-HCl. ** 2-HNQ. ** 3-H2SQ. ** 4-NaOH ; 5-Na ₂ S.O ₅ ** 6-NaHSO. * 17-Other * 8-4°C ** 9-5035	4-NaOH :: 5-Na ₂ S ₂ O ₃	6-NaHSO, 7-Other 8-4°C	9-5035	· · · · · · · · · · · · · · · · · · ·	2882 [] Other

lote: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Laboratory Group.
2. Unless otherwise agreed in a formal contract, services provided by ALS Laboratory Group are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Date: 21-Jul-10

Client:

Navajo Refining Company

Project:

Note:

Bottom Hole

Sample ID:

WW Effluent #1 Collection Date: 7/15/2010 01:42 PM Work Order: 1007504

Lab ID: 1007504-01

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TEXAS TPH			TX1005		Prep Date: 7/16/2010	Analyst: SE
nC6 to nC12	ND		5	0 mg/Kg	1	7/18/2010 02:50 AM
>nC12 to nC28	ND		5	0 mg/Kg	1	7/18/2010 02:50 AM
>nC28 to nC35	ND		5	0 mg/Kg	1	7/18/2010 02:50 AM
Total Petroleum Hydrocarbon	ND		5	0 mg/Kg	1	7/18/2010 02:50 AM
Surr: 2-Fluorobiphenyl	117		70-13	0 %REC	1	7/18/2010 02:50 AM
Surr: Trifluoromethyl benzene	107		70-13	0 %REC	1	7/18/2010 02:50 AM

Client:

Navajo Refining Company

Project:

Note:

Bottom Hole

Sample ID:

WW Effluent #2

Collection Date: 7/15/2010 01:46 PM

Date: 21-Jul-10

Work Order: 1007504

Lab ID: 1007504-02

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TEXAS TPH	******		TX1005		Prep Date: 7/16/2010	Analyst: SE
nC6 to nC12	ND		49	mg/Kg	1	7/18/2010 04:53 AM
>nC12 to nC28	ND		49	mg/Kg	1	7/18/2010 04:53 AM
>nC28 to nC35	ND		49	mg/Kg	1	7/18/2010 04:53 AM
Total Petroleum Hydrocarbon	ND		49	mg/Kg	1	7/18/2010 04:53 AM
Surr: 2-Fluorobiphenyl	114		70-13	%REC	1	7/18/2010 04:53 AM
Surr: Trifluoromethyl benzene	115		70-130	%REC	1	7/18/2010 04:53 AM



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Chain of Custody Form

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	Page

🗆 ALS Laboratory	39E3 450th A

3352 128th Ave. Holland, MI 49424-9263 Tel: +1 616 399 6070 Fax: +1 616 399 6185

		Manager Nanager Manager	orthograms and the state of the
Customer Information		Project Information	Parameter/Method Request for Analysis
Purchase Order	Project Name	Bottom Hole	
World Order	Projectivimber		
Company Name: Narab Relining Company	BIII To Company	Navajo Refining Company	:,o.
Sending Report To: Aaron Strange	Second Attraction	Aaron Strange	, A
A construction of the cons		P.O. Box 159	\$10, 11¢.
S GIWState/Zip. Aresa NM 88211	City/state/Zip	Ariesia, NM 88211	9.
A STATE OF THE STA	A DUCKER OF THE RESERVE OF THE RESER	(505) 748-3311	注:
	はないませんとのなるとのです。 おものではないないない。 おものではないないない。 はないないないないない。	(505) 746-5421	
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Sampler(s) Please, Print & Sign	Shipment Method		Required Turnaround Time: (Check Box) [2] Olien 123 152 152 153 153 154 155 155 155 155 155 155 155 155 155
Bringwished by. Bring & Dale: 15-11		Received by:	Notes:
0	,	111010 8KG	oler ID SE Cooler Temp. 9 OC
Logged by (Laboratory): No. 12 to 12	Time: Charles of Check	12 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Series Handers and Series and Landers and Level II Store Crew Dela TRRP Lavel IV Series And Crew Dela TRRP Lavel IV Series And Crew Dela
Preservative inext. 3.5 milet as 2.5 milet as 1.5 milet as 4.5 milet as 1.5 milet a	nd COC Form have been s	een suhmitted to ALS Laboratory Group.	· · · · · · · · · · · · · · · · · · ·

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District I 1625 N. French Dr., Hobbs, NM 88240 District II 1301 W. Grand Avenue, Artesia, NM 88210 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 11/10/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 2 Copies to appropriate District Office in accordance

with Rule 116 on back side of form

Form C-141

Revised October 10, 2003

		· · · · · ·	Rele	ease Notific	ation	n and Co	rrective A	ction				
						OPERAT	ГOR		Initia	ıl Report	\boxtimes	Final Report
Name of Co						Contact: Aa						
		Street Artes	ia, N.M.	88210			No. 575-748-331		·			
Facility Na	ne: Artesia	Plant				Facility Typ	e: Petroleum Re	efinery				
Surface Ow	ner			Mineral C	wner				Lease N	lo.		
				LOCA	TIOI	N OF REI	LEASE					
Unit Letter	Section	Township	Range	Feet from the	North	/South Line	Feet from the	East/We	est Line	County		
	<u> </u>		L	atitude ~N32°4	5'54.4	" Longitude	~W104°14'17.	.4"				
						OF RELI	EASE					
Type of Rele Treatment)	ase: Spill of	Treated Was	te Water (by Aggressive Bio	0.	Volume of	Release: Unknow	vn '	Volume R	ecovered:	~0 barr	els
Source of Re Injection We		ent line leak b	etween th	e Chukka and Gai	ines	Date and H 04/15/2010	lour of Occurrence Unknown		Date and ~ 09:40	Hour of Dis	covery:	04/15/2010
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required							Whom? Spoke w					
							a voicemail with on the with Art Vollme					
By Whom? Aaron Strange							lour: 04/15/2010 a					
						04/15/2010 at ~10:07 to the OCD Artesia office, and 04/15/2010 at ~10:10 to NMED Haz Waste Bureau.						
Was a Water	course Reac					If YES, Volume Impacting the Watercourse.						
		LJ	Yes 🏻	l No		NA						
If a Watercou												
	0 at ~ 09:40) a leak was f	ound betw	een the Chukka a			Vells. The Effluen line was clamped			in at the W	aste Wa	ater Treater
the line was o	cted was the clamped and EX, Metals,	effluent line is holding Tl	between t ne leak did	he Chukka and Ga I not stain the soil.	. Botton	n Hole sample	at ~ N32°45'54.4 es were collected a eak was just a few	and tested	for TPH	. This same	locatio	n was also
regulations al public health should their o	l operators a or the envir operations ha nment. In ac	are required to onment. The ave failed to a Idition, NMC	o report an acceptance dequately OCD accep	d/or file certain re e of a C-141 repo investigate and re	elease no ort by the emediate	otifications ar e NMOCD ma e contaminati	knowledge and ur nd perform correct arked as "Final Re on that pose a thre e the operator of r	tive action eport" doc eat to grou	ns for rele es not reli und water	eases which eve the ope , surface wa	may er rator of iter, hu	ndanger `liability man health
Signature:	low	v S	n	v,			OIL CONS	SERVA	TION	DIVISIO	N	
Printed Name	: Aaron Stra	ange				Approved by	District Superviso	or:				
Title: Sr. Env	ironmental '	Technician				Approval Dat	e:	Ex	piration I	Date:		
E-mail Addre	ss: aaron.str	ange@hollyc	corp.com			Conditions of	Approval:			Attached		

Phone: 575-703-5057

District I 1625 N. French Dr., Hobbs, NM 88240 District II 1301 W. Grand Avenue, Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 11/10/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Form C-141 Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

	· · · · · · · · · · · · · · · · · · ·		Rele	ase Notific	catio	n and Co	rrective A	ction				
						OPERA?	ror		Initia	al Report	\boxtimes	Final Report
		lavajo Refini				Contact: Aa						
		Street Artes	ia, N.M. 8	8210			No. 575-748-33					
Facility Na	me: Artesi	a Plant				Facility Typ	e: Petroleum Re	efinery				
Surface Ow	ner			Mineral C)wner				Lease N	10.		
				LOCA	ATIO	N OF REI	LEASE					
Unit Letter	Section	Township	Range	Feet from the	North	/South Line	Feet from the	East/Wes	st Line	County		
			L	ntitude <u>~N32°</u> 4	15'54.5	'' Longitude	~W104°14'17	.4"				
						OF REL						
Treatment)				y Aggressive Bi		Volume of	Release: Unknow			Recovered:		
Source of Re Injection We		ent line leak b	etween the	Chukka and Ga	ines	09/27/2010		~	08:00		-	09/27/2010
Was Immediate Notice Given? ⊠ Yes □ No □ Not Required						102), and left a voicemail with Hope Monzeglio from the NMED Haz Waste Bureau (505-476-6045).						
By Whom? Aaron Strange						Date and Hour: 09/28/2010 at ~07:31 to Carl Chavez (OCD Santa Fe), 09/28/2010 at ~08:12 to the OCD Artesia office, and 09/28/2010 at ~08:16 to NMED Haz Waste Bureau.						
Was a Water			Yes 🛭			If YES, Volume Impacting the Watercourse. NA						
Describe Cau On 09/27/20	ise of Probl 10 at ~ 08:0		dial Action	Taken.* en the Chukka a			Vells. The Effluer line was clamped			in at the W	aste Wa	ater Treater
The area affe make repairs Waste per an	cted was th and the soi alytical rest	l was placed in	between the nto roll-off tole sample	ie Chukka and G bins. The leak d s have been coll	id not st	ain the soil; h	at ~ N32°45'54.5 owever Navajo w TEX, Metals, and	ill dispose	of the ex	xcavated so	il as No	n-Hazardous
regulations a public health should their or or the enviro	II operators or the envi- operations h nment. In a	are required to ronment. The lave failed to a	o report and acceptance acceptance acceptance acceptance accept accept	d/or file certain r e of a C-141 repoint investigate and r	elease nort by the emediat	otifications ar e NMOCD m e contaminati	knowledge and und perform correct arked as "Final Roon that pose a thrust the operator of the correction of the correcti	etive actions eport" does eat to groun	s for rele s not reli nd water	eases which eve the ope , surface wa	may er rator of iter, hui	ndanger `liability man health
Signature:	Kon	n k	Zu	2/0			OIL CON:	SERVA'	TION	DIVISIO	<u>N</u>	
Printed Nam	e: Aaron Str	range				Approved by	District Supervise	or:				
Title: Sr. Env	vironmental	Technician				Approval Dat	e:	Exp	oiration l	Date:		
E-mail Addr	ess: aaron.si	trange@hollyc	corp.com			Conditions of	`Approval:			Attached		

Phone: 575-703-5057

Date: 18-Oct-10

Client:

Navajo Refining Company

Project:

WW Effluent

Sample ID:

Leak from 9-27-10 #1

Collection Date: 10/7/2010 12:30 PM

Work Order: 1010346

Lab ID: 1010346-01

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
BTEX			SW8021	В		Analyst: IGF
Benzene	ND		0.0010	mg/Kg	1	10/12/2010 04:20 PM
Toluene	NĐ		0.0010	mg/Kg	ñ	10/12/2010 04:20 PM
Ethylbenzene	ND		0,0010	mg/Kg	1	10/12/2010 04:20 PM
Xylenes, Total	ND		0.0030) mg/Kg	1	10/12/2010 04:20 PM
Surr: 4-Bromofluorobenzene	92.4		75-13:	1 %REC	1	10/12/2010 04:20 PM
Surr: Trifluorotoluene	90.3		73-130	%REC	1	10/12/2010 04:20 PM
MERCURY			SW7471	Α	Prep Date:	10/14/2010 Analyst: JCJ
Mercury	5.26		3.4	ρg/Kg	. 1	10/14/2010 03:40 PM
METALS			SW6020		Prep Date:	10/13/2010 Analyst: SKS
Aluminum	10,200		87.7	mg/Kg	100	10/14/2010 09:33 PM
Antimony	ND		0.439	mg/Kg	1	10/14/2010 06:42 AM
Arsenic	3.55		0.439	mg/Kg	1	10/14/2010 06:42 AM
Barium	134		43.9	mg/Kg	100	10/14/2010 09:33 PM
Beryllium	0.575		0.439	mg/Kg	1	10/14/2010 06:42 AM
Cadmium	ND		0,439	mg/Kg	1	10/14/2010 06:42 AM
Calcium	40,400		4,390	mg/Kg	100	10/14/2010 09:33 PM
Chromium	8.69		0.439	mg/Kg	1	10/14/2010 06:42 AM
Cobalt	3.61		0.439	mg/Kg	1	10/14/2010 06:42 AM
Copper	6.21		0.439	mg/Kg	1	10/14/2010 06:42 AM
Iron	6,830		43.9	mg/Kg	1	10/14/2010 06:42 AM
Lead	4.74		0,439	mg/Kg	1	10/14/2010 06:42 AM
Magnesium	9,320		43.9	mg/Kg	1	10/14/2010 06:42 AM
Manganese	255		43.9	mg/Kg	100	10/14/2010 09:33 PM
Nickel	7.85		0.439	mg/Kg	1	10/14/2010 06:42 AM
Potassium	2,670		43.9	mg/Kg	1	10/14/2010 06:42 AM
Selenium	0.701		0.439	mg/Kg	1	10/14/2010 06:42 AM
Silver	ND		0.439	mg/Kg	1	10/14/2010 06:42 AM
Sodium	689		43.9	mg/Kg	1	10/14/2010 06:42 AM
Strontium	221		43.9	mg/Kg	100	10/14/2010 09:33 PM
Thallium	ND		0.439	mg/Kg	1	10/14/2010 06:42 AM
Vanadium	16.3		0.439	mg/Kg	1	10/14/2010 06:42 AM
Zinc	21.0		0.439	mg/Kg	. 1	10/14/2010 06:42 AM
ANIONS			E300		Prep Date:	10/13/2010 Analyst: DM
Chloride	146		4.98	mg/Kg	1	10/14/2010 12:34 PM
Sulfate	7,620		49.8	mg/Kg	10	10/14/2010 04:11 PM
Surr: Selenate (surr).	108		85-115	%REC	10	10/14/2010 04:11 PM
Surr. Selenate (surr)	109		85-115	%REC	1	10/14/2010 12:34 PM

See Qualifiers Page for a list of qualifiers and their explanation. Note:

Date: 18-Oct-10

Client:

Navajo Refining Company

Project: Sample ID: WW Effluent

Leak from 9-27-10 #2

Collection Date: 10/7/2010 12:34 PM

Work Order: 1010346

Lab ID: 1010346-02

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
BTEX			SW8021	В		Analyst: IGF
Benzene	ND		0.0010) mg/Kg	1	10/12/2010 01:01 PM
Toluene	ND		0.0010	mg/Kg	1	10/12/2010 01:01 PM
Ethylbenzene	ПИ		0.0010	mg/Kg	1	10/12/2010 01:01 PM
Xylenes, Total	ND		0.0030) mg/Kg	1	10/12/2010 01:01 PM
Surr: 4-Bromofluorobenzene	93.4		75-13	1 %REC	1	10/12/2010 01:01 PM
Surr: Trifluorotoluene	92.8		73-130	%REC	1	10/12/2010 01:01 PM
MERCURY			SW7471	А	Prep Date:	10/14/2010 Analyst; JCJ
Mercury	8.09		3.57	7 μg/Kg	1	10/14/2010 03:42 PM
METALS			SW6020)	Prep Date:	10/13/2010 Analyst: SKS
Aluminum	2,220		90.1	l mg/Kg	100	10/14/2010 09:39 PM
Antimony	ПИ		0.450) mg/Kg	1	10/14/2010 06:48 AM
Arsenic	1.84		0.450	mg/Kg	1	10/14/2010 06:48 AM
Barium	174		45.0	mg/Kg	100	10/14/2010 09:39 PM
Beryllium	ND		0.450) mg/Kg	1	10/14/2010 06:48 AM
Cadmium	ПИ		0.450	mg/Kg	1	10/14/2010 06:48 AM
Calcium	54,000		4,500	mg/Kg	100	10/14/2010 09:39 PM
Chromium	2.52		0.450	mg/Kg	1	10/14/2010 06:48 AM
Cobalt	1.21		0.450	mg/Kg	1	10/14/2010 06:48 AM
Copper	1.86		0.450	mg/Kg	1	10/14/2010 06:48 AM
Iron	2,710		45.0	mg/Kg	1	10/14/2010 06:48 AM
Lead	2.08		0.450	mg/Kg	1	10/14/2010 06:48 AM
Magnesium	1,970		45.0	mg/Kg	1	10/14/2010 06:48 AM
Manganese	188		45.0	mg/Kg	100	10/14/2010 09:39 PM
Nickel	2.39		0.450	mg/Kg	1	10/14/2010 06:48 AM
Potassium	415		45.0	mg/Kg	1	10/14/2010 06:48 AM
Selenium	ND		0.450) mg/Kg	1	10/14/2010 06:48 AM
Silver	ND		0.450	mg/Kg	1	10/14/2010 06:48 AM
Sodium	195		45.0	mg/Kg	1	10/14/2010 06:48 AM
Strontium	119		0.450	mg/Kg	1	10/14/2010 06:48 AM
Thallium	ND		0.450	mg/Kg	1	10/14/2010 06:48 AM
Vanadium	6.30		0.450	mg/Kg	1	10/14/2010 06:48 AM
Zinc	6.76		0.450	mg/Kg	1	10/14/2010 06:48 AM
ANIONS			E300		Prep Date:	
Chloride	58.0		4.92	mg/Kg	1	10/14/2010 12:55 PM
Sulfate	6,630			mg/Kg	10	10/14/2010 04:32 PM
Surr: Selenate (surr)	110		85-115		10	10/14/2010 04:32 PM
Surr: Selenate (surr)	109		85-115	%REC	1	10/14/2010 12:55 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Date: 18-Oct-10

Client:

Navajo Refining Company

Project:

WW Effluent

Sample ID: Leak from 9-27-10 #3

Collection Date: 10/7/2010 12:49 PM

Work Order: 1010346

Lab ID: 1010346-03

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
BTEX			SW8021	В		Analyst: IGF
Benzene	ND		0.0010	mg/Kg	1	10/12/2010 02:03 PM
Toluene	ND		0.0010	mg/Kg	1	10/12/2010 02:03 PM
Ethylbenzene	ND		0.0010) mg/Kg	1	10/12/2010 02:03 PM
Xylenes, Total	ND		0.0030	mg/Kg	1	10/12/2010 02:03 PM
Surr: 4-Bromofluorobenzene	94.8		75 - 13	1 %REC	1	10/12/2010 02:03 PM
Surr: Trifluorotoluene	92.2		73-130	%REC	1	10/12/2010 02:03 PM
MERCURY			SW7471	Α	Prep Date: 10	0/14/2010 Analyst: JCJ
Mercury	6.73		3.6	1 μg/Kg	1	10/14/2010 03:44 PM
METALS			SW6020)	Prep Date: 10	0/13/2010 Analyst: SKS
Aluminum	6,810		92.6	mg/Kg	100	10/14/2010 09:45 PM
Antimony	ND		0.463	3 mg/Kg	1	10/14/2010 06:54 AM
Arsenic	3.00		0.463	3 mg/Kg	1	10/14/2010 06:54 AM
Barium	73.3		0.463	3 mg/Kg	1	10/14/2010 06:54 AM
Beryllium	ND		0.463	3 mg/Kg	1	10/14/2010 06:54 AM
Cadmium	ND		0.463	3 mg/Kg	1	10/14/2010 06:54 AM
Calcium	79,800		4,630	mg/Kg	100	10/14/2010 09:45 PM
Chromium	5.65		0.463	mg/Kg	1	10/14/2010 06:54 AM
Cobalt	2.43		0.463	mg/Kg	1	10/14/2010 06:54 AM
Copper	4.62		0.463	mg/Kg	1	10/14/2010 06:54 AM
Iron	4,510		46.3	3 mg/Kg	1	10/14/2010 06:54 AM
Lead	3.76		0.463		1	10/14/2010 06:54 AM
Magnesium	7,040		46.3	mg/Kg	1	10/14/2010 06:54 AM
Manganese	178		46,3		100	10/14/2010 09:45 PM
Nickel	5,19		0.463		1	10/14/2010 06:54 AM
Potassium	1,670		46.3	mg/Kg	1	10/14/2010 06:54 AM
Selenium	0,523		0.463		1	10/14/2010 06:54 AM
Silver	ND		0.463		1	10/14/2010 06:54 AM
Sodium	408		46.3	mg/Kg	1	10/14/2010 06:54 AM
Strontium	530		46,3		100	10/14/2010 09:45 PM
Thallium	ND		0.463		1	10/14/2010 06:54 AM
Vanadium	11.0		0,463	mg/Kg	1	10/14/2010 06:54 AM
Zinc	14.3		0.463		1	10/14/2010 06:54 AM
ANIONS			E300		Prep Date: 10	0/13/2010 Analyst: DM
Chloride	50.9		4.93	mg/Kg	1	10/14/2010 01:17 PM
Sulfate	12,100		493		100	10/14/2010 04:54 PM
Surr. Selenate (surr)	110		85-115		100	10/14/2010 04:54 PM
Surr. Selenate (surr)	107		85-115		1	10/14/2010 01:17 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Date: 18-Oct-10

Client:

Navajo Refining Company

Project:

WW Effluent

Leak from 9-27-10 #4

Sample ID: Collection Date: 10/7/2010 01:02 PM Work Order: 1010346

Lab ID: 1010346-04

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
втех			SW8021	В		Analyst: IGF
Benzene	ND		0.0010	mg/Kg	1	10/12/2010 02:24 PM
Toluene	ND		0.0010) mg/Kg	1	10/12/2010 02:24 PM
Ethylbenzene	ND		0.0010) mg/Kg	1	10/12/2010 02:24 PM
Xylenes, Total	ND		0.0030) mg/Kg	1	10/12/2010 02:24 PM
Surr: 4-Bromofluorobenzene	96.4		75-13	%REC	1	10/12/2010 02:24 PM
Surr: Trifluorotoluene	91.7		73-130	%REC	1	10/12/2010 02:24 PM
MERCURY			SW7471	А	Prep Date:	10/14/2010 Analyst: JCJ
Mercury	13.7		3.51	i μg/Kg	1	10/14/2010 03:46 PM
METALS			SW6020		Prep Date:	10/13/2010 Analyst: SKS
Aluminum	8,550		90.1	mg/Kg	100	10/14/2010 09:51 PM
Antimony	ND		0.450	mg/Kg	1	10/14/2010 07:00 AM
Arsenic	4.45		0.450	mg/Kg	1	10/14/2010 07:00 AM
Barium	86.8		0.450	mg/Kg	1	10/14/2010 07:00 AM
Beryllium	ND		0.450	mg/Kg	1	10/14/2010 07:00 AM
Cadmium	ND		0.450) mg/Kg	1	10/14/2010 07:00 AM
Calcium	53,900		4,500	mg/Kg	100	10/14/2010 09:51 PM
Chromium	7,28		0.450	mg/Kg	1	10/14/2010 07:00 AM
Cobalt	3,29		0.450	mg/Kg	1	10/14/2010 07:00 AM
Copper	7.54		0.450	mg/Kg	1	10/14/2010 07:00 AM
Iron	6,010		45.0	mg/Kg	1	10/14/2010 07:00 AM
Lead	4.56		2.25	mg/Kg	5	10/14/2010 07:42 PM
Magnesium	5,720		45.0	mg/Kg	1	10/14/2010 07:00 AM
Manganese	127		0.450	mg/Kg	1	10/14/2010 07:00 AM
Nickel	7.05		0.450	mg/Kg	1	10/14/2010 07:00 AM
Potassium	2,200		45.0	mg/Kg	1	10/14/2010 07:00 AM
Selenium	0.683		0.450	mg/Kg	1	10/14/2010 07:00 AM
Silver	NĐ		0,450	mg/Kg	1	10/14/2010 07:00 AM
Sodium	332		45.0	mg/Kg	1	10/14/2010 07:00 AM
Strontium	135		0.450	mg/Kg	1	10/14/2010 07:00 AM
Thallium	ND		2.25	mg/Kg	5	10/14/2010 07:42 PM
Vanadium	12.7		0.450	mg/Kg	1	10/14/2010 07:00 AM
Zinc	17.7		0,450	mg/Kg	1	10/14/2010 07:00 AM
ANIONS			E300		Prep Date:	10/13/2010 Analyst: DM
Chloride	89.6		4.97	mg/Kg	. 1	10/14/2010 01:39 PM
Sulfate	11,900		497	mg/Kg	100	10/14/2010 05:16 PM
Surr: Selenate (surr)	110		85-115	%REC	100	10/14/2010 05:16 PM
Surr: Selenate (surr)	108		85-115	%REC	1	10/14/2010 01:39 PM

See Qualifiers Page for a list of qualifiers and their explanation. Note:

Date: 18-Oct-10

Client:

Navajo Refining Company

Project: Sample ID: WW Effluent

Background N32 46' 05.6"-W104 13' 42.0"

Collection Date: 10/7/2010 01:10 PM

Work Order: 1010346

Lab ID: 1010346-05

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
BTEX			SW8021	В		Analyst: IGF
Benzene	ND		0.0010	mg/Kg	1	10/12/2010 02:45 PM
Toluene	ND		0.0010	mg/Kg	1	10/12/2010 02:45 PM
Ethylbenzene	ND		0.0010) mg/Kg	1	10/12/2010 02:45 PM
Xylenes, Total	ND		0.0030	mg/Kg	1	10/12/2010 02:45 PM
Surr: 4-Bromofluorobenzene	91.7		75-13	1 %REC	1	10/12/2010 02:45 PM
Surr: Trifluorotoluene	89.5		73-130	%REC	1	10/12/2010 02:45 PM
MERCURY			SW7471	Α	Prep Date:	10/14/2010 Analyst: JCJ
Mercury	1 1.4		3.46	β μg/Kg	1	10/14/2010 03:32 PM
METALS			SW6020		Prep Date:	10/13/2010 Analyst: SKS
Aluminum	7,740		90.1	t mg/Kg	100	10/14/2010 09:58 PM
Antimony	ND		0.450	mg/Kg	1	10/14/2010 07:06 AM
Arsenic	1.92		0.450	mg/Kg	1	10/14/2010 07:06 AM
Barium	63.5		0.450	mg/Kg	1	10/14/2010 07:06 AM
Beryllium	ND		0.450	mg/Kg	1	10/14/2010 07:06 AN
Cadmium	ND		0.450	mg/Kg	1	10/14/2010 07:06 AM
Calcium	21,000		4,500	mg/Kg	100	10/14/2010 09:58 PM
Chromium	6.53		0.450	mg/Kg	1	10/14/2010 07:06 AM
Cobalt	2.49		0.450	mg/Kg	1	10/14/2010 07:06 AM
Copper	5.23		0.450	mg/Kg	1	10/14/2010 07:06 AM
Iron	5,960		45.0	mg/Kg	1	10/14/2010 07:06 AM
Lead	5.83		0.450	mg/Kg	1	10/14/2010 07:06 AM
Magnesium	2,790		45.0	mg/Kg	1	10/14/2010 07:06 AM
Manganese	140		0.450	mg/Kg	1	10/14/2010 07:06 AM
Nickel	5.89		0.450	mg/Kg	1	10/14/2010 07:06 AM
Potassium	1,840		45.0	mg/Kg	1	10/14/2010 07:06 AM
Selenium	ND		0.450	mg/Kg	1	10/14/2010 07:06 AM
Silver	ND		0.450	mg/Kg	1	10/14/2010 07:06 AM
Sodium	ND		45.0	mg/Kg	1	10/14/2010 07:06 AM
Strontium	23.7		0.450	mg/Kg	1	10/14/2010 07:06 AN
Thatlium	ND		0.450	mg/Kg	1	10/14/2010 07:06 AM
Vanadium	8.36		0.450	mg/Kg	1	10/14/2010 07:06 AM
Zinc	18.9		0.450	mg/Kg	1	10/14/2010 07:06 AM
ANIONS			E300		Prep Date:	10/13/2010 Analyst: DM
Chloride	5.54		4.91	t mg/Kg	1	10/14/2010 02:44 PM
Sulfate	28.9		4.91	1 mg/Kg	1	10/14/2010 02:44 PN
Surr: Selenate (surr)	110		85-118	5 %REC	1	10/14/2010 02:44 PM

See Qualifiers Page for a list of qualifiers and their explanation. Note:

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Date: 12-Oct-10

Client:

Navajo Refining Company

Project:

Disposal

Sample ID:

WW Effluent Leak

Collection Date: 9/29/2010 02:33 PM

Work Order: 10091037

Lab ID: 10091037-02

Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TCLP MERCURY			SW7470		Prep Date: 1	0/6/2010 Analyst: JCJ
Mercury	ND		0.000200) mg/L	1	10/6/2010 04:11 PM
TCLP METALS			SW1311	/6020	Prep Date: 1	0/7/2010 Analyst: ALR
Arsenic	ND		0.0500	mg/L	10	10/8/2010 06:34 AM
Barium	0.166		0.0500	mg/L	10	10/8/2010 06:34 AM
Cadmium	ND		0.0500	mg/L	10	10/8/2010 06:34 AM
Chromium	ND		0.0500) mg/L	10	10/8/2010 06:34 AM
Lead	ND		0.0500	mg/L	10	10/8/2010 06:34 AM
Selenium	ПN		0.0500	mg/L	10	10/8/2010 06:34 AM
Silver	ND		0.0500) mg/L	10	10/8/2010 06:34 AM
TCLP SEMIVOLATILES			SW1311	/8270	Prep Date: 1	0/6/2010 Analyst: ACN
2,4,5-Trichlorophenol	ND		5.0) μg/L	. 1	10/7/2010 05:07 PM
2,4,6-Trichlorophenol	ND		5.0) μg/L	1	10/7/2010 05:07 PM
2,4-Dinitrotoluene	ND		5.0) µg/L	1	10/7/2010 05:07 PM
Cresols, Total	ND		15	5 μg/L	1	10/7/2010 05:07 PM
Hexachlorobenzene	ND		5.0) µg/L	1	10/7/2010 05:07 PM
Hexachlorobutadiene	ND		5.0		1	10/7/2010 05:07 PM
Hexachloroethane	ND		5.0	μg/L	1	10/7/2010 05:07 PM
Nitrobenzene	ND		5.0	μg/L	1	10/7/2010 05:07 PM
Pentachlorophenol	ND		5.0) μg/L	1	10/7/2010 05:07 PM
Pyridine	ND		5.0) μg/L	1	10/7/2010 05:07 PM
Surr: 2,4,6-Tribromophenol	50.5		42-124	# %REC	1	10/7/2010 05:07 PM
Surr: 2-Fluorobiphenyl	49.1		48-120	%REC	1	10/7/2010 05:07 PM
Surr: 2-Fluorophenol	38.9		20-120	%REC	1	10/7/2010 05:07 PM
Surr: 4-Terphenyl-d14	67.3		51-138	%REC	1	10/7/2010 05:07 PM
Surr: Nitrobenzene-d5	42.3		41-120	%REC	1	10/7/2010 05:07 PM
Surr: Phenol-d6	37.2		20-120	%REC	1	10/7/2010 05:07 PM
TCLP VOLATILES			SW1311	/8260B	Prep Date: 1	0/6/2010 Analyst: PC
1,1-Dichloroethene	ND		100		20	10/7/2010 04:32 PM
1,2-Dichloroethane	ND		100) µg/L	20	10/7/2010 04:32 PM
1,4-Dichlorobenzene	ND		100) µg/L	20	10/7/2010 04:32 PM
2-Butanone	ND		200		20	10/7/2010 04:32 PM
Benzene	330		100	μg/L	20	10/7/2010 04:32 PM
Carbon tetrachloride	ND		100		20	10/7/2010 04:32 PM
Chlorobenzene	ND		100		20	10/7/2010 04:32 PM
Chloroform	ND		100		20	10/7/2010 04:32 PM
Tetrachloroethene	ND		100		20	10/7/2010 04:32 PM
Trichloroethene	ND		100	. 5 -	20	10/7/2010 04:32 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Date: 12-Oct-10

Client:

Navajo Refining Company

Project:

Sample ID:

Disposal

WW Effluent Leak

Collection Date: 9/29/2010 02:33 PM

Work Order: 10091037

Lab ID: 10091037-02

Analyses	Result Q	Report ual Limit Units	Dilution Factor	Date Analyzed
Vinyl chloride	ND	100 µg/L	20	10/7/2010 04:32 PM
Surr: 1,2-Dichloroethane-d4	101	70-125 %REC	20	10/7/2010 04:32 PM
Surr: 4-Bromofluorobenzene	99.0	72-125 %REC	20	10/7/2010 04:32 PM
Surr: Dibromofluoromethane	95.5	71-125 %REC	20	10/7/2010 04:32 PM
Surr: Toluene-d8	99.6	75-125 %REC	20	10/7/2010 04:32 PM
REACTIVE CYANIDE		SW-846		Analyst: HN
Reactive Cyanide	ND	40.0 mg/Kg	1	10/5/2010 08:30 AM
REACTIVE SULFIDE		SW-846		Analyst: HN
Reactive Sulfide	ND	40.0 mg/Kg	1	10/5/2010 08:30 AM
IGNITABILITY		SW1030		Analyst: JLC
Ignitability, Solid	Negative	no uni	t 1	10/5/2010 10:00 AM
PH		SW9045B		Analyst: JLC
рН	7.80	0.100 pH Un	its 1	10/11/2010 10:00 AM

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Preservative Keys 1-HCI 12-HNU3 - 3-H2SU4 11-4-NAOH 13-NA2503 11-0-NAHSU4 11-1-Other	0H. 5-Na ₂ V ₂ O ₃	

late: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Laboratory Group.
2. Unless otherwise agreed in a formal contract, services provided by ALS Laboratory Group are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

Chavez, Carl J, EMNRD

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, November 12, 2010 7:33 AM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

RE: C-141 final report

Attachments:

CIMG0064.jpg; CIMG0066.jpg; CIMG0067.jpg; CIMG0068.jpg; New Image0059.jpg; effluent

leaks 010.jpg; effluent leaks 011.jpg; effluent leaks 012.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached photos per the email below

Thank you,

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Friday, November 12, 2010 7:27 AM

To: Strange, Aaron; 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us';

'larry.hill@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny **Subject:** RE: C-141 final report

Hope, Carl, Randy, and Buddy.

Please see the attached photos per the email below. I have attached about 1/3rd of the photos and will send the rest in two other emails following this email.

Thank you,

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Thursday, November 11, 2010 11:36 AM

To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us'; 'larry.hill@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny

Subject: C-141 final report

Hope, Carl, Randy, and Buddy,

Please see the attached final C-141s from the effluent leaks on 2/20/2010, 4/14/2010, and 9/27/2010. These are the three leaks that were very close together. Also attached are the associated analytical results. I am also sending the associated photos on another email following this.

Thank you,

Aaron Strange Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

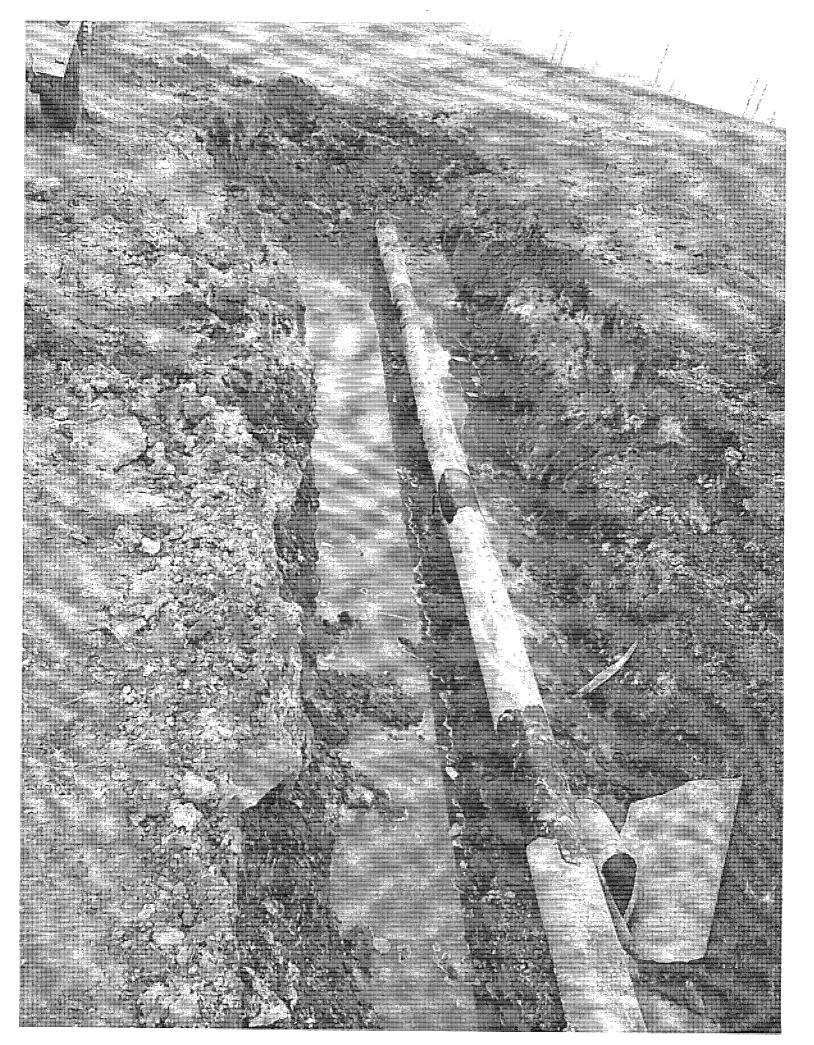
Off: (575) 746-5468 Cell: (575) 703-5057

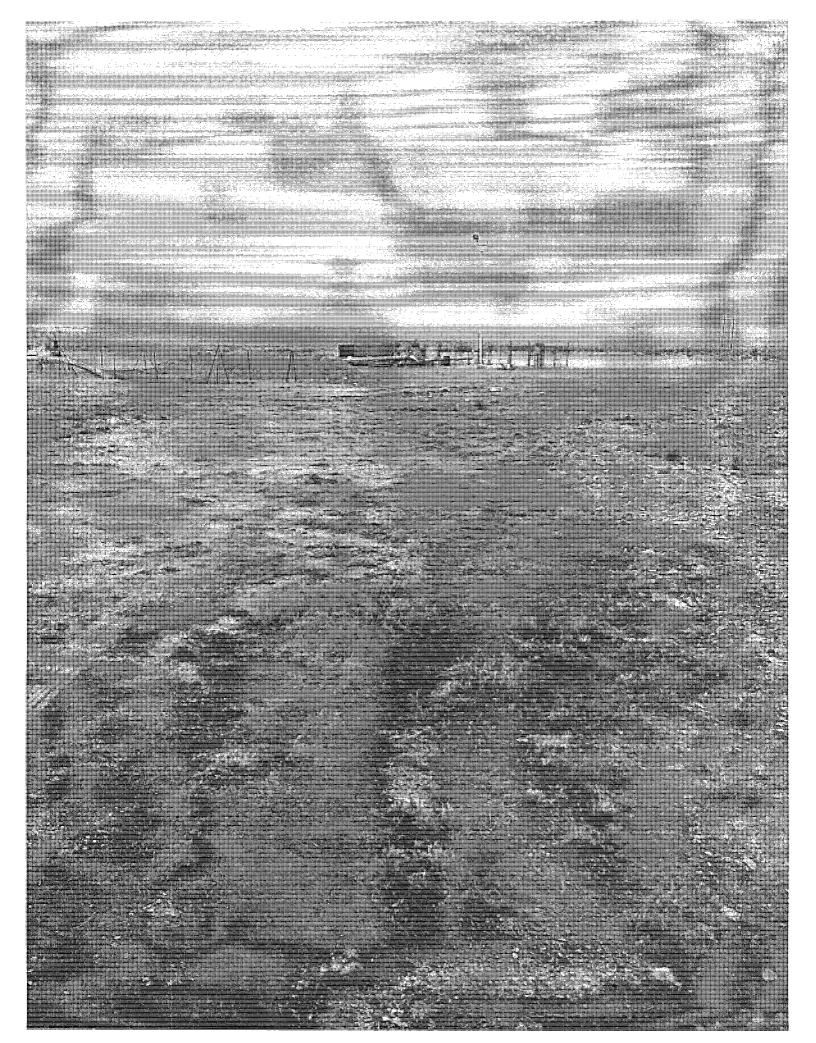
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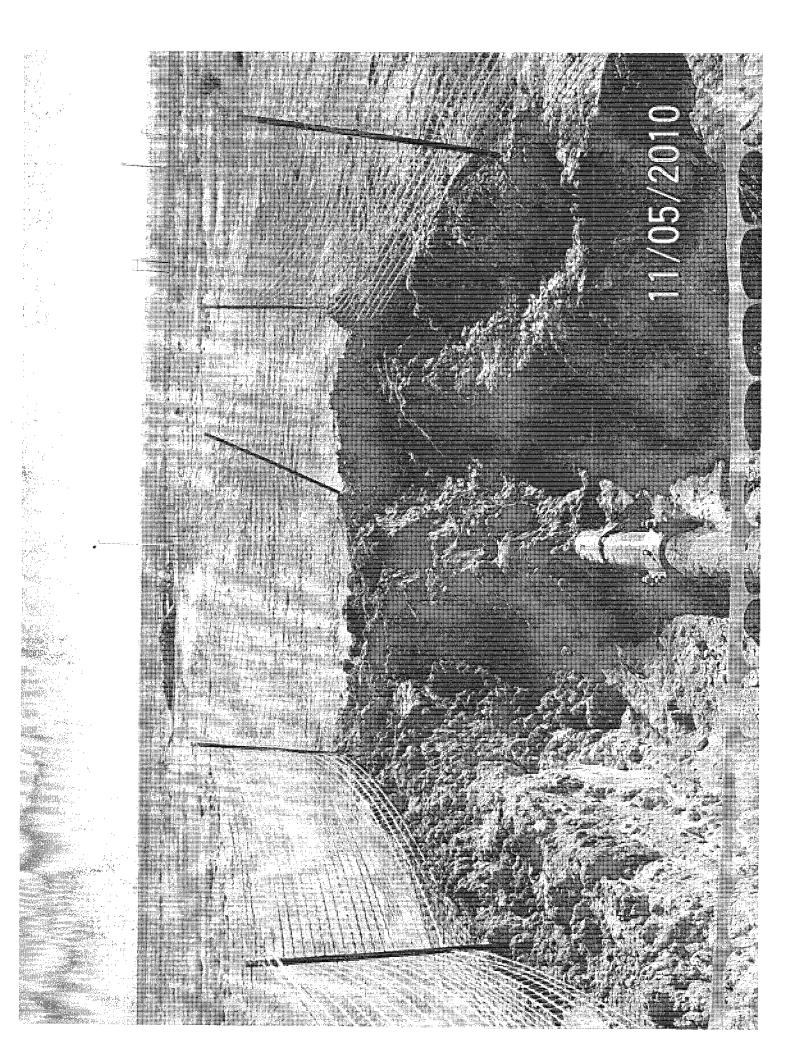












From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, November 12, 2010 7:34 AM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Cc:

Moore, Darrell; Lackey, Johnny

Subject:

RE: C-141 final report

Attachments:

effluent leaks 013.jpg; effluent leaks 001.jpg; effluent leaks 002.jpg; effluent leaks 003.jpg; effluent leaks 004.jpg; effluent leaks 005.jpg; effluent leaks 007.jpg;

effluent leaks 008.jpg; effluent leaks 009.jpg

Hope, Carl, Randy, and Buddy,

Please see the attached photos per the emails below. This should be the last of the photos.

Thank you,

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Friday, November 12, 2010 7:33 AM

To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us'; 'larry.hill@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny **Subject:** RE: C-141 final report

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Aaron Strange

Environmental Technician, Senior

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From: Strange, Aaron

Sent: Friday, November 12, 2010 7:27 AM

To: Strange, Aaron; 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us';

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Cc: Moore, Darrell; Lackey, Johnny **Subject:** RE: C-141 final report

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Off: (575) 746-5468 Cell: (575) 703-5057

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Sent: Thursday, November 11, 2010 11:36 AM

To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us'; 'larry.hill@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny

Subject: C-141 final report

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Please see the attached final C-141s from the effluent leaks on 2/20/2010, 4/14/2010, and 9/27/2010. These are the three leaks that were very close together. Also attached are the associated analytical results. I am also sending the associated photos on another email following this.

Thank you,

Aaron Strange Environmental Technician, Senior

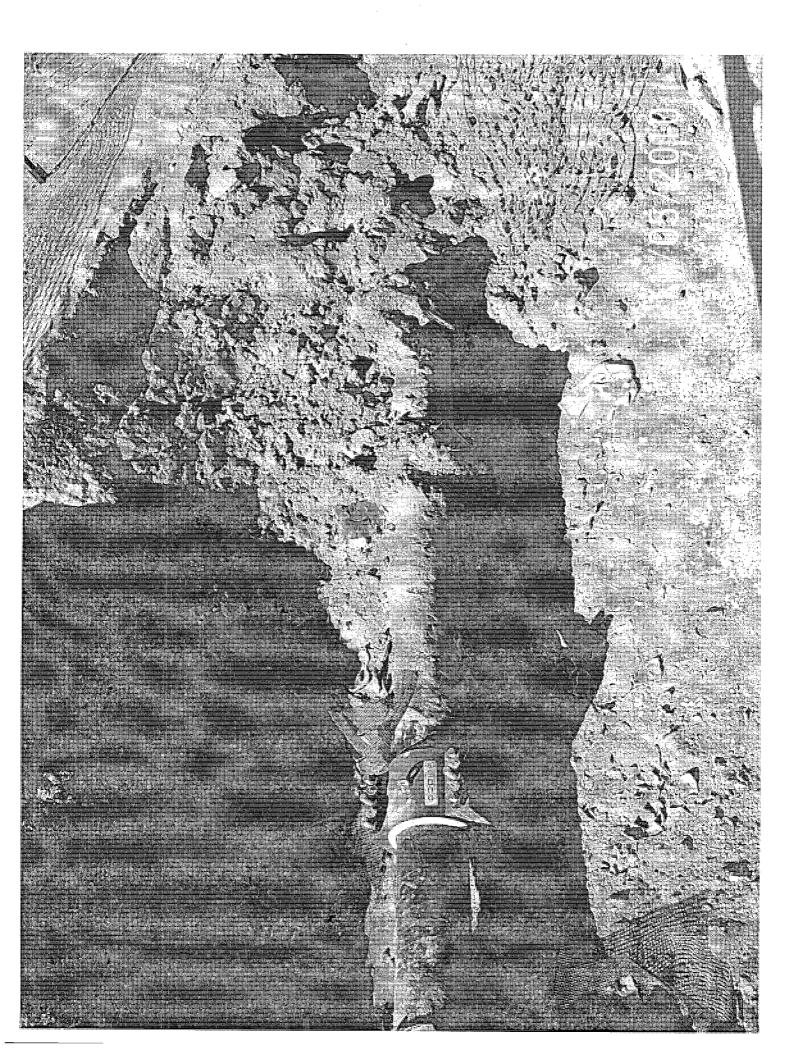
Environmental Department Navajo Refining Co, LLC Artesia NM Off: (575) 746-5468

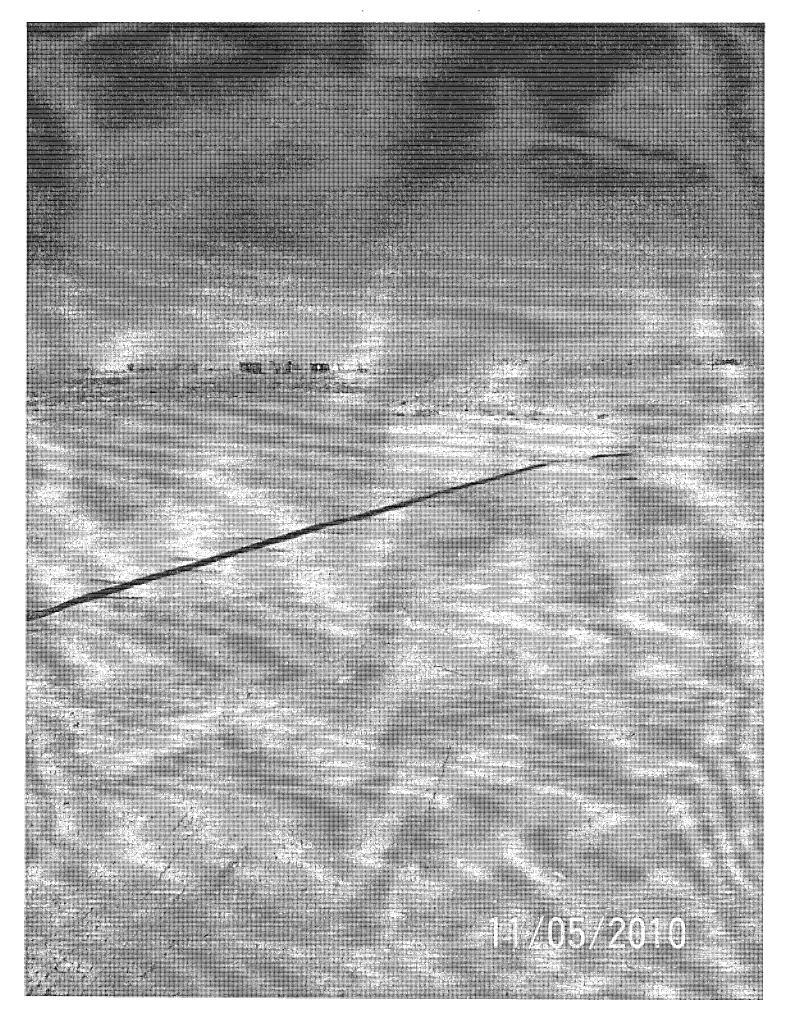
Cell: (575) 703-5057

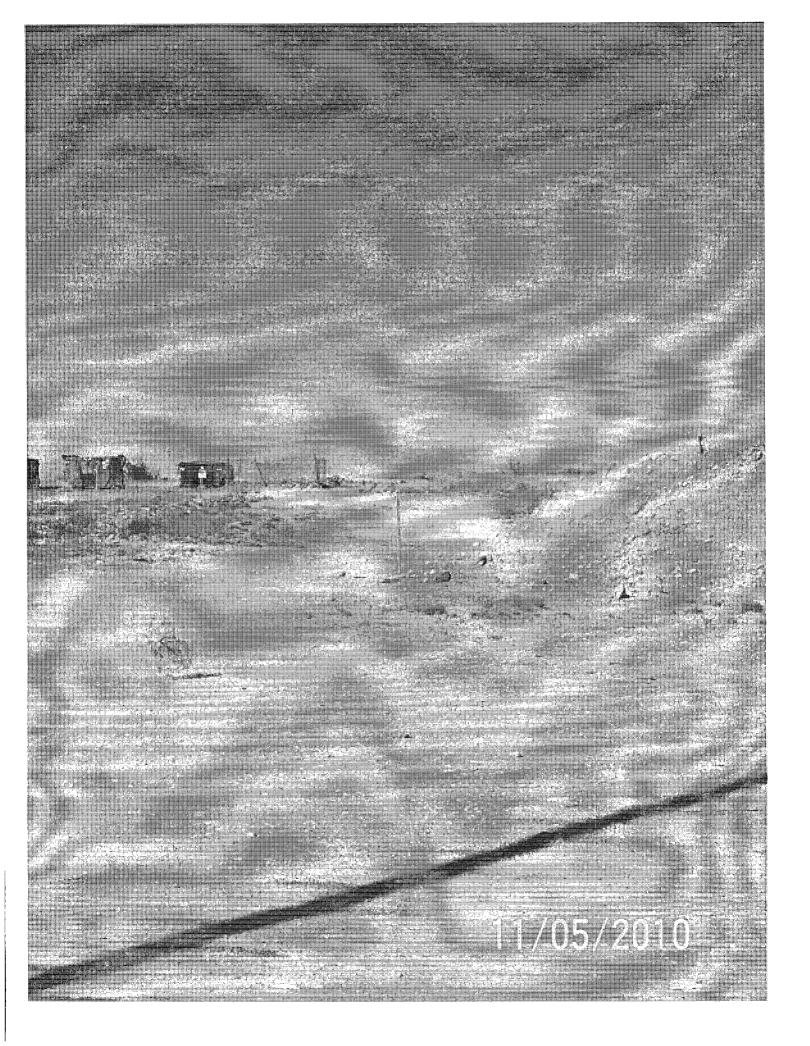
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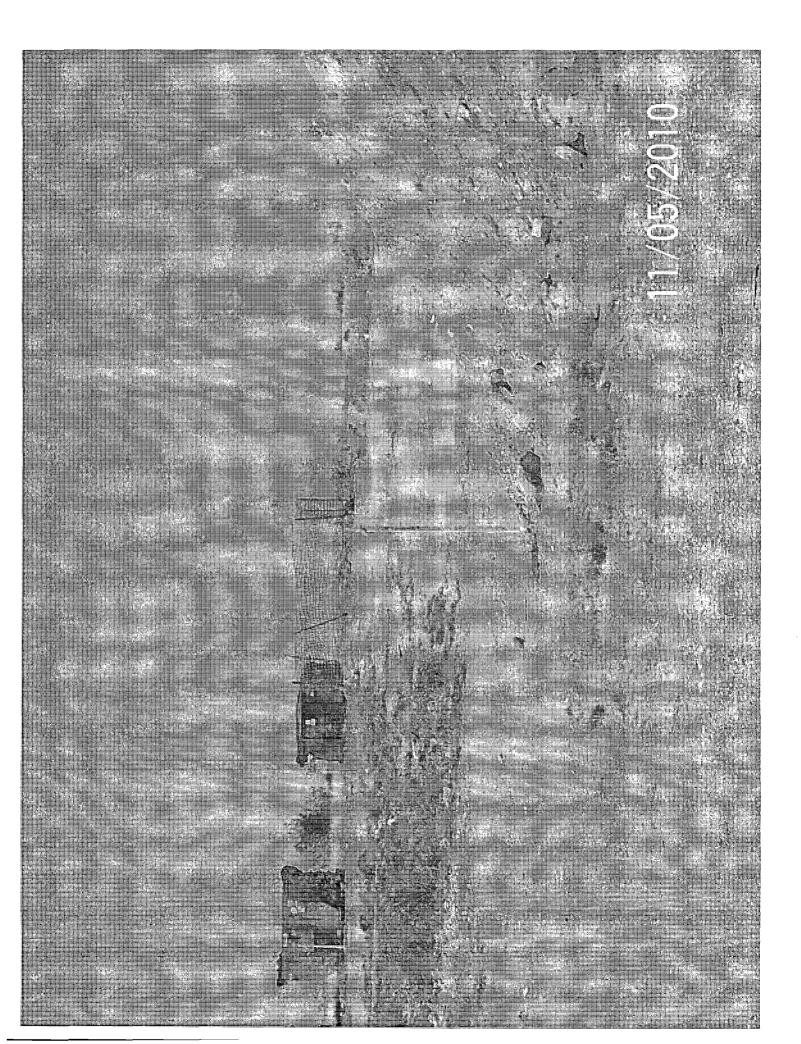
received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any

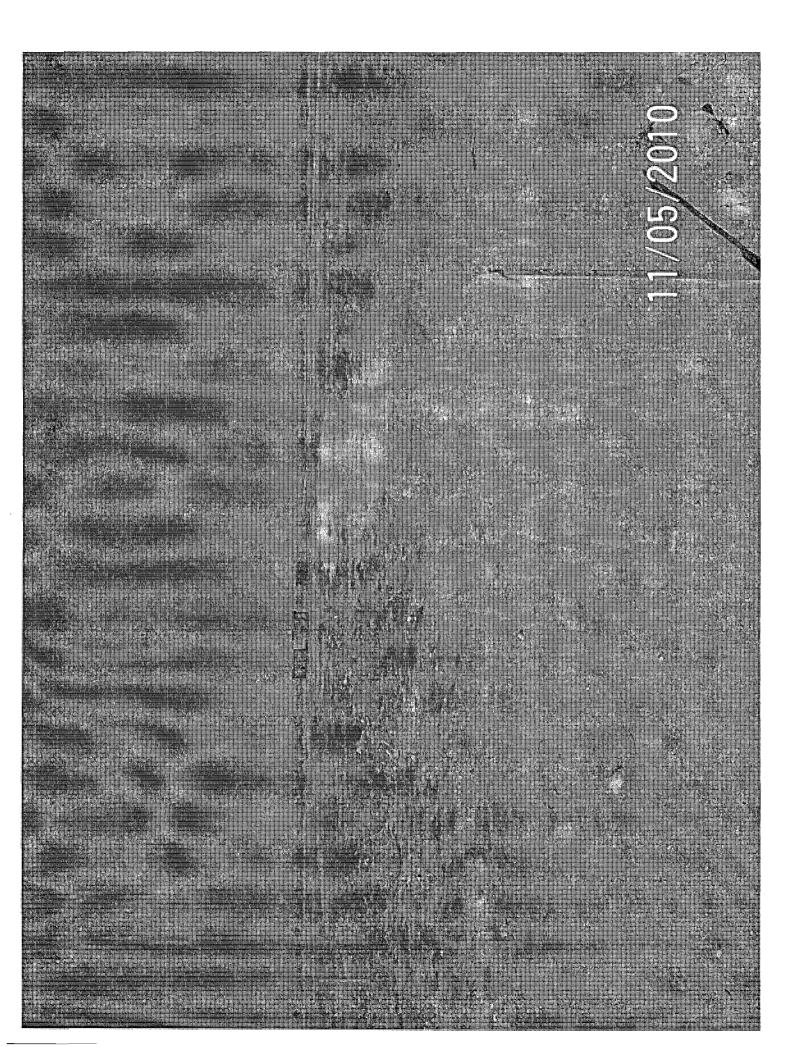
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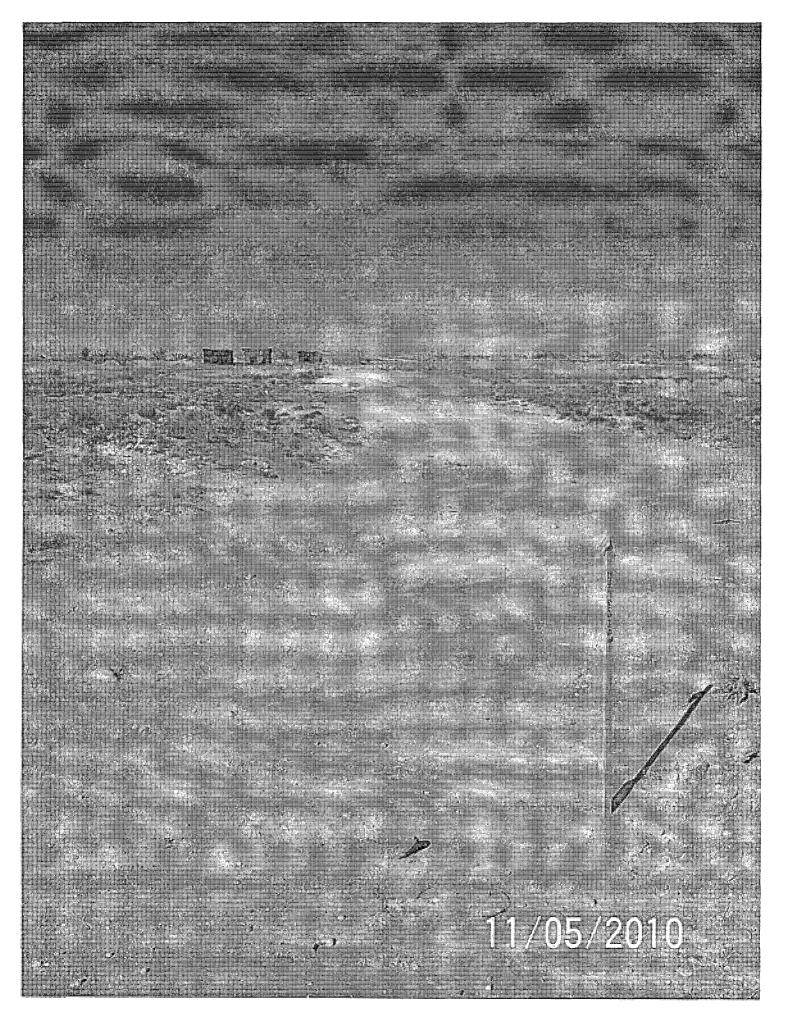


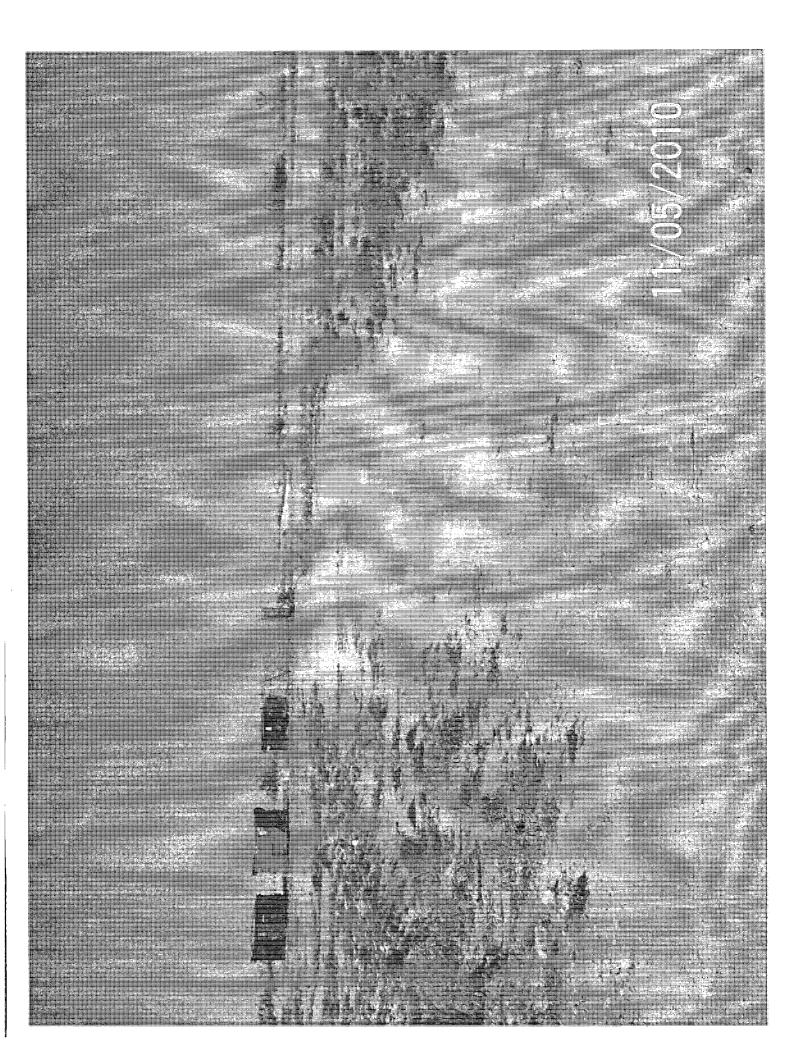


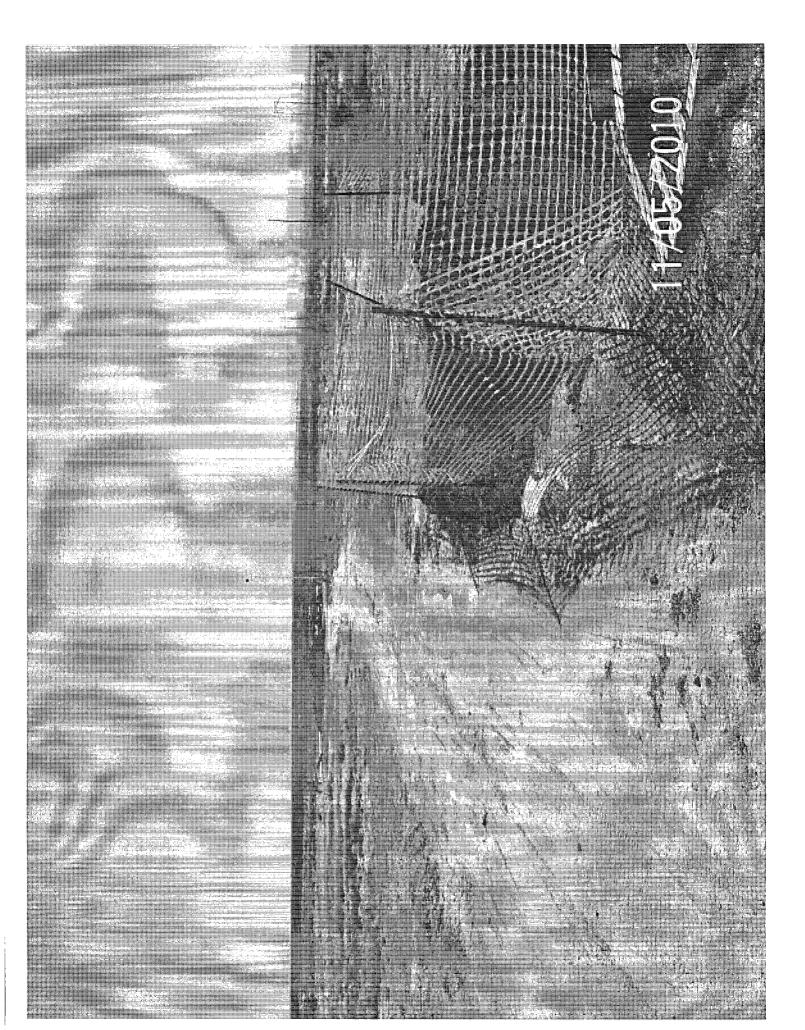


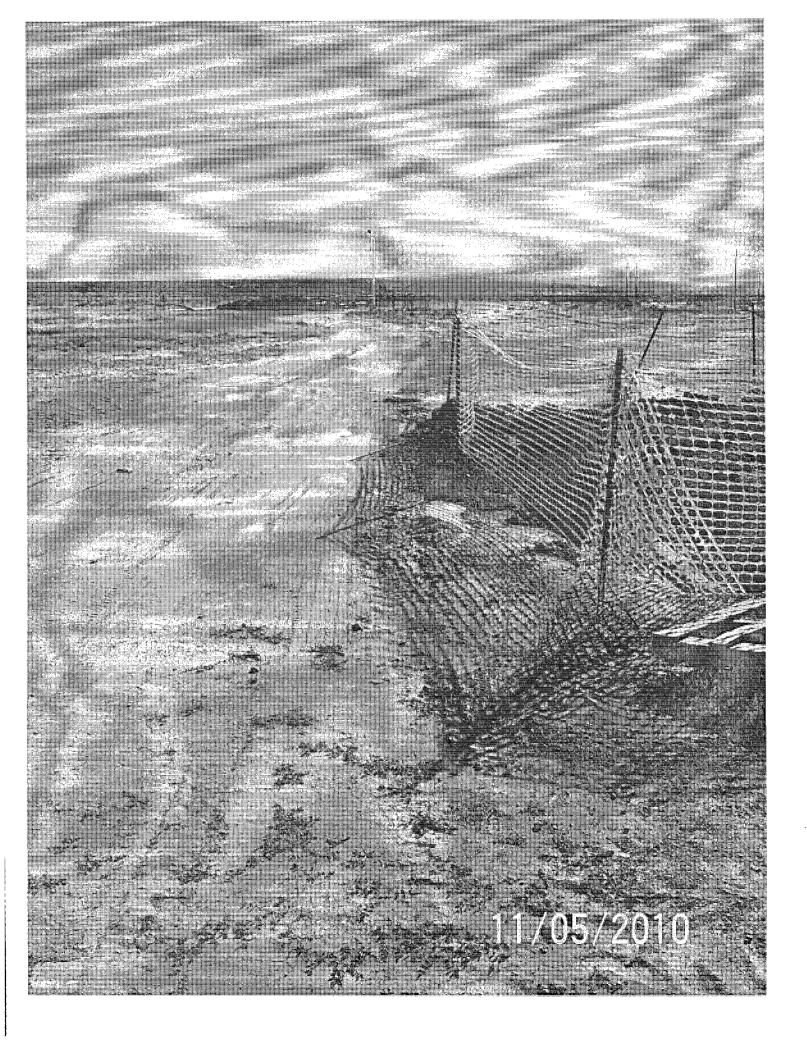


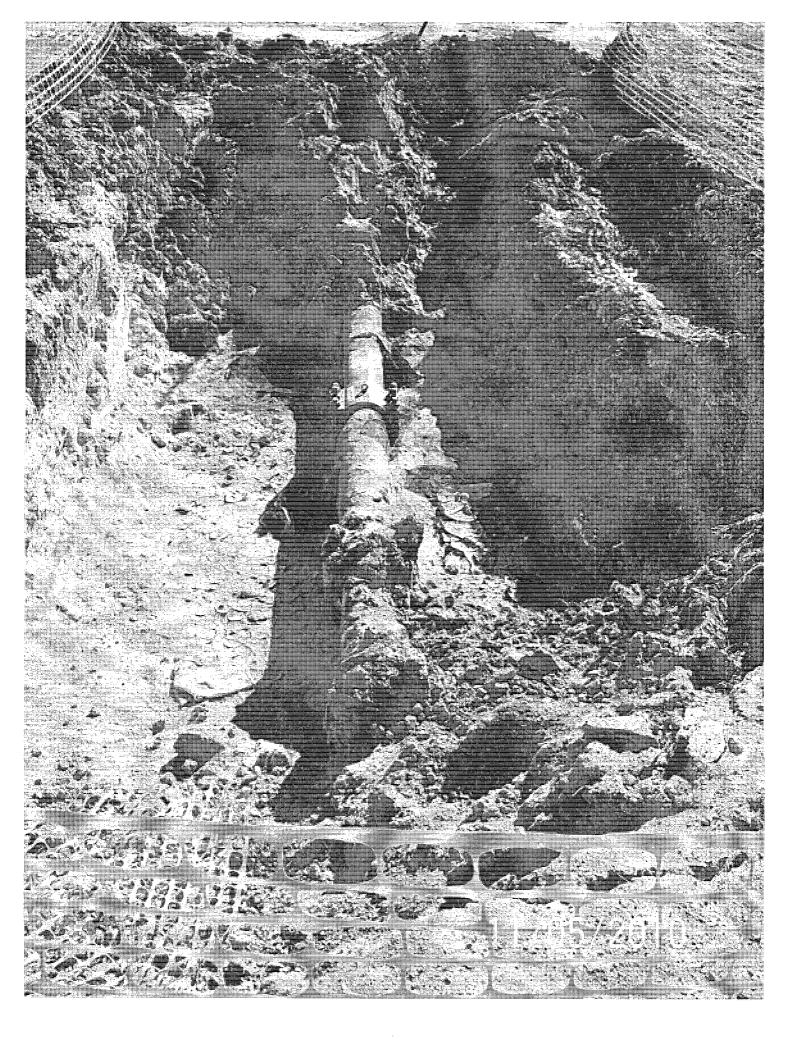












From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, October 08, 2010 4:37 PM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD; Hill, Larry,

EMNRD

Subject:

RE: C-141 Effluent Line Leak

Attachments:

2010-05-03 Effluent Line Leak.pdf; 2010-04-15 Effluent Line Leak.pdf

Carl.

While looking over the effluent line leaks, I could tell if two C-141s had been sent. I have updated the two of them with GPS coordinates and have attached them to this email.

Thank you, Aaron

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Strange, Aaron

Sent: Friday, October 01, 2010 4:19 PM

To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'; 'randy.dade@state.nm.us'

Cc: Moore, Darrell; Lackey, Johnny **Subject:** C-141 Effluent Line Leak

Carl, Randy, Buddy, and Hope,

Please see the attached C-141.

Thanks,

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any

attachments. Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.

District I 1625 N. French Dr., Hobbs, NM 88240 District II
1301 W. Grand Avenue, Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 10/08/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 2 Copies to appropriate District Office in accordance

with Rule 116 on back side of form

Form C-141

Revised October 10, 2003

Release Notifi	cation and Corrective Action	on		
	OPERATOR	\boxtimes	Initial Report	Final Report
ing Co. LLC	Contact: Aaron Strange			
sia, N.M. 88210	Telephone No. 575-748-3311			
	Facility Type: Petroleum Refine	ry		
Mineral Owner		L	ease No.	

Name of Company: Navajo Refin Address: 501 E. Main Street Artes Facility Name: Artesia Plant Surface Owner LOCATION OF RELEASE Unit Letter Section Township Range Feet from the North/South Line Feet from the East/West Line County Latitude ~N32°46'03.8" Longitude ~W104°13'44.4" NATURE OF RELEASE

Type of Release: Spill of Treated Waster Water (by Aggressive Bio. Treatment)	Volume of Release: Unknown	Volume Recovered: ~0 barrels						
Source of Release: Effluent line leak between the Chukka and Mewborne Injection Wells.	Date and Hour of Occurrence: 05/03/2010 Unknown	Date and Hour of Discovery: 05/03/2010 ~ 15:00						
Was Immediate Notice Given?	If YES, To Whom? Notified Carl Chavez from OCD in Santa Fe (505-476-							
Yes No Not Required								
Z res E no E norrequied	3490), OCD Artesia office (575-748-1283), and Hope Monzeglio with the NMED Haz Waste Bureau (505-476-6045).							
By Whom? Darrell Moore	Date and Hour: 05/032010 at ~18:06 to Carl Chavez (OCD Santa Fe),							
	05/03/2010 at ~18:10 to the OCD Artesia office, and 05/03/2010 at ~18:08							
	NMED Haz Waste Bureau.							
Was a Watercourse Reached?	If YES, Volume Impacting the Watercourse.							
☐ Yes 🖾 No	NA							
If a Watercourse was Impacted, Describe Fully.* NA								
Describe Cause of Problem and Remedial Action Taken.*								
On 04/15/2010 at ~ 09:40 a leak was found between the Chukka and Mev	shame Injection Walls. The Effluent I	ing was blooked in at the Weste Weter						
Treater (inside the refinery) to stop the leak and repair the line. The leak v	3							
Treater (fiside the refinery) to stop the leak and repair the fine. The leak v	vas excavated and the time was clampe	ed and is notding.						
Describe Area Affected and Cleanup Action Taken.*								
The area affected was the effluent line between the Chukka and Mcwborn	e Injection Wells at ~ N32°46'03.8".	W104°13'44.4". The leak was excavated						
and the line was clamped and is holding. The leak did not stain the soil. Bottom Hole samples have be collected and are being tested for BTEX, Metals,								
and Anions.	1	, ,						
I hereby certify that the information given above is true and complete to t	he best of my knowledge and understa	and that pursuant to NMOCD rules and						
regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger								
public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability								
should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health								
or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other								
federal, state, or local laws and/or regulations.	1							
Signature: Claum Claum	OIL CONSERVATION DIVISION							
Signature: Warm Stry	\							
Printed Name: Aaron Strange	Approved by District Supervisor:							
Title: Sr. Environmental Technician	Approval Date: Expiration Date:							
E-mail Address: aaron.strange@hollycorp.com	Conditions of Approval:	Attached						

Phone: 575-703-5057

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II 1301 W. Grand Avenue, Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Form C-141

Revised October 10, 2003

Release Notification and Corrective Action

	OPERATOR								
Name of Company: Navajo Refining Co. LLC	Contact: Aaron Strange								
Address: 501 E. Main Street Artesia, N.M. 88210	Telephone No. 575-748-3311								
Facility Name: Artesia Plant	Facility Type: Petroleum Refine	ery							
Surface Owner Mineral Owne		Lease No.							
Surface Owner Infinitely Owner		Lease 140.							
LOCATION OF RELEASE									
Unit Letter Section Township Range Feet from the Nor	th/South Line Feet from the Eas	st/West Line County							
Latitude ~N32°45'54.4" Longitude ~W104°14'17.4"									
NATURE OF RELEASE									
Type of Release: Spill of Treated Waster Water (by Aggressive Bio. Treatment)	Volume of Release: Unknown	Volume Recovered: ~0 barrels							
Source of Release: Effluent line leak between the Chukka and Gaines	Date and Hour of Occurrence:	Date and Hour of Discovery: 04/15/2010							
Injection Wells.	04/15/2010 Unknown	~ 09:40							
Was Immediate Notice Given?		Carl Chavez from OCD in Santa Fe (505-476-							
☐ Yes ☐ No ☐ Not Require		104). Spoke with Art Vollmer from the NMED Haz Waste Bureau (505-476-							
By Whom? Aaron Strange		Date and Hour: 04/15/2010 at ~10:02 to Carl Chavez (OCD Santa Fe),							
		04/15/2010 at ~10:07 to the OCD Artesia office, and 04/15/2010 at ~10:10 to							
Was a Watercourse Reached?	NMED Haz Waste Bureau. If YES, Volume Impacting the W	Internatives							
Yes No	NA								
If a Watercourse was Impacted, Describe Fully.* NA									
Describe Cause of Problem and Remedial Action Taken.*									
On-04/15/2010 at ~ 09:40 a leak was found between the Chukka and Gaines Injection Wells. The Effluent line was blocked in at the Waste Water Treater (inside the refinery) to stop the leak and repair the line. The leak was excavated and the line was clamped and is holding.									
Describe Area Affected and Cleanup Action Taken.*									
The area affected was the effluent line between the Chukka and Gaines	Injection Wells at ~ N32°45'54 4" W	/104°14'17 4" The leak was excavated and							
the line was clamped and is holding The leak did not stain the soil. Both									
from the leak that occurred on 2/20/2010.	om nord dumprido in dre domocida una c	costs for the first count was just a few foot							
The short of the table in formation of the short of the same of th	the best of the land of the land	NMOCD -11							
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger									
public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health									
or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other									
federal, state, or local laws and/or regulations.									
Signature: Clann Liny	OIL CONSERVATION DIVISION								
Printed Name: Aaron Strange	Approved by District Supervisor:								
Title: Sr. Environmental Technician	Approval Date:	Expiration Date:							
E-mail Address: aaron.strange@hollycorp.com	Conditions of Approval:								
Date: 10/08/2010 Phone: 575-703-5057									

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Friday, October 01, 2010 4:19 PM

To:

Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV; Dade, Randy, EMNRD

Cc: Subject: Moore, Darrell; Lackey, Johnny

C-141 Effluent Line Leak

Attachments:

2010-09-27 Effluent Line Leak.pdf

Carl, Randy, Buddy, and Hope,

Please see the attached C-141.

Thanks.

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Form C-141 Revised October 10, 2003

Release Notification and Corrective Action

						OPERA?	ror	_	🛛 Initi	al Report		Fina	l Report
Name of Company: Navajo Refining Co. LLC					Contact: Aaron Strange								
Address: 501 E. Main Street Artesia, N.M. 88210				Telephone No. 575-748-3311									
Facility Name: Artesia Plant				Facility Type: Petroleum Refinery									
Surface Owner Mineral Owner						Lease N	Vo						
LOCATION OF RELEASE													
Unit Letter	Section	Township	Range			South Line	Feet from the	East/\	West Line	County	· · · · · · · · · · · · · · · · · · ·		
	11						**********						
Latitude ~N32°45'54.5" Longitude ~W104°14'17.4"													
Type of Pole	anna: Snill of	Transad Was	ton Water			OF RELI			Voluma	Panovarad:	. () have	role	· · · · · · · · · · · · · · · · · · ·
Type of Release: Spill of Treated Waster Water (by Aggressive Bio. Treatment)				Volume of Release: Unknown Volume Recovered: ~0 barrels									
Source of Release: Effluent line leak between the Chukka and Gaines Injection Wells.			Date and Hour of Occurrence: Date and Hour of Discovery: 09/27/20 09/27/2010 ~ 07:20 (Unknown) ~ 08:00						7/2010				
Was Immedia		iven?					Whom? Spoke w			om OCD in	Santa	Fe (50	5-476-
		\boxtimes	Yes [No 🗌 Not Rec	quired	3490), left	a voicemail with	OCD A	rtesia Offic	e (575-748-	1283 €	extensi	on
							eft a voicemail wi	ith Hop	e Monzegli	o from the N	MED	Haz V	Vaste
By Whom? A	Aaron Strang	e				Bureau (505-476-6045). Date and Hour: 09/28/2010 at ~07:31 to Carl Chavez (OCD Santa Fe),							
2) Million Strange					09/28/2010 at ~08:12 to the OCD Artesia office, and 09/28/2010 at ~08:16 to								
Was a Water	Dood Dood	h a d 2				NMED Haz Waste Bureau. If YES, Volume Impacting the Watercourse.							
was a water	course Reaci		Yes 🗵	No		NA							
If a Watercou	urse was Imn	acted Descr	ibe Fully 3	· NA									
Describe Cau						· · · · · · · · · · · · · · · · · · ·			 ,	· · · · · · · · · · · · · · · · · · ·			
On 09/27/20	10 at ~ 08:00) a leak was f	ound betw	een the Chukka an						l in at the W	aste W	ater T	reater
(inside the re	finery) to sto	op the leak an	id repair th	ne line. The leak wa	as exca	ivated and the	line was clamped	d and is	holding.				
Describe Are	a Affected a	nd Cleanup A	Action Tak	*									
The area affe	cted was the	effluent line	between t	he Chukka and Ga	ines In	jection Wells	at ~ N32°45'54.5	5", W10)4°14'17.4''	The leak v	vas exc	avatec	i to
	make repairs and the soil was placed into roll-off bins. The leak did not stain the soil; however Navajo will dispose of the excavated soil per analytical												
results. Bottom Hole samples will be collected and tested for BTEX, Metals, and Anions. This leak was just a few feet from the leaks that occurred on 2/20/2010 and 4/15/2010.							on						
				is true and comple									
				nd/or file certain re se of a C-141 repor									
				investigate and re									
				tance of a C-141 re									
federal, state,	, or local law	s and/or regu	lations.	·	 , .								
Signature: Manyan Stur				" OIL CONSERVATION DIVISION "									
3 44	40.00	<u> </u>		to the									
Printed Name: Aaron Strange				Approved by District Supervisor:									
Title: Sr. Environmental Technician				Approval Date: Expiration Date:									
Tine, St. Ell	in Onniental	Commetan			Approvar Date.		Date.			· · · · · -			
E-mail Address: aaron.strange@hollycorp.com			Conditions of Approval:										
Date: 10/01/2	2010]	Phone: 575-703-50	57								

From: Chavez, Carl J, EMNRD

Sent: Tuesday, September 28, 2010 1:04 PM

To: Chavez, Carl J, EMNRD Cc: Dade, Randy, EMNRD

Subject: Artesia Refinery (GW-028) Effluent Line Leaks & Note to File

Aaron Strange called this morning at around 7:45 a.m. to report a recent discovery of a leak (~ 15 ft. from the 2 previous C-141 releases) along the effluent line to the UIC disposal wells ~ 1 mile west of the Pecos River. The lines are driven daily and this one was noticed with corrective action (installation of clamp seal on line and excavation of contaminated soils).

Went over Quarterly Effluent Monitor Reports for UICI-008 to identify chemicals of concern to verify remediation occurred and was completed, i.e., BTEX and Metals. Found one C-141 release form dated 2/20/2010 for one of the two past releases. Requested soil sample data from the previous 2 releases mentioned by Aaron along the effluent line. Analyticals from this most recent release.

Aaron will be sending a C-141 for this release. The refinery is planning to replace the entire line next year. Randy Dade is planning to inspect the line along the release location. I asked whether the location of the past releases is located near a bend in the line due to their proximity. Aaron did not know at the time of the call.

Ok.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD

Sent: Tuesday, April 27, 2010 7:44 AM

To: 'Lackey, Johnny'

Cc: VonGonten, Glenn, EMNRD; Monzeglio, Hope, NMENV; Whatley, Michael; Moore, Darrell

Subject: RE: NAVAJO UNDERGROUND LINES

Thanks for the clarification.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]

Sent: Thursday, April 22, 2010 11:27 AM

To: Chavez, Carl J, EMNRD

Cc: VonGonten, Glenn, EMNRD; Monzeglio, Hope, NMENV; Whatley, Michael; Moore, Darrell

Subject: RE: NAVAJO UNDERGROUND LINES

Carl. See my responses below.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny Lackey @hollycorp.com

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, April 21, 2010 4:34 PM

To: Lackey, Johnny

Cc: VonGonten, Glenn, EMNRD; Monzeglio, Hope, NMENV

Subject: RE: NAVAJO UNDERGROUND LINES

Johnny:

Sorry, I don't think OCD is very comfortable with an approach to leak detection at pipelines where the refinery implements a repair or replacement without corrective actions or investigation to determine the extent of the contamination, but attempts to rely on downgradient monitoring wells, recovery systems, or the addition of a monitor well to detect any contamination from leaky pipelines or infrastructure at a refinery.

If allowed, this would be allowing the refinery to openly contaminate the water resources of the state. However, this method with active investigation and corrective action to remediate or remove point source(s) contamination may address this concern, but otherwise, OCD would be allowing Navajo Refining Company to openly contaminate New Mexico's water resources. OCD cannot allow this.

Navajo: We're not suggesting that Navajo depend on existing monitor wells, recovery trenches, etc. to detect leaks from underground lines, that's why we want to implement the Praxair technology on the lines we have taken over from Holly Energy Partner's and add these to our routine testing to detect any leaks that may be present through routine testing. We currently hydro test lines that Navajo operates and if leaks are detected we take the necessary steps to repair/remediate etc. My comment about the existing monitor wells and recovery trenches was to point out that after the leak is repaired and cleaned up, we already have these detection methods in place and felt it would be unnecessary to add additional monitoring for these new sources,

Regarding the discovery of pipeline releases, yes C-141s are needed and I notice that while the contents of Tank 413 (older distillate tank) is listed in your most recent submittal of above ground tank schedule for the discharge permit, Tank 115 and its information has not been updated on our above ground tank schedule. What does Tank 115 contain and how old is it? Please update the tank list and tank diagram to include all updated tanks that are missing from the existing table in the OCD file by May 5, 2010 so we may keep the tank list and any new updated tank diagrams showing the location of each new tank installed by the refinery. Thank you.

Navajo: I answered the question regarding Tank 115 in a previous email, however, the line that leaked was in the general proximity of Tank 115, not connected to Tank 115. This is a product line that we took over from HEP as described in my earlier request to the OCD for consideration of the Praxair Technology for underground piping leak detection. The product in the line is gasoline and corrected action will be taken to clean up the spill area.

Hopefully this clears up any confusion regarding these sources.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: <u>CarlJ.Chavez@state.nm.us</u>

Website: http://www.emnrd.state.nm.us/ocd/ index.htm (Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]

Sent: Wednesday, April 21, 2010 4:10 PM

To: Chavez, Carl J, EMNRD

Cc: Whatley, Michael; Moore, Darrell; Douglas_Wilson@Praxair.com

Subject: RE: NAVAJO UNDERGROUND LINES

Thanks for the prompt reply Carl.

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The ultimate advantage of the TracerTight leak detection is the identification of a true failure at the onset, when the failure mechanism is very small and produces little effect to the environment. The sensitivity of TracerTight system, 0.05 gallons per hour, cannot be matched by either hydrostatic testing or GWUT inspection. It would be probable that leaks missed by these two other methods would continue to increase in size and produce contamination levels detrimental to the environment. Not to mention the disruption in refinery operations and water waste during hydrostatic testing methods.

Navajo is best served both environmentally and operationally by the TracerTight leak detection methods. This benefit is also compounded by the fact that buried piping can be tested in conjunction with tank testing already in progress. Any associated piping downstream from an inoculated tank is testable using the TracerTight method. If a leak is detected

through use of this technology, the line is dug up, if a leak is confirmed it is repaired and areas around the leak are UT'd to determine if there are additional areas that may need further investigation, repair or replacement of that segment of line.

Navajo will submit the C-141 forms for these leaks. The leaks have been repaired. We currently have monitor wells and recovery trenches down gradient from these leaks.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, April 21, 2010 6:55 AM

To: Lackey, Johnny

Cc: Whatley, Michael; Moore, Darrell; Schmidlen, Jeff; Douglas Wilson@Praxair.com

Subject: RE: NAVAJO UNDERGROUND LINES

Johnny:

Good morning. The OCD is in receipt of your request for approval of the Praxair technology and is evaluating your request. I am curious as to why Navajo is also not including the ultrasonic wall thickness (Impro) monitoring that complimented Praxair's technology at the time OCD received joint presentations from Praxair and Impro. Is Navajo forgetting the Impro services component of pipeline testing to determine when wall thickness decreases to a point of repair and/or replacement?

Also, OCD will be checking the chemicals in the associated tanks referenced in the leaky pipelines as over time these leaks become point sources for ground water contamination and depending on the days, months, years, etc. Therefore, by receipt of this e-mail, please submit a C-141 for the releases so Navajo and OCD can track corrective actions performed to fix the leaks. Also, if Navajo did not dig out around the leaks to remove the source of contamination, it should proposed monitoring of the ground water downgradient at a minimum to determine if there is a ground water contamination problem downgradient from the leaky lines.

Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

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E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]

Sent: Tuesday, April 20, 2010 12:51 PM

To: Chavez, Carl J, EMNRD

Cc: Whatley, Michael; Moore, Darrell; Schmidlen, Jeff; Douglas_Wilson@Praxair.com **Subject:** NAVAJO UNDERGROUND LINES

Carl,

As you are aware, Navajo has employed Praxair Services, Inc. (Praxair) to set up a comprehensive tank leak detection program throughout the Artesia and Lovington refineries for the majority of our product storage tanks. (The OCD has approved this technology for tank leak detection at Navajo's refineries).

Navajo recently assumed operating responsibilities for 41 pipeline segments located within the Artesia Refinery from Holly Energy Partners (they provide pipeline and terminal services for Holly Corp.), and each of these segments have short runs of underground piping that will be added to our underground line testing program. Navajo also assumed operating responsibilities for some Holly Energy Partner's pipelines at Lovington also. Navajo is in the process of identifying these lines and they will be added to the underground line testing program at Lovington.

Praxair provides leak detection technology for underground pipe testing. To test Praxair's technology for underground piping leak detection, Navajo proactively had Praxair install monitors on selected segments of piping that we assumed operating responsibilities from Holly Energy Partner's. Praxair injected their tracer into these selected segments (13 lines) and their sampling results identified two lines that indicated a leak was present (See attached Praxair Report). Both lines that had suspected leaks are included in the package of assets acquired from Holly Energy Partners. The lines with potential leaks are as follows:

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- 2) A section just south of Tank 115 (Sketch 708).

Both lines were "day lighted" and very small leaks (drips) were discovered. There was no saturation of the soil around these leaks and no free product was present. The leaks were repaired.

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Attached is a spreadsheet listing the additional lines to be added to our test schedule, copies of the isometric drawings for each line segment (The sketch number on the spreadsheet references the corresponding isometric drawing) and Praxair's Report detailing the trial test results mentioned above.

Navajo requests approval from the OCD to utilize Praxair's Leak Detection Technology for underground pipe testing at our Artesia and Lovington refineries. Navajo and Praxair will be happy to meet with the OCD in Santa Fe to present this technology in detail.

Thanks,

Johnny Lackey
Environmental Manager
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Office - 575-746-5490
Cell - 972-261-8075
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From:

Chavez, Carl J, EMNRD

Sent:

Wednesday, April 21, 2010 4:18 PM

To:

'Strange, Aaron'

Cc:

Chavez, Carl J, EMNRD

Subject:

Release Notifications & C-141s for Navajo Refining Company (GW-14 and GW-28)

Aaron:

OCD would appreciate notification e-mails with a copy to the OCD District Supervisor on releases with an indication of whether a C-141 Form is to follow. As I mentioned at refineries, where the discovery of leakage from pipelines, tanks, etc. are not known, it is best to take the conservative approach to reporting all of these type of spills/releases where the volume is not known. And on all fire and explosions, Navajo Refining Company seem to be following the permit condition on reporting, etc. Thank you.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: <u>CarlJ.Chavez@state.nm.us</u>

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From:

Chavez, Carl J, EMNRD

Sent:

Wednesday, April 21, 2010 4:34 PM

To:

'Lackey, Johnny'

Cc:

VonGonten, Glenn, EMNRD; Monzeglio, Hope, NMENV

Subject:

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From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]

Sent: Wednesday, April 21, 2010 4:10 PM

To: Chavez, Carl J, EMNRD

Cc: Whatley, Michael; Moore, Darrell; Douglas_Wilson@Praxair.com

Subject: RE: NAVAJO UNDERGROUND LINES

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Sent: Wednesday, April 21, 2010 6:55 AM

To: Lackey, Johnny

Cc: Whatley, Michael; Moore, Darrell; Schmidlen, Jeff; Douglas Wilson@Praxair.com

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From:

Chavez, Carl J, EMNRD

Sent:

Thursday, April 15, 2010 10:15 AM

· To: Cc: Chavez, Carl J, EMNRD Dade, Randy, EMNRD

Subject:

Navajo Release Notification (GW-028)

Aaron Strange notified me today at 10:01 a.m. about a release at their effluent line to WDW-2 or 3? He said they blocked in discharge to the wells and he thinks they are routing effluent to ABTs? The leak was noticed around 9:40 a.m. and is within 100 to 150 feet of the injection well, so the leak is not near the Pecos River. The cause is a suspected leaky clamp on the line.

By receipt of this note, if OCD Artesia could investigate and while you're there inquire about the location of the last leak (~ 1 mo. ago) along the discharge line. OCD does not recall receiving a C-141 for that release called in by Darrell Moore and we don't know the details. Thanks.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/ index.htm (Pollution Prevention Guidance is under "Publications")

From:

Strange, Aaron [aaron.strange@hollycorp.com]

Sent:

Wednesday, March 31, 2010 7:52 AM

To:

Chavez, Carl J, EMNRD

Subject:

RE: Excavated Line Testing Soil.

Hello Carl,

There was no release associated with excavated soil mentioned below. A section of pipe was excavated for inspection in conjunction with the line testing. No leaks were found, however the soil removed had visual signs (appeared gray) of historic contamination.

Aaron Strange

Environmental Technician, Senior

Off: (575) 746-5468 Cell: (575) 703-5057

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Tuesday, March 30, 2010 2:59 PM

To: Strange, Aaron

Subject: RE: Excavated Line Testing Soil.

Aaron:

Thanks for the submittal. Is there a C-141 for this release? Thanks.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

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E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/ index.htm (Pollution Prevention Guidance is under "Publications")

From: Strange, Aaron [mailto:aaron.strange@hollycorp.com]

Sent: Wednesday, March 17, 2010 3:45 PM **To:** Kim Flowers; Chavez, Carl J, EMNRD **Subject:** Excavated Line Testing Soil.

Kim,

Please see the attachment requesting the approval of excavated soil from line testing north of the Diesel Boosters from the Artesia Plant.

Thanks,

Aaron Strange

Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057 CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged, proprietary and/or confidential. If you

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District I 1625 N. French Dr., Hobbs, NM 88240 District II 1301 W. Grand Avenue, Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 1220 S. St. Francis Dr., Santa Fe, NM 87505

Date: 03/05/2010

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Revised October 10, 2003 Submit 2 Copies to appropriate

Form C-141

District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action OPERATOR ☐ Initial Report Final Report Name of Company: Navajo Refining Co. LLC Contact: Aaron Strange Address: 501 E. Main Street Artesia, N.M. 88210 Telephone No. 575-748-3311 Facility Name: Artesia Plant Facility Type: Petroleum Refinery Surface Owner Mineral Owner Lease No. LOCATION OF RELEASE Unit Letter Feet from the North/South Line Feet from the East/West Line Section Township Range County Latitude Longitude NATURE OF RELEASE Type of Release: Spill of Treated Waster Water (by Aggressive Bio. Volume of Release: Unknown Volume Recovered: ~0 barrels Treatment) Source of Release: Effluent line leak between the Chukka and Gaines Date and Hour of Occurrence: Date and Hour of Discovery: 02/20/2010 Injection Wells. $02/20/2010 \sim 12:10$ ~ 12:30 Was Immediate Notice Given? If YES, To Whom? Left a voicemail with Carl Chavez with OCD in Santa Fe (505-476-3490), left a voicemail with Hope Monzeglio from the NMED Haz Waste Bureau (505-476-6045), and left a voicemail with the OCD Artesia Office (575-748-1283 extension 104). OCD (Artesia) called back. By Whom? Darrell Moore Date and Hour: 02/20/2010 at ~13:50 to Carl Chavez (OCD Santa Fe), 02/20/2010 at ~14:15 to Hope Monzeglio (NMED Haz Waste Bureau), and 02/31/2010 at $\sim 14:17$ to the OCD Artesia office. Was a Watercourse Reached? If YES, Volume Impacting the Watercourse. ☐ Yes 🛛 No NA If a Watercourse was Impacted, Describe Fully.* NA Describe Cause of Problem and Remedial Action Taken,* On 02/20/2010 at ~ 12:30 the waste water effluent line began to leak between the Chukka and Gaines Injection Wells. The effluent line was blocked in at the Waste Water Treater (inside the refinery) at ~ 13:04 on 02/20/2010 to stop the leak and repair the line. The leak was excavated and the line was clamped and is holding. Describe Area Affected and Cleanup Action Taken.* The area affected was the effluent line between the Chukka and Gaines Injection wells. The leak was excavated to make repairs and the soil was placed into six roll off bins. The leak did not stain the soil; however Navajo will dispose of the excavated soil per analytical results. I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. OIL CONSERVATION DIVISION Printed Name: Aaron Strange Approved by District Supervisor: Title: Sr. Environmental Technician Approval Date: Expiration Date: E-mail Address: aaron.strange@hollycorp.com Conditions of Approval: Attached

Phone: 575-703-5057

GW - 028

C-141s (2)

Chavez, Carl J, EMNRD

From: Combs, Robert < Robert.Combs@HollyFrontier.com>

Sent: Tuesday, September 01, 2015 10:42 AM

To: Chavez, Carl J, EMNRD

Subject: Test 2

Attachments: Revised WW line investigation plan.pdf

Carl,

Please let me know if you receive this file or if it again is encrypted. You should not have to register to read our emails. This is a problem on our end and we will work to resolve it.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159

Artesia, NM 88211-0159 office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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Mr. Scott Denton Environmental Manager Navajo Refining Company, LLC 501 East Main Artesia. New Mexico 88211 ARCADIS U.S., Inc.
2929 Briarpark Drive
Suite 300
Houston
Texas 77042
Tel 713 953 4800
Fax 713 977 4620
www.arcadis-us.com

Subject:

Revised Potential Soil Response Action Levels for Wastewater Pipeline Break near the Evaporation Ponds Area, Navajo Refining Company Artesia Refinery

Dear Mr. Denton:

ARCADIS is providing this letter discussing potential soil response action levels in relation to the reported release of wastewater that occurred approximately 1500 feet south of the inactive former Evaporation Ponds (EPs) associated with the Navajo Refining Company, L.L.C. (NRC) Artesia Refinery (Refinery). The EPs are a Resource Conservation and Recovery Act (RCRA) regulated unit. Documentation of the information relevant to the release was provided on June 11, 2015. Based on conversations with the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD), the proposed assessment has been revised.

It is our understanding that the release occurred due to a break in the pipeline that conveys treated wastewater from the Refinery to injection wells located approximately 12 miles east of the Refinery. The break occurred approximately three miles east of the Refinery, south of the Evaporation Ponds (Figure 1).

The wastewater that is conveyed through the pipeline is sampled quarterly and analyzed for waste characterization purposes. A copy of the first quarter 2015 wastewater analytical report is provided in Attachment 1 to this letter. The sample was analyzed for total metals, anions, cations, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), corrosivity, reactivity, ignitability, specific conductance, specific gravity, total dissolved solids (TDS), and pH. In addition, the sample was analyzed for eight metals using the toxicity characteristic leaching procedure (TCLP).

The analytical results indicate that the wastewater is not corrosive, not reactive, not ignitable, not toxic (no TCLP metals detected), and contains no VOCs above the New Mexico Water Quality Control Commission (WQCC) standards. The following compounds were reported above the WQCC standards:

ENVIRONMENT

Date

August 21, 2015

Contact:

Pamela R. Krueger

Phone:

713.953.4816

Email:

pam.krueger@arcadis-us.com

Our ref: TX001155

ARCADIS

Mr. Scott Denton
August 21, 2015

- Phenol was reported at 0.0081 mg/L, above the WQCC standard of 0.005mg/L
- Iron was reported at 3.7 mg/L, above the WQCC standard of 1.0 mg/L
- Manganese was reported at 0.25 mg/L, above the WQCC standard of 0.2 mg/L
- Chloride was reported at 300 mg/L, above the WQCC standard of 250 mg/L
- Fluoride was reported at 11 mg/L, above the WQCC standard of 1.6 mg/L
- Sulfate was reported at 2,100 mg/L, above the WQCC standard of 600 mg/L
- TDS was reported at 3,710 mg/L, above the WQCC standard of 1,000 mg/L

ARCADIS understands that the OCD requested that a soil investigation and remediation be performed, as well as a limited groundwater investigation.

Although the wastewater sample analytical results do exceed the WQCC standards for water quality parameters, including chloride, it should be noted that the area in which the release occurred is known to have elevated chloride concentrations in soil and groundwater, along with other cations, anions and total metals. In 2013, as part of the Phase IV Corrective Action Investigation of the EPs, ARCADIS collected soil samples from 12 soil borings and analyzed the samples for thirteen total metals and for three anions, including chloride, fluoride, and sulfate. A statistical evaluation of the background soil sample results was performed to determine an appropriate upper tolerance limit (UTL) for the data obtained. A copy of the statistical evaluation memo is provided as Attachment 2 to this letter, including a table with a summary of the UTLs calculated for each parameter evaluated.

Figure 1 shows the locations of the background soil samples collected in 2013 (locations BG-01 through BG-12). The borings were located on both sides of the Pecos River, in locations both to the east and west of the EPs. These areas were selected based on their proximity to the EPs, yet outside of the RCRA-regulated unit and outside of the area of potential impacts from the operation of the EPs. Thus, these soil borings were considered representative of the native conditions of soil in the vicinity of the EPs. As a result, it would be appropriate to use the UTLs from this background soil study as alternative action levels for screening potential impacts from the wastewater line release.

As per the OCD requests, soil samples and groundwater samples will be collected as close as possible to the pipeline break and from a location approximately 50 feet to the northwest, or hydraulically upgradient, of the pipeline break. Two soil borings will

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be installed and converted into temporary wells. The proposed locations of these borings/temporary wells are provided on Figure 1.

The soil borings will be installed by a State of New Mexico licensed well driller, using a truck-mounted hollow-stem auger rig. Soil samples will be collected continuously and screened using a photo-ionization detector (PID) and visual observations. Discrete soil samples will be collected for laboratory analysis from the following depths below ground surface: 0-1 feet (surface), 3-4 feet (below the 3 foot deep pipeline), and capillary zone above encountered groundwater. The soil samples will be analyzed for the following:

- Total Petroleum Hydrocarbons (TPH):
 - o Gasoline Range Organics (GRO)
 - Diesel Range Organics (DRO)
 - o Oil Range Organics (ORO)
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- Chloride
- Fluoride
- Sulfate
- Iron
- Manganese
- Phenol

The soil analytical results will be compared to the calculated background UTL (chloride, fluoride, sulfate, iron, and manganese). For parameters that do not have a calculated background UTL, the analytical results will be compared to the lower of the OCD spill cleanup guidelines and/or the residential or soil-leaching-to-groundwater soil screening levels (SSLs) published by the New Mexico Environment Department. Table 1 presents the proposed screening values for the analytical suite.

The soil borings will be extended to five feet below the observed depth of groundwater. The temporary monitoring wells will be constructed of 2-inch polyvinyl chlorinated (PVC) casing with 5 feet of 0.010-inch well screen. Solid 2-inch diameter PVC casing will be attached to the screen interval and extended to the ground surface. Clean sand will be placed in the annular space to approximately 2 feet above the well screen top as filter pack, then a two-foot bentonite seal will be placed above the filter pack. The PVC casing will be cut off approximately 3 feet above the ground surface. Since the wells will be temporary, a manhole and pad will not be installed.

Both temporary wells will be developed by bailing or pumping to remove fine-grained materials. Water quality parameters will be monitored throughout the development process and development will be considered complete when the parameters have

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stabilized. The volume of development water will be recorded and the development water will be disposed of in the refinery process wastewater system.

Groundwater samples will be collected from each of the two temporary monitoring wells, unless there is more than 0.03 feet of phase-separated hydrocarbons (PSH) present in the wells. Groundwater samples will be collected no sooner than 24 hours after the temporary wells have been developed. The groundwater samples will be analyzed for the following:

- TPH (GRO, DRO, ORO)
- BTEX
- Phenol

The groundwater analytical results will be compared to the WQCC standards. The WQCC standards do not include a value for TPH, therefore, the NMED screening value for TPH in groundwater will be used for comparison. Table 2 provides a summary of the groundwater screening values.

A letter report will be prepared and submitted to OCD, documenting the field activities and the analytical results of the investigation. If any of the soil or groundwater results exceed the proposed screening levels, then additional delineation may be warranted and will be proposed in the letter report.

Should you have any questions or comments, please feel free to contact me at 713.953.4816.

Sincerely,

ARCADIS U.S., Inc.

Pamela R. Krueger Principal-in-Charge

Enclosures:

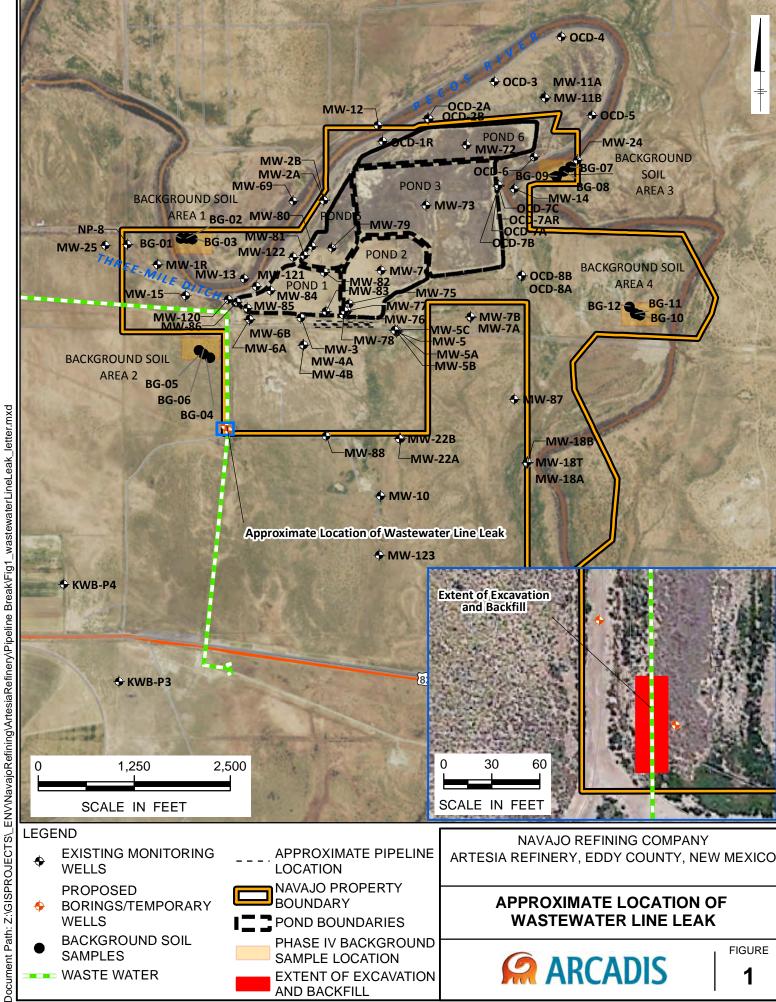
Figure 1 Table 1 Table 2

Attachment 1: Wastewater Analytical Report

Attachment 2: EP Background Soil Statistical Evaluation Memo



Figure



EXISTING MONITORING WELLS

PROPOSED

- **BORINGS/TEMPORARY** WELLS
- BACKGROUND SOIL SAMPLES
- WASTE WATER

APPROXIMATE PIPELINE LOCATION

NAVAJO PROPERTY **BOUNDARY**

POND BOUNDARIES

PHASE IV BACKGROUND SAMPLE LOCATION

EXTENT OF EXCAVATION AND BACKFILL

NAVAJO REFINING COMPANY ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

APPROXIMATE LOCATION OF WASTEWATER LINE LEAK



FIGURE



Tables

Table 1
Proposed Action Levels for Soil Delineation
Wastewater Line Leak, Artesia, NM

Parameter	OCD Spill Guideline ^a (mg/kg)	Background UTL (mg/kg)	Residential SSL (mg/kg)	DAF 20 SSL (mg/kg)
TPH GRO	100		-	
TPH DRO	100		1000	
TPH ORO	100		1000	
Benzene	10		17.8	0.0380
Ethylbenzene	-		75.1	0.262
Toluene			5228	12.1
Xylenes	-		871	2.98
BTEX	50		-	
Chloride		5264		
Fluoride		17.9		
Sulfate	-	9336	-	
Iron		17344		
Manganese		488	-	
Phenol			18490	52.3

^a Ranking criteria score of >19 based on depth to groundwater Values shaded in grey are the proposed action levels

BTEX = benzene, toluene, ethylbenzene, total xylenes combined

DAF 20 = dilution attenuation factor of 20

DRO = diesel range organics

GRO = gasoline range organics

mg/kg = milligrams per kilogram

ORO = oil range organics

SSL = soil screening level

TPH = total petroleum hydrocarbons

UTL = upper tolerance limit

Table 2
Proposed Action Levels for Groundwater Delineation
Wastewater Line Leak, Artesia, NM

Parameter	WQCC Standard (mg/L)	NMED TPH Screening Level (mg/L)
TPH GRO		
TPH DRO		0.2
TPH ORO		0.2
Benzene	0.01	
Ethylbenzene	0.75	
Toluene	0.75	
Xylenes	0.62	
Phenol	0.005	

DRO = diesel range organics

GRO = gasoline range organics

mg/kg = milligrams per kilogram

NMED = New Mexico Environment Department

ORO = oil range organics

TPH = total petroleum hydrocarbons

WQCC = Water Quality Control Commission



Attachment 1

Wastewater Analytical Report



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

March 25, 2015

Dan Crawford Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Quarterly WDW-1, 2, &3 Inj Well OrderNo.: 1502959

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 2/24/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Case Narrative

WO#: **1502959**Date: **3/25/2015**

CLIENT: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:

Allyl alcohol

t-amyl ethyl ether

Bis(2-chloroethyl)sulfide

Bromoacetone

Chloral hydrate

1-chlorobutane

1-chlorohexane

2-chloroethanol

Crotonaldehyde

Cis-1,4-Dichloro-2butene

1,3-Dichloro-2-propanol

1,2,3,4-Depoxybutane

Ethanol

Ethylene oxide

Malonitrile

Methanol

Methyl acrylate

2-Nitropropane

Paraldehyde

Pentafluorobenzene

2-Pentanone

2-picoline

1-propanol

2-propanol

Propargyl alcohol

Beta-propiolactone

n-propylamine

Lab Order **1502959**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT:Navajo Refining CompanyClient Sample ID: WDW-1,2,&3 EffluentProject:Quarterly WDW-1, 2, &3 Inj WellCollection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001 **Matrix:** AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL (Qual Units	DF	Batch	
EPA METHOD 300.0: ANIONS					Analyst	LGT
Fluoride	11	5.0	* mg/L	50	2/24/2015 11:37:59 PM	R24502
Chloride	300	25	mg/L	50	2/24/2015 11:37:59 PM	R24502
Nitrogen, Nitrite (As N)	ND	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Bromide	1.1	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Nitrogen, Nitrate (As N)	ND	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Phosphorus, Orthophosphate (As P)	ND	2.5	mg/L	5	2/24/2015 11:25:35 PM	R24502
Sulfate	2100	25	mg/L	50	2/24/2015 11:37:59 PM	R24502
EPA METHOD 7470: MERCURY					Analyst	MED
Mercury	ND	0.00020	mg/L	1	2/26/2015 9:31:31 AM	17887
MERCURY, TCLP					Analyst	MED
Mercury	ND	0.020	mg/L	1	3/10/2015 8:26:24 AM	18037
EPA METHOD 6010B: TCLP METALS					Analyst	ELS
Arsenic	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Barium	ND	100	mg/L	1	3/7/2015 2:01:03 PM	18024
Cadmium	ND	1.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Chromium	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Lead	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Selenium	ND	1.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Silver	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
EPA 6010B: TOTAL METALS					Analyst	ELS
Aluminum	2.0	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Antimony	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Arsenic	0.029	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Barium	ND	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Beryllium	ND	0.0030	mg/L	1	3/7/2015 1:56:58 PM	18024
Cadmium	ND	0.0020	mg/L	1	3/7/2015 1:56:58 PM	18024
Calcium	85	1.0	mg/L	1	3/10/2015 12:46:11 PM	18050
Chromium	ND	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Cobalt	ND	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Copper	0.0068	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Iron	3.7	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Lead	ND	0.0050	mg/L	1	3/7/2015 1:56:58 PM	18024
Magnesium	26	1.0	mg/L	1	3/10/2015 12:46:11 PM	
Manganese	0.25	0.0020	mg/L	1	3/7/2015 1:56:58 PM	18024
Nickel	0.035	0.010	mg/L	1	3/7/2015 1:56:58 PM	18024
Potassium	35	1.0	mg/L	1	3/10/2015 12:46:11 PM	
Selenium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 2 of 25

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: WDW-1,2,&3 Effluent

Project: Quarterly WDW-1, 2, &3 Inj Well **Collection Date:** 2/23/2015 8:30:00 AM

1502959-001 Lab ID: Matrix: AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS					Analyst	: ELS
Silver	ND	0.0050	mg/L	1	3/7/2015 1:56:58 PM	18024
Sodium	1300	20	mg/L	20	3/10/2015 12:51:05 PM	18050
Thallium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Vanadium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Zinc	0.064	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
EPA METHOD 8260B: VOLATILES					Analyst	: SUB
Acetonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Allyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroprene	ND	0.50	μg/L	1	3/3/2015	R24992
Cyclohexane	ND	0.50	μg/L	1	3/3/2015	R24992
Diethyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Diisopropyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Epichlorohydrin	ND	5.0	μg/L	1	3/3/2015	R24992
Ethyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Ethyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Freon-113	ND	0.50	μg/L	1	3/3/2015	R24992
Isobutanol	ND	50	μg/L	1	3/3/2015	R24992
Isopropyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methacrylonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Methyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl ethyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Methylcyclohexane	ND	1.0	μg/L	1	3/3/2015	R24992
n-Amyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
n-Hexane	ND	1.0	μg/L	1	3/3/2015	R24992
Nitrobenzene	ND	5.0	μg/L	1	3/3/2015	R24992
Pentachloroethane	ND	5.0	μg/L	1	3/3/2015	R24992
p-isopropyltoluene	1.4	0.50	μg/L	1	3/3/2015	R24992
Propionitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Tetrahydrofuran	ND	0.50	μg/L	1	3/3/2015	R24992
Benzene	ND	0.50	μg/L	1	3/3/2015	R24992
Toluene	ND	0.50	μg/L	1	3/3/2015	R24992
Ethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/3/2015	R24992
1,2,4-Trimethylbenzene	2.8	0.50	μg/L	1	3/3/2015	R24992
1,3,5-Trimethylbenzene	2.7	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 25

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: WDW-1,2,&3 Effluent

Project: Quarterly WDW-1, 2, &3 Inj Well **Collection Date:** 2/23/2015 8:30:00 AM

1502959-001 Lab ID: Matrix: AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Αı	nalyst: SUB
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	3/3/2015	R24992
Naphthalene	ND	0.50	μg/L	1	3/3/2015	R24992
Acetone	57	2.5	μg/L	1	3/3/2015	R24992
Bromobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Bromodichloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Bromoform	ND	0.50	μg/L	1	3/3/2015	R24992
Bromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon disulfide	0.53	0.50	μg/L	1	3/3/2015	R24992
Carbon Tetrachloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroform	ND	0.50	μg/L	1	3/3/2015	R24992
Chloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
4-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Dichlorodifluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
2,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
Hexachlorobutadiene	ND	0.50	μg/L	1	3/3/2015	R24992
2-Hexanone	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methylene Chloride	ND	2.5	μg/L	1	3/3/2015	R24992
n-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
n-Propylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
sec-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Styrene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - Page 4 of 25
- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Lab ID: 1502959-001

Matrix: AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent

Collection Date: 2/23/2015 8:30:00 AM

Received Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/3/2015	R24992
Trichlorofluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
mp-Xylenes	2.4	1.0	μg/L	1	3/3/2015	R24992
o-Xylene	1.7	0.50	μg/L	1	3/3/2015	R24992
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butyl alcohol	21	10	μg/L	1	3/3/2015	R24992
Acrolein	ND	0.50	μg/L	1	3/3/2015	R24992
Acrylonitrile	ND	0.50	μg/L	1	3/3/2015	R24992
Bromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Iodomethane	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dioxane	ND	20	μg/L	1	3/3/2015	R24992
Surr: 1,2-Dichlorobenzene-d4	110	70-130	%REC	1	3/3/2015	R24992
Surr: 4-Bromofluorobenzene	100	70-130	%REC	1	3/3/2015	R24992
Surr: Toluene-d8	99.6	70-130	%REC	1	3/3/2015	R24992
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	3/2/2015	R24992
Atrazine	ND	5.0	μg/L	1	3/2/2015	R24992
Benzaldehyde	ND	5.0	μg/L	1	3/2/2015	R24992
Caprolactam	ND	5.0	μg/L	1	3/2/2015	R24992
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	3/2/2015	R24992
Acetophenone	ND	10	μg/L	1	3/2/2015	R24992
1-Methylnaphthalene	ND	10	μg/L	1	3/2/2015	R24992
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4,5-Trichlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4,6-Trichlorophenol	ND	10	μg/L	1	3/2/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Lab Order 1502959

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company Client Sample ID: WDW-1,2,&3 Effluent **Project:** Quarterly WDW-1, 2, &3 Inj Well Collection Date: 2/23/2015 8:30:00 AM Lab ID: 1502959-001 Matrix: AQUEOUS Received Date: 2/24/2015 8:00:00 AM

Analyses Result **RL Qual Units DF** Date Analyzed Batch **EPA 8270C: SEMIVOLATILES/MOD** Analyst: SUB 2,4-Dichlorophenol ND 10 μg/L 1 3/2/2015 R24992 2,4-Dimethylphenol 710 10 μg/L 3/2/2015 R24992 2,4-Dinitrophenol ND 10 μg/L 1 3/2/2015 R24992 2,4-Dinitrotoluene ND 10 μg/L 1 3/2/2015 R24992 ND 2,6-Dinitrotoluene 10 μg/L 1 R24992 3/2/2015 2-Chloronaphthalene ND 10 μg/L 1 3/2/2015 R24992 2-Chlorophenol ND 10 μg/L 1 3/2/2015 R24992 2-Methylnaphthalene ND 10 μg/L 1 3/2/2015 R24992 2-Methylphenol 480 10 μg/L 1 3/2/2015 R24992 2-Nitroaniline ND 10 R24992 μg/L 1 3/2/2015 2-Nitrophenol ND 10 μg/L 3/2/2015 R24992 3,3´-Dichlorobenzidine ND 10 μg/L 1 3/2/2015 R24992 3-Nitroaniline ND 10 μg/L 3/2/2015 R24992 ND 10 4,6-Dinitro-2-methylphenol μg/L 1 3/2/2015 R24992 4-Bromophenyl phenyl ether ND 10 μg/L 1 3/2/2015 R24992 ND 5.0 4-Chloro-3-methylphenol μg/L 1 3/2/2015 R24992 4-Chloroaniline ND 10 μg/L 1 3/2/2015 R24992 4-Chlorophenyl phenyl ether ND 10 R24992 μg/L 1 3/2/2015 4-Nitroaniline ND 10 μg/L 3/2/2015 R24992 1 4-Nitrophenol ND 10 μg/L 3/2/2015 R24992 ND R24992 Acenaphthene 10 μg/L 3/2/2015 Acenaphthylene ND 10 μg/L 3/2/2015 R24992 Anthracene ND 10 3/2/2015 R24992 μg/L 1 ND 10 3/2/2015 R24992 Benzo(g,h,i)perylene μg/L 1 ND 0.10 R24992 Benz(a)anthracene μg/L 1 3/2/2015 R24992 Benzo(a)pyrene ND 0.10 μg/L 1 3/2/2015 Benzo(b)fluoranthene ND 0.10 μg/L 3/2/2015 R24992 Benzo(k)fluoranthene ND 0.10 μg/L 3/2/2015 R24992 3/2/2015 R24992 Bis(2-chloroethoxy)methane ND 10 μg/L Bis(2-chloroethyl)ether ND 10 3/2/2015 R24992 μg/L 1 Bis(2-chloroisopropyl)ether ND 10 μg/L 3/2/2015 R24992 Bis(2-ethylhexyl)phthalate ND 5.0 μg/L 1 3/2/2015 R24992 Butyl benzyl phthalate ND 10 μg/L 3/2/2015 R24992 Carbazole ND 10 μg/L 3/2/2015 R24992 Chrysene ND 0.10 3/2/2015 R24992 μg/L ND 0.10 3/2/2015 R24992 Dibenz(a,h)anthracene μg/L Dibenzofuran ND 10 μg/L 1 3/2/2015 R24992 Diethyl phthalate ND 10 3/2/2015 R24992 μg/L 1

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

10

μg/L

ND

Qualifiers:

Dimethyl phthalate

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank

3/2/2015

- Η Holding times for preparation or analysis exceeded
- ND

Not Detected at the Reporting Limit

Sample pH Not In Range P

RLReporting Detection Limit Page 6 of 25

R24992

Analytical ReportLab Order **1502959**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company
Client Sample ID: WDW-1,2,&3 Effluent
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001
Matrix: AQUEOUS
Received Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
Di-n-butyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Di-n-octyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Fluoranthene	ND	10	μg/L	1	3/2/2015	R24992
Fluorene	ND	10	μg/L	1	3/2/2015	R24992
Hexachlorobenzene	ND	1.0	μg/L	1	3/2/2015	R24992
Hexachlorobutadiene	ND	10	μg/L	1	3/2/2015	R24992
Hexachlorocyclopentadiene	ND	10	μg/L	1	3/2/2015	R24992
Hexachloroethane	ND	10	μg/L	1	3/2/2015	R24992
Indeno(1,2,3-cd)pyrene	ND	5.0	μg/L	1	3/2/2015	R24992
Isophorone	ND	10	μg/L	1	3/2/2015	R24992
Naphthalene	ND	10	μg/L	1	3/2/2015	R24992
Nitrobenzene	ND	10	μg/L	1	3/2/2015	R24992
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	3/2/2015	R24992
N-Nitrosodiphenylamine	ND	2.0	μg/L	1	3/2/2015	R24992
Pentachlorophenol	ND	10	μg/L	1	3/2/2015	R24992
Phenanthrene	ND	10	μg/L	1	3/2/2015	R24992
Phenol	8.1	5.0	μg/L	1	3/2/2015	R24992
Pyrene	ND	10	μg/L	1	3/2/2015	R24992
o-Toluidine	ND	5.0	μg/L	1	3/2/2015	R24992
Pyridine	ND	5.0	μg/L	1	3/2/2015	R24992
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	3/2/2015	R24992
Surr: 2,4,6-Tribromophenol	121	10-123	%REC	1	3/2/2015	R24992
Surr: 2-Fluorobiphenyl	80.8	19-130	%REC	1	3/2/2015	R24992
Surr: 2-Fluorophenol	83.8	21-110	%REC	1	3/2/2015	R24992
Surr: Nitrobenzene-d5	85.6	25-130	%REC	1	3/2/2015	R24992
Surr: Phenol-d5	86.4	10-125	%REC	1	3/2/2015	R24992
Surr: Terphenyl-d14	29.7	21-141	%REC	1	3/2/2015	R24992
CORROSIVITY						Analyst: SUB
рН	7.01	0.100	pH Units	1	2/27/2015	R24992
IGNITABILITY METHOD 1010						Analyst: SUB
Ignitability	>200	0	°F	1	3/6/2015	R24992
CYANIDE, REACTIVE						Analyst: SUB
Cyanide, Reactive	ND	1.00	mg/L	1	3/5/2015	R24992
SULFIDE, REACTIVE						Analyst: SUB
Reactive Sulfide	ND	1.0	mg/L	1	3/3/2015	R24992
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	4600	0.010	µmhos/cm	1	3/3/2015 3:37:2	29 PM R24621

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order **1502959**Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: WDW-1,2,&3 Effluent

Project: Quarterly WDW-1, 2, &3 Inj Well

Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001 **Matrix:** AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF Date Analyzed Bate	ch
SM4500-H+B: PH				Analyst: JRF	R
рН	7.13	1.68 H	d pH units	1 3/3/2015 3:37:29 PM R24	1621
SM2320B: ALKALINITY				Analyst: JRF	R
Bicarbonate (As CaCO3)	240	20	mg/L CaCO3	1 3/3/2015 3:37:29 PM R24	1621
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1 3/3/2015 3:37:29 PM R24	1621
Total Alkalinity (as CaCO3)	240	20	mg/L CaCO3	1 3/3/2015 3:37:29 PM R24	1621
SPECIFIC GRAVITY				Analyst: JRF	R
Specific Gravity	1.002	0		1 3/5/2015 12:07:00 PM R24	4648
SM2540C MOD: TOTAL DISSOLV	ED SOLIDS			Analyst: KS	
Total Dissolved Solids	3710	200	* mg/L	1 2/27/2015 8:17:00 AM 178	95

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order **1502959**

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date:

Lab ID: 1502959-002 **Matrix:** TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Acetonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Allyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroprene	ND	0.50	μg/L	1	3/3/2015	R24992
Cyclohexane	ND	0.50	μg/L	1	3/3/2015	R24992
Diethyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Diisopropyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Epichlorohydrin	ND	5.0	μg/L	1	3/3/2015	R24992
Ethyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Ethyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Freon-113	ND	0.50	μg/L	1	3/3/2015	R24992
Isobutanol	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methacrylonitrile	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl ethyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Methylcyclohexane	ND	1.0	μg/L	1	3/3/2015	R24992
n-Amyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
n-Hexane	ND	1.0	μg/L	1	3/3/2015	R24992
Nitrobenzene	ND	5.0	μg/L	1	3/3/2015	R24992
Pentachloroethane	ND	5.0	μg/L	1	3/3/2015	R24992
p-isopropyltoluene	ND	0.50	μg/L	1	3/3/2015	R24992
Propionitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Tetrahydrofuran	ND	0.50	μg/L	1	3/3/2015	R24992
Benzene	ND	0.50	μg/L	1	3/3/2015	R24992
Toluene	ND	0.50	μg/L	1	3/3/2015	R24992
Ethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/3/2015	R24992
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	3/3/2015	R24992
Naphthalene	ND	0.50	μg/L	1	3/3/2015	R24992
Acetone	5.0	2.5	μg/L	1	3/3/2015	R24992
Bromobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Bromodichloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Bromoform	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - D C 1 HN / L D

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order **1502959**

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date:

Lab ID: 1502959-002 **Matrix:** TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon disulfide	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon Tetrachloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroform	ND	0.50	μg/L	1	3/3/2015	R24992
Chloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
4-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Dichlorodifluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
2,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
Hexachlorobutadiene	ND	0.50	μg/L	1	3/3/2015	R24992
2-Hexanone	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methylene Chloride	ND	2.5	μg/L	1	3/3/2015	R24992
n-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
n-Propylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
sec-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Styrene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order **1502959**Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date:

Lab ID: 1502959-002 **Matrix:** TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/3/2015	R24992
Trichlorofluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
mp-Xylenes	ND	1.0	μg/L	1	3/3/2015	R24992
o-Xylene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butyl alcohol	ND	10	μg/L	1	3/3/2015	R24992
Acrolein	ND	1.0	μg/L	1	3/3/2015	R24992
Acrylonitrile	ND	0.50	μg/L	1	3/3/2015	R24992
Bromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Iodomethane	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dioxane	ND	20	μg/L	1	3/3/2015	R24992
Surr: 1,2-Dichlorobenzene-d4	102	70-130	%REC	1	3/3/2015	R24992
Surr: 4-Bromofluorobenzene	98.4	70-130	%REC	1	3/3/2015	R24992
Surr: Toluene-d8	100	70-130	%REC	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB SampType: MBLK TestCode: EPA Method 300.0: Anions PBW Client ID: Batch ID: R24502 RunNo: 24502 Prep Date: Analysis Date: 2/24/2015 SeqNo: 721446 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride ND 0.10 Chloride ND 0.50 Nitrogen, Nitrite (As N) ND 0.10 Bromide ND 0.10 Nitrogen, Nitrate (As N) ND 0.10 Phosphorus, Orthophosphate (As P ND 0.50 Sulfate ND 0.50

Sample ID LCS	SampType: LCS TestCode: EPA Method 30				300.0: Anion	s				
Client ID: LCSW	Batch	n ID: R2	4502	F	RunNo: 2	4502				
Prep Date:	Analysis D	ate: 2/	24/2015	SeqNo: 721447			Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.54	0.10	0.5000	0	108	90	110			
Chloride	4.8	0.50	5.000	0	95.3	90	110			
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.4	90	110			
Bromide	2.5	0.10	2.500	0	99.1	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	100	90	110			
Sulfate	9.8	0.50	10.00	0	97.6	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: R24992 RunNo: 24992 Analysis Date: 3/3/2015 Prep Date: SeqNo: 736964 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Acetonitrile ND 0.50 Allyl chloride ND 0.50 ND Chloroprene 0.50 Ethyl methacrylate ND 0.50 Isobutanol ND 0.50 Methacrylonitrile ND 0.50 Methyl ethyl ketone ND 2.5 Methyl isobutyl ketone ND 2.5 Methyl methacrylate ND 0.50 Propionitrile ND 0.50 Benzene ND 0.50 ND 0.50 Toluene Ethylbenzene ND 0.50 1,2-Dichloroethane (EDC) ND 0.50 1,2-Dibromoethane (EDB) ND 0.50 Acetone ND 2.5 Bromodichloromethane ND 0.50 Bromoform ND 0.50 Bromomethane ND 0.50 Carbon disulfide ND 0.50 Carbon Tetrachloride ND 0.50 Chlorobenzene ND 0.50 Chloroethane ND 0.50 Chloroform ND 0.50 Chloromethane ND 0.50 cis-1,2-DCE ND 0.50 cis-1,3-Dichloropropene ND 0.50 1,2-Dibromo-3-chloropropane ND 0.50 Dibromochloromethane ND 0.50 Dibromomethane ND 0.50 ND 1.2-Dichlorobenzene 0.50 ND 0.50 1,4-Dichlorobenzene Dichlorodifluoromethane ND 0.50 1,1-Dichloroethane ND 0.50 1,1-Dichloroethene ND 0.50 1,2-Dichloropropane ND 0.50 ND 0.50 1,3-Dichloropropane 2,2-Dichloropropane ND 0.50 1,1-Dichloropropene ND 0.50

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampT	уре: МЕ	BLK	TestCode: EPA Method 8260B: VOLATILES							
Client ID: PBW	Batch	n ID: R2	4992	F	RunNo: 2	4992					
Prep Date:	Analysis D	ate: 3/	3/2015	5	SeqNo: 736964			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2-Hexanone	ND	0.50									
Methylene Chloride	ND	2.5									
Styrene	ND	0.50									
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
Tetrachloroethene (PCE)	ND	0.50									
trans-1,2-DCE	ND	0.50									
trans-1,3-Dichloropropene	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
Trichloroethene (TCE)	ND	0.50									
Trichlorofluoromethane	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
Vinyl chloride	ND	0.50									
mp-Xylenes	ND	1.0									
o-Xylene	ND	0.50									
Acrolein	ND	0.50									
Acrylonitrile	ND	0.50									
Bromochloromethane	ND	0.50									
Iodomethane	ND	0.50									
trans-1,4-Dichloro-2-butene	ND	0.50									
Vinyl acetate	ND	0.50									

Sample ID LCS-R24992	SampT	ype: LC	cs	Tes	PA Method	od 8260B: VOLATILES					
Client ID: LCSW	Batch	n ID: R2	24992	F	RunNo: 24992						
Prep Date:	Analysis Date: 3/3/2015			S	SeqNo: 736965			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	9.8		10.00	0	98.4	80	120				
Toluene	10		10.00	0	99.8	80	120				
Ethylbenzene	10		10.00	0	101	80	120				
Chlorobenzene	9.8		10.00	0	98.5	80	120				
1,1-Dichloroethene	9.2		10.00	0	91.7	80	120				
Tetrachloroethene (PCE)	9.8		10.00	0	98.4	80	120				
Trichloroethene (TCE)	9.6		10.00	0	96.1	80	120				
o-Xylene	10		10.00	0	104	80	120				

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampTy	pe: M I	BLK	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	ID: R2	24992	F	RunNo: 2	4992				
Prep Date:	Analysis Da	te: 3	/2/2015	\$	SeqNo: 7	36968	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetophenone	ND	10								
1-Methylnaphthalene	ND	10								
2,3,4,6-Tetrachlorophenol	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2,4-Dichlorophenol	ND	10								
2,4-Dimethylphenol	ND	10								
2,4-Dinitrophenol	ND	10								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3,3´-Dichlorobenzidine	ND	10								
3-Nitroaniline	ND	10								
4,6-Dinitro-2-methylphenol	ND	10								
4-Bromophenyl phenyl ether	ND	10								
4-Chloro-3-methylphenol	ND	5.0								
4-Chloroaniline	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Anthracene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benz(a)anthracene	ND	0.10								
Benzo(a)pyrene	ND	0.10								
Benzo(b)fluoranthene	ND	0.10								
Benzo(k)fluoranthene	ND	0.10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampT	ype: ME	BLK	Tes	tCode: E	PA 8270C:	Semivolatiles	/Mod				
Client ID: PBW	Batch	n ID: R2	4992	F	RunNo: 2	4992						
Prep Date:	Analysis D	ate: 3/	2/2015	S	SeqNo: 736968			Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Chrysene	ND	0.10										
Dibenz(a,h)anthracene	ND	0.10										
Dibenzofuran	ND	10										
Diethyl phthalate	ND	10										
Dimethyl phthalate	ND	10										
Di-n-butyl phthalate	ND	10										
Di-n-octyl phthalate	ND	10										
Fluoranthene	ND	10										
Fluorene	ND	10										
Hexachlorobenzene	ND	1.0										
Hexachlorobutadiene	ND	10										
Hexachlorocyclopentadiene	ND	10										
Hexachloroethane	ND	10										
Isophorone	ND	10										
Naphthalene	ND	10										
Nitrobenzene	ND	10										
N-Nitrosodi-n-propylamine	ND	10										
Pentachlorophenol	ND	10										
Phenanthrene	ND	1.0										
Phenol	ND	5.0										
Pyrene	ND	10										
1,2,4,5-Tetrachlorobenzene	ND	10										

Sample ID LCS-R24992	SampType: LCS TestCode: EPA 8270C: Semivolatiles/Mod											
Client ID: LCSW	Batch	ID: R2	24992	R	RunNo: 2	4992						
Prep Date:	Analysis D	ate: 3/	/2/2015	S	SeqNo: 736969			Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
2,4-Dinitrotoluene	5.6		5.000	0	112	49	134					
2-Chlorophenol	4.7		5.000	0	94.8	50	131					
4-Chloro-3-methylphenol	4.2		5.000	0	83.0	42	139					
4-Nitrophenol	2.8		5.000	0	56.8	19	137					
Acenaphthene	5.3		5.000	0	106	36	122					
Bis(2-ethylhexyl)phthalate	5.4		5.000	0	109	43	142					
N-Nitrosodi-n-propylamine	5.3		5.000	0	107	46	135					
Pentachlorophenol	4.0		5.000	0	79.4	22	138					
Phenol	4.1		5.000	0	81.2	45	134					
Pyrene	6.2		5.000	0	123	45	138					

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-17887 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: **PBW** Batch ID: **17887** RunNo: **24523**

Prep Date: 2/25/2015 Analysis Date: 2/26/2015 SeqNo: 722178 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-17887 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 17887 RunNo: 24523

Prep Date: 2/25/2015 Analysis Date: 2/26/2015 SeqNo: 722179 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0051 0.00020 0.005000 0 102 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1502959

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-18037 SampType: MBLK TestCode: MERCURY, TCLP

Client ID: PBW Batch ID: 18037 RunNo: 24714

Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728042 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.020

Sample ID LCS-18037 SampType: LCS TestCode: MERCURY, TCLP

Client ID: LCSW Batch ID: 18037 RunNo: 24714

Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728043 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.020 0.005000 0 105 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

0.020

WO#: 1502959

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-18024 SampType: MBLK TestCode: EPA 6010B: Total Metals Client ID: **PBW** Batch ID: 18024 RunNo: 24683 Prep Date: 3/6/2015 Analysis Date: 3/7/2015 SeqNo: 727309 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Aluminum ND 0.020 ND 0.050 Antimony ND Arsenic 0.020 Barium ND 0.020 Beryllium ND 0.0030 Cadmium ND 0.0020 Chromium ND 0.0060 Cobalt ND 0.0060 Copper ND 0.0060 Iron ND 0.050 Lead ND 0.0050 ND 0.0020 Manganese Nickel ND 0.010 Selenium ND 0.050 Silver ND 0.0050 Thallium ND 0.050 Vanadium ND 0.050

Sample ID LCS-18024	Samp	Type: LC	S	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	ch ID: 18	024	F	RunNo: 24683					
Prep Date: 3/6/2015	Analysis	Date: 3/	7/2015	8	SeqNo: 7	27310	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.48	0.020	0.5000	0	95.4	80	120			
Antimony	0.52	0.050	0.5000	0	104	80	120			
Arsenic	0.47	0.020	0.5000	0	93.5	80	120			
Barium	0.49	0.020	0.5000	0	97.1	80	120			
Beryllium	0.50	0.0030	0.5000	0	99.1	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.49	0.0060	0.5000	0	97.8	80	120			
Cobalt	0.49	0.0060	0.5000	0	97.4	80	120			
Copper	0.52	0.0060	0.5000	0	105	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.48	0.0050	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	98.6	80	120			
Nickel	0.49	0.010	0.5000	0	98.6	80	120			
Selenium	0.49	0.050	0.5000	0	98.0	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			

Qualifiers:

Zinc

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Reporting Detection Limit

P

Sample pH Not In Range

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Hall Environmental Analysis Laboratory, Inc.

PQL

1.0

1.0

1.0

1.0

Result

ND

ND

ND

ND

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID	LCS-18024	SampT	ype: LC	s	TestCode: EPA 6010B: Total Metals								
Client ID:	LCSW	Batch	n ID: 18	024	R	tunNo: 2	4683						
Prep Date:	3/6/2015	Analysis D	ate: 3/	7/2015	S	eqNo: 7	27310	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Thallium		0.48	0.050	0.5000	0	97.0	80	120					
Vanadium		0.49	0.050	0.5000	0	98.2	80	120					
Zinc		0.48	0.020	0.5000	0	95.1	80	120					
Sample ID	Sample ID 1502959-001BMS SampType: MS TestCode: EPA 6010B: Total Metals												
Client ID:	WDW-1,2,&3 Eff	luen Batch	n ID: 18	050	R	tunNo: 2	4731						
Prep Date:	3/9/2015	Analysis D	ate: 3/	10/2015	S	SeqNo: 7	28505	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Magnesium		76	1.0	50.00	25.84	101	75	125					
Potassium		84	1.0	50.00	34.66	98.8	75	125					
Sample ID	1502959-001BM	SD SampT	уре: М \$	SD	Test	tCode: El	PA 6010B:	Total Metals					
Client ID:	WDW-1,2,&3 Eff	luen Batch	n ID: 18	050	RunNo: 24731								
Prep Date:	3/9/2015	Analysis D	ate: 3/	10/2015	S	SeqNo: 7	28506	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Magnesium		75	1.0	50.00	25.84	98.6	75	125	1.52	20			
Potassium		86	1.0	50.00	34.66	102	75	125	1.89	20			
					TestCode: EPA 6010B: Total Metals								
Sample ID	MB-18050	SampT	ype: ME	BLK	Test	tCode: El	PA 6010B:	Total Metals					
Sample ID Client ID:	MB-18050 PBW		ype: ME			tCode: El		Total Metals					

Sample ID LCS-18050	SampT	ype: LC	s	Tes	tCode: El	PA 6010B:				
Client ID: LCSW	Batch	ID: 18	050	F	RunNo: 24731					
Prep Date: 3/9/2015	Analysis D	ate: 3/	10/2015	SeqNo: 728509			Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	57	1.0	50.00	0	113	80	120			
Magnesium	56	1.0	50.00	0	113	80	120			
Potassium	53	1.0	50.00	0	105	80	120			
Sodium	58	1.0	50.00	0	116	80	120			

SPK value SPK Ref Val %REC LowLimit

Qualifiers:

Analyte

Magnesium Potassium

Calcium

Sodium

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank

HighLimit

%RPD

RPDLimit

Qual

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1502959

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: CYANIDE, Reactive

Client ID: PBW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/5/2015 SeqNo: 736973 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive ND 1.00

Sample ID LCS-R24992 SampType: LCS TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/5/2015 SeqNo: 736974 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive 0.480 0.5000 0 96.0 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: SULFIDE, Reactive

Client ID: PBW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/3/2015 SeqNo: 736976 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide ND 1.0

Sample ID LCS-R24992 SampType: LCS TestCode: SULFIDE, Reactive

Client ID: LCSW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/3/2015 SeqNo: 736977 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide 0.20 0.2000 0 100 70 130

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID mb-1 SampType: MBLK TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R24621 RunNo: 24621

Prep Date: Analysis Date: 3/3/2015 SeqNo: 725674 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20

Sample ID Ics-1 SampType: LCS TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R24621 RunNo: 24621

Prep Date: Analysis Date: 3/3/2015 SeqNo: 725675 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 79 20 80.00 0 99.2 90 110

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - P Sample pH Not In Range
- RL Reporting Detection Limit

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID 1502959-001ADUP SampType: DUP TestCode: Specific Gravity

Client ID: WDW-1,2,&3 Effluen Batch ID: R24648 RunNo: 24648

Prep Date: Analysis Date: 3/5/2015 SeqNo: 726439 Units:

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Specific Gravity 0.9999 0 0.220 20

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-17895 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: **PBW** Batch ID: **17895** RunNo: **24545**

Prep Date: 2/25/2015 Analysis Date: 2/27/2015 SeqNo: 722782 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids ND 20.0

Sample ID LCS-17895 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 17895 RunNo: 24545

Prep Date: 2/25/2015 Analysis Date: 2/27/2015 SeqNo: 722783 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids 1010 20.0 1000 0 101 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL, 305-345-3975 FAY: 505-345-4107

Sample Log-In Check List

Website: www.hallenvironmental.com ReptNo: 1 Work Order Number: 1502959 NAVAJO REFINING CO Client Name: Received by/date: 2/24/2015 B:00:00 AM Ashley Gallegos Logged By: 2/24/2015 9:49:07 AM Completed By: Ashley Gallegos Reviewed By: 02/24/15 Chain of Custody Not Present Yes 1. Custody seals intact on sample bottles? No T Not Present Yes V 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In No NA 4. Was an altempt made to cool the samples? Yes V NA. Were all samples received at a temperature of >0° C to 6.0°C No ... No _ Yes V Sample(s) in proper container(s)? No 7. Sufficient sample volume for indicated test(s)? 8. Are samples (except VOA and ONG) properly preserved? NA . No V 9. Was preservative added to bottles? No VOA Vials 10. VOA vials have zero headspace? No V 11. Were any sample containers received broken? # of preserved bottles checked for pH: No _ 12 Does paperwork match bottle labels? Yes (<2/or(>12 unless noted) (Note discrepancies on chain of custody) Adjusted? No L 13. Are matrices correctly identified on Chain of Custody? 14. Is it clear what analyses were requested? No Checked by 15. Were all holding times able to be met? (If no, notify customer for authorization.) Special Handling (if applicable) NA V Yes No. 16. Was client notified of all discrepancies with this order? Date Person Notified: eMail Phone Fax In Person Via By Whom: Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Condition | Seal Intact | Seal No. Seal Date Signed By Cooler No Temp °C

1.0

Good

Yes

ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report. Remarks: Report these results separately from all other www.hallenvironmental.com Fax 505-345-4107 Analysis Request 261/ SW-846 Method 1311 TCLP Metals, only M0 CFR Part Ca, K, Mg, Na/40 CFR 136.3 7470 (see attached list 'Metals') Shain of Custody kits provided. Tel. 505-345-3975 Metals/SW-846 Mthd 6010, R,C,I/40 CFR part 261 × (see attached list 'SVOCs') 2VOCs/SW-846 Method 8270D (see attached list 'VOCs') VOCs/SVV-846 Method 8260C Cation/anion bal., Br, Eh/40 SO4, TDS, pH, cond.,FI, Specific Gravity, HCO3, CO3, CI, 15080 9 -00 50395 HEAL No. Quarterly WDW-1, 2, & 3 Inj Well oN □ Preservative □ Rush Neat/H2S04 Project #: P.O. # 167796 Sample Temperature: **Oyyes** HN03 Turn-Around Time Neat Neat Neat Neat 건 Project Manager Dan Crawford Project Name Container Type and # □ Standar Received by Sampler On Ice: ო ო 7 $^{\circ}$ Relinquished by: 21, TQD octh Salsberry Sample Request ID □ Level 4 (Full Validation) WDW-1 2, & 3 Effluent WDW-1, 2, & 3 Effluent Xalobern Chain-of-Custody Record Temperature Blank Trip Blank Mailing Address: P.O. Box 159 Artesia, Sugar Sugar email or Fax#; 575-746-5451 Matrix 1980 Liquid Client: Navajo Refining Co. 2830 | Liquid 830 Liquid SSC Liquid Liguid 830 Liquid COSO Liquid Phone #: 575-748-3311 10880 0230 Time NM 88211-0159 Other Time: QA/QC Package: □ Standard Date 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 Date: 2/23/15 Date:



Navajo Refining Company, LLX OUS
501 E. Main
Artesia, NM 88210
(Tel) 575.748.3311
(Fax) 575.746.5451

Injection Well Quarterly Sample Details Attachment

	Sample Type	Physical Property
Project Name WDW-1.2. & 3 Orthy Ini Well	Grab ✓	Solid
Samplers Name Elizabeth Salsberry	Time Weighted Composite	Liquid 🗠
Samplers Affiliation Navajo Refining Co. LLC	Flow Weighted Composite	Sludge 🗌
Start Date and Time 2/23/2015 @ 08:25		
End Date and Time 2/23/2015 @ 08:35	Parts / Sample Intervals One	Type of Sampler Directly to sample Jars
Outfall / Sample Location: Waste water effluent pumps to injection wells.	P-849 sample point (first from east)	P-856 sample point (third from east)
	[4] P-854 sample point (second from east)	L P-857 sample point (routh from east)

Material # of Containers (None) (Non	NaHSO4	Other Analysis and/or Method Requested Specific Gravity, HC03, C03, C1, S04, TDS, pH, cond., F1, Cation/anion bat., Br. Eh/40 CFR 136.3 VOCs/SW-846 Method 8260C (see attached
3 X X 3 3 X X 3 3 3 X X 4 3 3 X X 4 3 3 X X 4 3 3 X X 4 3 3 X 4 3 4 3	NaHSO4	
x x x x x x x		
× × × × ×		pH, cond.,Fl, Cation/anion bal., Br, Eh/40 CFR 136.3 VOCs/SW-846 Method 8260C (see attached
× × × ×		VOCs/SW-846 Method 8260C (see attached
× × × ×		VOCs/SW-846 Method 8260C (see attached
× × × ×		
× × × ×		list VOCs)
* * * *		SVOCs/SW-846 Method 8270D (see
		attached list 'SVOCs')
		R,C,I/40 CFR part 261
x x x		Metals/SW-846 Mthd 6010, 7470 (see
x x		attached list 'Metals')
×		Ca, K, Mg, Na/40 CFR 136.3
×		TCLP Metals, only /40 CFR Part 261/ SvV-
		846 Method 1311

	_	_			_
	Refrigerated	Other 🗆	Shipping Media	[∑] eol	Other
t snow				!	
itions ligh					
oh, Condi					
111.5 mp					
od Speed					
NNE, Wi					
Vind Dir.					
100% V					
Humidity					
np. 19.4,					
08:35 Tn					
23/2015					
2/2		98			
ns, Etc):		Field pH 6.86			
bservatic		芷			
Field Data (Weather, Observations, Etc): 2/23/2015 08:35 Tmp. 19.4, Humidity 100%, Wind Dir. NNE, Wind Speed 11.5 mph, Conditions light snow	ail	5.6⁰F			
Data (W	Date and Time:	Field Temp. 95.6°F			
Field	Sate	ield			

Classification	Analyte name ⁽¹⁾		Units	RL
Inorganics	Mercury	SW-846 Method 7470		
Inorganics	Arsenic	SW-846 Method 6010		
Inorganics	Silver	SW-846 Method 6010		
Inorganics	Aluminum	SW-846 Method 6010		
Inorganics	Barium	SW-846 Method 6010		
Inorganics	Beryllium	SW-846 Method 6010		
Inorganics	Calcium	SW-846 Method 6010		
Inorganics	Cadmium	SW-846 Method 6010	<u></u>	
Inorganics	Cobalt	SW-846 Method 6010		
Inorganics	Chromium	SW-846 Method 6010		
Inorganics	Copper	SW-846 Method 6010		
Inorganics	Iron	SW-846 Method 6010		
Inorganics	Mercury	SW-846 Method 6010		
Inorganics	Potassium	SW-846 Method 6010		
Inorganics	Magnesium	SW-846 Method 6010		
Inorganics	Manganese	SW-846 Method 6010		<u>'</u>
Inorganics	Sodium	SW-846 Method 6010		
Inorganics	Nickel	SW-846 Method 6010		
Inorganics	Lead	SW-846 Method 6010		
Inorganics	Antimony	SW-846 Method 6010		
Inorganics	Selenium	SW-846 Method 6010		
Inorganics	Thallium	SW-846 Method 6010		
Inorganics	Vanadium	SW-846 Method 6010		
Inorganics	Zinc	SW-846 Method 6010		

^{**} dilute elements only if necessary

(1) 23 TAL Metals



Attachment 2

EP Background Soil Statistical Evaluation Memo



MEMO

To:

Karel Schnebele

Copies:

Pam Krueger

ARCADIS U.S., Inc. 100 East Campus View Blvd. Suite 200 Columbus Ohio 43235 Tel 614 985 9100

Fax 614 985 9170

Mark Lupo

Date:

August 14, 2013

ARCADIS Project No.: TX000864.0004

Subject:

Statistical Determination of Background Concentrations in Soil, Navajo Refinery, Artesia, New Mexico.

Soil borings were advanced in four designated background soil areas surrounding the Evaporation Ponds near the Navajo Refinery in Artesia, New Mexico in order to determine the background concentrations of key constituents in soil. The data were statistically analyzed in order to calculate values representative of naturally occurring background concentrations. In this memo, the method and results of these calculations are presented.

Location of the Soil Borings

Four areas were designated as "background soil areas" in which soil borings were advanced for collecting background samples. The areas were selected to be representative of native soils similar to those encountered both in the Refinery and in the Evaporation Ponds. However, the four areas were also selected in locations that would not be expected to have impacts from refinery operations or other potential hydrocarbon impacts. Three borings were advanced in each of the areas, designated BG-01 to BG-12. Two samples were collected for analysis from each boring. The first sample was collected one foot below ground surface (bgs) in a soil identified in the boring logs as sandy silt. The second sample was collected within the first foot after encountering a soil identified as silty clay in the boring logs. Table 1 lists the borings, the depths of the samples, and the background areas from which they were obtained.



List of Chemical Constituents

Statistical analysis was conducted for the following thirteen metallic constituents: arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc. Three ions were also selected for statistical analysis due to interest to the project team: chloride, fluoride, and sulfate. Of the metals for which data were available, only silver lacked a sufficient number of detections to allow parametric testing. Silver was detected only once out of 24 samples, in BG-05 at a depth of one foot bgs. Eleven of the metals were detected in 24 of 24 samples, as were the ions. Selenium had one non-detection, and mercury had three. The analytical data used in the statistical analysis are presented in Table 1.

Statistical Test Method

Representative background concentrations of the COCs were determined by constructing a statistical interval that would capture 95 percent (%) of the background values with 95% confidence. In statistics, this interval is called a Tolerance Interval, and its upper limit is called the Upper Tolerance Limit (UTL). Because of the application and the COCs, the interval was single-tailed. In this memorandum, all UTLs are "95/95 UTLs", that is, they are the upper limit of an interval designed to capture 95% of the background values with 95% confidence.

A UTL can be computed for a given COC from the mean of the background values (x) and the standard deviation (S) using the following parametric formula:

UTL =
$$x + S \kappa$$

The value of the parameter κ is chosen based upon the level of confidence, the coverage, and the number of points in the data set. The appropriate values of κ can be found in a table provided by the United States Environmental Protection Agency (USEPA) in its 2009 Unified Guidance document for groundwater statistics. (Table 17-3, USEPA, 2009). These values are also available in the statistics literature. In computing the UTLs in this memorandum, we used the table provided by the USEPA (USEPA, 2009).

There are requirements for the use of the above equation. The data must be independent, normally distributed, and free of severe outliers. The distribution of the data points can be tested using a normality test. The Shapiro-Wilk test was run at a 5% level of significance. The Shapiro-Wilk Test is a robust test and is recommended in Unified Guidance (USEPA, 2009). If the data set failed the normality test, a transformation was made and the normality test was repeated. The transformations were made in the following order: square root, cube root, and logarithmic (Box and Cox, 1964). In the event that the data could not be normalized, the parametric equation above could not be used and a non-parametric method for determining the UTL was used. Non-parametric methods are not discussed further in this memo, because their use was not necessary, as discussed below. In addition to testing for normality, the Dixon



test was applied to identify any statistical outliers that might be present. The Dixon test was run at a 5% level of significance. Only one outlier was identified (for cadmium) and its handling is discussed below where the cadmium results are presented.

Environmental data often include non-detected results. Statisticians refer to this condition as censorship. If the detection rate is 85% or better, non-detections were replaced by one half of the detection limit. If the detection rate had been less than 85% for any data set, procedures specified in Unified Guidance (USEPA, 2009) would have been applied. These measures were not needed, because none of the data sets for which UTLs were computed had detection rates less than 85%.

Because the data were collected from two distinct soil types, it was of interest to see if the background data points were of the same statistical population. Toward that end, the data collected from sandy silt and silty clay were compared using a parametric Student's t-test at 95% confidence. If the test identified a statistical difference between the two groups, separate UTLs were computed for each of the two soil types.

Laboratories indicate the concentration as "estimated" and place a "J-flag" if a COC is detected at a concentration higher than the Method Detection Limit (MDL), but lower than the Practical Quantitation Limit (PQL), sometimes called a "reporting limit". All values that were J-flagged were used in the computation of UTLs as if they were quantitative.

Results

The results of the UTL calculations are summarized in Table 2. Each of the sixteen COCs for which a UTL was computed is discussed in a separate section below. In these sections, distribution determinations and outlier tests are discussed. Statistical independence was assumed, since it appears that an effort was made to identify the background soil areas. It is also clear that no two data points came from the same location, but that the twelve borings were distinct.

Arsenic

Arsenic was detected in all of the 24 background samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 2.18 mg/kg. The average concentrations of arsenic in the two soil types were 2.11 mg/kg and 2.24 mg/kg for the sandy silt and the silty clay, respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 3.92 mg/kg. This means that 95% of soil samples can be expected to have a naturally occurring arsenic concentration of 3.92 mg/kg or less with 95% confidence. Thus 3.92 mg/kg can be adopted as the background concentration for arsenic in soil at this site.



Barium

Barium was detected in all of the 24 background samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 144 mg/kg. The average concentrations of barium in the two soil types were 158 mg/kg and 130 mg/kg for the sandy silt and the silty clay, respectively. The t-test indicated that barium was statistically elevated in the sandy silt. The parametric analysis of variance (ANOVA) did not indicate a difference in the populations, but its non-parametric counterpart, the Kruskal-Wallis test did. Therefore the barium data for sandy silt and silty clay were treated as separate statistical populations. Both data sets were normally distributed. No statistical outliers were identified in either group. The sandy silt data had a UTL of 252 mg/kg. The silty clay had a UTL of 227 mg/kg. Thus, a soil sample collected from sandy silt can be expected to have a naturally occurring barium concentration of 252 mg/kg or less. In like manner, a sample is collected from silty clay can be expected to have a naturally occurring barium concentration of 227 mg/kg or less.

Cadmium

All but one of the cadmium analyses resulted in a concentration that was below the reporting limit. Cadmium was detected in all 24 samples at concentrations above the method detection limit. Although the data is thus 96% composed of J-flagged data, the data have a discernable distribution. The full data set failed the Shapiro-Wilk test of normality. Successive transformations were undertaken using the method of Box and Cox (1964). The data were found to be lognormally distributed. One statistical outlier was identified, which was the result from BG-12 at one foot bgs. Usually, that data point would be set aside. It would be compelling to do so, because the other 23 data points would be normally distributed (with no other outliers). However, removing the outlier from the calculation would also remove the only point that was not J-flagged.

The decision to include outlier was based upon the following reasoning. First, there is no evidence to suggest that the measurement of the cadmium concentration at BG-12 was the result of an error on the part of field personnel or the laboratory. On the contrary, this concentration of 0.465 mg/kg is believable when compared to the other two samples collected in sandy silt in Background Soil Area 4. BG-11 had the second highest concentration of 0.242 mg/kg. BG-10 had 0.184 mg/kg, which was also greater than the arithmetic mean for the sandy silt. It is therefore more likely that the high concentration is an accurate measurement rather than a sampling or analytical error. The present view of the environmental statistics community is to retain data points rather than dismiss them unless there is evidence of some sort or error or distortion in the data point. The evidence points in the opposite direction. Second, the data set is lognormally distributed with the data point from BG-12 included. That a known distribution is exhibited supports the view that the data point belongs to the population. Third, the twelve data points of each of the sandy silt and silty clay subsets pass the Shapiro-Wilk test when lognormally transformed. Finally, as stated already, the data point in question is the only member of the data set that is not flagged as estimated. For all of these reasons, the outlier was retained.



Whenever a data set is not normally distributed, the arithmetic mean may not be the best estimate of central tendency. It is more accurate to compute the mean in transformed space and back-transform the result. In lognormally distributed data sets, such a measure is known as the geometric mean. For the complete cadmium data set, the geometric mean was 0.139 mg/kg. The geometric mean of the sandy silt was 0.153 mg/kg; the geometric mean of the silty clay was 0.126 mg/kg. The parametric t-test was performed on the log-transformed data and indicated that the data from the two soil types were a single population. The UTL was computed and back-transformed to be 0.339 mg/kg. This means that a soil sample could be expected to have a naturally occurring cadmium concentration of 0.339 mg/kg or less.

Chromium

Chromium was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 10.0 mg/kg. The average concentrations of chromium in the two soil types were nearly the same: 10.03 mg/kg and 9.97 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 18.8 mg/kg. This means that a soil sample could be expected to have a naturally occurring chromium concentration of 18.8 mg/kg or less.

Copper

Copper was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 6.62 mg/kg. The average concentrations of copper in the two soil types were nearly the same: 6.64 mg/kg and 6.61 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 12.4 mg/kg. This means that a soil sample could be expected to have a naturally occurring copper concentration of 12.4 mg/kg or less.

Iron

Iron was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 9,242 mg/kg. The average concentrations of iron in the two soil types were nearly the same: 9,335 mg/kg and 9,149 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 17,344 mg/kg. This means that a soil sample could be expected to have a naturally occurring iron concentration of 17,344 mg/kg or less.

Lead

Lead was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 6.66 mg/kg. The



average concentrations of lead in the two soil types were 6.94 mg/kg and 6.38 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 12.1 mg/kg. This means that a soil sample could be expected to have a naturally occurring lead concentration of 12.1 mg/kg or less.

Manganese

Manganese was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 305 mg/kg. The average concentrations of manganese in the two soil types were 309 mg/kg and 301 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 488 mg/kg. This means that a soil sample could be expected to have a naturally occurring manganese concentration of 488 mg/kg or less.

Mercury

The mercury data set contained 21 detections and 3 non-detections. The detection rate of 87.5% is greater than the 85% threshold, below which it would no longer be acceptable to replace the non-detections with one half of the method detection limit. With these substitutions, the data were found to be lognormally distributed. The geometric mean, the relevant measure of the mean of a lognormally distributed data set, was 0.00210 mg/kg. The geometric mean of the mercury concentration in sandy silt was 0.00195 mg/kg; the geometric mean in the silty clay was 0.00225 mg/kg. The parametric t-test was performed on the log-transformed data and indicated that the data from the two soil types were a single population. The UTL was computed and back-transformed to be 0.0302 mg/kg. This means that a soil sample could be expected to have a naturally occurring mercury concentration of 0.0302 mg/kg or less.

Nickel

Nickel was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 9.15 mg/kg. The average concentrations of nickel in the two soil types were nearly the same: 9.25 mg/kg and 9.05 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 16.2 mg/kg. This means that a soil sample could be expected to have a naturally occurring nickel concentration of 16.2 mg/kg or less.

Selenium

The selenium data set contained 23 detections out of 24 data points. The detection rate of 96% is great enough to justify replacing the non-detection with one half of the method detection limit. With this substitution, the data were statistically analyzed. The data set was found to be normally distributed and



free of outliers. The selenium data had an average value of 0.378 mg/kg. The average concentrations of selenium in the two soil types were 0.391 mg/kg and 0.365 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 0.682 mg/kg. This means that a soil sample could be expected to have a naturally occurring selenium concentration of 0.682 mg/kg or less.

Vanadium

Vanadium was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 15.6 mg/kg. The average concentrations of vanadium in the two soil types were 14.6 mg/kg and 16.6 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 28.3 mg/kg. This means that a soil sample could be expected to have a naturally occurring vanadium concentration of 28.3 mg/kg or less.

Zinc

Zinc was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 25.1 mg/kg. The average concentrations of zinc in the two soil types were 26.1 mg/kg and 24.1 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 46.6 mg/kg. This means that a soil sample could be expected to have a naturally occurring zinc concentration of 46.6 mg/kg or less.

Chloride

Chloride was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 1,952 mg/kg. The average concentrations of chloride in the two soil types were 1,704 mg/kg and 2,200 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 5,264 mg/kg. This means that a soil sample could be expected to have a naturally occurring chloride concentration of 5,264 mg/kg or less.

Fluoride

Fluoride was detected in all of the 24 background soil samples. The data were found to be cube-root normally distributed. The relevant measure of the mean of a cube-root normal data set is to compute the mean of the cube roots of the data points and cube the result. This value was 3.56 mg/kg. The cube-root corrected mean of the fluoride concentration in sandy silt was 2.80 mg/kg; for the silty clay it was 4.45 mg/kg. The parametric t-test was performed on the cube-root transformed data and indicated that the



fluoride data from the two soil types were a single population. The UTL was computed and back-transformed to be 17.9 mg/kg. This means that a soil sample could be expected to have a naturally occurring fluoride concentration of 17.9 mg/kg or less.

Sulfate

Sulfate data was detected in all of the 24 background soil samples. The data were found to be cube-root normally distributed. The cube-root corrected mean was 1,464 mg/kg. The cube-root corrected mean of the sulfate concentration in sandy silt was 553 mg/kg; for the silty clay it was 3,113 mg/kg. The parametric t-test was performed on the cube-root transformed data and indicated that sulfate was statistically elevated in the silty clay compared to the sandy silt. The parametric analysis of variance (ANOVA) and its non-parametric counterpart, the Kruskal-Wallis test concurred. Therefore the sulfate data for sandy silt and silty clay were treated as separate statistical populations. Both data sets were cube-root normally distributed. No statistical outliers were identified in either group. The sandy silt data had a UTL of 9,336 mg/kg. The silty clay had a UTL of 21,620 mg/kg. Thus, a soil sample collected from sandy silt could be expected to have a naturally occurring sulfate concentration of 9,336 mg/kg or less. In like manner, a sample collected from silty clay could be expected to have a naturally occurring sulfate concentration of 21,260 mg/kg or less.

Discussion

It has been stated above that the tolerance intervals from which the UTLs were computed were designed with 95% coverage. By definition, 5% of all background samples will have concentrations that exceed the UTLs. From a practical standpoint, this means that if a soil sample has a concentration that is less than or equal to the UTL, it can be considered to be background, but the converse is not true. If a sample exceeds the UTL it might indicate contamination, but this is not necessarily the case. In order to categorize such a sample as "above background", another line of evidence is necessary. It may be convenient to simply judge samples as "background" and "above background" on the basis of these UTLs, but in practice, one would be wrong 5% of the time. Stated another way, a suite of samples that were truly from the background and were compared to the UTLs presented in Table 2 would exceed the UTLs and be falsely identified as "above background" 5% of the time. In summary, a thorough interpretation of the field data must be made in view of the definition of the coverage of the UTL. To simply classify all concentrations that exceed the UTL as contaminated is a conservative assumption.

Conclusion

The background soil data were statistically analyzed for sixteen constituents, including thirteen metals and three ions. After testing to be sure the concentrations of the constituent collected from two soil types were a single population, UTLs were computed for the combined data set or for the subsets for the soil types, as appropriate. Procedures were followed to correctly identify the distribution of the data and to account



for outliers. The UTLs are presented in the text of this memo and in a summary table (Table 2). The UTLs were computed for 95% coverage and with 95% confidence. For a given constituent, 95% of background soil samples can be expected to have a concentration at or less than the UTL presented in this memo with 95% confidence. If a soil sample collected in the Refinery area or near the Evaporation Ponds had a concentration less than or equal to its UTL, that concentration of that constituent could be considered to be naturally occurring.

References

Box G.E.P. and D.R. Cox. 1964. An analysis of transformations (with discussion). *Journal of Royal Statistical Society Series B*, 26, 211-252.

United States Environmental Protection Agency. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, U.S. Environmental Protection Agency. EPA 530-R-09-007. March, 2009.



Table 1. Data from Background Soil Borings Navajo Refining Company, Artesia Refinery, New Mexico

		Depth	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury
Boring	Area	feet	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BG-01	1	1	1.07	97.2	0.0964	J 3.70	2.25	3,740	3.00	191	0.00048 U
BG-01	1	5	2.12	144	0.0955	J 8.65	6.98	8,940	6.57	348	0.00157 J
BG-02	1	1	1.12	129	0.129	J 5.56	3.21	5,210	3.99	204	0.00121 J
BG-02	1	5	2.75	176	0.139	J 13.8	9.59	12,700	8.77	371	0.00448
BG-03	1	1	2.28	186	0.131	J 10.9	6.44	10,400	6.62	344	0.00155 J
BG-03	1	6	2.88	162	0.198	J 16.9	10.1	15,300	9.54	431	0.00274 J
BG-04	2	1	2.62	153	0.187	J 14.8	9.48	13,700	9.13	405	0.00580
BG-04	2	3	1.61	85.6	0.123	J 8.02	4.86	6,370	4.00	178	0.00184 J
BG-05	2	1	1.99	150	0.163	J 8.82	7.34	7,600	7.66	268	0.0300
BG-05	2	4	3.56	58.6	0.145	J 9.58	7.11	8,070	5.43	241	0.00199 J
BG-06	2	1	2.54	178	0.144	J 10.6	7.49	9,670	7.80	348	0.00574
BG-06	2	4	2.36	88.6	0.140	J 8.96	5.81	7,130	5.51	266	0.00181 J
BG-07	3	1	0.93	103	0.0719	J 3.80	2.27	3,810	2.93	181	0.00048 U
BG-07	3	5	1.42	139	0.0884	J 6.67	4.42	6,550	4.57	244	0.00157 J
BG-08	3	1	1.92	167	0.132	J 8.99	6.31	8,000	5.83	299	0.00050 U
BG-08	3	4	1.88	145	0.104	J 8.47	5.71	8,230	5.98	261	0.00141 J
BG-09	3	1	1.94	214	0.120	J 9.45	5.51	9,090	6.11	328	0.00076 J
BG-09	3	4	1.24	129	0.0906	J 6.47	3.39	5,910	4.05	232	0.00192 J
BG-10	4	1	2.34	176	0.184	J 12.2	8.33	11,500	8.30	307	0.00314 J
BG-10	4	4	2.62	158	0.140	J 12.5	8.45	12,200	8.56	358	0.00545
BG-11	4	1	2.58	166	0.242	J 11.4	8.89	11,000	9.50	384	0.00662
BG-11	4	5	2.59	127	0.184	J 10.4	7.47	9,580	8.09	386	0.00537
BG-12	4	1	4.04	179	0.465	20.1	12.1	18,300	12.4	445	0.00707
BG-12	4	5	1.80	152	0.114	J 9.25	5.44	8,810	5.53	301	0.00108 J

Notes:

Area: The designated background soil area in which the boring was advanced.

mg/kg: Milligrams per kilogram.

J: Estimated value; the constituent was detected at a concentration between the method detection limit and the reporting limit.

U: Non-detection; the constituent was not detected above the method detection limit, the value shown on this table. One half the method detection limit was the value used in the statistical calculations.



Table 1. Data from Background Soil Borings Navajo Refining Company, Artesia Refinery, New Mexico

		Depth	Nickel	Selenium	1	Silver	١	/anadium	Zinc	Chloride	Fluoride	Sulfate
Boring	Area	feet	mg/kg	mg/kg		mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BG-01	1	1	3.60	0.351	J	0.483	U	6.57	10.0	47.6	0.816 J	
BG-01	1	5	9.51	0.394	J	0.457	U	13.6	22.0	1120	4.33	972
BG-02	1	1	5.02	0.170	U	0.468	U	8.72	15.0	14.7	0.388 J	87.8
BG-02	1	5	12.7	0.485		0.440	U	20.4	33.3	3550	3.43	2560
BG-03	1	1	10.5	0.354	J	0.456	U	17.0	26.7	5760	4.10	4390
BG-03	1	6	13.5	0.433	J	0.467	U	23.9	38.9	1720	1.40	1910
BG-04	2	1	12.8	0.576		0.433	U	19.8	36.9	2480	1.75	4890
BG-04	2	3	5.83	0.192	J	0.425	U	14.2	16.1	860	11.0	7830
BG-05	2	1	8.22	0.399	J	0.262	J	12.1	31.9	45.1	2.56	18.2
BG-05	2	4	7.95	0.394	J	0.488	U	27.6	23.8	1950	20.7	13500
BG-06	2	1	10.8	0.451		0.419	U	15.1	28.1	993	2.21	1080
BG-06	2	4	7.64	0.316	J	0.456	U	16.7	20.8	865	12.1	10600
BG-07	3	1	3.64	0.168	J	0.431	U	6.68	9.94	607	3.34	56.5
BG-07	3	5	6.82	0.270	J	0.472	U	10.9	17.1	3260	3.04	2960
BG-08	3	1	8.46	0.467	J	0.468	U	13.2	21.7	4150	11.1	1130
BG-08	3	4	8.51	0.381	J	0.438	U	13.2	21.3	3810	3.78	4260
BG-09	3	1	9.91	0.287	J	0.443	U	14.9	24.0	1180	6.6	834
BG-09	3	4	5.85	0.222	J	0.453	U	10.2	15.0	2080	3.38	960
BG-10	4	1	11.3	0.394	J	0.425	U	17.9	29.5	2530	2.14	198
BG-10	4	4	11.5	0.468	J	0.484	U	19.0	30.3	2280	3.16	1520
BG-11	4	1	11.6	0.509		0.462	U	16.3	30.8	955	5.03	364
BG-11	4	5	10.3	0.495		0.425	U	14.3	28.3	2960	1.01	1080
BG-12	4	1	15.2	0.654		0.438	U	26.9	49.0	1680	1.64	90.4
BG-12	4	5	8.48	0.330	J	0.388	U	14.6	22.5	1950	1.87	1480

Notes:

Area: The designated background soil area in which the boring was advanced.

mg/kg: Milligrams per kilogram.

J: Estimated value; the constituent was detected at a concentration between the method detection limit and the reporting limit.

U: Non-detection; the constituent was not detected above the method detection limit, the value shown on this table. One half the method detection limit was the value used in the statistical calculations.



Table 2. Background Concentrations of Key Constituents in Soil Navajo Refining Company, Artesia Refinery, New Mexico

		UTL	Mean	
Constituent	Lithology	mg/kg	mg/kg	Distribution
Arsenic	All	3.92	2.18	Normal
Barium	Sandy silt	252	158	Normal
Barium	Silty clay	227	130	Normal
Cadmium	All	0.339	0.139	Lognormal
Chromium	All	18.8	10.0	Normal
Copper	All	12.4	6.62	Normal
Iron	All	17,344	9,242	Normal
Lead	All	12.1	6.66	Normal
Manganese	All	488	305	Normal
Mercury	All	0.0302	0.00210	Lognormal
Nickel	All	16.2	9.15	Normal
Selenium	All	0.682	0.378	Normal
Vanadium	All	28.3	15.6	Normal
Zinc	All	46.6	25.1	Normal
Chloride	All	5,264	1,952	Normal
Fluoride	All	17.9	3.56	Cube root
Sulfate	Sandy silt	9,336	533	Cube root
Sulfate	Silty clay	21,620	3,113	Cube root

Notes:

UTL: Upper tolerance limit, with 95% coverage and 95% confidence.

mg/kg: Milligrams per kilogram.

Mean: Not necessarily the arithmetic mean, but the mean computed according to the distribution indicated on this table and back-transformed. See text.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Tuesday, April 21, 2015 9:36 AM

To: 'Combs, Robert'

Cc: Tsinnajinnie, Leona, NMENV; Griswold, Jim, EMNRD

Subject: RE: Initial C-141 report - Effluent Pipeline Leak 2015-04-12

Robert:

Received. OCD wants to make sure this properly cleaned up.

This is high Chloride and Sulfate containing fluids with other parameters of concern. Please note the depth to GW and make sure in your CA that the release is properly investigated (i.e., characterization 500 mg/kg Chloride to delineate horiz./vertical extent of release) and OCD expects to receive a remediation plan for final CA.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, New Mexico 87505

O: (505) 476-3490

E-mail: <u>CarlJ.Chavez@State.NM.US</u>
Web: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental



From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Friday, April 17, 2015 2:22 PM

To: Chavez, Carl J, EMNRD; Tsinnajinnie, Leona, NMENV **Cc:** Denton, Scott; Schultz, Michele; Strange, Aaron

Subject: Initial C-141 report - Effluent Pipeline Leak 2015-04-12

Carl and Leona,

Please see the attached C-141 form regarding the effluent pipeline leak on 4/12/15. A Final C-141 form will be prepared once all field activities are complete.

Please contact me for any questions.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159 office: 575-746-5382

cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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20-Nov-2013

Robert Combs Navajo Refining Company PO Box 1490 Artesia, NM 88211-1490

Tel: (575) 746-5382 Fax: (575) 746-5421

Re: WWTP Spill Work Order: 1309450

Dear Robert,

ALS Environmental received 1 sample on 11-Sep-2013 09:30 AM for the analyses presented in the following report.

This is a REVISED REPORT. Please see the Case Narrative for discussion concerning this revision.

The total number of pages in this revised report is CF.

Regards,

Electronically approved by: Sonia West

Sonie West

Sonia West

Project Manager



Certificate No: T104704231-13-12

ALS Environmental

Date: 20-Nov-13

Client: Navajo Refining Company

Project: WWTP Spill Work Order Sample Summary
Work Order: 1309450

<u>Lab Samp ID Client Sample ID Matrix Tag Number Collection Date Date Received Hold</u>

1309450-01 API Excavation Liquid 9/3/2013 16:58 9/11/2013 09:30

ALS Environmental

Date: 20-Nov-13

Client: Navajo Refining Company

Project: WWTP Spill Case Narrative

Work Order: 1309450

As per the clients request via phone conversation on November 15, 2013, this report has been revised to include Chrysene by method 8270.

Sample API Excavation was received in an unpreserved 1 Liter glass container. The sample was received outside of the recommended analytical holding time for water sample for Volatile Organics Method 8260 and Semivolatile Organics Method 8270; the data has been qualified with an "H".

Batch 73195, Total Metals Method 6020, Sample 1309616-01: MS/MSD performed on an unrelated sample.

Batch 73050, Semivolatile Organics Method 8270, Sample API Excavation was analyzed at 10X due to sample matrix and had initial vol of 200mL and final volume of 1.5mL.

Batch 73050, Semivolatile Organics Method 8270, Insufficient sample volume for MS/MSD. An LCS/LCSD pair provided as batch quality control.

Batch 73050, Semivolatile Organics Method 8270, Two surrogates did not meet the RPD limit in the LCS/LCSD pair; however, the individual percent recoveries were within control limits

ALS Environmental

Client: Navajo Refining Company

Project:WWTP SpillWork Order:1309450Sample ID:API ExcavationLab ID:1309450-01Collection Date:9/3/2013 04:58 PMMatrix:LIQUID

Analyses	Result	Qual	Report Limit V	U nits	Dilution Factor	Date Prep	Date Analyzed
MERCURY-SW7470A			SW7470		SW74	70	Analyst: OFO
Mercury	0.00205		0.000800	mg/L	1	9/18/2013	9/18/2013 04:02 PM
METALS			SW6020		SW30	10A	Analyst: SKS
Aluminum	1.86		0.100	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Arsenic	0.130		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Barium	0.0656		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Boron	1.21		0.500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Cadmium	U		0.0200	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Chromium	U		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Cobalt	0.00872	J	0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Copper	0.0456	J	0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Iron	6.90		2.00	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Lead	0.0164	J	0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Manganese	0.0780		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Molybdenum	0.0894		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Nickel	0.0771		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Selenium	0.742		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Silver	U		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Uranium	U		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
Zinc	0.365		0.0500	mg/L	1	9/19/2013	9/19/2013 04:40 PM
SEMIVOLATILES - SW8270D			SW8270		SW35	10	Analyst: ACN
1-Methylnaphthalene	370	JH	380	μg/L	10	9/13/2013	9/20/2013 03:06 PM
2-Methylnaphthalene	500	Н	380	μg/L	10	9/13/2013	9/20/2013 03:06 PM
Benzo(a)pyrene	U	Н	380	μg/L	10	9/13/2013	9/20/2013 03:06 PM
Chrysene	U	Н	380	μg/L	10	9/13/2013	9/20/2013 03:06 PM
Naphthalene	370	JH	380	μg/L	10	9/13/2013	9/20/2013 03:06 PM
Surr: 2,4,6-Tribromophenol	69.0	J	42-124	%REC	10	9/13/2013	9/20/2013 03:06 PM
Surr: 2-Fluorobiphenyl	64.5	J	48-120	%REC	10	9/13/2013	9/20/2013 03:06 PM
Surr: 2-Fluorophenol	48.0	J	20-120	%REC	10	9/13/2013	9/20/2013 03:06 PM
Surr: 4-Terphenyl-d14	81.8		51-135	%REC	10	9/13/2013	9/20/2013 03:06 PM
Surr: Nitrobenzene-d5	72.2	J	41-120	%REC	10	9/13/2013	9/20/2013 03:06 PM
Surr: Phenol-d6	63.4	J	20-120	%REC	10	9/13/2013	9/20/2013 03:06 PM
VOLATILES - SW8260C			SW8260				Analyst: PC
1,1,1-Trichloroethane	U	Н		mg/L	50		9/12/2013 04:02 PM
1,1,2,2-Tetrachloroethane	U	Н		mg/L	50		9/12/2013 04:02 PM
1,1,2-Trichloroethane	U	Н		mg/L	50		9/12/2013 04:02 PM
1,1-Dichloroethane	U	Н		mg/L	50		9/12/2013 04:02 PM
1,1-Dichloroethene	U	Н		mg/L	50		9/12/2013 04:02 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Date: 20-Nov-13

ALS Environmental

Client: Navajo Refining Company

Project:WWTP SpillWork Order:1309450Sample ID:API ExcavationLab ID:1309450-01Collection Date:9/3/2013 04:58 PMMatrix:LIQUID

Analyses	Result	Oual	Report Limit U	nits	Dilution Factor	Date Prep	Date Analyzed
Anaryses	Result	Quai	Limit C	iiits	ractor	Date 11ep	Date Analyzeu
1,2-Dibromoethane	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
1,2-Dichloroethane	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Benzene	2.4	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Carbon tetrachloride	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Chloroform	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Ethylbenzene	2.4	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Methylene chloride	U	Н	0.50	mg/L	50		9/12/2013 04:02 PM
Tetrachloroethene	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Toluene	3.8	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Trichloroethene	U	Н	0.25	mg/L	50		9/12/2013 04:02 PM
Vinyl chloride	U	Н	0.10	mg/L	50		9/12/2013 04:02 PM
Xylenes, Total	5.3	Н	0.75	mg/L	50		9/12/2013 04:02 PM
Surr: 1,2-Dichloroethane-d4	93.5		70-125	%REC	50		9/12/2013 04:02 PM
Surr: 4-Bromofluorobenzene	97.1		72-125	%REC	50		9/12/2013 04:02 PM
Surr: Dibromofluoromethane	96.7		71-125	%REC	50		9/12/2013 04:02 PM
Surr: Toluene-d8	93.1		75-125	%REC	50		9/12/2013 04:02 PM

Date: 20-Nov-13

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Work Order: 1309450

Client: Navajo Refining Company

Project: WWTP Spill

Sample ID	Client Sample ID	Matrix	Collection Date	TCLP Date	Prep Date	Analysis Date
Batch ID 7	73050 Test Name:	Semivolatiles - SW	78270D			
1309450-01A	API Excavation	Liquid	9/3/2013 4:58:00 PM		9/13/2013 09:15 AM	9/20/2013 03:06 PM
Batch ID 7	73162 Test Name:	Mercury-SW7470	<u>A</u>			
1309450-01A	API Excavation	Liquid	9/3/2013 4:58:00 PM		9/18/2013 11:40 AM	9/18/2013 04:02 PM
Batch ID 7	73195 <u>Test Name:</u>	Metals				
1309450-01A	API Excavation	Liquid	9/3/2013 4:58:00 PM		9/19/2013 10:00 AM	9/19/2013 04:40 PM
Batch ID E	R153657 Test Name:	Volatiles - SW8260	<u>0C</u>			
1309450-01A	API Excavation	Liquid	9/3/2013 4:58:00 PM			9/12/2013 04:02 PM

DATES REPORT

Date: 20-Nov-13

QC BATCH REPORT

Navajo Refining Company **Client:**

1309450 Work Order: **Project:** WWTP Spill

Batch ID: 7	3162 Instrument ID	HG03		Method	d: SW74 7	0					
MBLK	Sample ID: GBLKW1-0918	13-73162				Units: mg/	'L	Analys	is Date:	9/18/2013 0	3:41 PM
Client ID:		Rur	n ID: HG0 3	3_130918A		SeqNo: 3360508		Prep Date: 9/18	3/2013	DF: 1	
Analyte		Result	PQI	L SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury		U	0.000200)							
LCS	Sample ID: GLCSW1-0918	13-73162				Units: mg/	'L	Analys	is Date:	9/18/2013 0	3:42 PM
Client ID:	Run ID: HG03_130918A				SeqNo: 336	0509	Prep Date: 9/18/2013 DF: 1				
Analyte		Result	PQI	L SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury		0.00505	0.000200	0.005		0 101	85-115				
MS	Sample ID: 1309402-01DM :	S				Units: mg/	'L	Analysis Date: 9/18/2013 03:50			3:50 PM
Client ID:		Rur	n ID: HG0 3	3_130918A	SeqNo: 3360512			Prep Date: 9/18	DF: 1		
Analyte		Result	PQI	_ SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury		0.00511	0.000200	0.005	-0.00002	25 103	85-115				
MSD	Sample ID: 1309402-01DM :	SD			Units: mg/L			Analysis Date: 9/18/2013 03:51 PM			
Client ID:		Rur	n ID: HG0 3	3_130918A		SeqNo: 336	0513	Prep Date: 9/18/2013 DF: 1			
Analyte		Result	PQI	L SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury		0.00492	0.000200	0.005	-0.00002	25 98.9	85-115	0.00511	3.7	9 20	
DUP	Sample ID: 1309402-01DDU	JP				Units: mg/	'L	Analys	is Date:	9/18/2013 0	3:46 PM
Client ID:		Rur	n ID: HG0 3	3_130918A		SeqNo: 336	0511	Prep Date: 9/18	3/2013	DF: 1	
Analyte		Result	PQI	_ SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury		U	0.000200)				-0.000025		0 20	
The followi	ing samples were analyzed in	this batch	n:	1309450-01A							

Note:

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: 73195 Instrument ID ICPMS05 Method: SW6020 **MBLK** Sample ID: MBLKW3-091913-73195 Units: mg/L Analysis Date: 9/20/2013 12:08 PM Client ID: SeqNo: 3363548 Prep Date: 9/19/2013 DF: 1 Run ID: ICPMS05_130920A SPK Ref RPD Ref RPD Control Value Limit Value Limit %REC Analyte Result PQL SPK Val %RPD Qual U Aluminum 0.0100 Arsenic U 0.00500 U Barium 0.00500 Boron U 0.0500 Cadmium U 0.00200 Chromium U 0.00500 U Cobalt 0.00500 U Copper 0.00500 Iron U 0.200 U 0.00500 Lead U 0.00500 Manganese U 0.00500 Molybdenum U Nickel 0.00500 Selenium U 0.00500 Silver U 0.00500 Uranium U 0.00500 Zinc U 0.00500

LCS	Sample ID: MLCSW3-091913-73195				L	Jnits: mg/	L	Analy	sis Date: 9	9/19/2013 0	4:07 PM
Client ID:	Rur	n ID: ICPMS	05_130919 <i>A</i>	4	Se	qNo: 336	2300	Prep Date: 9/1	9/2013	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05273	0.00500	0.05		0	105	80-120				
Barium	0.05382	0.00500	0.05		0	108	80-120				
Boron	0.4791	0.0500	0.5		0	95.8	80-120				
Cadmium	0.05023	0.00200	0.05		0	100	80-120				
Chromium	0.05218	0.00500	0.05		0	104	80-120				
Cobalt	0.0522	0.00500	0.05		0	104	80-120				
Copper	0.05123	0.00500	0.05		0	102	80-120				
Iron	5.33	0.200	5		0	107	80-120				
Lead	0.05107	0.00500	0.05		0	102	80-120				
Manganese	0.05274	0.00500	0.05		0	105	80-120				
Molybdenum	0.04933	0.00500	0.05		0	98.7	80-120				
Nickel	0.0511	0.00500	0.05		0	102	80-120				
Selenium	0.05262	0.00500	0.05		0	105	80-120				
Silver	0.05091	0.00500	0.05		0	102	80-120				
Uranium	0.09508	0.00500	0.1		0	95.1	80-120				
Zinc	0.05587	0.00500	0.05		0	112	80-120				

See Qualifiers Page for a list of Qualifiers and their explanation.

Note:

Client: Navajo Refining Company

Work Order: 1309450
Project: WWTP Spill

Batch ID: 73	195 Instrument ID ICPMS05		Method:	SW6020						
LCS	Sample ID: MLCSW3-091913-73195				Units: mg/	L .	Analy	sis Date: 9	/20/2013 1	12:10 PM
Client ID:	Ru	n ID: ICPMS	05_130920A	S	SeqNo: 336	3549	Prep Date: 9/1	9/2013	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1065	0.0100	0.1	0	107	80-120				-
MS	Sample ID: 1309616-01DMS				Units: mg/	'L	Analy	sis Date: 9	/19/2013 ()4:21 PM
Client ID:	Ru	n ID: ICPMS	05_130919A	5	SeqNo: 336	2305	Prep Date: 9/1	9/2013	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	2.837	0.0100	0.1	2.969	-132	80-120				SEO
Arsenic	0.05759	0.00500	0.05	0.00563	104	80-120				
Barium	0.1532	0.00500	0.05	0.1134	79.6	80-120				S
Boron	1.091	0.0500	0.5	0.6631	85.6	80-120				
Cadmium	0.0527	0.00200	0.05	0.000053	105	80-120				
Chromium	0.06385	0.00500	0.05	0.01307	102	80-120				
Cobalt	0.05086	0.00500	0.05	0.001394	98.9	80-120				
Copper	0.05476	0.00500	0.05	0.005046	99.4	80-120				
Iron	29.93	0.200	5	26.15	75.6	80-120				SO
Lead	0.0539	0.00500	0.05	0.002549	103	80-120				
Manganese	0.2507	0.00500	0.05	0.211	79.5	80-120				SO
Molybdenum	0.05565	0.00500	0.05	0.00842	94.5	80-120				
Nickel	0.05403	0.00500	0.05	0.004901		80-120				
Selenium	0.0584	0.00500	0.05	0.005257		80-120				
Silver	0.04873	0.00500	0.05	0.00001		80-120				
Uranium	0.1061	0.00500	0.1	0.008033		80-120				
Zinc	0.08035	0.00500	0.05	0.02509	111	80-120				

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: 73195 Instrument ID ICPMS05 Method: SW6020

MSD Sample ID:	1309616-01DMSD			1	Units: mg/	L	Analysis Date: 9/19/2013 04:23 PM				
Client ID:	Rur	Run ID: ICPMS05_130919A			SeqNo: 3362306			/2013	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Aluminum	2.716	0.0100	0.1	2.969	-253	80-120	2.837	4.37	15	SEO	
Arsenic	0.05978	0.00500	0.05	0.00563	108	80-120	0.05759	3.73	15		
Barium	0.1575	0.00500	0.05	0.1134	88.3	80-120	0.1532	2.79	15		
Boron	1.103	0.0500	0.5	0.6631	87.9	80-120	1.091	1.06	15		
Cadmium	0.05355	0.00200	0.05	0.000053	107	80-120	0.0527	1.6	15		
Chromium	0.06485	0.00500	0.05	0.01307	104	80-120	0.06385	1.55	15		
Cobalt	0.05328	0.00500	0.05	0.001394	104	80-120	0.05086	4.64	15		
Copper	0.05661	0.00500	0.05	0.005046	103	80-120	0.05476	3.32	15		
Iron	30.81	0.200	5	26.15	93.3	80-120	29.93	2.91	15	0	
Lead	0.05453	0.00500	0.05	0.002549	104	80-120	0.0539	1.15	15		
Manganese	0.2572	0.00500	0.05	0.211	92.5	80-120	0.2507	2.56	15	0	
Molybdenum	0.05767	0.00500	0.05	0.00842	98.5	80-120	0.05565	3.56	15		
Nickel	0.05706	0.00500	0.05	0.004901	104	80-120	0.05403	5.45	15		
Selenium	0.0605	0.00500	0.05	0.005257	110	80-120	0.0584	3.53	15		
Silver	0.04981	0.00500	0.05	0.00001	99.6	80-120	0.04873	2.19	15		
Uranium	0.1081	0.00500	0.1	0.008033	100	80-120	0.1061	1.89	15		
Zinc	0.07989	0.00500	0.05	0.02509	110	80-120	0.08035	0.578	15		

DUP	Sample ID: 1309616-01DDUP				Units: mg/	L	Analysi	s Date: 9/	19/2013 0	4:18 PM
Client ID:	Rui	n ID: ICPMS	05_130919	4	SeqNo: 336	Prep Date: 9/19	/2013	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.006299	0.00500					0.00563	11.2	25	
Barium	0.1128	0.00500					0.1134	0.471	25	
Boron	0.6726	0.0500					0.6631	1.43	25	
Cadmium	U	0.00200					0.000053	0	25	
Chromium	0.01436	0.00500					0.01307	9.42	25	
Cobalt	0.001703	0.00500					0.001394	0	25	J
Copper	0.005504	0.00500					0.005046	8.68	25	
Iron	28.46	0.200					26.15	8.48	25	
Lead	0.002397	0.00500					0.002549	0	25	J
Manganese	0.2288	0.00500					0.211	8.11	25	
Molybdenum	0.009001	0.00500					0.00842	6.67	25	
Nickel	0.005295	0.00500					0.004901	7.73	25	
Selenium	0.006381	0.00500					0.005257	19.3	25	
Silver	U	0.00500					0.00001	0	25	
Uranium	0.008277	0.00500					0.008033	2.99	25	
Zinc	0.02722	0.00500					0.02509	8.15	25	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill QC BATCH REPORT

Batch ID: 7	3195 Instrument ID	CPMS05		Metho	d: SW602	20					
DUP	Sample ID: 1309616-01DDU	Р				Units: mg/	'L	Analys	sis Date:	9/20/2013 1	2:15 PM
Client ID:		Run II	D: ICPMS	05_130920	4	SeqNo: 336	3551	Prep Date: 9/1	9/2013	DF: 10	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum		2.192	0.100					2.31	5.2	24 25	

The following samples were analyzed in this batch:

1309450-01A

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: 73050 Instrument ID SV-3 Method: SW8270 Analysis Date: 9/16/2013 06:21 PM **MBLK** Sample ID: SBLKW1-130913-73050 Units: µq/L Run ID: SV-3_130916B Prep Date: 9/13/2013 Client ID: SeqNo: 3358240 DF: 1 **RPD** SPK Ref Control RPD Ref Value Limit Value Limit Analyte Result PQL SPK Val %REC %RPD Qual U 1-Methylnaphthalene 5.0 2-Methylnaphthalene U 5.0 U Benzo(a)pyrene 5.0 Chrysene U 5.0 Naphthalene U 5.0 Surr: 2,4,6-Tribromophenol 93.53 5.0 100 0 93.5 42-124 0 Surr: 2-Fluorobiphenyl 77.17 5.0 100 0 77.2 48-120 0 Surr: 2-Fluorophenol 67.1 100 0 67.1 20-120 0 5.0 Surr: 4-Terphenyl-d14 87.53 5.0 100 0 87.5 51-135 0 0 0 Surr: Nitrobenzene-d5 71.14 5.0 100 71.1 41-120 Surr: Phenol-d6 69.12 5.0 100 0 69.1 20-120 0 Units: µg/L LCS Sample ID: SLCSW1-130913-73050 Analysis Date: 9/16/2013 05:35 PM Client ID: Run ID: SV-3_130916B SeqNo: 3358239 Prep Date: 9/13/2013 DF: 1 RPD SPK Ref Control RPD Ref Value Limit Value Limit PQL SPK Val %REC %RPD Qual Result Analyte 1-Methylnaphthalene 41.26 5.0 50 0 82.5 55-120 2-Methylnaphthalene 42.44 5.0 50 0 84.9 55-120 50 0 80.9 Benzo(a)pyrene 40.43 5.0 55-120 Chrysene 0 41.67 5.0 50 83.3 55-120

Naphthalene

Surr: 2,4,6-Tribromophenol

Surr: 2-Fluorobiphenyl

Surr: 2-Fluorophenol

Surr: 4-Terphenyl-d14

Surr: Nitrobenzene-d5

Surr: Phenol-d6

39.6

79.62

69.61

98.92

89.45

69.5

83.36

5.0

5.0

5.0

5.0

5.0

5.0

5.0

50

100

100

100

100

100

100

0

0

0

0

0

0

0

79.2

79.6

69.6

98.9

89.4

69.5

83.4

55-120

42-124

48-120

20-120

51-135

41-120

20-120

0

0

0

0

0

0

Navajo Refining Company

QC BATCH REPORT

Work Order: 1309450 Project: WWTP Spill

Client:

Batch ID: 73050	Instrument ID SV-3	Method:	SW8270
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LCSD Sample ID: SLCSDW1-	-130913-73050			ı	Jnits: μ g/l	L	Analysis Date: 9/17/2013 11:47 AM				
Client ID:	Run ID): SV-3_1	30916B	Se	SeqNo: 3358244			/2013	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1-Methylnaphthalene	38.91	5.0	50	0	77.8	55-120	41.26	5.86	20		
2-Methylnaphthalene	41.44	5.0	50	0	82.9	55-120	42.44	2.39	20		
Benzo(a)pyrene	41.04	5.0	50	0	82.1	55-120	40.43	1.51	20		
Chrysene	41.56	5.0	50	0	83.1	55-120	41.67	0.283	20		
Naphthalene	39.98	5.0	50	0	80	55-120	39.6	0.95	20		
Surr: 2,4,6-Tribromophenol	87.43	5.0	100	0	87.4	42-124	79.62	9.35	20		
Surr: 2-Fluorobiphenyl	73.19	5.0	100	0	73.2	48-120	69.61	5.01	20		
Surr: 2-Fluorophenol	75.18	5.0	100	0	75.2	20-120	98.92	27.3	20	R	
Surr: 4-Terphenyl-d14	77.31	5.0	100	0	77.3	51-135	89.45	14.6	20		
Surr: Nitrobenzene-d5	76.3	5.0	100	0	76.3	41-120	69.5	9.32	20		
Surr: Phenol-d6	66.91	5.0	100	0	66.9	20-120	83.36	21.9	20	R	

The following samples were analyzed in this batch:

1309450-01A

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: R153657 Instrument ID VOA1 Method: SW8260

MBLK Sample ID: VBLKW-1	30912-R153657				Units: µg/l	L	Anal	ysis Date: 9	/12/2013 (02:46 PN
Client ID:	Run II	D: VOA1 _	130912A		SeqNo: 335	4011	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	U	5.0								
1,1,2,2-Tetrachloroethane	U	5.0								
1,1,2-Trichloroethane	U	5.0								
1,1-Dichloroethane	U	5.0								
1,1-Dichloroethene	U	5.0								
1,2-Dibromoethane	U	5.0								
1,2-Dichloroethane	U	5.0								
Benzene	U	5.0								
Carbon tetrachloride	U	5.0								
Chloroform	U	5.0								
Ethylbenzene	U	5.0								
Methylene chloride	U	10								
Tetrachloroethene	U	5.0								
Toluene	U	5.0								
Trichloroethene	U	5.0								
Vinyl chloride	U	2.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	49	5.0	50		0 98	70-125		0		
Surr: 4-Bromofluorobenzene	51.26	5.0	50		0 103	72-125		0		
Surr: Dibromofluoromethane	47.84	5.0	50		0 95.7	71-125		0		
Surr: Toluene-d8	45.14	5.0	50		0 90.3	75-125		0		

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: R153657 Instrument ID VOA1 Method: SW8260

LCS Sample ID: VLCSW-13	0912-R153657				U	Inits: µg/L	-	Analysis Date: 9/12/2013 01:14 I				
Client ID:	Run I	D: VOA1 _	130912A	SeqNo: 3354010			Prep Date:	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
1,1,1-Trichloroethane	51.59	5.0	50		0	103	80-120					
1,1,2,2-Tetrachloroethane	43.8	5.0	50		0	87.6	72-120					
1,1,2-Trichloroethane	48.85	5.0	50		0	97.7	80-120					
1,1-Dichloroethane	55.72	5.0	50		0	111	76-120					
1,1-Dichloroethene	57.77	5.0	50		0	116	73-124					
1,2-Dibromoethane	49.91	5.0	50		0	99.8	80-120					
1,2-Dichloroethane	52.43	5.0	50		0	105	78-120					
Benzene	54.11	5.0	50		0	108	73-121					
Carbon tetrachloride	48.43	5.0	50		0	96.9	75-125					
Chloroform	52.59	5.0	50		0	105	70-130					
Ethylbenzene	48.86	5.0	50		0	97.7	80-120					
Methylene chloride	51.52	10	50		0	103	65-133					
Tetrachloroethene	47.65	5.0	50		0	95.3	79-120					
Toluene	47.62	5.0	50		0	95.2	80-120					
Trichloroethene	53.45	5.0	50		0	107	80-120					
Vinyl chloride	60.26	2.0	50		0	121	70-127					
Xylenes, Total	149.3	15	150		0	99.6	80-120					
Surr: 1,2-Dichloroethane-d4	48.87	5.0	50		0	97.7	70-125		0			
Surr: 4-Bromofluorobenzene	52.18	5.0	50		0	104	72-125		0			
Surr: Dibromofluoromethane	50.3	5.0	50		0	101	71-125		0			
Surr: Toluene-d8	47.56	5.0	50		0	95.1	75-125		0			

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: R153657 Instrument ID VOA1 Method: SW8260

MS Sample ID: 1309436-0	5AMS				U	nits: µg/L	-	Anal	ysis Date: 9	/12/2013 (04:28 PN
Client ID:	Run II	D: VOA1 _	130912A		Sec	qNo: 335	4015	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	47.54	5.0	50		0	95.1	80-120				
1,1,2,2-Tetrachloroethane	52.72	5.0	50		0	105	72-120				
1,1,2-Trichloroethane	51.89	5.0	50		0	104	80-120				
1,1-Dichloroethane	53	5.0	50		0	106	76-120				
1,1-Dichloroethene	48.61	5.0	50		0	97.2	73-124				
1,2-Dibromoethane	51.94	5.0	50		0	104	80-120				
1,2-Dichloroethane	48.5	5.0	50		0	97	78-120				
Benzene	44.39	5.0	50		0	88.8	73-121				
Carbon tetrachloride	44.48	5.0	50		0	89	75-125				
Chloroform	50.02	5.0	50		0	100	70-130				
Ethylbenzene	46.39	5.0	50		0	92.8	80-120				
Methylene chloride	50.26	10	50		0	101	65-133				
Tetrachloroethene	41.87	5.0	50		0	83.7	79-120				
Toluene	46.75	5.0	50		0	93.5	80-120				
Trichloroethene	45.58	5.0	50		0	91.2	80-120				
Vinyl chloride	40.53	2.0	50		0	81.1	70-127				
Xylenes, Total	145.5	15	150		0	97	80-120				
Surr: 1,2-Dichloroethane-d4	48.39	5.0	50		0	96.8	70-125		0		
Surr: 4-Bromofluorobenzene	51.28	5.0	50		0	103	72-125		0		
Surr: Dibromofluoromethane	50.54	5.0	50		0	101	71-125		0		
Surr: Toluene-d8	50.23	5.0	50		0	100	75-125		0		

Client: Navajo Refining Company

Work Order: 1309450 Project: WWTP Spill

Batch ID: R153657 Instrument ID VOA1 Method: SW8260

MSD Sample ID: 1309436-09	5AMSD				Units: µg/ l	L	Analys	is Date: 9/	12/2013 0	4:53 PM
Client ID:	Run I	D: VOA1 _	130912A	S	eqNo: 335	4016	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	47.16	5.0	50	0	94.3	80-120	47.54	0.797	20	
1,1,2,2-Tetrachloroethane	50.78	5.0	50	0	102	72-120	52.72	3.75	20	
1,1,2-Trichloroethane	50.25	5.0	50	0	100	80-120	51.89	3.22	20	
1,1-Dichloroethane	52.51	5.0	50	0	105	76-120	53	0.937	20	
1,1-Dichloroethene	51.28	5.0	50	0	103	73-124	48.61	5.35	20	
1,2-Dibromoethane	50.19	5.0	50	0	100	80-120	51.94	3.42	20	
1,2-Dichloroethane	49.25	5.0	50	0	98.5	78-120	48.5	1.55	20	
Benzene	47.99	5.0	50	0	96	73-121	44.39	7.78	20	
Carbon tetrachloride	48.08	5.0	50	0	96.2	75-125	44.48	7.79	20	
Chloroform	49.8	5.0	50	0	99.6	70-130	50.02	0.454	20	
Ethylbenzene	43.63	5.0	50	0	87.3	80-120	46.39	6.13	20	
Methylene chloride	50.01	10	50	0	100	65-133	50.26	0.49	20	
Tetrachloroethene	45.56	5.0	50	0	91.1	79-120	41.87	8.44	20	
Toluene	48.55	5.0	50	0	97.1	80-120	46.75	3.78	20	
Trichloroethene	48.97	5.0	50	0	97.9	80-120	45.58	7.17	20	
Vinyl chloride	48.68	2.0	50	0	97.4	70-127	40.53	18.3	20	
Xylenes, Total	147.3	15	150	0	98.2	78-121	145.5	1.2	20	
Surr: 1,2-Dichloroethane-d4	48.01	5.0	50	0	96	70-125	48.39	0.789	20	
Surr: 4-Bromofluorobenzene	49.03	5.0	50	0	98.1	72-125	51.28	4.49	20	
Surr: Dibromofluoromethane	48.77	5.0	50	0	97.5	71-125	50.54	3.57	20	
Surr: Toluene-d8	47.38	5.0	50	0	94.8	75-125	50.23	5.84	20	

The following samples were analyzed in this batch:

1309450-01A

Date: 20-Nov-13 **ALS Environmental**

Client: Navajo Refining Company **QUALIFIERS,**

WWTP Spill **Project:** ACRONYMS, UNITS WorkOrder: 1309450

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program
Units Reported	Description
$\mu g/L$	Micrograms per Liter

mg/L Milligrams per Liter

Sample Receipt Checklist

Client Name: NAVAJO REFINING			Date/Time Received: 11-Sep-13 09:30								
Work Order:	<u>1309450</u>				Received by	y:	<u>JBA</u>	<u>\</u>			
Checklist comple	eted by <u>Paresh M. Giga</u> eSignature	1.	2-Sep-13		Reviewed by:	Sonia					13-Sep-13 Date
Matrices: Carrier name:	<u>Liquid</u> <u>FedEx</u>	l								ı	
Shipping contain	er/cooler in good condition?		Yes	✓	No 🗆	Not P	resent				
Custody seals in	tact on shipping container/coole	r?	Yes	✓	No 🗆	Not P	resent				
Custody seals in	tact on sample bottles?		Yes		No 🗌	Not P	resent	✓			
Chain of custody	present?		Yes	✓	No 🗌						
Chain of custody	signed when relinquished and	received?	Yes	✓	No 🗌						
Chain of custody	agrees with sample labels?		Yes	✓	No 🗆						
Samples in prop	er container/bottle?		Yes		No 🗸						
Sample containe	ers intact?		Yes	✓	No 🗆						
Sufficient sample	e volume for indicated test?		Yes	✓	No 🗆						
All samples received within holding time?			Yes		No 🗹						
Container/Temp Blank temperature in compliance?			Yes	✓	No 🗆						
Temperature(s)/	Thermometer(s):		1.0c/1.0	Oc C/	<u>U</u>		IR1				
Cooler(s)/Kit(s):			<u>2988</u>								
	le(s) sent to storage:		9/12/13	09:1							
	s have zero headspace?		Yes		No 🗆	No VOA v	⁄ıals subi ¬	mitted	✓		
	ptable upon receipt?			✓	No 🗔	N/A L	_				
pH adjusted? pH adjusted by:			Yes		No 🗀	N/A	4				
Login Notes:	Sample received in 1 Liter V day holding time; sample re					ved - volat	iles and	semivo	olatiles h	ave 7	
====	=======	=====	===	= =	====	===	==:		===	==	====
Client Contacted Contacted By:	:	Date Contacted: Regarding:			Person	Contacted	l:				
Comments:											
CorrectiveAction	:								SF	RC Pa	ge 1 of 1



ALS Laboratory Group 10450 Stancliff Rd. #210 Houston, Texas 77099 (Tel) 281.530.5656 (Fax) 281.530.5887

Chain of Custody Form

Page _1 of __1

1309450

NAVAJO REFINING: Navajo Refining Company

Project: WWTP Spill



				ALS Project M				100	ar a sa						## # #			
	tomer Information			Project In				Parameter/Method Request for Analysis										
Purchase Order			Project	Name WWTP S	pill			ΑV	olitiles (Totals)	l						•••••	
Work Order			Project Ni	ımber				ВВ	emi-Voli	tiles (T	otals)							
Company Name	Navajo Refining Com	pany	Bill To Con	npany Navajo R	efining Con	npany		© Metals (Totals)										
Send Report To	Robert Combs		Invoice	Attn. Aaron Sti	range			D	D									
Address	P. O. Box 159		Address 501 East Main															
City/State/Zip	Artesia, New Mexico	88211-0159						G										
Phone	(575) 748-3311			hone (575) 748	-3311			н								***************************************		
Fax	(575) 746-5451	THE INCHASE OF		Fax (575) 746	-5451							***************************************						
e-Mail Address	Aaron.Strange@hollyfr	rontier.com	e-Mail Address Aaron.Strange@hollyfrontier.com					j			,,,,a,,F*******************************	····		V11001301				
No.	Sample Description	ria dielaidia alaidia ara ara d	Date Time Matrix Pres. #Bottles					Α	В	C	D	È	F	G	H			Hojd
API Excavat	ion	<u></u>	9/3/13	16:58	Liquid	None	1	X	Х	Х		· · · · · · ·						
🔯 Temperatur	e Blank				Liquid		1											
3.																		
4																	<u> </u>	
5.5																		
(16)()																		
7									<u> </u>				<u></u>		<u> </u>		<u> </u>	
8								ļ		ļ			ļ					
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3100					<u> </u>	<u> </u>		<u></u>	<u> </u>			<u> </u>			<u> </u>			
Sampler(s): Please P Aaron Strange	rint & Sign		414141414141414141	ment Method: edEx		quired Tur STD 10 Wk		Time: 5 Wk	: Days		☐ Other Vk Days		4 Hour	Re	sults Du	ie Date:		
Relinquished by:	2	Date: 9/3/2013	Time: Received by: 16:15					No	otes:									***************************************
Relinquished by:	72	1/11/13	Time; Received by (Laboratory):						ooler Te	Ç.	C Pack	age: (C	neck B	ox Belo	w) · · · · · ·			
			Time: Received by (Laboratory):						Ociel 16))));		vel II:					RP-Che	
Logged by (Laboratory):	and grapher	Date:	Time:	CHecked by (Labo	uratory):		1997		a gare					C + Ray		TR	RP Leve	el IV
Preservative Key:	1-HCI 2-HNO3 3	H2SO4 4-N	NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4 degrees C				9-5	035		Le	vel IV:	SW84	6 CLP-	Like	-			
			Name of the Control o					(8) 10 - 10	Vertical Control	651/A6	Ot	her:				1		

ORIGIN ID: ROWA (575) 748-3311 NAVAJO ARTESIA 501 E MAIN

ARTESIA , NM 882109440 UNITED STATES US

SHIP DATE: 09SEP13 ACTWGT: 25.0 LB MAN CAD: 634483/CAFE2608

BILL RECIPIENT

PSONIA WEST ALS LABORATORY GROUP 10450 STANCLIFF RD.,

SÚITE 210

HOUSTON TX 77099 (281) 530-5656 REF

Fec 至文。 TRK# 9201 5614 5589 2050

WED - 11 SEP 10:30A PRIORITY OVERNIGHT

AB SGRA

77099 TX-US IAH

FedEx



Emp# 891856 18SEP13 ROWA 519C1/9256/93AB

ALS Environmental

10450 Stancliff Rd., Suite 21 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887

CUSTODY SEAL



06-Nov-2013

Aaron Strange Navajo Refining Company PO Box 1490 Artesia, NM 88211-1490

Tel: (575) 748-6733 Fax: (575) 746-5421

Re: Wastewater Spill-Artesia Work Order: 1311143

Dear Aaron,

ALS Environmental received 1 sample on 25-Sep-2013 09:25 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 20.

Sonie West

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Electronically approved by: Dayna.Fisher

Sonia West Project Manager ENP ACCREONE

Certificate No: T104704231-13-12

Client: Navajo Refining Company

Project: Wastewater Spill-Artesia 1311143

Work Order:

Work Order Sample Summary

9/24/2013 14:07

9/25/2013 09:25

Lab Samp ID Client Sample ID Tag Number **Collection Date Date Received** <u>Matrix</u> <u>Hold</u>

13091139

Solid

1311143-01 Wastewater Spill at Lift Station

Excavation

Client: Navajo Refining Company
Project: Wastewater Spill-Artesia

Project: Wastewater Spill-Artesia Case Narrative

Work Order: 1311143

This report contains additional analyses per your request on November 4, 2013 via email. The laboratory analyzed your sample Wastewater Spill at Lift Station Excavation for RCI. The sample was originally reported as ALS Workorder Number 13091139.

The analyses for Reactive Cyanide and Reactive Sulfide were subcontracted to ALS Environmental in Holland, MI.

Client: Navajo Refining Company

Project: Wastewater Spill-Artesia Work Order: 1311143

Sample ID: Wastewater Spill at Lift Station Excavation Lab ID: 1311143-01

Collection Date: 9/24/2013 02:07 PM Matrix: SOLID

Analyses	Result	Qual	Report Limit Units	Dilution Factor	Date Analyzed
REACTIVE CYANIDE			SW-846		Analyst: HN
Reactive Cyanide	U	Н	0.100 mg/	/Kg 1	11/6/2013
REACTIVE SULFIDE			SW-846		Analyst: HN
Reactive Sulfide	242	Н	40.0 mg/	/Kg 1	11/5/2013 02:00 PM
IGNITABILITY			SW1030		Analyst: KAH
Ignitability, Solid	Negative	Н		n Rate, 1 //sec	11/5/2013 04:20 PM
PH - SOIL - SW9045D			SW9045B		Analyst: KL
рН	7.61	Н	0.100 pH	Units 1	11/5/2013 01:00 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Work Order: 1311143

Client: Navajo Refining Company

Project: Wastewater Spill-Artesia

Sample ID	Client Sample ID	Matrix	Collection Date	TCLP Date	Prep Date	Analysis Date	
Batch ID	R156646 <u>Test Name:</u> I	<u>gnitability</u>					
1311143-01A	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM			11/5/2013 04:20 PM	
Batch ID	<u>R156658</u> <u>Test Name:</u> p	oH - Soil - SW904	<u>5D</u>				
1311143-01A	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM			11/5/2013 01:00 PM	
Batch ID	R156680 Test Name: I	Reactive Cyanide					
1311143-01B	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM			11/6/2013	
	Station Excavation					11/5/2013 02:00 PM	

DATES REPORT

Client: Navajo Refining Company

Work Order: 1311143

Project: Wastewater Spill-Artesia

QC BATCH REPORT

Batch ID: R15	instrument ID V	VetChem		Method	d: SW103	0	(Dissolve	e)					
DUP	Sample ID: 1311030-01ADU I	•				Units: Bur	n Rate, n	nm/se Ar	nalysi	s Date:	11/5	5/2013 0	4:20 PM
Client ID:		Run I	D: WETCH	IEM_13110	5E	SeqNo: 342	1081	Prep Date:				DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Re Value	ef	%RPD		RPD Limit	Qual
Ignitability, Sc	olid	U	0						0		0	25	
The following	g samples were analyzed in	this batch:	13	311143-01A									

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Navajo Refining Company

Work Order: 1311143

Project: Wastewater Spill-Artesia

QC BATCH REPORT

Batch ID: R	2156658 Instrumen	t ID WetChem		Metho	d: SW90 4	15B (Dissolve)			
LCS	Sample ID: WLCSS1-13	31105-R156658				Units: pH (Jnits	Analys	sis Date: 1	1/5/2013 0	1:00 PN
Client ID:		Run II	ID: WETCHEM_131105H			SeqNo: 342 1	408	Prep Date:	DF: 1		
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
рН		6.01	0.100	6		0 100	98-102				
DUP	Sample ID: 1311030-01	ADUP				Units: pH (Jnits	Analys	sis Date: 1	1/5/2013 0	1:00 PN
Client ID:		Run II	D: WETCH	HEM_13110	5H	SeqNo: 342 1	419	Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
рН		5.45	0.100					5.5	0.913	10	Н

Client: Navajo Refining Company **QUALIFIERS, Project:** Wastewater Spill-Artesia **ACRONYMS, UNITS**

WorkOrder: 1311143

Oualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program
Units Reported	Description

Units Reported Description

Burn Rate, mm/sec

mg/Kg Milligrams per Kilogram

pH Units

Sample Receipt Checklist

Client Name: NAVAJO REFINING				Date/Time Received: 25-Sep					<u> 09:25</u>			
Work Order:	13091139				Received b	y:	<u>w</u> 1	. <u>7</u>				
Checklist comp	pleted by Farish M. Giga eSignature	2	25-Sep-13 Date	!	Reviewed by:	eSigna	ture				Date	_
Matrices: Carrier name:	Solid FedEx	'								'		
Shipping contai	iner/cooler in good condition?		Yes	✓	No 🗌	No	t Present					
Custody seals i	intact on shipping container/coole	er?	Yes	✓	No 🗌	No	t Present					
Custody seals i	intact on sample bottles?		Yes		No \square	No	t Present	✓				
Chain of custod	dy present?		Yes	✓	No 🗆							
Chain of custod	dy signed when relinquished and	received?	Yes	✓	No 🗆							
Chain of custod	dy agrees with sample labels?		Yes	✓	No 🗌							
Samples in pro	per container/bottle?		Yes	✓	No 🗌							
Sample contain	ners intact?		Yes	✓	No 🗆							
Sufficient samp	ole volume for indicated test?		Yes	~	No 🗌							
All samples rec	ceived within holding time?		Yes	~	No 🗆							
Container/Temp	p Blank temperature in compliand	ce?	Yes	~	No 🗆							
Temperature(s))/Thermometer(s):		3.3c/3.3	3c C/	<u>U</u>		IR1					
Cooler(s)/Kit(s)	:		<u>5119</u>									
Date/Time sam	ple(s) sent to storage:		9/25/13	3 16:1								
Water - VOA via	als have zero headspace?		Yes		No U		A vials sub	mitted	✓			
	eptable upon receipt?		Yes		No 🗆	N/A	✓					
pH adjusted? pH adjusted by:	:		Yes -		No L	N/A	V					
Login Notes:												
				:								_
Client Contacte	ed:	Date Contacted:			Person	Contact	ted:					
Contacted By:		Regarding:										
Comments:												
CorrectiveActio	on:											
_ 55557.10110									S	RC Pa	ge 1 of	1



ALS Laboratory Group 10450 Stancliff Rd, #210 Houston, Texas 77099 (Tel) 281.530.5656 (Fax) 281.530.5887

Chain of Custody Form

				•
Page	_1	of	1	

1311143

NAVAJO REFINING: Navajo Refining Company

Project: Wastewater Spill-Artesia

()		,			ALS	Project Ma	anager: So	nia West			ere Ge								:	
	Cus	tomer Information				oject Inf							1 (51)	11111111			11 616 82 1	.	:	
1	Purchase Order			Project I	Name	Wastewat	er Spili - A	Artesia		Α	TCLP Vol	tiles								
	Work Order			Project Nu	mber	r ·					TCLP Semi-Votatiles									
(Company Name	Navajo Refining Comp	any	Bill To Com	pany	Navajo Refining Company C TCLP Metals					als									
,	Send Report To	Aaron Strange		Invoice	Attn.	Aaron Str	ange			ם		***************************************								
	Address	P. O. Box 159		Add	dress	501 East 1	Vlain			E										
	City/State/Zip	Artesia, New Mexico 8	8211-0159	City/Stat	e/Zip	Artesia, N	ew Mexico	88210	······································	G									-	
	Phone	(575) 748-3311	· · · · · · · · · · · · · · · · · · ·	P	hone	(575) 748-	3311			Н									-	
	Fax	(575) 746-5451			Fax	(575) 746-	5451			ı								·····		
	e-Mail Address	A.Strange@hollyfrontier	.com	e-Mail Add	dress	A.Strange(@hollyfront	ier.com		J										
No.	-99	Sample Description		Date]	Time	Matrix	Pres.	# Botles	<i>f</i>	A B	С	a	E	F	G y	H	1	J	Hold
1	Wastewater Spill	at Lift Station Excavation)	9/24/13	1	14:07	Solid	Chill	1	>	< X	Х				-				
2																				
3																				
4								<u> </u>												
-5											_									
6								ļ												
7					<u> </u>			 												
8								-												
9	ļ						<u> </u>	ļ			_									
10 Samn	lor(s): Please Pi	rint & Sian	4	Shipn	nent M	lethod:	Rec	ulred Tur	naround T	ime			Other			Res	ults Du	e Date:		
Gi	en Rhodes	Alan Pho	dee	Fed	teral	Express	Ø	5TD 10 WK	Days [] 5	Wk Days	2W	-		Hour			- -	4	×
Relingu	ished by:	fint & Sign The Pho Phole Phole	Pate: 9/24/13	Time: 1500		ved by:					Notes:					····	<u></u>			
Roling	uished by:	7	9/11/13	16:15	Receiv	BAIL	ratory)	al 1			-Coaler Ton	, QC				x Below)			
1 0000	S by (Laboratory):	con of the same of	7/	Time	Chack	od by (Labor	alory):	7/25//	<u>s ()"/</u>	ار ا	ugurus (e.b.) Valus das Sas	965 398			standar Std OC	d QC + Raw	Data		RP-Chec	
											3:3					CLP-L				
Pres	rvative Key:	1-HCL 2-HNO3 3-	H2SO4 4-Na	OH 5-Na2S20	3 6	6-NaHSO4	7-Othe	r: 8-4 de	grees C	9-	5035 inc		Ott	er: _					1	

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS Laboratory Group.

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10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887

Date: Q-Name: A-Company: 1 CUSTODY SEAL

tter 5 trage? Varaji Retturz Co.



ALS Group USA, Corp

Date: 06-Nov-13

Client: ALS Environmental

Project: 1311143 **Work Order:** 1311181

Work Order Sample Summary

 Lab Samp ID
 Client Sample ID
 Matrix
 Tag Number
 Collection Date
 Date Received
 Hold

 1311181-01
 1311143-01B
 Solid
 9/24/2013 14:07
 11/5/2013 09:30
 □

mg/Kg

Milligrams per Kilogram

Date: 06-Nov-13

Client: ALS Environmental QUALIFIERS,

Project: 1311143
WorkOrder: 1311181

ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P R	Dual Column results percent difference > 40% RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
Acronym	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
Units Reported	Description

QF Page 1 of 1

Date: 06-Nov-13

Client: ALS Environmental

1311181

Project: 1311143 **Case Narrative** Work Order:

Batch R129921, Method SR 7.3.4.2 WST, Sample 1311181-01A: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch R129963, Method CNR_7.3.3.2_WST, Sample 1311181-01A: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

ALS Group USA, Corp

Client: ALS Environmental

 Project:
 1311143
 Work Order:
 1311181

 Sample ID:
 1311143-01B
 Lab ID:
 1311181-01

 Collection Date:
 9/24/2013 02:07 PM
 Matrix:
 SOLID

Analyses	Result	Qual	Report Limit Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE Cyanide, Reactive	ND	Н	SW7.3.3.2 100 mg/Kg	1	Analyst: ND 11/6/2013
SULFIDE, REACTIVE Sulfide, Reactive	240	Н	SW7.3.4.2 100 mg/Kg	1	Analyst: ND 11/5/2013 02:00 PM

Date: 06-Nov-13

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Client: ALS Environmental

Work Order: 1311181 **Project:** 1311143

Date: 06-Nov-13

QC BATCH REPORT

Batch ID: R129921	Instrument ID WE	ГСНЕМ		Method	d: SW7.3	.4.2							
MBLK	Sample ID: MB-R12992	1-R129921	I			L	Jnits: mg/l	Kg		Ana	lysis Date: 1	11/5/2013 (02:00 PM
Client ID:		Run ID	: WETCH	IEM_13110	5M	Se	qNo: 252 3	3666	Prep D	ate:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit		Ref alue	%RPD	RPD Limit	Qual
Sulfide, Reactive		ND	100										
LCS	Sample ID: LCS-R12992	21-R12992	21			ι	Jnits: mg/l	Kg		Ana	lysis Date: 1	11/5/2013 (02:00 PM
Client ID:		Run ID	: WETCH	IEM_13110	5M	Se	qNo: 252 3	3667	Prep D	ate:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit		Ref alue	%RPD	RPD Limit	Qual
Sulfide, Reactive		1638	100	2149		0	76.2	60-120			0		
The following samp	oles were analyzed in this	s batch:	13	11181-01A									

Work Order: 1311181 **Project:** 1311143

Client:

QC BATCH REPORT

Batch ID: R129963	Instrument ID WET	СНЕМ		Method	d: SW7.3	.3.2						
MBLK	Sample ID: MB-R129963	-R129963				U	nits: mg/l	K g	Ana	alysis Date:	11/6/2013	
Client ID:		Run ID: 1	NETCH	EM_131106	6B	SeqNo: 2524712		Prep Date:		DF: 1		
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive		ND	100									
LCS	Sample ID: LCS-R12996	3-R129963				U	nits: mg/l	K g	Ana	alysis Date:	11/6/2013	
Client ID:		Run ID: 1	NETCH	EM_131106	6B	Sec	No: 2524	713	Prep Date:		DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive		117.4	100	125		0	94	75-125		0		
MS	Sample ID: 13101619-02	A MS				U	nits: mg/l	K g	Ana	alysis Date:	11/6/2013	
Client ID:		Run ID: 1	NETCH	EM_131106	SB	SeqNo: 2524716			Prep Date:		DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive		235	100	250		0	94	50-150		0		
MSD	Sample ID: 13101619-02	A MSD				U	nits: mg/l	K g	Ana	alysis Date:	11/6/2013	
Client ID:		Run ID: 1	NETCH	EM_131106	SB	Sec	No: 2524	717	Prep Date:		DF: 1	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive		235.1	100	250		0	94	50-150		235 0.038	33 35	
	les were analyzed in this	hatahı	12	11181-01A								

The following samples were analyzed in this batch:

1311181-01A



Subcontractor: ALS Laboratory Group

3352 128th Ave.

Holland, MI 49424

(616) 399-6070 TEL:

FAX: Acct #: (616) 399-6185

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

Date: 04-Nov-13

COC ID: <u>15242</u>

Due Date 07-Nov-13

	Salesperson	Houston House Acct	ļ		
Ct	ustomer Information	P	roject Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	1311143	Α	Reactive Cyanide (SW-846)
Work Order		Project Number		В	Reactive Sulfide (SW-846)
Company Name	ALS Group USA, Corp.	Bill To Company	ALS Group USA, Corp.	С	
Send Report To	Sonia West	Inv Attn	Accounts Payable	D	
Address 10450 Stancliff Rd, Suite 2		Address	Address 10450 Stancliff Rd, Suite 210		
				F	
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G	
Phone	(281) 530-5656	Phone	(281) 530-5656	Н	
Fax	(281) 530-5887	Fax	(281) 530-5887	1	
eMail Address	Sonia.West@alsglobal.com	eMail CC		J	
Sample ID	<u> </u>	Matrix Collection	n Date 24hr Bottle	1	A B C D E F G H I
1311143-01B (Wa Station Excavation	nstewater Spill at Lift	Solid 24/Sep/2	013 14:07 (1) 4OZGNEAT		X X

RUSH

	Please analyze for reactive awal@alsglobal.com	cyanide & Reactive sulfide.	Due on 11/7/13. send report to s	sonia.west@alsglobal	.com & cc : results to
	·				3.000
Relinquished by:	Date/Time 11/4/13 . 1800.	Received by:	Date/Time	Cooler IDs	Report/QC Level Std
Relinquished by:	Date/Time	Received by:	Date/Time 5/13 0	930	

ALS Group USA, Corp

Sample Receipt Checklist

Client Name:	ALS - HOUSTON				Date/Time I	Receiv	ed: <u>05</u>	-Nov-13	<u>3 09:30</u>		
Work Order:	<u>1311181</u>				Received by	y:	<u>D\$</u>	<u>S</u>			
Checklist comp		0	05-Nov-13		Reviewed by:	Bill	Carey			06-Nov	
Matrices:	eSignature <u>Solid</u>		Date			eSigr	nature			Date	ie
Carrier name:	FedEx										
Shipping conta	niner/cooler in good condition?		Yes	~	No 🗌	N	ot Present				
Custody seals	intact on shipping container/coole	r?	Yes	✓	No 🗆	N	ot Present				
Custody seals	intact on sample bottles?		Yes		No 🗌	N	ot Present	✓			
Chain of custo	dy present?		Yes	✓	No 🗌						
Chain of custo	dy signed when relinquished and r	eceived?	Yes	✓	No 🗌						
Chain of custo	dy agrees with sample labels?		Yes	✓	No 🗌						
Samples in pro	oper container/bottle?		Yes	✓	No 🗌						
Sample contain	ners intact?		Yes	✓	No 🗌						
Sufficient samp	ple volume for indicated test?		Yes	✓	No 🗌						
All samples red	ceived within holding time?		Yes		No 🗹						
Container/Tem	p Blank temperature in complianc	e?	Yes	~	No 🗆						
Sample(s) rece	eived on ice?			~	No 🗆						
	s)/Thermometer(s):		<u>3.0 c</u>								
Cooler(s)/Kit(s)			44/5/20	10.1	0.04.40 AM						
	nple(s) sent to storage: ials have zero headspace?		Yes	13 1	0:21:13 AM No	No VC	OA vials su	bmitted	✓		
	ceptable upon receipt?		Yes		No 🗆	N/A	~				
pH adjusted?			Yes		No 🗌	N/A	✓				
pH adjusted by	<i>f</i> :		-								
Login Notes:											
				_							
Client Contacte	ed:	Date Contacted:			Person	Conta	cted:				
Contacted By:		Regarding:									
Comments:											
Johnnerits.											
CorrectiveAction	on.										
Somodivorion									QE	RC Page 1 o	of 1
									J Sr	o aye it	<i>-</i> 1





04-Oct-2013

Aaron Strange Navajo Refining Company PO Box 159 Artesia, NM 88211

Tel: (575) 748-6733 Fax: (575) 746-5421

Re: Wastewater Spill - Artesia Work Order: 13091139

Dear Aaron,

ALS Environmental received 1 sample on 25-Sep-2013 09:25 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 19.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Electronically approved by: Jumoke M. Lawal

Sonie West

Sonia West

Project Manager



Certificate No: T104704231-13-12

ALS Environmental

Date: 04-Oct-13

Client: Navajo Refining Company

Project: Wastewater Spill - Artesia Work Order Sample Summary
Work Order: 13091139

<u>Lab Samp ID Client Sample ID Matrix Tag Number Collection Date Date Received Hold</u>

13091139-01 Wastewater Spill at Lift Station Solid 9/24/2013 14:07 9/25/2013 09:25

Excavation

ALS Environmental

Date: 04-Oct-13

Client: Navajo Refining Company

Project: Wastewater Spill - Artesia Case Narrative

Work Order: 13091139

Batch 73408, VÔŠÚÁÙ^{ āç[|ææāl^Á∪¦*æ) a& ÁFHFFÐÖG €ÉÂÚæ(]|^ÁÚŠÔÙÖVŒËH€JG KÁV@ÆŠÔÙÖÜÜÖĞÁ ærÁ[*œÁs°À Áræ Ás@ÆS]}d[|Áa[ārÁ[¦ÁÚ^}cæ&@[¦[]@}[|Áæ) åÁ/[cæÁÔ¦^•[|•ÈÁV@ÆSÔÙÁæ) å ŠÔÙÖÁ^&[ç^¦à*•Á,^¦^Á, ás@a) Ás@ÆSÎ}d[|Áa[ārÈ

mental Date: 04-Oct-13

Client:Navajo Refining CompanyProject:Wastewater Spill - ArtesiaWork Order: 13091139Sample ID:Wastewater Spill at Lift Station ExcavationLab ID: 13091139-01

Collection Date: 9/24/2013 02:07 PM Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TCLP MERCURY Mercury	U		SW7470		Prep Date:	9/30/2013 Analyst: OFO 9/30/2013 06:14 PM
TCLP METALS			SW1311	_	Prep Date:	9/27/2013 Analyst: SKS
Arsenic	U		0.050		1 10p Date.	9/27/2013 03:40 PM
Barium	0.137		0.050	·	10	9/27/2013 03:40 PM
Cadmium	U		0.020	•	10	9/27/2013 03:40 PM
Chromium	U		0.0500	Ū	10	9/27/2013 03:40 PM
Lead	U		0.0500	J	10	9/27/2013 03:40 PM
Selenium	U		0.0500	·	10	9/27/2013 03:40 PM
Silver	U		0.0500	J	10	9/27/2013 03:40 PM
TCLP SEMIVOLATILES			SW1311	/8270	Prep Date:	9/27/2013 Analyst: JLJ
2,4,5-Trichlorophenol	U			0 mg/L	1	10/2/2013 04:04 PM
2,4,6-Trichlorophenol	U		0.0050	·	1	10/2/2013 04:04 PM
2,4-Dinitrotoluene	U		0.0050	_	1	10/2/2013 04:04 PM
Cresols, Total	U		0.01	_	1	10/2/2013 04:04 PM
Hexachlorobenzene	U		0.0050	0 mg/L	1	10/2/2013 04:04 PM
Hexachlorobutadiene	U		0.0050	0 mg/L	1	10/2/2013 04:04 PM
Hexachloroethane	U		0.0050	-	1	10/2/2013 04:04 PM
Nitrobenzene	U		0.0050	0 mg/L	1	10/2/2013 04:04 PM
Pentachlorophenol	U		0.0050	-	1	10/2/2013 04:04 PM
Pyridine	U		0.0050	0 mg/L	1	10/2/2013 04:04 PM
Surr: 2,4,6-Tribromophenol	79.4		36-12	6 %REC	1	10/2/2013 04:04 PM
Surr: 2-Fluorobiphenyl	72.7		43-12	5 %REC	1	10/2/2013 04:04 PM
Surr: 2-Fluorophenol	74.5		37-12	5 %REC	1	10/2/2013 04:04 PM
Surr: 4-Terphenyl-d14	84.4		32-12	5 %REC	1	10/2/2013 04:04 PM
Surr: Nitrobenzene-d5	88.3		37-12	5 %REC	1	10/2/2013 04:04 PM
Surr: Phenol-d6	86.7		40-12	5 %REC	1	10/2/2013 04:04 PM
TCLP VOLATILES			SW1311	/8260B	Prep Date:	9/27/2013 Analyst: PC
1,1-Dichloroethene	U		0.10	0 mg/L	20	10/1/2013 05:00 AM
1,2-Dichloroethane	U		0.10	0 mg/L	20	10/1/2013 05:00 AM
1,4-Dichlorobenzene	U		0.10	0 mg/L	20	10/1/2013 05:00 AM
2-Butanone	U		0.20	0 mg/L	20	10/1/2013 05:00 AM
Benzene	U		0.10	0 mg/L	20	10/1/2013 05:00 AM
Carbon tetrachloride	U		0.10	0 mg/L	20	10/1/2013 05:00 AM
Chlorobenzene	U		0.10) mg/L	20	10/1/2013 05:00 AM
Chloroform	U		0.10		20	10/1/2013 05:00 AM
Tetrachloroethene	U		0.10) mg/L	20	10/1/2013 05:00 AM
Trichloroethene	U		0.10) mg/L	20	10/1/2013 05:00 AM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Navajo Refining Company

Project: Wastewater Spill - Artesia Work Order: 13091139

Sample ID: Wastewater Spill at Lift Station Excavation Lab ID: 13091139-01

Collection Date: 9/24/2013 02:07 PM Matrix: SOLID

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Vinyl chloride	U		0.1	0 mg/L	20	10/1/2013 05:00 AM
Surr: 1,2-Dichloroethane-d4	102		70-12	5 %REC	20	10/1/2013 05:00 AM
Surr: 4-Bromofluorobenzene	97.0		72-12	5 %REC	20	10/1/2013 05:00 AM
Surr: Dibromofluoromethane	106		71-12	5 %REC	20	10/1/2013 05:00 AM
Surr: Toluene-d8	96.9		75-12	5 %REC	20	10/1/2013 05:00 AM

Date: 04-Oct-13

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Work Order: 13091139

Client: Navajo Refining Company

Project: Wastewater Spill - Artesia

Sample ID	Client Sample ID	Matrix	Collection Date	TCLP Date	Prep Date	Analysis Date
Batch ID 7	<u>Test Name:</u>	TCLP Semivolatiles				
13091139-01	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM	9/27/2013 3:09:09 PM	9/27/2013 10:17 AM	10/2/2013 04:04 PM
Batch ID 7	Test Name:	TCLP Metals				
13091139-01	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM	9/27/2013 8:00:00 AM	9/27/2013 10:00 AM	9/27/2013 03:40 PM
Batch ID 7	<u>Test Name:</u>	TCLP Mercury				
13091139-01	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM	9/27/2013 8:00:00 AM	9/30/2013 11:02 AM	9/30/2013 06:14 PM
Batch ID E	<u>R154586</u> <u>Test Name:</u>	TCLP Volatiles				
13091139-01	Wastewater Spill at Lift Station Excavation	Solid	9/24/2013 2:07:00 PM	9/28/2013 9:00:00 AM	9/27/2013 05:00 PM	10/1/2013 05:00 AM

DATES REPORT

Date: 04-Oct-13 **ALS** Environmental

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia QC BATCH REPORT

Batch ID: 73	Instrument ID IC	CPMS05		Method	d: SW131	11/60	20					
MBLK	Sample ID: MBLKT1-092613	-73416				Units: mg/L			Analysis Date: 9/27/2013 03:28 F			
Client ID:		Run	ID: ICPMS	05_130927 <i>A</i>	١	Seq	No: 337 2	2767	Prep Date: 9/2	27/2013	DF: 10	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic		U	0.0500									
Barium		0.04562	0.0500									J
Cadmium		U	0.0200									
Chromium		U	0.0500									
Lead		U	0.0500									
Selenium	(0.01023	0.0500									J
Silver		U	0.0500									
MBLK	Sample ID: MBLKW3-092713	3-73416				Units: mg/L			Analy	/27/2013 0	3:31 PM	
Client ID:		Run	n ID: ICPMS05_130927A			SeqNo: 3372768		Prep Date: 9/27/2013		DF: 10		
					SPK Ref			Control	RPD Ref		RPD Limit	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	%RPD	Limit	Qual
Arsenic		U	0.0500									
Barium		U	0.0500									
Cadmium		U	0.0200									
Chromium		U	0.0500									
Lead		U	0.0500									
Selenium		U	0.0500									
Silver		U	0.0500									
LCS	Sample ID: MLCSW3-092713	3-73416				Ur	nits: mg/	L	Analy	sis Date: 9	/27/2013 0	3:33 PM
Client ID:		Run	ID: ICPMS	05_130927 <i>A</i>	١	Seq	No: 337 2	2769	Prep Date: 9/2	27/2013	DF: 10	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Analyte										70KFD		Quai
Arsenic		0.4864	0.0500	0.5		0	97.3	80-120				
Barium		0.486	0.0500	0.5		0	97.2	80-120				
Cadmium		0.4791	0.0200	0.5		0	95.8	80-120				
Chromium		0.4922	0.0500	0.5		0	98.4	80-120				
Lead		0.4826	0.0500	0.5		0	96.5	80-120				
Selenium		0.5094	0.0500	0.5		0	102	80-120				
Silver		0.4932	0.0500	0.5		0	98.6	80-120				

Note:

Navajo Refining Company Client:

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: 73	Instrument ID ICPMS05		Method:	: SW1311/6	6020						
MS	Sample ID: 1309685-01AMS			Į	Units: mg/	L_	Analysis Date: 9/27/2013 03:54 PN				
Client ID:	Run	ID: ICPMS	05_130927A	Se	eqNo: 337 2	2779	Prep Date: 9/27	DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Arsenic	0.4908	0.0500	0.5	0.000654	98	75-125					
Barium	1.866	0.0500	0.5	1.363	101	75-125					
Cadmium	0.4825	0.0200	0.5	0.003663	95.8	75-125					
Chromium	0.4944	0.0500	0.5	0.007794	97.3	75-125					
Lead	0.5033	0.0500	0.5	0.02031	96.6	75-125					
Selenium	0.5265	0.0500	0.5	0.01452	102	75-125					
Silver	0.4746	0.0500	0.5	0.000548	94.8	75-125					
MSD	Sample ID: 1309685-01AMSD			ı	Units: mg/	L	Analysis Date: 9/27/2013 03:57 PM				
Client ID:	Run	ID: ICPMS	05_130927A	SeqNo: 3372780			Prep Date: 9/27	DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Arsenic	0.4823	0.0500	0.5	0.000654	96.3	75-125	0.4908	1.76	20		
Barium	1.789	0.0500	0.5	1.363	85.4	75-125	1.866	4.21	20		
Cadmium	0.4702	0.0200	0.5	0.003663	93.3	75-125	0.4825	2.59	20		
Chromium	0.4836	0.0500	0.5	0.007794	95.2	75-125	0.4944	2.22	20		
Lead	0.4826	0.0500	0.5	0.02031	92.5	75-125	0.5033	4.19	20		
Selenium	0.5019	0.0500	0.5	0.01452	97.5	75-125	0.5265	4.79	20		
Silver	0.4627	0.0500	0.5	0.000548	92.4	75-125	0.4746	2.55	20		
DUP	Sample ID: 1309685-01ADUP			l	Units: mg/	L	Analysis Date: 9/27/2013 03:			3:52 PM	
Client ID:	Run	ID: ICPMS	05_130927A	Se	eqNo: 337 2	2778	Prep Date: 9/27	/2013	DF: 10		
				SPK Ref		Control	RPD Ref		RPD		
Analyte	Result	PQL	SPK Val	Value	%REC	Limit	Value	%RPD	Limit	Qual	
Arsenic	U	0.0500					0.000654	0	25		
Barium	1.34	0.0500					1.363	1.67	25		
Cadmium	U	0.0200					0.003663	0	25		
Chromium	U	0.0500					0.007794	0	25		
Lead	0.01903	0.0500					0.02031	0	25	J	
Selenium	0.01275	0.0500					0.01452	0	25	J	
Silver	U	0.0500					0.000548	0	25		

Note:

01A

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

	3461 Instrument ID HG03		Metho	d: SW747	0						
MBLK	Sample ID: GBLKW4-093013-73461				Units: mg/	L	Analysis Date: 9/30/2013 05:51 P				
Client ID:	Ru	ın ID: HG03	_130930A		SeqNo: 337	5908	Prep Date: 9/30	/2013	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	U	0.000200									
MBLK	Sample ID: GBLKT1-092813-73461				Units: mg/	L	Analysi	Analysis Date: 9/30/2013 06:01 PM			
Client ID:	Ru	Run ID: HG03_130930A			SeqNo: 337	5914	Prep Date: 9/30/2013 DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	U	0.000200									
LCS	Sample ID: GLCSW4-093013-73461				Units: mg/L		Analysi	9/30/2013 05:52			
Client ID:	Ru	_130930A		SeqNo: 337 5	5909	Prep Date: 9/30	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.0048	0.000200	0.005		0 96	80-120					
MS	Sample ID: 13091157-01CMS					L	Analysis Date: 9/30/2013 05:57 PM				
Client ID:	Ru	Run ID: HG03_130930A			SeqNo: 337	5912	Prep Date: 9/30	DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.00496	0.000200	0.005	-0.00003	38 100	75-125					
MSD	Sample ID: 13091157-01CMSD				Units: mg/	L	Analysis Date: 9/30/2013 05:59 PN				
Client ID:	Ru	ın ID: HG03	_130930A		SeqNo: 3375913		Prep Date: 9/30/2013		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.0048	0.000200	0.005	-0.00003	38 96.8	75-125	0.00496	3.28	20		
DUP	Sample ID: 13091157-01CDUP				Units: mg/	L	Analysis Date: 9/30/2013 05:56 PM				
Client ID:	Run ID: HG03_130930A			SeqNo: 337 !	5911	Prep Date: 9/30	/2013	DF: 1			
	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Analyte	Result										
Analyte Mercury	V	0.000200					-0.000038	0	20		

See Qualifiers Page for a list of Qualifiers and their explanation.

Note:

QC Page: 3 of 9

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: 73408 Ins	strument ID SV-5	Method: SW1311/8270									
MBLK Sample ID: SBL	KT2-130927-73408		Units: µg/L			Analy	Analysis Date: 10/2/2013 06:43 PM				
Client ID:	Rur	un ID: SV-5_131003A			SeqNo: 3380068			Prep Date: 9/27/2013		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-Trichlorophenol	U	5.0									
2,4,6-Trichlorophenol	U	5.0									
2,4-Dinitrotoluene	U	5.0									
Cresols, Total		15									
Hexachlorobenzene		5.0									
Hexachlorobutadiene		5.0									
Hexachloroethane	U	5.0									
Nitrobenzene	U	5.0									
Pentachlorophenol	U	5.0									
Pyridine	U	5.0									
Surr: 2,4,6-Tribromophenol	91.8	5.0	100		0	91.8	36-126	•	0		
Surr: 2-Fluorobiphenyl	78.43	5.0	100		0	78.4	43-125	(0		
Surr: 2-Fluorophenol	73.56	5.0	100		0	73.6	37-125		0		
Surr: 4-Terphenyl-d14 100		5.0	100		0	100	32-125	(0		
Surr: Nitrobenzene-d5 68.		5.0	100		0	68.8	37-125		0		
Surr: Phenol-d6	67.93	5.0	100		0	67.9	40-125	(0		
LCS Sample ID: SLC	ST2-130927-73408				Units: µg/L				sis Date:	10/3/2013 ()2:47 PM

•								,			
Client ID:	Run I		SeqNo: 3380072			Prep Date: 9/27/2013		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
2,4,5-Trichlorophenol	84.69	5.0	100		0	84.7	55-120				
2,4,6-Trichlorophenol	82.97	5.0	100		0	83	55-120				
2,4-Dinitrotoluene	45.63	5.0	50		0	91.3	55-125				
Cresols, Total	219.3	15	250		0	87.7	40-120				
Hexachlorobenzene	44.72	5.0	50		0	89.4	55-120				
Hexachlorobutadiene	42.43	5.0	50		0	84.9	55-120				
Hexachloroethane	36.85	5.0	50		0	73.7	55-120				
Nitrobenzene	34.58	5.0	50		0	69.2	55-120				
Pentachlorophenol	85.09	5.0	100		0	85.1	50-135				
Pyridine	22.82	5.0	50		0	45.6	30-120				
Surr: 2,4,6-Tribromophenol	106.5	5.0	100		0	106	36-126		0		
Surr: 2-Fluorobiphenyl	72.92	5.0	100		0	72.9	43-125		0		
Surr: 2-Fluorophenol	82.36	5.0	100		0	82.4	37-125		0		
Surr: 4-Terphenyl-d14	103.6	5.0	100		0	104	32-125		0		
Surr: Nitrobenzene-d5	66.12	5.0	100		0	66.1	37-125		0		
Surr: Phenol-d6	85.66	5.0	100		0	85.7	40-125		0		

See Qualifiers Page for a list of Qualifiers and their explanation.

Note:

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: 73408 Instru	ument ID SV-5	nt ID SV-5 Method:									
LCSD Sample ID: SLCSE	DT2-130927-73408				U	nits: µg/L		Analysi	s Date: 10	/2/2013 0	7:27 PM
Client ID:	Run ID	: SV-5_1	31003A		SeqNo: 3380070			Prep Date: 9/27	/2013	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-Trichlorophenol	82.14	5.0	100	(0	82.1	55-120	84.69	3.05	25	
2,4,6-Trichlorophenol	80.22	5.0	100	(0	80.2	55-120	82.97	3.37	25	
2,4-Dinitrotoluene	40.98	5.0	50	(0	82	55-125	45.63	10.8	25	
Cresols, Total	170.3	15	250	(0	68.1	40-120	219.3	25.2	25	R
Hexachlorobenzene	44.56	5.0	50	(0	89.1	55-120	44.72	0.37	25	
Hexachlorobutadiene	47.1	5.0	50	(0	94.2	55-120	42.43	10.4	25	
Hexachloroethane	36.41	5.0	50	(0	72.8	55-120	36.85	1.18	25	
Nitrobenzene	33.67	5.0	50	(0	67.3	55-120	34.58	2.66	25	
Pentachlorophenol	63.88	5.0	100	(0	63.9	50-135	85.09	28.5	25	R
Pyridine	25.09	5.0	50	(0	50.2	30-120	22.82	9.48	25	
Surr: 2,4,6-Tribromophenol	95.85	5.0	100	(0	95.8	36-126	106.5	10.5	25	
Surr: 2-Fluorobiphenyl	76.93	5.0	100	(0	76.9	43-125	72.92	5.36	25	
Surr: 2-Fluorophenol	76.63	5.0	100	(0	76.6	37-125	82.36	7.21	25	
Surr: 4-Terphenyl-d14	92.69	5.0	100	(0	92.7	32-125	103.6	11.1	25	
Surr: Nitrobenzene-d5	64.27	5.0	100	(0	64.3	37-125	66.12	2.85	25	
Surr: Phenol-d6	68.76	5.0	100	(0	68.8	40-125	85.66	21.9	25	
MS Sample ID: 130911	39-01AMS				U	nits: µg/L	-	Analysi	s Date: 10	/3/2013 0	3:54 PM

Client ID: Wastewater Spill at Lift Station Excavation	Run ID: SV-5_131003A			SeqNo: 33801 8		0184	Prep Date: 9/27/2013				
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
2,4,5-Trichlorophenol	84.55	5.0	100		0	84.6	55-120				
2,4,6-Trichlorophenol	77.79	5.0	100		0	77.8	55-120				
2,4-Dinitrotoluene	46.14	5.0	50		0	92.3	55-125				
Cresols, Total	174.5	15	250		0	69.8	40-120				
Hexachlorobenzene	43.86	5.0	50		0	87.7	55-120				
Hexachlorobutadiene	44.35	5.0	50		0	88.7	55-120				
Hexachloroethane	38.8	5.0	50		0	77.6	55-120				
Nitrobenzene	33.42	5.0	50		0	66.8	55-120				
Pentachlorophenol	82.56	5.0	100		0	82.6	50-135				
Pyridine	26.93	5.0	50		0	53.9	30-120				
Surr: 2,4,6-Tribromophenol	102.3	5.0	100		0	102	36-126		0		
Surr: 2-Fluorobiphenyl	74.81	5.0	100		0	74.8	43-125	(0		
Surr: 2-Fluorophenol	72.74	5.0	100		0	72.7	37-125		0		
Surr: 4-Terphenyl-d14	93.41	5.0	100		0	93.4	32-125		0		
Surr: Nitrobenzene-d5	63.02	5.0	100		0	63	37-125		0		
Surr: Phenol-d6	69.75	5.0	100		0	69.8	40-125	1	0		

See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: 73408 Instrument ID SV-5 Method: SW1311/8270

The following samples were analyzed in this batch: 13091139-

01A

Note:

QC BATCH REPORT

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: R154586 Instru	ment ID VOA1		Metho	d: SW13 ′	11/82	260B					
MBLK Sample ID: VBLKW	/-130930-R154586				ι	Jnits: µg/l	-	Analy	sis Date: 9	/30/2013	11:32 PM
Client ID:	Run II	D: VOA1 _	130930E		Se	qNo: 337	6306	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	U	5.0									
1,2-Dichloroethane	U	5.0									
1,4-Dichlorobenzene	U	5.0									
2-Butanone	U	10									
Benzene	U	5.0									
Carbon tetrachloride	U	5.0									
Chlorobenzene	U	5.0									
Chloroform	U	5.0									
Tetrachloroethene	U	5.0									
Trichloroethene	U	5.0									
Vinyl chloride	U	2.0									
Surr: 1,2-Dichloroethane-d4	50.94	5.0	50		0	102	70-125		0		
Surr: 4-Bromofluorobenzene	49.99	5.0	50		0	100	72.4-125	;	0		
Surr: Dibromofluoromethane	50.52	5.0	50		0	101	71.2-125	j	0		
Surr: Toluene-d8	51.39	5.0	50		0	103	75-125		0		
MBLK Sample ID: MBLKV	1-130927-R154586				Ĺ	Jnits: µg/l	_	Analy	/sis Date: 1	0/1/2013 (04:10 AM
Client ID:	Run II	D: VOA1 _	130930E		Se	qNo: 337	6310	Prep Date: 9/2	27/2013	DF: 2 0)
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	U	100									
1,2-Dichloroethane	U	100									
1,4-Dichlorobenzene	U	100									
2-Butanone	U	200									
Benzene	U	100									
Carbon tetrachloride	U	100									
Chlorobenzene	U	100									
Chloroform	U	100									
Tetrachloroethene	U	100									
Trichloroethene	U	100									
Vinyl chloride	U	40									
Surr: 1,2-Dichloroethane-d4	957.2	100	1000		0	95.7	70-125		0		
Surr: 4-Bromofluorobenzene	941.5	100	1000		0	94.1	72.4-125	5	0		
Surr: Dibromofluoromethane	1043	100	1000		0	104	71.2-125	j	0		
Surr: Toluene-d8	997.9	100	1000		0	99.8	75-125		0		

See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: R154586 In:	strument ID VOA1		Metho	d: SW131 1	1/8260E	3					
LCS Sample ID: VLC	SW-130930-R154586				Units	∶µg/L		Analy	sis Date: 9	/30/2013	10:41 PM
Client ID:	Run ID	: VOA1_	130930E		SeqNo	: 3376	6305	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%F	REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	51.11	5.0	50		0	102	73-124				
1,2-Dichloroethane	52.15	5.0	50		0	104	76-120				
1,4-Dichlorobenzene	50.27	5.0	50		0	101	70-130				
2-Butanone	104.2	10	100		0	104	70-130				
Benzene	52.56	5.0	50	-	0	105	70-128				
Carbon tetrachloride	51.09	5.0	50		0	102	70-130				
Chlorobenzene	47.61	5.0	50	1	0 9	5.2	72-127				
Chloroform	51.55	5.0	50		0	103	70-130				
Tetrachloroethene	50.16	5.0	50	-	0	100	70-130				
Trichloroethene	53.99	5.0	50		0	108	72-129				
Vinyl chloride	54.23	2.0	50	-	0	108	70-130				
Surr: 1,2-Dichloroethane-d4	50.76	5.0	50		0	102	70-125		0		
Surr: 4-Bromofluorobenzene	49.56	5.0	50		0 9	99.1	72-125		0		
Surr: Dibromofluoromethane	51.66	5.0	50		0	103	71-125		0		
Surr: Toluene-d8	50.87	5.0	50		0	102	75-125	1	0		

MS S	Sample ID: 13091337-01AM	S	•		•	Units: µg/	L	Analy	ysis Date: 1	0/1/2013	02:29 AM
Client ID:		Run	ID: VOA1_	130930E	S	SeqNo: 337	6308	Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroeth	hene	47.41	5.0	50	0	94.8	73-124				
1,2-Dichloroeth	hane	49.26	5.0	50	0	98.5	76-120				
1,4-Dichlorobe	nzene	46.02	5.0	50	0	92	70-130				
2-Butanone		104	10	100	0	104	70-130				
Benzene		49.85	5.0	50	0	99.7	70-128				
Carbon tetrach	nloride	45.47	5.0	50	0	90.9	70-130				
Chlorobenzene	е	48.98	5.0	50	0	98	72-127	•			
Chloroform		109.1	5.0	50	71.57	75	70-130				
Tetrachloroeth	ene	46.17	5.0	50	0	92.3	70-130	1			
Trichloroethen	е	47.04	5.0	50	0	94.1	72-129				
Vinyl chloride		49.16	2.0	50	0	98.3	70-130)			
Surr: 1,2-Di	chloroethane-d4	51.18	5.0	50	C	102	70-125	5	0		
Surr: 4-Bron	nofluorobenzene	52.97	5.0	50	C	106	72-125	5	0		
Surr: Dibron	mofluoromethane	51.09	5.0	50	C	102	71-125	5	0		
Surr: Toluer	ne-d8	51.35	5.0	50	C	103	75-125	5	0		

Client: Navajo Refining Company

Work Order: 13091139

Project: Wastewater Spill - Artesia

Batch ID: R154586	Instrument ID VOA1		Metho	d: SW1311	/8260B					
MSD Sample ID:	13091337-01AMSD				Units: µg/l		Analysi	s Date: 10	/1/2013 0	2:54 AM
Client ID:	Ru	n ID: VOA1 _	130930E	;	SeqNo: 337	6309	Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	43.36	5.0	50	C	86.7	73-124	47.41	8.94	20	
1,2-Dichloroethane	48.03	5.0	50	C	96.1	76-120	49.26	2.53	20	
1,4-Dichlorobenzene	48.44	5.0	50	C	96.9	70-130	46.02	5.13	20	
2-Butanone	96.22	10	100	C	96.2	70-130	104	7.76	20	
Benzene	45.94	5.0	50	C	91.9	70-128	49.85	8.16	20	
Carbon tetrachloride	43.75	5.0	50	C	87.5	70-130	45.47	3.85	20	
Chlorobenzene	49.06	5.0	50	C	98.1	72-127	48.98	0.157	20	
Chloroform	108	5.0	50	71.57	7 72.8	70-130	109.1	1.03	20	
Tetrachloroethene	45.61	5.0	50	C	91.2	70-130	46.17	1.23	20	
Trichloroethene	46.76	5.0	50	C	93.5	72-129	47.04	0.582	20	
Vinyl chloride	45.31	2.0	50	C	90.6	70-130	49.16	8.16	20	
Surr: 1,2-Dichloroethan	e- <i>d4</i> 48.41	5.0	50	C	96.8	70-125	51.18	5.56	20	
Surr: 4-Bromofluoroben	zene 52.85	5.0	50	C	106	72-125	52.97	0.235	20	
Surr: Dibromofluoromet	hane 47.58	5.0	50	C	95.2	71-125	51.09	7.11	20	
Surr: Toluene-d8	51.26	5.0	50	C	103	75-125	51.35	0.185	20	

The following samples were analyzed in this batch:

13091139-01A

ALS Environmental Date: 04-Oct-13

Client: Navajo Refining Company **QUALIFIERS,** Wastewater Spill - Artesia **Project: ACRONYMS, UNITS**

WorkOrder: 13091139

Qualifier	<u>Description</u>
*	Value exceeds Regulatory Limit
a	Not accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
Acronym	<u>Description</u>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program
Units Reported	Description

mg/LMilligrams per Liter

ALS Environmental

Sample Receipt Checklist

Client Name:	NAVAJO REFINING			Date/Time F	Received: 2	5-Sep-13	3 09:25		
Work Order:	13091139			Received by	/: <u>V</u>	<u>VTJ</u>			
Checklist compl Matrices: Carrier name:	leted by Faresh M. Giga eSignature Solid FedEx	2	25-Sep-13 Date	Reviewed by:	eSignature			D:	ate
Chinning contain	por/opplor in good condition?		Yes 🗸	No 🗌	Not Presen	. n			
	ner/cooler in good condition? ntact on shipping container/coole	ur?	res ▼ Yes ✓	No 🗆	Not Presen				
-		:1 f		No 🗆					
-	ntact on sample bottles?		Yes ☐ Yes ✔	No \square	Not Presen	. •			
Chain of custod		raceivad?	res ⊻ Yes ⊻	No 🗆					
	y signed when relinquished and	received?	Yes 🗹	No \square					
	y agrees with sample labels?		Yes 🗹	No \square					
	per container/bottle?		res v Yes v	No \square					
Sample contain			Yes ⊻						
·	le volume for indicated test?			No 🗆					
	eived within holding time?		Yes 🗹	No 🗆					
	Blank temperature in compliand	ce?	Yes ✓	No 🗆	ID4				
Cooler(s)/Kit(s):	/Thermometer(s):		3.3c/3.3c (5119	<u>5/U</u>	IR1				
	ple(s) sent to storage:		9/25/13 16	·10					
	als have zero headspace?		Yes		No VOA vials s	ubmitted	✓		
Water - pH acce	eptable upon receipt?		Yes 🗌	No 🗌	N/A				
pH adjusted? pH adjusted by:			Yes 🗌	No 🗆	N/A 🔽				
Login Notes:									
====	=======	=====	====	====	====	===:	====	===	===
Client Contacted	d:	Date Contacted:		Person	Contacted:				
Contacted By:		Regarding:							
Comments:									
CorrectiveAction	n:						000	5 4	-£ 4

Chavez, Carl J, EMNRD

From:

Combs, Robert < Robert.Combs@hollyfrontier.com>

Sent:

Thursday, May 31, 2012 10:24 PM

To:

Chavez, Carl J, EMNRD; Dade, Randy, EMNRD; Horowitz, Ruth, NMENV; Cobrain, Dave,

NMENV

Cc:

Lackey, Johnny; Holder, Mike; Strange, Aaron; Schultz, Michele

Subject:

C-141 initial report--2012-05-24 Effluent pipeline leaks

Attachments:

C-141 2012-05-24 Effluent pipeline leak--initial report.pdf; Effluent Pipeline Spill

Locations 052412.pdf

Please see the attached initial C-141 report for the treated waste water leaks that occurred on 5/24/12. Also attached is a GoogleEarth image indicating the approximate locations.

If there are any questions, please contact me at 575-746-5382.

Thanks, Robert

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received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any

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District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Form C-141 Revised August 8, 2011

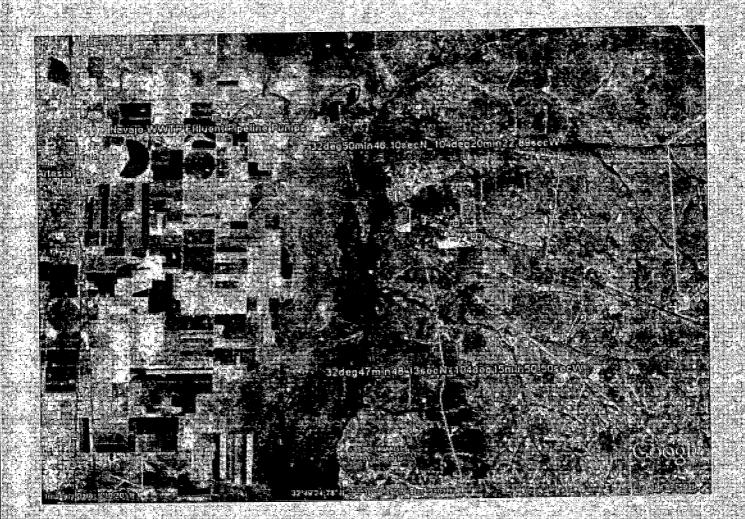
Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

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			Rele	ease Notific	ation	and Co	orrective A	ction					
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pipeline was				•	•					-			
At this time,	the holes w	here repairs v	vere made	remain open and	barricac	led, and no fi	irther cleanup act	ivities have t	ocen p	ursued. Since the locations are			
outside of R	efinery, the	landowners a	re being c	ontacted for acces	s to be g	granted for sp	ill cleanup.						
A final C-14	II report wi	II be submitted	d and will	include all analyt	ical repo	orts, photos, a	and any associated	l disposal rec	cords.				
I hereby cert	lify that the	information g	iven abov	e is true and comp	olete to t	the best of m	y knowledge and	understand th	hat pui	suant to NMOCD rules and			
regulations a	all operators	are required	to report a	and/or file certain	release i	notifications	and perform corre	ctive actions	for re	leases which may endanger lieve the operator of liability			
should their	operations	have failed to	adequatei	y investigate and	on by u remedia	te contamina	tion that pose a th	reat to groun	id wate	er, surface water, human health			
or the enviro	onment. In	addition, NM	OCD acce							compliance with any other			
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Signature:							н	o t. tt .					
Printed Nan	1c: Robert	Combs				Approved b	y Environmental	Specialist:					
Title: En	vironmenta	l Specialist				Approval D	ate:	Exp	iration	Date:			

r			T	
E-mail	Address:	obert:combs@hollyfrontier.com	Conditions of Approval:	Attached
Date:	5/31/12	Phone: 575-308-2718		

^{*} Attach Additional Sheets If Necessary



Chavez, Carl J, EMNRD

From:

Chavez, Carl J, EMNRD

Sent:

Thursday, May 24, 2012 2:29 PM

To:

CarlJ.Chavez@state.nm.us

Cc:

VonGonten, Glenn, EMNRD; Dade, Randy, EMNRD

Subject:

Navajo Artesia Refinery (GW-028) Effluent Line Release Notification to OCD

************ Note to File***********

FYI:

I received a call today at about 14:10 from Mr. Robert Combs related to a release along the effluent line to the 3 UIC Class I (NH) Disposal Wells (about 3 miles from the Pecos River or ¾ mile west and upgradient from the Gaines Disposal Well. Mr. Combs indicated that a pressure drop was realized at about 10:00 today and the line was shut-in within 20 minutes. Since the flow rate was about 750 gpm over a 20 minute time-frame, the estimated volume of the release is about 350 bbls. of effluent from the refinery. A C-141 will be submitted next week.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the

Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

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State of New Mexico Energy Minerals and Natural Resources

Form C-141 Revised August 8, 2011 ubmit 1 Copy to appropriate District Office in

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

			Rele	ease Notific	cation	n and Co	rrective A	ction					
						OPERA'	ror		al Report				
				pany, L.L.C.			Robert Combs						
		St, Artesia,	NM 882	10		Telephone 1							
Facility Na	me Artesi	a Refinery		 		Facility Typ	e Petroleum	Refinery					
Surface Ow	ner			Mineral ()wner		,	API No					
				LOCA	OITA	N OF RE	LEASE						
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			Yes 🔀] No									
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		and Cleanup A ired and faste			Vacuu	m trucks wer	e dispatched to th	e area to recover th	e remaining liquid. The wet				
soil will be re	emoved, sar	npled and disp	osed at ar	n appropriate disp	osal site	:.	•		0 1				
A final C-14	l, analytical	results, and p	hotos will	follow with all o	ther sup	porting docur	nentation and inc	ident details.					
regulations a public health should their or or the environ	Il operators or the envir operations h nment. In a	are required to connent. The ave failed to a	report ar acceptance dequately CD accep	nd/or file certain r se of a C-141 repo investigate and r	elease n ort by the emediat	otifications ar e NMOCD m e contaminati	nd perform correct arked as "Final R on that pose a thr	ctive actions for rele eport" does not reli eat to ground water	uant to NMOCD rules and eases which may endanger eve the operator of liability surface water, human health ompliance with any other				
	1					•	OIL CON	<u>SERVATION</u>	<u>DIVISION</u>				
Signature:	MA	bulls											
Printed Name	e: Robert (Combs				Approved by	Environmental S	pecialist:					
Title: Env	ironmental	Specialist				Approval Dat	e:	Expiration	Date:				
E-mail Addre	ss: robert	.combs@holl	frontier.c	om		Conditions of	Approval:		Attached				
Date: 01/	31/2012		Phone:	575-308-2718									

^{*} Attach Additional Sheets If Necessary

Chavez, Carl J, EMNRD

From: Strange, Aaron

Strange, Aaron [Aaron.Strange@hollyfrontier.com]

Sent: Wednesday, December 14, 2011 8:47 AM

To: Chavez, Carl J, EMNRD; Cobrain, Dave, NMENV; Tsinnajinnie, Leona, NMENV

Cc: Moore, Darrell; Lackey, Johnny; Combs, Robert

Subject: C-141 Final - Flash fire at the SRU-2

Attachments: C-141--fire at SRU-2.pdf

Carl, Randy, Dave, and Leona,

Please see the attached C-141 for flash fire at the SRU-2.

Please let me know if you have any questions regarding these events.

Thanks, Aaron

Aaron Strange Environmental Technician, Senior

Environmental Department Navajo Refining Co, LLC Artesia NM

Off: (575) 746-5468 Cell: (575) 703-5057

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GW-28

C – 141
(3)

06/11/2015 - 06/11/2017

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Friday, June 16, 2017 1:51 PM

To: 'Combs, Robert'

Cc: Griswold, Jim, EMNRD; Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Podany,

Raymond, EMNRD; Tsinnajinnie, Leona, NMENV

Subject: HollyFrontier Navajo Refining LLC Artesia Refinery (GW-28) Pipeline Release C-141s Due

Today!

Attachments: OCD Environmental CharacterizationGuidelines.pdf; Pipeline Release 2016 Update.pdf

Robert, et al.:

The New Mexico Oil Conservation Division (OCD) has completed its review of the 2016 wastewater effluent release. OCD hereby **approves** the corrective action with the conditions of approval outlined below.

OCD observations are:

- 1) Based on the high variability in environmental analytical laboratory soil quality data results for Chloride and Sulfate, this appears to be indicative of a historical release(s) at or in the vicinity of the pipeline release location (please refer to the attached "update" document).
- 2) Historical wastewater effluent quality in the pipeline has generally exceeded WQCC water quality standards for Cl, F, Fe, SO4, and TDS.
- 3) The release location is approximately 1,500 ft. east of the Pecos River within the floodplain.
- 4) All releases within the floodplain and/or "waters of the state" are considered to be "major releases" by OCD; thus, are reportable and the Permittee should act expediently to address spills/releases therein to protect water resources.
- 5) The Permittee followed its proposed work plan; however, backfilling excavations before proper sampling of the base and sidewalls of the excavation and lack of environmental analytical laboratory data quality results before backfilling is not acceptable to OCD.

OCD conditions of approval are:

- 1) The Permittee shall follow the attached corrective action guidelines for releases at all times.
- 2) The Permittee shall specify to OCD in its release report **any** reoccurring release locations along the effluent pipeline by indicating the number of historical releases at a given pipeline release location.
- 3) The Permittee **shall submit** a diagram(s) of the effluent pipeline to scale with all historical releases (any release in the flood plain or near "waters of the state") depicted along the pipeline over the past 10-years within 60 days of today's date or by COB on Wednesday, August 16, 2017.

Please contact me if you have questions. Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, May 24, 2017 3:32 PM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us>; Denton, Scott < Scott.Denton@HollyFrontier.com>; Sahba, Arsin

M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis (Randy) <Lewis.Dade@HollyFrontier.com>

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Carl,

Please find the attached Final C-141 form and Release Report for the 2016-08-09 Artesia WW effluent release.

Please let us know if you would like to discuss.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Thursday, May 11, 2017 1:21 PM

To: Combs, Robert

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Robert:

End of May 2017 is fine.

Thank you.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, May 10, 2017 9:30 AM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us >; Denton, Scott < Scott.Denton@HollyFrontier.com >

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Hi Carl; on our last phone conversation on 4/21 we agreed to the end of May to provide the updates for the two events. We have the sample results and the consultants are currently preparing the write-ups. I can check with them on their status and possibly move them quicker if needed – please let me know.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, May 10, 2017 8:23 AM

To: Combs, Robert

Cc: Griswold, Jim, EMNRD

Subject: FW: GW-28 Pipeline Release C-141s Due Today!

Robert:

The New Mexico Oil Conservation Division (OCD) has not received the updates on the pipeline releases that occurred in 2015 and 2016.

OCD had requested updates on the releases on or before May 5, 2017.

Thank you.

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Wednesday, June 7, 2017 4:57 PM

To: 'Combs, Robert'

Cc: Griswold, Jim, EMNRD; Denton, Scott; Tsinnajinnie, Leona, NMENV

Subject: RE: GW-28 Pipeline Release C-141s Due Today! **Attachments:** Pipeline Release 2015 Update.pdf; Figures.pdf

Robert:

The New Mexico Oil Conservation Division (OCD) has completed its review of the 2015 Effluent Pipeline Release.

OCD regards the excavated soils to be impacted soils from the leaking pipeline. Therefore, OCD has determined the following:

- 1) HollyFrontier shall backfill the excavation with clean fill, and properly dispose of the excavated soils.
- 2) HollyFrontier shall provide final photos of the backfilled excavation and waste disposition documentation for the excavated soils to the OCD within 60 days of today's date on/or before COB on August 7, 2017.

Please contact me if you have questions. Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Friday, May 19, 2017 12:26 PM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us>; Denton, Scott < Scott.Denton@HollyFrontier.com>

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Carl,

Please see attached for the 2015 effluent pipeline release (April 12, 2015) follow-up report. The 2016 release (August 9, 2016) Final C-141 and report will follow next week.

Please let me know if you have any questions or would like to discuss.

Thanks and have a good weekend,

Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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Sent: Thursday, May 11, 2017 1:21 PM

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Cc: Griswold, Jim, EMNRD; Denton, Scott

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Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us>; Denton, Scott < Scott.Denton@HollyFrontier.com>

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Robert:

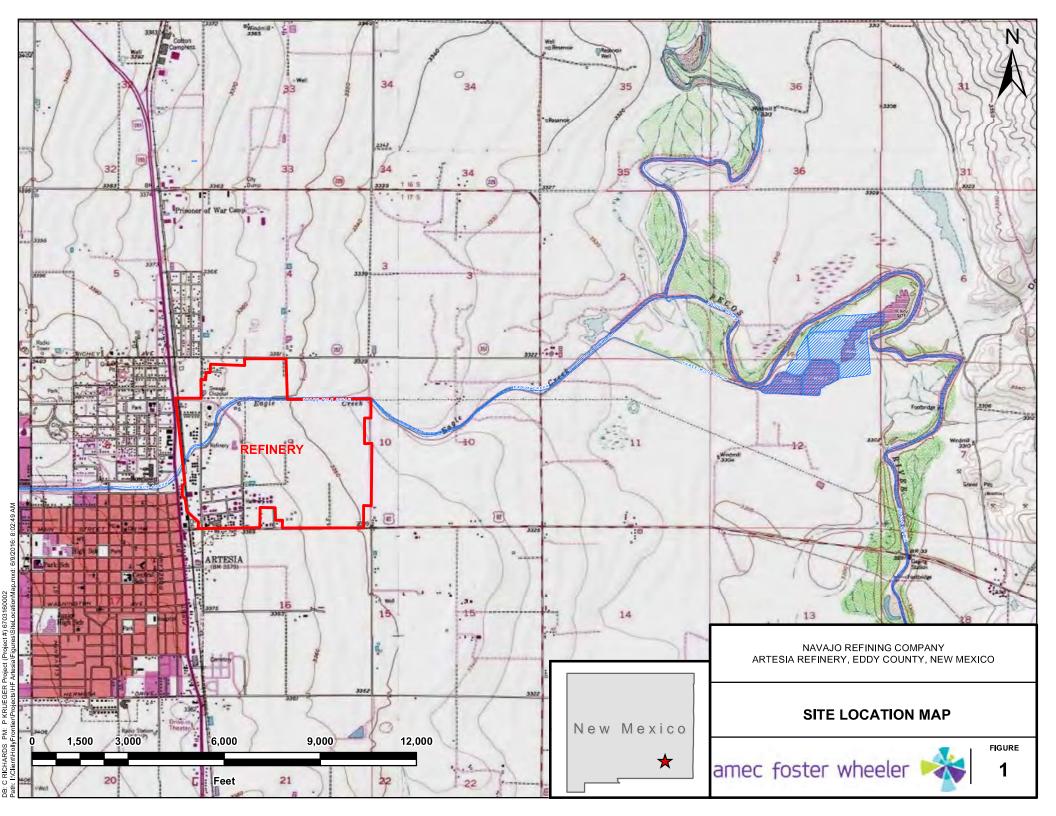
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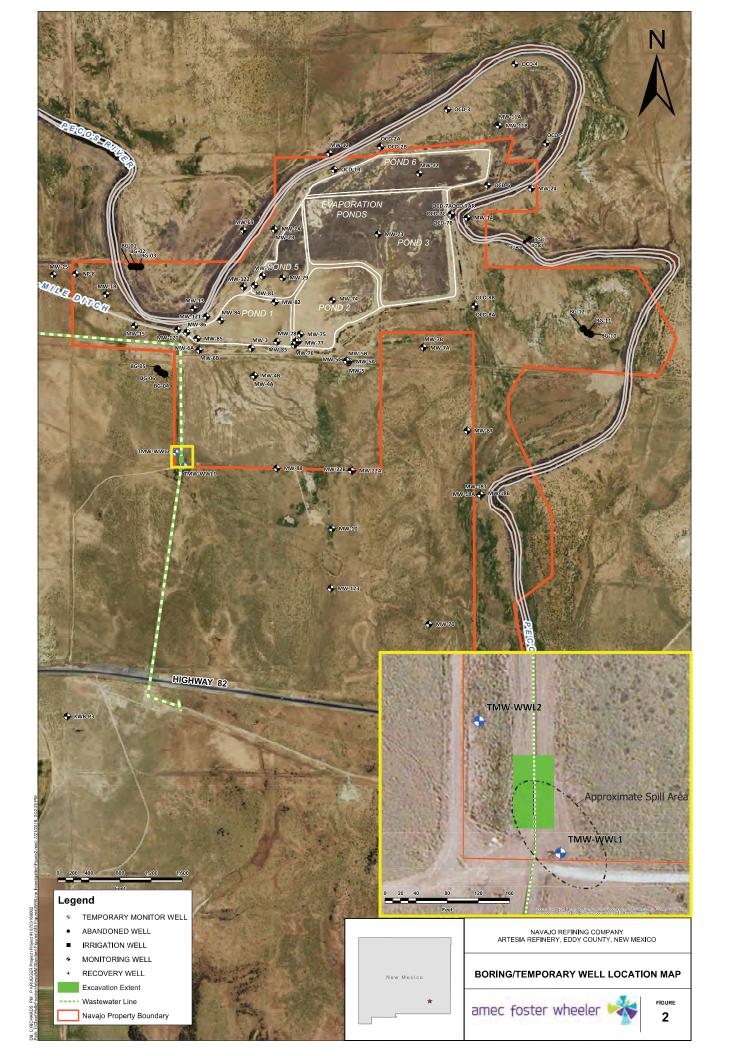
OCD had requested updates on the releases on or before May 5, 2017.

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Sent: Friday, May 19, 2017 12:26 PM

To: Chavez, Carl J, EMNRD

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Attachments: 2017-05-18 Follow up report for 2015 WW Effluent Release.pdf

Carl,

Please see attached for the 2015 effluent pipeline release (April 12, 2015) follow-up report. The 2016 release (August 9, 2016) Final C-141 and report will follow next week.

Please let me know if you have any questions or would like to discuss.

Thanks and have a good weekend,

Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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Sent: Thursday, May 11, 2017 1:21 PM

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Sent: Wednesday, May 10, 2017 8:23 AM

To: Combs, Robert **Cc:** Griswold, Jim, EMNRD

Subject: FW: GW-28 Pipeline Release C-141s Due Today!

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May 18, 2017



Robert Combs Arsin Sahba HollyFrontier Navajo Refining LLC 510 East Main Street Artesia, New Mexico 88210

Soil Pile Sampling
April 12, 2015 Wastewater Pipeline Break near the Former
Evaporation Ponds Area
HollyFrontier Navajo Refining LLC – Artesia, New Mexico
Discharge Permit GW-028

Dear Robert:

Amec Foster Wheeler prepared a release response report that described investigation of the soil and shallow groundwater near a wastewater pipeline break that occurred near the former evaporation ponds located east of the HollyFrontier Navajo Refining LLC (Navajo) Refinery in Artesia, New Mexico. This investigation was performed according to the revised work plan submitted to the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) in October 2015. The release response report was submitted to OCD on July 28, 2016.

In November 2016, OCD requested that the soil that was excavated from the pipeline break area to allow repairs of the pipeline be sampled and analyzed. The request stated that three discrete (grab) soil samples be collected to be analyzed for the following:

- Volatile Organic Compounds (VOCs) by Method 8260
- ► Total Petroleum Hydrocarbons (TPH) by Method 8015 (extended range)
- Iron and Manganese by Method 6010
- Chloride, Fluoride, and Sulfate by Method 300

Three discrete soil samples were collected on April 25, 2017 from the stockpiled, excavated soil. The samples were submitted to Hall Environmental Analysis Laboratory, Inc. (Hall) for the requested analyses. Following initial review of the data, the three samples were additionally analyzed for iron using the synthetic precipitation leaching procedure (SPLP). A copy of the full laboratory report, including quality control data, is provided as Attachment A to this letter.

Robert Combs Arsin Sahba May 18, 2017 Page 2

The analytical results from the soil pile samples are provided in Table 1 along with the results of the soil samples collected during the initial investigation of the release area performed in May 2016. The analytical results presented in Table 1 were compared to the following standards:

- OCD Spill Guidance standards for TPH and benzene
- New Mexico Environment Department (NMED) soil screening levels (SSLs):
 - Cancer and Non-cancer residential exposure scenarios
 - Soil leaching to groundwater exposure scenarios, both risk-based and drinking water standard based, using a dilution attenuation factor (DAF) of 20
- Background threshold values (BTVs) calculated for soils in the vicinity of the nearby former evaporation ponds, approved by the NMED
- Water Quality Control Commission (WQCC) domestic water supply standard for iron (SPLP samples only)

The following is a summary of the comparison of the soil analytical results to the various screening standards:

- ► TPH was not detected in any of the soil pile samples. Samples collected during the 2016 investigation were either not detected or contained low concentrations of TPH well below the screening standards.
- VOCs were not detected in any of the soil pile samples nor the samples collected during the 2016 investigation.
- ▶ Anions (Chloride, Fluoride, and Sulfate) were detected in both the soil pile samples and the samples collected during the 2016 investigation. All reported concentrations of anions were below all of the screening standards.
- ▶ Iron was detected in the soil pile samples at concentrations above the BTV and above the DAF 20 SSL, but below the Residential SSL. The SPLP results indicated that potential leachate from the soil pile would not contain detectable iron, with a detection limit two orders of magnitude below the WQCC standard. The iron concentrations reported in the samples collected during the 2016 investigation ranged from below all of the screening standards to above the DAF 20 SSL but below both the BTV and the Residential SSL.
- Manganese was detected in the soil pile samples and the samples collected during the 2016 investigation at concentrations below all of the screening standards.

Thus, iron is the only constituent of concern that exceeds any of the screening standards. It should be noted that groundwater samples collected during the 2016 investigation contained iron

Robert Combs Arsin Sahba May 18, 2017 Page 3

at a concentration well below the screening standard for "domestic water supply" for iron, as listed in the WQCC regulations (New Mexico Administrative Code 20.6.2.3103.b). This empirical data and the SPLP results indicate that iron does not pose a threat to the shallow groundwater.

We believe that the iron detected in the soil pile does not present a human health risk if left in place.

If you have any questions or comments, please feel free to contact me at 713-929-5674 or 713-249-8548.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Pamela R. Krueger Senior Associate

Pa 0.21

Enclosures:

Table 1 – Soil Analytical Results – 2015 Wastewater Line Break Attachment A – Analytical Report for Soil Pile Samples



TABLE 1

Table 1 - Soil Analytical Results - 2015 Wastewater Line Break

HollyFrontier Navajo Refining, LLC - Artesia, New Mexico

							Location:	South Pile (Sample 1)	Center Pile (Sample 2)	North Pile (Sample 3)	-	rmw-wwL	1		TM	N-WWL2	
						Sample D	Depth (ft bgs):	-	-	-	1	5	12	1	5		12 (Duplicate)
						- Cap.o	Sample Date:	4/25/2017	4/25/2017	4/25/2017	05/10/2016	05/10/2016		05/10/2016	05/10/2016	05/10/2016	05/10/2016
Analyte	OCD Spill Guidance	Former EP BTV	Res SSL, Cancer			DAF 20 SSL, MCL-Based	WQCC Domestic										
TPH (mg/kg)																П	
Gasoline Range Organics	1.00E+02			1.00E+03				<4.0	<4.4	<3.6	< 0.108	< 0.108	< 0.108	0.255	< 0.108	< 0.108	< 0.108
Diesel Range Organics	1.00E+02			1.00E+03		2.0E+04		<9.6	<9.8	<9.6	7.31	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
Motor Oil Range Organic	1.00E+02			1.00E+03		2.0E+04		<48	<49	<48	3.15	< 0.274	< 0.274	0.687	< 0.274	< 0.274	< 0.274
Metals (mg/kg)											0110						
Iron		1.73E+04		5.48E+04	6.96E+03			18,000	18,000	19,000	12.200	7,850	2,710	10,500	5,580	2,880	3,950
Manganese		4.88E+02		1.05E+04	2.63E+03			430	360	440	388	162	65	344	71	80	95
Metals by SPLP (mg/L)				1	1												
Iron							1.00E+00	< 0.05	< 0.05	< 0.05							
Anions (mg/kg)				L		•											
Chloride		5.26E+03		1.88E+07				1,200	1,200	330	1,730	1,070	1,690	113	712	712	899
Fluoride		1.79E+01		4.69E+03				8.9	11	11	5.61	16.1	11.8	4.56	15.8	8.01	11.2
Sulfate		2.16E+04						8,200	8,100	7,000	7,580	18,300	18,300	2,590	18,300	17,200	18,200
VOCs (mg/kg)					•												
Benzene	1.00E+01		1.77E+01	1.14E+02	3.80E-02	4.18E-02		<0.020	<0.022	<0.018	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135
Toluene				5.22E+03	1.21E+01	1.11E+01		<0.040	<0.044	<0.036	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00148
Ethylbenzene			7.45E+01	3.92E+03	2.64E-01	1.23E+01		<0.040	<0.044	< 0.036	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148
1,2-Dichloroethane			8.25E+00	5.52E+01	8.14E-03	2.38E-02		< 0.040	<0.044	< 0.036		-					
1,2-Dibromoethane			6.68E-01	1.34E+02	3.52E-04	2.36E-04		< 0.040	<0.044	< 0.036		•					
Carbon Disulfide				1.54E+03	4.42E+00			<0.40	<0.44	<0.36							
Chloroform			5.85E+00	3.04E+02	1.09E-02			<0.040	<0.044	<0.036							
1,1-Dichloroethane			7.79E+01	1.56E+04	1.36E-01			<0.040	<0.044	<0.036							
1,1-Dichloroethene				4.36E+02	1.95E+00	4.79E-02		<0.040	<0.044	<0.036							
Methylene chloride			7.66E+02	4.09E+02	4.71E-01	2.21E-02		<0.12	<0.13	<0.11							
1,1,2,2-Tetrachloroethane			7.93E+00	1.56E+03	4.81E-03			<0.040	<0.044	<0.036							
Tetrachloroethene			3.35E+02	1.10E+02	3.21E-01	3.98E-02		<0.040	<0.044	<0.036							
1,1,1-Trichloroethane				1.43E+04	5.11E+01	1.28E+00		<0.040	<0.044	<0.036							
1,1,2-Trichloroethane			1.86E+01	2.59E+00	2.23E-03	2.68E-02		<0.040	<0.044	<0.036							
Trichloroethene			1.54E+01	6.72E+00	1.61E-02	3.10E-02		<0.040	<0.044	<0.036							
Vinyl chloride			7.41E-01	1.13E+02	2.17E-03	1.34E-02		<0.040	<0.044	<0.036							
Xylene, total				8.63E+02	2.98E+00	1.54E+02		<0.080	<0.087	<0.073	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349

Notes:

< X = result not detected with a detection limit of X

Values shown in italics with green highlight exceed the BTV and DAF 20 SSL but are below the Res SSL Values shown in regular font with blue highlight exceed the DAF 20 SSL but are below the Res SSL and BTV

Definitions

- = sample depth does not apply
- -- = sample was not analyzed for this constituent
- --- = no standard available from this source or for this pathway

BTV = Background Threshold Value

DAF 20 = Soil Leaching to Groundwater Exposure Scenario, with Dilution Attenuation Factor = 20

EP = Evaporation Ponds

ft bgs = feet below ground surface

MCL = Maximum Contaminant Levelfor drinking water

Definitions (continued)

mg/kg = milligrams per kilogram

mg/L = milligrams per Liter

NMAC = New Mexico Administrative Code

NMED = New Mexico Environment Department

OCD = Oil Conservation Division

Res = Residential exposure scenario

SSL = Soil Screening Level from NMED risk assessment guidance, March 2017

TPH = Total Petroleum Hydrocarbons

WQCC Domestic = Water Quality Control Commission limit for domestic water supply (NMAC 20.6.2.3103.B)



ATTACHMENT A



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

May 17, 2017

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: 2015 Effluent PL Release OrderNo.: 1704B58

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 6 sample(s) on 5/12/2017 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued April 28, 2017.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Analytical ReportLab Order **1704B58**

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT:Navajo Refining CompanyClient Sample ID: South Pile Sample 1Project:2015 Effluent PL ReleaseCollection Date: 4/25/2017 11:20:00 AMLab ID:1704B58-001Matrix: SOILReceived Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	ual Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS	3			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6	mg/Kg	1	4/26/2017 2:07:57 PM
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	4/26/2017 2:07:57 PM
Surr: DNOP	104	70-130	%Rec	1	4/26/2017 2:07:57 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	8.9	0.30	mg/Kg	1	4/26/2017 1:21:41 PM
Chloride	1200	150	mg/Kg	100	4/26/2017 2:36:09 PM
Sulfate	8200	150	mg/Kg	100	4/26/2017 2:36:09 PM
EPA METHOD 6010B: SOIL METALS	3				Analyst: MED
Iron	18000	250	mg/Kg	100	4/27/2017 10:06:50 AM
Manganese	430	0.51	mg/Kg	5	4/27/2017 10:08:11 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.020	mg/Kg	1	4/26/2017 11:34:00 AM
Toluene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Ethylbenzene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,2-Dichloroethane (EDC)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,2-Dibromoethane (EDB)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Carbon disulfide	ND	0.40	mg/Kg	1	4/26/2017 11:34:00 AM
Chloroform	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1-Dichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1-Dichloroethene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Methylene chloride	ND	0.12	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,2,2-Tetrachloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Tetrachloroethene (PCE)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,1-Trichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,2-Trichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Trichloroethene (TCE)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Vinyl chloride	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Xylenes, Total	ND	0.080	mg/Kg	1	4/26/2017 11:34:00 AM
Surr: Dibromofluoromethane	98.1	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: 1,2-Dichloroethane-d4	91.0	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: 4-Bromofluorobenzene	110	70-130	%Rec	1	4/26/2017 11:34:00 AM
EPA METHOD 8015D MOD: GASOLINE RANGE					Analyst: AG
Gasoline Range Organics (GRO)	ND	4.0	mg/Kg	1	4/26/2017 11:34:00 AM
Surr: BFB	94.7	70-130	%Rec	1	4/26/2017 11:34:00 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical ReportLab Order **1704B58**

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Center Pile Sample 2

 Project:
 2015 Effluent PL Release
 Collection Date: 4/25/2017 11:25:00 AM

 Lab ID:
 1704B58-002
 Matrix: SOIL
 Received Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS	3			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	4/26/2017 2:30:04 PM
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	4/26/2017 2:30:04 PM
Surr: DNOP	99.0	70-130	%Rec	1	4/26/2017 2:30:04 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	11	0.30	mg/Kg	1	4/26/2017 1:46:30 PM
Chloride	1200	150	mg/Kg	100	4/26/2017 2:48:34 PM
Sulfate	8100	150	mg/Kg	100	4/26/2017 2:48:34 PM
EPA METHOD 6010B: SOIL METALS	6				Analyst: MED
Iron	18000	250	mg/Kg	100	4/27/2017 10:09:33 AM
Manganese	360	0.50	mg/Kg	5	4/27/2017 10:10:54 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.022	mg/Kg	1	4/26/2017 12:03:19 PM
Toluene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Ethylbenzene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,2-Dichloroethane (EDC)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,2-Dibromoethane (EDB)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Carbon disulfide	ND	0.44	mg/Kg	1	4/26/2017 12:03:19 PM
Chloroform	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1-Dichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1-Dichloroethene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Methylene chloride	ND	0.13	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,2,2-Tetrachloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Tetrachloroethene (PCE)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,1-Trichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,2-Trichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Trichloroethene (TCE)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Vinyl chloride	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Xylenes, Total	ND	0.087	mg/Kg	1	4/26/2017 12:03:19 PM
Surr: Dibromofluoromethane	100	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: 1,2-Dichloroethane-d4	85.3	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: 4-Bromofluorobenzene	107	70-130	%Rec	1	4/26/2017 12:03:19 PM
EPA METHOD 8015D MOD: GASOLINE RANGE					Analyst: AG
Gasoline Range Organics (GRO)	ND	4.4	mg/Kg	1	4/26/2017 12:03:19 PM
Surr: BFB	94.4	70-130	%Rec	1	4/26/2017 12:03:19 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical ReportLab Order **1704B58**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 5/17/2017

CLIENT:Navajo Refining CompanyClient Sample ID: North Pile Sample 3Project:2015 Effluent PL ReleaseCollection Date: 4/25/2017 11:30:00 AMLab ID:1704B58-003Matrix: SOILReceived Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS				Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6	mg/Kg	1	4/26/2017 2:52:19 PM
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	4/26/2017 2:52:19 PM
Surr: DNOP	100	70-130	%Rec	1	4/26/2017 2:52:19 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	11	0.30	mg/Kg	1	4/26/2017 2:11:20 PM
Chloride	330	30	mg/Kg	20	4/26/2017 2:23:44 PM
Sulfate	7000	150	mg/Kg	100	4/26/2017 3:25:47 PM
EPA METHOD 6010B: SOIL METALS	5				Analyst: MED
Iron	19000	250	mg/Kg	100	4/27/2017 10:12:16 AM
Manganese	440	0.50	mg/Kg	5	4/27/2017 10:13:38 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.018	mg/Kg	1	4/26/2017 12:32:58 PM
Toluene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Ethylbenzene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,2-Dichloroethane (EDC)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,2-Dibromoethane (EDB)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Carbon disulfide	ND	0.36	mg/Kg	1	4/26/2017 12:32:58 PM
Chloroform	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1-Dichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1-Dichloroethene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Methylene chloride	ND	0.11	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,2,2-Tetrachloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Tetrachloroethene (PCE)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,1-Trichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,2-Trichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Trichloroethene (TCE)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Vinyl chloride	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Xylenes, Total	ND	0.073	mg/Kg	1	4/26/2017 12:32:58 PM
Surr: Dibromofluoromethane	101	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: 1,2-Dichloroethane-d4	90.6	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: 4-Bromofluorobenzene	110	70-130	%Rec	1	4/26/2017 12:32:58 PM
EPA METHOD 8015D MOD: GASOLI	NE RANGE				Analyst: AG
Gasoline Range Organics (GRO)	ND	3.6	mg/Kg	1	4/26/2017 12:32:58 PM
Surr: BFB	95.0	70-130	%Rec	1	4/26/2017 12:32:58 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order 1704B58

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: South Pile Sample 1

 Project:
 2015 Effluent PL Release
 Collection Date: 5/12/2017 8:00:00 AM

 Lab ID:
 1704B58-004
 Matrix: LEACHATE
 Received Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qua	l Units	DF	Date Analyzed
EPA METHOD 6010B: SPLP METALS					Analyst: MED
Iron	ND	0.050	mg/L	1	5/17/2017 8:35:53 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order 1704B58

Received Date: 5/12/2017 8:40:00 AM

Hall Environmental Analysis Laboratory, Inc. Date Reported: 5/17/2017

CLIENT: Navajo Refining Company **Client Sample ID:** Center Pile Sample 2

Project: 2015 Effluent PL Release **Collection Date:** 5/12/2017 8:00:00 AM **Matrix:** LEACHATE

Analyses Result **PQL Qual Units** DF **Date Analyzed EPA METHOD 6010B: SPLP METALS** Analyst: MED ND 0.050 5/17/2017 8:41:45 AM mg/L 1

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: Value exceeds Maximum Contaminant Level.

Lab ID:

1704B58-005

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

Analyte detected in the associated Method Blank

E Value above quantitation range

Analyte detected below quantitation limits Page 5 of 13 J

P Sample pH Not In Range

Reporting Detection Limit RL

Sample container temperature is out of limit as specified

Analytical Report

Lab Order 1704B58

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: North Pile Sample 3

 Project:
 2015 Effluent PL Release
 Collection Date: 5/12/2017 8:00:00 AM

 Lab ID:
 1704B58-006
 Matrix: LEACHATE
 Received Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 6010B: SPLP METALS					Analyst: MED
Iron	ND	0.050	mg/L	1	5/17/2017 8:43:41 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID MB-31441 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: **PBS** Batch ID: 31441 RunNo: 42386

Units: mg/Kg Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1333287

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Fluoride ND 0.30 Chloride ND 1.5 Sulfate ND 1.5

Sample ID LCS-31441 TestCode: EPA Method 300.0: Anions SampType: Ics

LCSS Client ID: Batch ID: 31441 RunNo: 42386

Analysis Date: 4/26/2017 Prep Date: 4/26/2017 SeqNo: 1333288 Units: mg/Kg Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 0.30 0 100 90 Fluoride 1.5 1.500 110 Chloride 15 1.5 15.00 0 97.7 90 110 29 1.5 30.00 0 98.0 90 110 Sulfate

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Page 7 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID LCS-31439 SampType: LCS TestCode: EPA Method 8015M/D: Diesel Range Organics

Client ID: LCSS Batch ID: 31439 RunNo: 42363

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1332305 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Diesel Range Organics (DRO) 10 42 50.00 0 83.8 63.8 116

Surr: DNOP 4.3 5.000 0 83.8 63.8 116

Sample ID MB-31439 SampType: MBLK TestCode: EPA Method 8015M/D: Diesel Range Organics

Client ID: PBS Batch ID: 31439 RunNo: 42363

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1332306 Units: mg/Kg

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Diesel Range Organics (DRO) ND 10
Motor Oil Range Organics (MRO) ND 50

Surr: DNOP 8.1 10.00 80.6 70 130

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 8 of 13

Hall Environmental Analysis Laboratory, Inc.

0.54

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID rb SampType: MBLK TestCode: EPA Method 8260B: Volatiles Client ID: **PBS** Batch ID: **R42377** RunNo: 42377 Analysis Date: 4/26/2017 Prep Date: SeqNo: 1332328 Units: mg/Kg Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Benzene ND 0.025 ND 0.050 Toluene ND Ethylbenzene 0.050 1,2-Dichloroethane (EDC) ND 0.050 1,2-Dibromoethane (EDB) ND 0.050 Carbon disulfide ND 0.50 Chloroform ND 0.050 ND 0.050 1,1-Dichloroethane 1,1-Dichloroethene ND 0.050 ND Methylene chloride 0.15 1,1,2,2-Tetrachloroethane ND 0.050 ND 0.050 Tetrachloroethene (PCE) 1,1,1-Trichloroethane ND 0.050 1,1,2-Trichloroethane ND 0.050 Trichloroethene (TCE) ND 0.050 Vinyl chloride ND 0.050 Xylenes, Total ND 0.10 Surr: Dibromofluoromethane 0.53 0.5000 106 70 130 Surr: 1,2-Dichloroethane-d4 0.49 0.5000 97.1 70 130 Surr: Toluene-d8 0.50 0.5000 101 70 130

Sample ID 100ng Ics	ample ID 100ng Ics SampType: LCS TestCode: EPA Metho							tiles		
Client ID: LCSS	Batc	h ID: R4	2377	F	RunNo: 4					
Prep Date:	Analysis [Date: 4/	26/2017	8	SeqNo: 1	332329	Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.025	1.000	0	119	70	130			
Toluene	1.1	0.050	1.000	0	114	70	130			
1,1-Dichloroethene	1.2	0.050	1.000	0	119	72	146			
Trichloroethene (TCE)	1.1	0.050	1.000	0	113	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		91.9	70	130			
Surr: Toluene-d8	0.48		0.5000		96.3	70	130			
Surr: 4-Bromofluorobenzene	0.56		0.5000		113	70	130			

108

70

130

0.5000

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Surr: 4-Bromofluorobenzene

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 9 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID 1704b58-002ams SampType: MS TestCode: EPA Method 8260B: Volatiles

Client ID: Center Pile Sample Batch ID: **R42377** RunNo: 42377

Prep Date: Analysis Date: 4/26/2017 SeqNo: 1332784 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.022	0.8726	0	108	61.9	146			
Toluene	1.1	0.044	0.8726	0.02386	120	70	130			
1,1-Dichloroethene	0.98	0.044	0.8726	0	113	37.1	170			
Trichloroethene (TCE)	0.87	0.044	0.8726	0	99.2	49.8	150			
Surr: Dibromofluoromethane	0.41		0.4363		95.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.38		0.4363		87.4	70	130			
Surr: Toluene-d8	0.46		0.4363		105	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.4363		106	70	130			

Sample ID 1704b58-002amsd TestCode: EPA Method 8260B: Volatiles SampType: MSD Client ID: Center Pile Sample Batch ID: R42377 RunNo: 42377

Prep Date: Analysis Date: 4/26/2017 SeaNo: 1332785 Unite: malka

Prep Date.	Analysis L	Jaie. 4/	26/2017	•	sequo. 1	332785	Units: mg/r	v g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.022	0.8726	0	99.7	61.9	146	7.73	20	
Toluene	0.99	0.044	0.8726	0.02386	111	70	130	7.09	20	
1,1-Dichloroethene	0.92	0.044	0.8726	0	105	37.1	170	6.93	20	
Trichloroethene (TCE)	0.85	0.044	0.8726	0	97.5	49.8	150	1.71	20	
Surr: Dibromofluoromethane	0.41		0.4363		93.8	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.37		0.4363		85.8	70	130	0	0	
Surr: Toluene-d8	0.46		0.4363		105	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.47		0.4363		108	70	130	0	0	

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Reporting Detection Limit

Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

Page 10 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID MB-31451 SampType: MBLK TestCode: EPA Method 6010B: Soil Metals

Client ID: PBS Batch ID: 31451 RunNo: 42402

Prep Date: 4/26/2017 Analysis Date: 4/27/2017 SeqNo: 1333071 Units: mg/Kg

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Iron
 ND
 2.5

 Manganese
 ND
 0.10

Sample ID LCS-31451 SampType: LCS TestCode: EPA Method 6010B: Soil Metals

Client ID: LCSS Batch ID: 31451 RunNo: 42402

Prep Date: 4/26/2017 Analysis Date: 4/27/2017 SeqNo: 1333072 Units: mg/Kg

LowLimit Analyte Result **PQL** SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual 26 2.5 25.00 0 105 80 120 25 25.00 0 101 80 0.10 120 Manganese

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 11 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID MB-31758 SampType: MBLK TestCode: EPA Method 6010B: SPLP Metals

Client ID: **PBW** Batch ID: 31758 RunNo: 42833

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347165 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 0.050 Iron

Sample ID LCS-31758 SampType: LCS TestCode: EPA Method 6010B: SPLP Metals

Client ID: LCSW Batch ID: 31758 RunNo: 42833

Units: mg/L Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347166

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Iron 0.53 0.050 0.5000 0 106 120

Sample ID 1704B58-004AMS SampType: MS TestCode: EPA Method 6010B: SPLP Metals

Client ID: South Pile Sample 1 Batch ID: 31758 RunNo: 42833

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347168 Units: mg/L

%REC Analyte **PQL** SPK value SPK Ref Val HighLimit %RPD **RPDLimit** Qual Result LowLimit

0.53 0.050 0.5000 106 Iron

Sample ID 1704B58-004AMSD SampType: MSD TestCode: EPA Method 6010B: SPLP Metals

Client ID: Batch ID: 31758 RunNo: 42833 South Pile Sample 1

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347169 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC I owl imit HighLimit %RPD **RPDLimit** Qual

Iron 0.52 0.050 0.5000 0 104 75 125 1.93 20

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Page 12 of 13

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

Client:

Project:

Analyte

Surr: BFB

Client ID:

Prep Date:

Surr: BFB

Analyte

Sample ID rb

Gasoline Range Organics (GRO)

PBS

Gasoline Range Organics (GRO)

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

2015 Effluent PL Release

Result

27

520

Result

ND

500

SampType: MBLK

Batch ID: A42377

Analysis Date: 4/26/2017

PQL

5.0

WO#: **1704B58**

RPDLimit

RPDLimit

Page 13 of 13

Qual

Qual

%RPD

%RPD

17-May-17

Sample ID 1704b58-001am	s SampT	уре: М\$	3	Tes	tCode: El	PA Method	8015D Mod:	Gasoline	Range	
Client ID: South Pile Sam	ple 1 Batch	1D: A4	2377	F	RunNo: 4	2377				
Prep Date:	Analysis D	ate: 4/	26/2017	5	SeqNo: 1	332780	Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.0	20.03	0	124	63.2	128			
Surr: BFB	370		400.6		93.1	70	130			
Sample ID 1704b58-001am	sd SampT	уре: М \$	SD	Tes	tCode: El	PA Method	8015D Mod:	Gasoline	Range	
Client ID: South Pile Sam	ple 1 Batch	1D: A4	2377	F	RunNo: 4	2377				
Prep Date:	Analysis D	ate: 4/	26/2017	5	SeqNo: 1	332781	Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	4.0	20.03	0	116	63.2	128	6.14	20	
Surr: BFB	390		400.6		96.8	70	130	0	0	
Sample ID 2.5ug gro lcs	SampT	ype: LC	s	Tes	tCode: El	PA Method	8015D Mod:	Gasoline	Range	
Client ID: LCSS	Batch	1D: A4	2377	F	RunNo: 4	2377				
Prep Date:	Analysis D						Units: mg/k			

%REC

106

104

RunNo: 42377

100

SeqNo: 1332783

LowLimit

LowLimit

70

70

70

TestCode: EPA Method 8015D Mod: Gasoline Range

HighLimit

130

130

Units: mg/Kg

130

HighLimit

SPK value SPK Ref Val

SPK value SPK Ref Val %REC

25.00

500.0

500.0

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

yuamiers.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Sample Log-In Check List

Website: www.hallenvironmental.com NAVAJO REFINING CO Client Name: Work Order Number: 1704B58 RcptNo: 1 am Ih Received By: Erin Melendrez 4/26/2017 9:35:00 AM Completed By: **Anne Thorne** 4/26/2017 10:10:47 AM 04/26/17 Reviewed By: Chain of Custody Yes 🗔 No 🗌 Not Present 🗹 1. Custody seals intact on sample bottles? No 🗌 Yes 🗸 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In No 🗌 4. Was an attempt made to cool the samples? Yes 🔽 NA 🗌 No □ 5. Were all samples received at a temperature of >0° C to 6.0°C Yes 🔽 NA 🗌 No 🗌 Yes 🔽 Sample(s) in proper container(s)? No 🗌 Yes 🗸 7. Sufficient sample volume for indicated test(s)? No 🗔 8. Are samples (except VOA and ONG) properly preserved? Yes 🗹 9. Was preservative added to bottles? Yes 🗌 No 🗹 NA 🗌 10. VOA vials have zero headspace? Yes 🗌 No 🗀 No VOA Viais Yes No 🗹 11. Were any sample containers received broken? # of preserved bottles checked Yes 🔽 No \square for pH: 12. Does paperwork match bottle labels? (<2 or >12 unless noted) (Note discrepancies on chain of custody) Adjusted? No 🗌 13. Are matrices correctly identified on Chain of Custody? Yes 🔽 Yes 🗸 No 🗌 14. Is it clear what analyses were requested? No 🗌 Checked by: 15. Were all holding times able to be met? Yes 🔽 (If no, notify customer for authorization.) Special Handling (if applicable) Yes \square 16. Was client notified of all discrepancies with this order? No 🔲 NA 🗹 Person Notified: Date By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition | Seal Intact | Seal No Seal Date Signed By 2.1 Good Yes

HALL ENVIRONMENTAL	ANALYSIS LABORATORY	www.rianelivilolifierial.com	₹	lel. 505-345-3975 Fax 505-345-4107	Analysis Kequest	(nM ,	94) a	letal: 3O, 6	M C	SeoB:WQC	9 >	< <	×××××××××××××××××××××××××××××××××××××××	××××						remarks: cc: Kandy Dade		Schilly Any Sub-contracted data will be a
Standard Rush X	ame 2015		Project #:	PO: 231642	Project Manager: Robert Combs	Scott Denton		X Yes		ative HEAL No.	0504011	000	202	433					1	Market lime		If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted to other accredited laboratories. This serves as notice of this possibility.
HollyFrontier Navajo Refining LLC			Artesia, NM 88211-0159	575-308-2718		X I ovel 4 (Evil Velident	A Lever + (ruii vaiidauori)			Sample Request ID	South Pile sample 1	l.		No M Pile sample 3					2	Day V	shed by:	bmitted to Hall Environmental may be subcon
HollyFrontier N		35S: PO Box 159	Artesia	575-30	ii.	je:		(a)	-	Time Matrix	lios 48/			130 soil					Time: Relinduished by	^	Relinera	ecessary, samples sur
Client:	 - -	Malling Address:		Phone #:	email or Fax#	QA/QC Package: Standard	□ Other	🗆 EDD (Type)		Date	4/25/2017	-		4/25/2017						4/02/17	Date: T	, , , , , , , , , , , , , , , , , , ,

other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>

Sent: Wednesday, May 24, 2017 3:32 PM

To: Chavez, Carl J, EMNRD

Cc: Griswold, Jim, EMNRD; Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy)

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Attachments: Artesia Aug2016 WW Effluent Release FINAL to Navajo 052417.pdf; 2017-05-24 Final

C-141 2016 WW Effluent Release 2016-08-09.pdf

Carl,

Please find the attached Final C-141 form and Release Report for the 2016-08-09 Artesia WW effluent release.

Please let us know if you would like to discuss.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Thursday, May 11, 2017 1:21 PM

To: Combs, Robert

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Robert:

End of May 2017 is fine.

Thank you.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, May 10, 2017 9:30 AM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us >; Denton, Scott < Scott.Denton@HollyFrontier.com >

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Hi Carl; on our last phone conversation on 4/21 we agreed to the end of May to provide the updates for the two events. We have the sample results and the consultants are currently preparing the write-ups. I can check with them on their status and possibly move them quicker if needed – please let me know.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, May 10, 2017 8:23 AM

To: Combs, Robert **Cc:** Griswold, Jim, EMNRD

Subject: FW: GW-28 Pipeline Release C-141s Due Today!

Robert:

The New Mexico Oil Conservation Division (OCD) has not received the updates on the pipeline releases that occurred in 2015 and 2016.

OCD had requested updates on the releases on or before May 5, 2017.

Thank you.

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505 East Huntland Drive Suite 250 Austin, TX 78752

512.329.6080 PHONE 512.329.8750 FAX

www.TRCsolutions.com

May 24, 2017

Mr. Robert Combs, Mr. Scott Denton, Mr. Arsin Sahba HollyFrontier Navajo Refining LLC PO Box 159 Artesia, New Mexico 88211

Re: August 2016 Wastewater Effluent Pipeline Release Investigation Results and Request for Closure
HollyFrontier Navajo Refining LLC, Artesia Refinery
Discharge Permit GW-028

Dear Mr. Combs, et al.:

TRC Environmental Corporation (TRC) is pleased to provide HollyFrontier Navajo Refining LLC (Navajo) with this letter to document investigation results completed by Navajo related to the August 2016 wastewater effluent release that occurred approximately 5 miles east of Artesia, New Mexico. The release occurred from the Navajo pipeline that conveys treated wastewater from Navajo's Artesia Refinery (refinery) to injection wells for disposal in accordance with Discharge Permit GW-028 and Underground Injection Control (UIC) permits.

BACKGROUND

Wastewater effluent was released at 6:00 PM on August 9, 2016, due to a collar failure in the pipeline that conveys treated wastewater from the refinery to injection wells located approximately 15 miles southeast of the refinery. The refinery and release locations are shown on Figure 1. The pipeline release was discovered based on a sudden change in monitored pipeline flow and pressure. Navajo completed initial release response and abatement activities on August 9, 2016, immediately following the release. Wastewater effluent discharge pumps located at the refinery were shut down and in-line valves were blocked-in to minimize flow back. The initial Form C-141 documented a release of 10 barrels but the release was greater than the original estimate based on recovery of 40 barrels. Operations reported that 10 barrels were initially released to the surface. As the pipeline was further exposed for repairs, the section of pipeline between the nearest block valve and the line breach drained into the excavation, thus the additional volume recovered by the vacuum truck.

Mr. Robert Combs, et al. May 24, 2017 Page 2

The recovered water was returned to the refinery waste water treatment unit for processing. The released water did not migrate from the release location or enter the Pecos River.

The pipeline was repaired and returned to service on August 10, 2016. The maintenance contractor performed the required repairs and backfilled the excavation with the excavated material due to an absence of obvious impacts. The soil investigation below addresses the entire release area including the material that was backfilled.

Navajo notified the New Mexico Oil Conservation Division (OCD), OCD Artesia District office, and the New Mexico Environment Department (NMED) Hazardous Waste Bureau within 24 hours of the release by telephone. An initial Form C-141 was submitted to the OCD on August 12, 2016, to document the release and initial response and abatement activities. The approximate aerial extent of the accumulated released wastewater is shown on Figure 2.

RELEASE INVESTIGATION

Navajo conducted wastewater and surface soil investigation related to the August 2016 wastewater effluent release. The investigation activities and results are discussed below.

Wastewater Investigation

Navajo collected a sample of wastewater from a pipeline pump on August 10, 2016; this sample is considered equivalent to the wastewater that was released. The wastewater sample was submitted to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for analysis of the same analytical suite required for the quarterly effluent monitoring in the UIC permits. The analytical results are summarized and compared to applicable Water Quality Control Commission Groundwater Standards (WQCC Standards) in Table 1. The following parameters were detected in the wastewater effluent sample in exceedance of WQCC Standards: chloride (320 milligrams per liter [mg/L]), fluoride (13 mg/L), sulfate (1,500 mg/L), iron (2.40 mg/L), and total dissolved solids (TDS) (2,800 mg/L).

Soil Investigation

On October 10, 2016, Navajo collected four surface soil samples from within the release area (samples "Test 1" through "Test 4") and four surface soil samples from non-release locations in the general vicinity of the release to provide data representative of background conditions (samples "Background 5" through "Background 8"). The sample locations are shown on Figure 2 and include two samples (Test 2 and Test 3) within the material used to backfill the excavation. The surface soil samples were submitted to Hall for laboratory analysis of chloride, fluoride, sulfate, and iron – consistent with the parameters detected in the wastewater effluent sample that exceeded the WQCC Standards. Surface soil analytical results are presented in Table 2 and Figure 2. Laboratory analytical reports are provided in Attachment A. Surface soil analytical results indicate each parameter is present at a highly variable distribution across the release and non-release areas as follows:



Mr. Robert Combs, et al. May 24, 2017 Page 3

- <u>Chloride</u>: Concentrations ranged from 27 milligrams per kilogram (mg/kg) to 3,100 mg/kg in the release area; and 400 mg/kg to 7,600 mg/kg in the non-release areas. Chloride concentrations ranged by up to two orders of magnitude across the release and non-release areas, and were overall greater at locations outside the release area.
- <u>Fluoride</u>: Concentrations ranged from 0.65 mg/kg to 1.8 mg/kg in the release area; and 0.8 mg/kg to 3.2 mg/kg in the non-release areas. Overall fluoride concentrations were greater outside the release area.
- <u>Sulfate</u>: Concentrations ranged from 1,300 mg/kg to 5,200 mg/kg in the release area; and 370 mg/kg to 3,500 mg/kg in the non-release areas. Overall sulfate concentrations were greater within the release area.
- <u>Iron</u>: Concentrations ranged from 20,000 mg/kg to 27,000 mg/kg in the release area; and 14,000 mg/kg to 27,000 mg/kg in the non-release areas. Overall iron concentrations were similar within the release and non-release areas.

To assess the potential for chloride, fluoride, sulfate, and iron to leach from surface soil within the release area to groundwater, surface soil samples were collected on April 27, 2017 from the same four sample locations ("Test 1" through "Test 4"), and submitted to Hall for synthetic precipitation leaching procedure (SPLP) analysis for each of these parameters. The SPLP results are presented and compared to WQCC Standards in Table 2. The SPLP results indicate that chloride, fluoride, and sulfate do not have the potential to leach from surface soil to groundwater at concentrations greater than WQCC Standards. The SPLP iron results indicate that iron has the potential to leach from surface soil to groundwater at a concentration greater than the WQCC Standard at only one of the four sample locations (Test 3) within the release area. The presence of iron at this sample location (Test 3) is attributed to background conditions and not attributed to the August 2016 wastewater release based on the following:

- The iron concentration in soil at Test 3 (23,000 mg/kg) was less than or equal to three of the four samples collected from the non-release areas that are representative of background concentrations (which ranged from 14,000 mg/kg to 27,000 mg/kg).
- The SPLP iron concentration at Test 3 (3.2 mg/L) was greater than the iron concentration in the released wastewater effluent (2.4 mg/L), thus indicating there is additional background source of iron.

Request for Closure

TRC recommends Navajo request that no further action be required in regards to the August 2016 wastewater effluent release based on the following:

• A majority of the wastewater effluent released was recovered via vacuum truck immediately following the release.



- The parameters present in the wastewater effluent at concentrations above WQCC Standards (chloride, fluoride, sulfate, and iron) are present in background (non-release) soils at concentrations similar to or greater than concentrations in the release area. In addition, the distribution of these parameters is highly variable across the release and non-release areas. Therefore, the presence of these parameters in soil at the release location are attributed to background condition and not attributed to the August 2016 wastewater effluent release.
- Chloride, fluoride, and sulfate in soil does not have the potential to leach to groundwater at concentrations above WQCC Standards based on SPLP laboratory analysis. Iron has the potential to leach to groundwater at a concentration above the WQCC Standard at one of the four locations within the release area, but the presence of iron at this location is attributed to background conditions and not the August 2016 wastewater effluent release as described above.

If you have any questions or comments regarding this letter, please feel free to contact me at 512-684-3148.

Sincerely,

Julie Speer Project Manager

TRC Environmental Corporation

cc: TRC: B. Gilbert, C. Smith

Attachments:

Figure 1 – Site Location Map

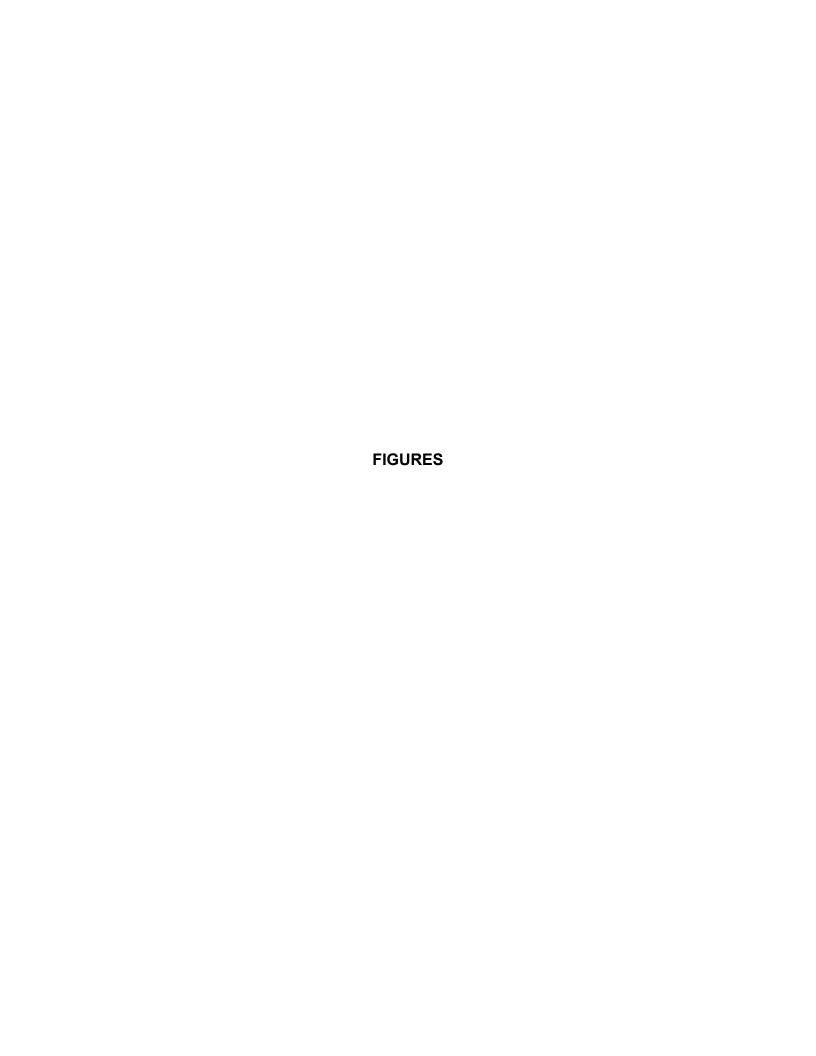
Figure 2 – Sample Location and Results Map

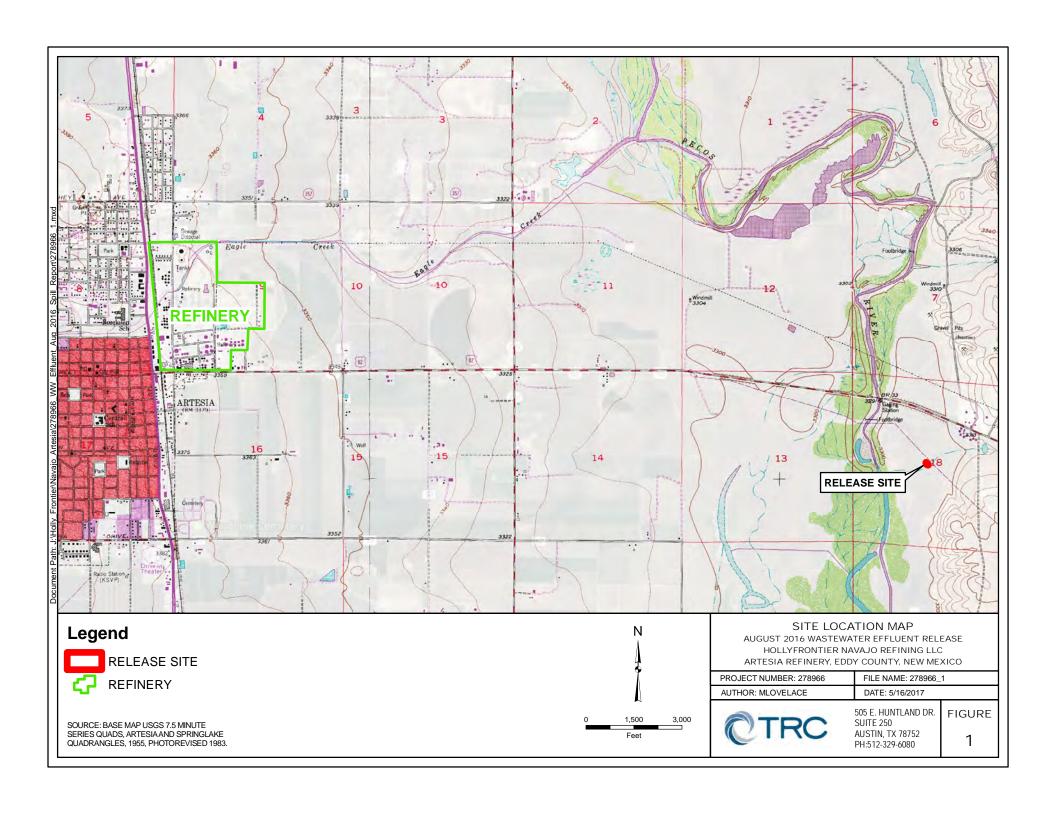
Table 1 – Wastewater Effluent Analytical Results

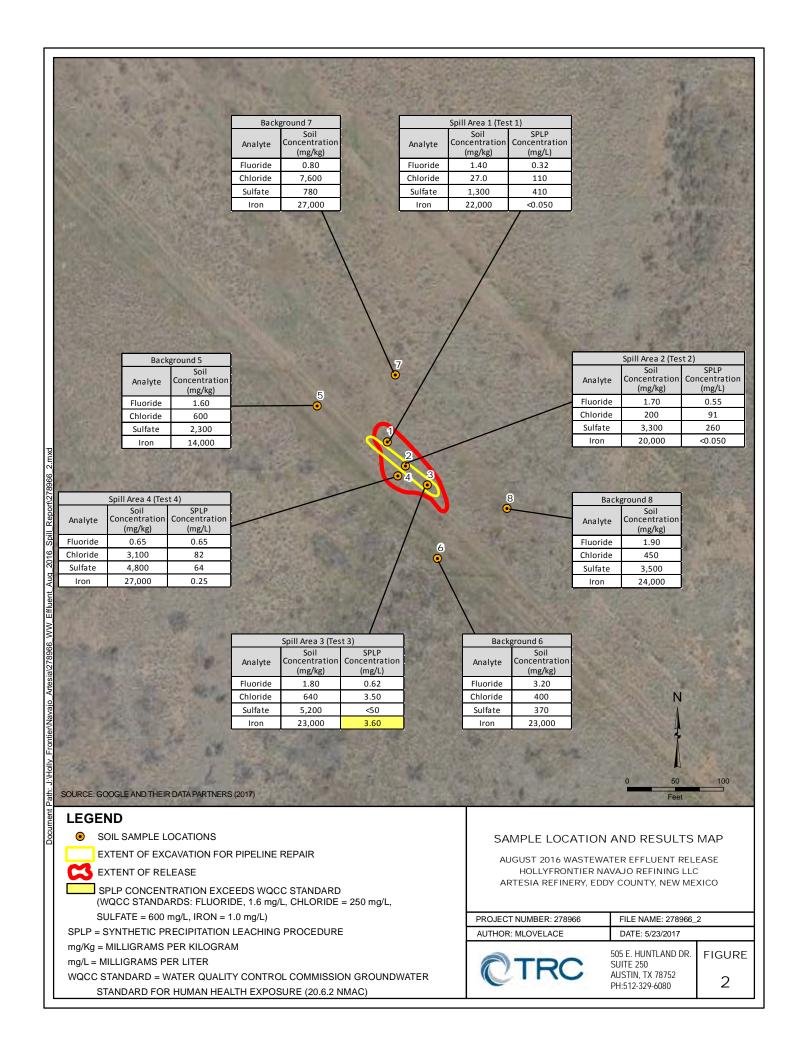
Table 2 – Soil Analytical Results

Attachment A – Laboratory Analytical Reports









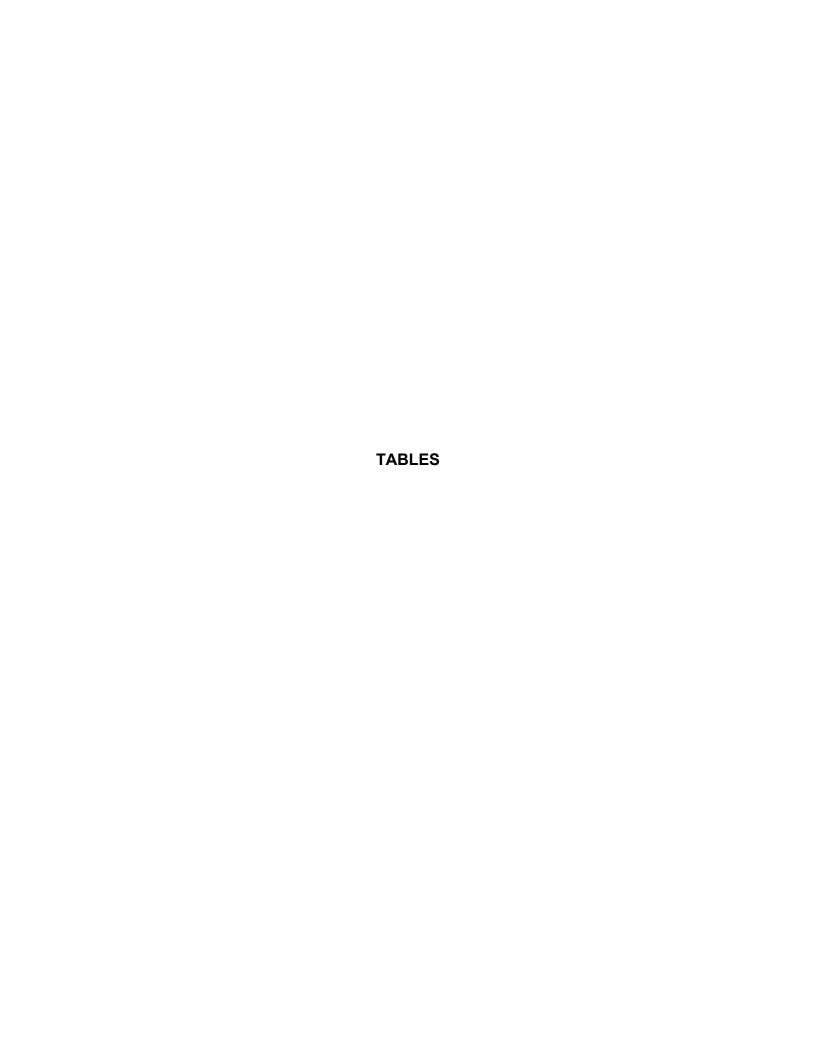


Table 1. Wastewater Effluent Analytical Results Wastewater Pipeline Release Approximately 5 Miles East of Artesia - August 9, 2016 HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

			Sample ID:	Wastewater Effluent
			Date:	8/10/2016
		wqcc		
Analyte	Units	Standard	Screening Standard	Result
VOCs			_	
1,1,1-Trichloroethane	mg/L	0.060	NMED GW Human Health	< 0.0025
1,1,2,2-Tetrachloroethane	mg/L	0.010	NMED GW Human Health	< 0.0025
1,1,2-Trichloroethane	mg/L	0.100	NMED GW Human Health	< 0.0025
1,1-Dichloroethane	mg/L	0.025	NMED GW Human Health	< 0.0025
1,1-Dichloroethene	mg/L	0.005	NMED GW Human Health	< 0.0025
1,2-Dichloroethane	mg/L	0.010	NMED GW Human Health	< 0.0025
Benzene	mg/L	0.010	NMED GW Human Health	< 0.0025
Carbon Tetrachloride	mg/L	0.010	NMED GW Human Health	< 0.0025
Chloroform	mg/L	0.100	NMED GW Human Health	< 0.0025
Ethylbenzene	mg/L	0.750	NMED GW Human Health	< 0.0025
Methylene Chloride	mg/L	0.100	NMED GW Human Health	< 0.012
Tetrachloroethene	mg/L	0.020	NMED GW Human Health	< 0.0025
Toluene	mg/L	0.750	NMED GW Human Health	0.012
Total Xylenes	mg/L	0.620	NMED GW Human Health	< 0.005
Trichloroethene	mg/L	0.100	NMED GW Human Health	< 0.0025
Vinyl Chloride	mg/L	0.001	NMED GW Human Health	< 0.0025
SVOCs				
1-Methylnaphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
2-Methylnaphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
Naphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
Benzo(a)Pyrene	mg/L	0.0002	EPA MCL	< 0.0002
Total Metals (mg/L)				
Aluminum	mg/L	5.00	NMED GW Irrigation	0.260
Arsenic	mg/L	0.100	NMED GW Human Health	0.031
Barium	mg/L	1.00	NMED GW Human Health	< 0.020
Cadmium	mg/L	0.010	NMED GW Human Health	< 0.0020
Calcium	mg/L			130
Chromium	mg/L	0.050	NMED GW Human Health	< 0.0060
Cobalt	mg/L	0.050	NMED GW Irrigation	< 0.0060
Copper	mg/L	1.00	NMED GW Irrigation	< 0.0060
Iron	mg/L	1.00	NMED GW Irrigation	2.40
Lead	mg/L	0.050	NMED GW Human Health	< 0.0050
Manganese	mg/L	0.200	NMED GW Domestic	0.15
Mercury	mg/L	0.002	NMED GW Human Health	< 0.0002
Nickel	mg/L	0.200	NMED GW Irrigation	0.010
Potassium	mg/L			60.0
Selenium	mg/L	0.050	NMED GW Human Health	< 0.050
Silver	mg/L	0.050	NMED GW Human Health	< 0.0050
Sodium	mg/L			630
Zinc	mg/L	10.0	NMED GW Domestic	0.025
Anions				
Bromide	mg/L			1.60
Chloride	mg/L	250	NMED GW Domestic	320
Fluoride (F-, Anion)	mg/L	1.60	NMED GW Human Health	13.0
Nitrite (as N)	mg/L	1.00	NMED GW Human Health	0.96
Nitrate (as N)	mg/L	1.00	NMED GW Human Health	0.50
Sulfate	mg/L	600	NMED GW Domestic	1,500
Other Parameters		ļ		
Total Dissolved Solids	mg/L	1,000	NMED GW Domestic	2,800

Notes:

Yellow highlighted concentration exceeds applicable WQCC Standard

mg/L = milligrams per liter

NMED = New Mexico Environment Department

NMED GW Human Health = NMED groundwater standard for human health exposure, NMAC 20.6.2.3103.A

NMED GW Irrigation = NMED groundwater standard for irrigation exposure, NMAC 20.6.2.3103.C

 $NMED\ GW\ Domestic = NMED\ groundwater\ standard\ for\ domestic\ exposure,\ NMAC\ 20.6.2.3103.B$

NMAC = New Mexico Administrative Code WQCC = Water Quality Control Commission

Table 2. Soil Analytical Results

Wastewater Effluent Pipeline Release Approximately 5 Miles East of Artesia - August 9, 2016 HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

		Release Area	Soil Samples ⁽¹⁾		Noi	n-Release "Back	ground" Sample	es ⁽¹⁾	Max Release	Max	
Sample Location:	Test 1	Test 2	Test 3	Test 4	Background 5	Background 6	Background 7	Background 8		Background	
Analyte		Concentration (mg/kg)									
Fluoride	1.40	1.70	1.80	0.65	1.60	3.20	0.80	1.90	1.80	3.20	
Chloride	27.0	200	640	3,100	600	400	7,600	450	3,100	7,600	
Sulfate	1,300	3,300	5,200	4,800	2,300	370	780	3,500	5,200	3,500	
Iron	22,000	20,000	23,000	27,000	14,000	23,000	27,000	24,000	27,000	27,000	

	R	elease Area So	il SPLP Samples	(2)	Wastewater	wocc
Sample Location:	Test 1	Test 2	Test 3	Test 4	Effluent ⁽³⁾	Standard ⁽⁴⁾
Analyte						
Fluoride	0.32	0.55	0.62	0.65	13.0	1.6
Chloride	110	91	3.5	82	320	250
Sulfate	410	260	<50	64	1,500	600
Iron	<0.050	<0.050	3.6	0.25	2.40	1.0

Notes:

Yellow highlighted concentration exceeds applicable WQCC Standard

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

Concentrations highlighted in yellw

⁽¹⁾ Soil samples were collected on October 10, 2016 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽²⁾ Soil samples were collected on April 27, 2017 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽³⁾ Wastewater effluent sample was collected on August 10, 2016 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽⁴⁾ Water Quality Control Commission Groundwater Standard for human health exposure (20.6.2 NMAC)

ATTACHMENT A Laboratory Analytical Reports



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

December 05, 2016

Robert Combs
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Effluent Release 8/10/16 OrderNo.: 1610723

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 11 sample(s) on 10/14/2016 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued October 31, 2016.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,<<>>>

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 1

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:27:00 AM

 Lab ID:
 1610723-001
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.4	0.30	mg/Kg	1	10/21/2016 2:58:57 PM
Chloride	27	1.5	mg/Kg	1	10/21/2016 2:58:57 PM
Sulfate	1300	30	mg/Kg	20	10/21/2016 3:36:12 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	22000	250	mg/Kg	100	10/18/2016 9:21:23 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company Client Sample ID: Test 2

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:32:00 AM

 Lab ID:
 1610723-002
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.7	0.30	mg/Kg	1	10/21/2016 3:48:36 PM
Chloride	200	30	mg/Kg	20	10/21/2016 4:01:01 PM
Sulfate	3300	75	mg/Kg	50	10/25/2016 10:03:43 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	20000	240	mg/Kg	100	10/18/2016 9:22:56 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 3

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:37:00 AM

 Lab ID:
 1610723-003
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.8	0.30	mg/Kg	1	10/21/2016 4:13:25 PM
Chloride	640	30	mg/Kg	20	10/21/2016 4:25:50 PM
Sulfate	5200	75	mg/Kg	50	10/25/2016 10:16:08 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	23000	240	mg/Kg	100	10/18/2016 9:24:29 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 4

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:44:00 AM

 Lab ID:
 1610723-004
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	0.65	0.30	mg/Kg	1	10/21/2016 4:38:14 PM
Chloride	3100	150	mg/Kg	100	10/25/2016 10:28:33 PM
Sulfate	4800	150	mg/Kg	100	10/25/2016 10:28:33 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	27000	490	mg/Kg	200	10/18/2016 10:03:51 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company

Client Sample ID: Background 5

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:56:00 AM

 Lab ID:
 1610723-005
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.6	0.30	mg/Kg	1	10/21/2016 5:27:53 PM
Chloride	600	30	mg/Kg	20	10/21/2016 5:40:18 PM
Sulfate	2300	30	mg/Kg	20	10/21/2016 5:40:18 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	14000	250	mg/Kg	100	10/18/2016 9:27:36 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Background 6

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:01:00 AM

 Lab ID:
 1610723-006
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	3.2	0.30	mg/Kg	1	10/25/2016 12:56:59 PM
Chloride	400	30	mg/Kg	20	10/25/2016 1:34:13 PM
Sulfate	370	30	mg/Kg	20	10/25/2016 1:34:13 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	23000	250	mg/Kg	100	10/18/2016 9:29:09 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Background 7

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:08:00 AM

 Lab ID:
 1610723-007
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.80	0.30	mg/Kg	1	10/25/2016 1:46:37 PM
Chloride	7600	300	mg/Kg	200	10/26/2016 11:36:39 PM
Sulfate	780	30	mg/Kg	20	10/25/2016 1:59:02 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	27000	500	mg/Kg	200	10/18/2016 10:05:25 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 7 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc. Date Reported: 12/5/2016

CLIENT: Navajo Refining Company

Client Sample ID: Background 8

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:14:00 AM

 Lab ID:
 1610723-008
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	1.9	0.30	mg/Kg	1	10/25/2016 2:11:26 PM
Chloride	450	30	mg/Kg	20	10/25/2016 2:23:51 PM
Sulfate	3500	75	mg/Kg	50	10/26/2016 11:49:03 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	24000	250	mg/Kg	100	10/18/2016 9:37:54 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 8 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1610723**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company Client Sample ID: Test 3

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-009 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS				Analyst: LGT
Fluoride	0.53	0.10 mg/L	1	11/11/2016 6:35:12 PM
Sulfate	520	10 * mg/L	20	11/10/2016 2:59:00 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 9 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 4

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-010 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Chloride	150	10	mg/L	20	11/10/2016 3:48:38 AM
EPA 6010B: TOTAL RECOVERABL	E METALS				Analyst: MED
Iron	ND	0.050	mg/L	1	11/13/2016 2:46:08 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 10 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: SPLP BLANK

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-011 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	ND	0.10	mg/L	1	11/10/2016 4:01:03 AM
Chloride	ND	0.50	mg/L	1	11/10/2016 4:01:03 AM
Sulfate	ND	0.50	mg/L	1	11/10/2016 4:01:03 AM
EPA 6010B: TOTAL RECOVERABL	E METALS				Analyst: MED
Iron	ND	0.050	mg/L	1	11/13/2016 2:52:13 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limit Page 11 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID MB-28232 SampType: MBLK TestCode: EPA Method 300.0: Anions

Client ID: **PBS** Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190570 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

0.30 Fluoride ND Chloride ND 1.5 ND Sulfate 1.5

Sample ID LCS-28232 SampType: LCS TestCode: EPA Method 300.0: Anions

LCSS Client ID: Batch ID: 28232 RunNo: 38151

Analysis Date: 10/21/2016 SeqNo: 1190571 Prep Date: 10/21/2016 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 0.30 0 106 90 110 1.6 1.500 Chloride 14 15.00 0 94.3 90 110 1.5 29 0 96.3 Sulfate 1.5 30.00 90 110

Sample ID 1610723-001AMS TestCode: EPA Method 300.0: Anions SampType: MS

Client ID: Test 1 Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190594 Units: mg/Kg

SPK Ref Val %REC %RPD **RPDLimit** Analyte Result **PQL** SPK value LowLimit HighLimit Qual Fluoride 1.5 0.30 1.500 1.352 8.14 15 S 110 Chloride 47 1.5 15.00 26.77 138 70.8 119 S

Sample ID 1610723-001AMSD TestCode: EPA Method 300.0: Anions SampType: MSD

Client ID: Test 1 Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190595 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 1.3 0.30 1.500 1.352 -1.32 15 10.1 20 S 110 0.00989 20 S Chloride 47 1.5 15.00 26.77 138 70.8 119

Sample ID MB-28251 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: **PBS** Batch ID: 28251 RunNo: 38161

Prep Date: Analysis Date: 10/24/2016 10/24/2016 SeqNo: 1191020 Units: mg/Kg

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Fluoride ND 0.30 Chloride ND 1.5 Sulfate ND 1.5

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit Sample container temperature is out of limit as specified Page 12 of 16

Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID LCS-28251	SampT	ype: Ics	;	Tes	TestCode: EPA Method 300.0: Anions					
Client ID: LCSS	Batch	ID: 28 2	251	F	RunNo: 3	8161				
Prep Date: 10/24/2016	Analysis D	ate: 10)/24/2016	8	SeqNo: 1	191021	Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.30	1.500	0	103	90	110			
Chloride	14	1.5	15.00	0	96.6	90	110			
Sulfate	29	1.5	30.00	0	97.9	90	110			

Sample ID 1610723-006AMS SampType: MS TestCode: EPA Method 300.0: Anions Client ID: Background 6 Batch ID: 28251 RunNo: 38187 Prep Date: 10/24/2016 Analysis Date: 10/25/2016 SeqNo: 1193030 Units: mg/Kg Analyte Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 3.5 0.30 1.500 3.210 21.9 15 110

Sample ID	1610723-006AMSE	SampTy	pe: M \$	SD	Tes	tCode: E	PA Method	300.0: Anion	s			
Client ID:	Background 6	Batch	ID: 28	251	F	RunNo: 3	8187					
Prep Date:	10/24/2016	Analysis Da	ate: 10	0/25/2016	5	SeqNo: 1	193031	Units: mg/K	(g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Fluoride		3.4	0.30	1.500	3.210	9.98	15	110	5.17	20	S	

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix
- В
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified

Analyte detected in the associated Method Blank

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Hall Environmental Analysis Laboratory, Inc.

Result

0.54

0.10

WO#: 1610723

05-Dec-16

Client: Project:		Navajo Refining Company Effluent Release 8/10/16						
Sample ID	МВ	SampType: MBLK	TestC	ode: EPA Metho	d 300.0: Anions			
Client ID:	PBW	Batch ID: A38595	Rur	nNo: 38595				
Prep Date:		Analysis Date: 11/9/201	16 Sec	qNo: 1205622	Units: mg/L			
Analyte		Result PQL SPK	value SPK Ref Val	%REC LowLimit	: HighLimit %	RPD	RPDLimit	Qual
Chloride Sulfate		ND 0.50 ND 0.50						
Sample ID	LCS	SampType: LCS	TestC	ode: EPA Metho	d 300.0: Anions			
Client ID:	LCSW	Batch ID: A38595	Rur	nNo: 38595				
Prep Date:		Analysis Date: 11/9/201	16 Sec	qNo: 1205623	Units: mg/L			
Analyte		Result PQL SPK	value SPK Ref Val	%REC LowLimit	: HighLimit %	RPD	RPDLimit	Qual
Chloride		4.8 0.50	5.000 0	96.0 90	110			
Sulfate		9.8 0.50	10.00 0	97.7 90	110			
Sample ID	МВ	SampType: MBLK	TestC	ode: EPA Metho	d 300.0: Anions			
Client ID:	PBW	Batch ID: R38671	Rur	nNo: 38671				
Prep Date:		Analysis Date: 11/11/20	016 Sec	qNo: 1207765	Units: mg/L			
Analyte		Result PQL SPK	value SPK Ref Val	%REC LowLimit	: HighLimit %	RPD	RPDLimit	Qual
Fluoride		ND 0.10						
Sample ID	LCS	SampType: LCS	TestC	ode: EPA Metho	d 300.0: Anions			
Client ID:	LCSW	Batch ID: R38671	Rur	nNo: 38671				
Prep Date:		Analysis Date: 11/11/20	016 Sec	qNo: 1207766	Units: mg/L			

SPK value SPK Ref Val %REC

0.5000

Qualifiers:

Analyte

Fluoride

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix
- В

LowLimit

108

HighLimit

- Value above quantitation range
- P Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified

Analyte detected in the associated Method Blank

E

J Analyte detected below quantitation limits

Page 14 of 16

%RPD

RPDLimit

Qual

Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID MB-28097 SampType: MBLK TestCode: EPA Method 6010B: Soil Metals

Client ID: **PBS** Batch ID: 28097 RunNo: 38014

Prep Date: 10/17/2016 Analysis Date: 10/18/2016 SeqNo: 1185141 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 2.5 Iron

Sample ID LCS-28097 SampType: LCS TestCode: EPA Method 6010B: Soil Metals

Client ID: LCSS Batch ID: 28097 RunNo: 38014

Prep Date: 10/17/2016 Analysis Date: 10/18/2016 SeqNo: 1185142 Units: mg/Kg

SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result Qual

Iron 25 2.5 25.00 0 101 120

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1610723**

05-Dec-16

Client: Navajo Refining Company
Project: Effluent Release 8/10/16

Sample ID MB-28558 SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207448 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron ND 0.050

Sample ID LCS-28558 SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207452 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron 0.48 0.050 0.5000 0 96.8 80 120

Sample ID 1610723-010BMS SampType: MS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Test 4 Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207457 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

ron 0.50 0.500 0.5000 0.008830 97.5 75 125

Sample ID 1610723-010BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals

Client ID: **Test 4** Batch ID: **28558** RunNo: **38660**

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207458 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

lron 0.49 0.050 0.5000 0.008830 95.6 75 125 1.95 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Bioll Environmental Analysis Laboratory 4901 Hawkins NI Albuquerque, NM 87109

TEL: 505-345-39/5 FAX: 505-345-4107 Website, www.itallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING CO Work Order Number: 1610723 ReptNo: 1 10/4/16 Received by/date: Logged By: 10/14/2016 8:45:00 AM Michelle Garcia Completed By: Michelle Garcia 10/14/2016 1:12:57 PM Reviewed By: 10 14/16 Chain of Custody 1. Custody seals intact on sample bottles? No Yes Not Present V No. 2. Is Chain of Custody complete? Yes V Not Present 3 How was the sample delivered? UPS Log In Was an attempt made to cool the samples? No NA I Yes V Were all samples received at a temperature of >0° C to 6.0°C No Yes V NA . Sample(s) in proper container(s)? Yes V No _ Sufficient sample volume for indicated lest(s)? Yes V No I 8. Are samples (except VOA and ONG) properly preserved? Yes V No. 9. Was preservative added to bottles? No V NA Yes 10. VOA vials have zero headspace? Yes No -No VOA Vials Yes 11. Were any sample containers received broken? No V # of preserved bottles checked 12. Does paperwork match bottle labels? No L for pH: Yes V (Note discrepancies on chair of custody) (<2 or >12 unless noted) Adjusted? 13. Are matrices correctly identified on Chain of Custody? No. 14. Is it clear what analyses were requested? V No Yes 15. Were all holding times able to be met? Yes Y No _ Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) 16. Was client notified of all discrepancies with this order? Yes | No L NA V Person Notified: Date By Whom. Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition Seal Intact | Seal No Seal Date 4.7 Good

CIIO	0-10-11	Citalit-or-Custody Record	DIRO CHIN			
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	,		Project Name:			The Proposition of the Propositi
alling Add	alling Address: P.O. Box	Box 159	Erruer	it Release	Se Sholle	4901 Hawkins NE - Albuquerque, NM 87109
KTESIA	A, D	m 88211	Project #:			Tel: 505-345-3975 Fax 505-345-4107
10ne #: 575	1	746-5281	SAS/vent	Place		Anal
nail or Fax#:	# 522	-246-5451		ger.		
VQC Package:	:age:		9	0		97,
Standard		L Level 4 (Full Validation)	NOBER	NOBER! COMOS		PSY
creditation:			Sampler:			in)s
NELAP	Other	10	On Ice:	- 1	□ No	0
EDD (Type)	(ac		Sample Temperature:		78° when collected	100 P
)ate Tin	Time Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL NO.	Chlay Fluar Sular Jedn
116 8:27 Am	Soil	Tesr 1	len # 1	on dec	001	×
116 8324	*	Test 2	1 42	1	COD	
16 8:37 Am		Test 3	#3		200	
16 8:44 m	4	Tot 4	24		700	
116 8:56m	***	Back Stoud S	75		2020	
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If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

August 22, 2016

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Waste Water Effluent OrderNo.: 1608660

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/11/2016 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT:Navajo Refining CompanyClient Sample ID: Wastewater Effluent 8-10-16Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
IGNITABILITY METHOD 1010						Analys	t: SUB
Ignitability	>200	0		°F	1	8/17/2016	R36648
SULFIDE, REACTIVE						Analys	t: SUB
Reactive Sulfide	ND	0.20		mg/L	1	8/17/2016	R36648
SPECIFIC GRAVITY						Analys	t: LGT
Specific Gravity	1.002	0			1	8/15/2016 4:29:00 PM	R36512
EPA METHOD 300.0: ANIONS						Analys	t: MRA
Fluoride	13	0.50	*	mg/L	5	8/11/2016 3:26:00 PM	R36408
Chloride	320	10		mg/L	20	8/11/2016 3:38:24 PM	R36408
Nitrogen, Nitrite (As N)	0.96	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Bromide	1.6	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	8/11/2016 3:26:00 PM	R36408
Sulfate	1500	25		mg/L	50	8/18/2016 2:24:04 AM	R36593
SM2510B: SPECIFIC CONDUCTANC	E					Analys	t: JRR
Conductivity	4400	1.0		µmhos/cm	1	8/15/2016 3:14:28 PM	R36527
SM2320B: ALKALINITY						Analys	t: JRR
Bicarbonate (As CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Total Alkalinity (as CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analys	t: KS
Total Dissolved Solids	2800	40.0	*	mg/L	1	8/16/2016 8:21:00 AM	26968
CORROSIVITY						Analys	t: SUB
рН	6.99			pH Units	1	8/17/2016	R36648
CYANIDE, REACTIVE						Analys	t: SUB
Cyanide, Reactive	0.120	0.0100		mg/L	1	8/16/2016	R36648
SM4500-H+B: PH						Analys	t: JRR
рН	7.49	1.68	Н	pH units	1	8/15/2016 3:14:28 PM	R36527
EPA METHOD 7470: MERCURY						Analys	t: pmf
Mercury	ND	0.00020		mg/L	1	8/12/2016 11:14:45 AM	1 26894
MERCURY, TCLP						Analys	t: pmf
Mercury	ND	0.020		mg/L	1	8/17/2016 10:49:54 AM	1 27020
EPA 6010B: TOTAL RECOVERABLE	METALS					Analys	t: MED
Aluminum	0.26	0.020		mg/L	1	8/18/2016 5:02:57 PM	26942

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 32
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF I	Date Analyzed	Batch
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	MED
Antimony	ND	0.050	mg/L	1	8/19/2016 10:36:34 AM	26942
Arsenic	0.031	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Barium	ND	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Beryllium	ND	0.0030	mg/L	1	8/18/2016 5:02:57 PM	26942
Cadmium	ND	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Calcium	130	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Chromium	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Cobalt	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Copper	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Iron	2.4	0.25	mg/L	5	8/18/2016 5:10:17 PM	26942
Lead	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Magnesium	41	1.0	mg/L	1	8/18/2016 5:02:57 PM	26942
Manganese	0.15	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Nickel	0.010	0.010	mg/L	1	8/18/2016 5:02:57 PM	26942
Potassium	60	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Selenium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Silver	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Sodium	630	10	mg/L	10	8/18/2016 5:21:39 PM	26942
Strontium	1.9	0.10	mg/L	10	8/18/2016 5:21:39 PM	26942
Thallium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Zinc	0.025	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Silica	14	5.4	mg/L	5	8/18/2016 5:10:17 PM	26942
EPA 6010B: TCLP METALS					Analyst	MED
Arsenic	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Barium	ND	100	mg/L	1	8/15/2016 1:30:42 PM	26961
Cadmium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Chromium	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Lead	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Selenium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Silver	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
EPA METHOD 8260B: VOLATILES					Analyst	SUB
Acetonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Allyl chloride	ND	2.5	μg/L		8/12/2016	R36648
Chloroprene	ND	2.5	μg/L		8/12/2016	R36648
Cyclohexane	ND	2.5	μg/L		8/12/2016	R36648
Diethyl ether	ND	2.5	μg/L		8/12/2016	R36648
Diisopropyl ether	ND	2.5	μg/L		8/12/2016	R36648
Epichlorohydrin	ND	25	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES				Aı	nalyst: SUB
Ethyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	2.5	μg/L	1 8/12/2016	R36648
Freon-113	ND	2.5	μg/L	1 8/12/2016	R36648
Isobutanol	ND	50	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	12	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	5.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
n-Hexane	ND	2.5	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	25	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	25	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	2.5	μg/L	1 8/12/2016	R36648
Propionitrile	ND	12	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	2.5	μg/L	1 8/12/2016	R36648
Benzene	ND	2.5	μg/L	1 8/12/2016	R36648
Toluene	12	2.5	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	50	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	2.8	2.5	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	4.5	2.5	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	2.5	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	2.5	μg/L	1 8/12/2016	R36648
Naphthalene	ND	2.5	μg/L	1 8/12/2016	R36648
Acetone	350	12	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	2.5	μg/L	1 8/12/2016	R36648
Bromoform	ND	2.5	μg/L	1 8/12/2016	R36648
Bromomethane	ND	2.5	μg/L	1 8/12/2016	R36648
2-Butanone	47	12	μg/L	1 8/12/2016	R36648
Carbon disulfide	ND	2.5	μg/L	1 8/12/2016	R36648
Carbon Tetrachloride	ND	2.5	μg/L	1 8/12/2016	R36648
Chlorobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroethane	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroform	ND	2.5	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Aı	nalyst: SUB
Chloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	2.5	μg/L	1	8/12/2016	R36648
2-Hexanone	28	2.5	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	12	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Styrene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	2.5	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S $\,\,$ % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					А	nalyst: SUB
Vinyl chloride	ND	2.5	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	5.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	2.5	μg/L	1	8/12/2016	R36648
Acrolein	ND	12	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	12	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
Iodomethane	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	2.5	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	100	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	99.6	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	102	70-130	%Rec	1	8/12/2016	R36648
EPA 8270C: SEMIVOLATILES/MOD					А	nalyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	8/17/2016	R36648
Atrazine	ND	5.0	μg/L	1	8/17/2016	R36648
Benzaldehyde	ND	5.0	μg/L	1	8/17/2016	R36648
Caprolactam	ND	5.0	μg/L	1	8/17/2016	R36648
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	8/17/2016	R36648
Acetophenone	ND	10	μg/L	1	8/17/2016	R36648
1-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,5-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,6-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dimethylphenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2,6-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2-Chloronaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Chlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Methylphenol	ND	10	μg/L	1	8/17/2016	R36648
2-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
2-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
3,3´-Dichlorobenzidine	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent

Collection Date: 8/10/2016 10:55:00 AM

Lab ID: 1608660-001 **Matrix:** AQUEOUS **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD					An	nalyst: SUB
3-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Bromophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Chloro-3-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Chloroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthene	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthylene	ND	10	μg/L	1	8/17/2016	R36648
Anthracene	ND	10	μg/L	1	8/17/2016	R36648
Benzo(g,h,i)perylene	ND	10	μg/L	1	8/17/2016	R36648
Benz(a)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(a)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(b)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(k)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroethyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	8/17/2016	R36648
Butyl benzyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Carbazole	ND	10	μg/L	1	8/17/2016	R36648
Chrysene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenz(a,h)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenzofuran	ND	10	μg/L	1	8/17/2016	R36648
Diethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Dimethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-butyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-octyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Fluoranthene	ND	10	μg/L	1	8/17/2016	R36648
Fluorene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorobenzene	ND	2.0	μg/L	1	8/17/2016	R36648
Hexachlorobutadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorocyclopentadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachloroethane	ND	10	μg/L	1	8/17/2016	R36648
Indeno(1,2,3-cd)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Isophorone	ND	10	μg/L	1	8/17/2016	R36648
Naphthalene	ND	10	μg/L	1	8/17/2016	R36648
Nitrobenzene	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
N-Nitrosodi-n-propylamine	ND	4.0	μg/L	1	8/17/2016	R36648
N-Nitrosodiphenylamine	ND	10	μg/L	1	8/17/2016	R36648
Pentachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
Phenanthrene	ND	10	μg/L	1	8/17/2016	R36648
Phenol	ND	10	μg/L	1	8/17/2016	R36648
Pyrene	ND	10	μg/L	1	8/17/2016	R36648
o-Toluidine	ND	4.0	μg/L	1	8/17/2016	R36648
Pyridine	ND	10	μg/L	1	8/17/2016	R36648
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	8/17/2016	R36648
Surr: 2,4,6-Tribromophenol	90.0	63-110	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorobiphenyl	60.4	58-112	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorophenol	69.0	47-109	%Rec	1	8/17/2016	R36648
Surr: Nitrobenzene-d5	72.0	58-110	%Rec	1	8/17/2016	R36648
Surr: Phenol-d5	67.8	52-105	%Rec	1	8/17/2016	R36648
Surr: Terphenyl-d14	28.7	22-133	%Rec	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 7 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analy	zed Batch
EPA METHOD 8260B: VOLATILES					Analyst: SUB
Acetonitrile	ND	0.50	μg/L	1 8/12/2016	R36648
Allyl chloride	ND	0.50	μg/L	1 8/12/2016	R36648
Chloroprene	ND	0.50	μg/L	1 8/12/2016	R36648
Cyclohexane	ND	0.50	μg/L	1 8/12/2016	R36648
Diethyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Diisopropyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Epichlorohydrin	ND	5.0	μg/L	1 8/12/2016	R36648
Ethyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Freon-113	ND	0.50	μg/L	1 8/12/2016	R36648
Isobutanol	ND	10	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	1.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
n-Hexane	ND	0.50	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	5.0	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	5.0	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	0.50	μg/L	1 8/12/2016	R36648
Propionitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	0.50	μg/L	1 8/12/2016	R36648
Benzene	ND	0.50	μg/L	1 8/12/2016	R36648
Toluene	ND	0.50	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1 8/12/2016	R36648
Naphthalene	ND	0.50	μg/L	1 8/12/2016	R36648
Acetone	ND	2.5	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	0.50	μg/L	1 8/12/2016	R36648
Bromoform	ND	0.50	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 8 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Butanone	ND	2.5	μg/L	1	8/12/2016	R36648
Carbon disulfide	ND	0.50	μg/L	1	8/12/2016	R36648
Carbon Tetrachloride	ND	0.50	μg/L	1	8/12/2016	R36648
Chlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroform	ND	0.50	μg/L	1	8/12/2016	R36648
Chloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	0.50	μg/L	1	8/12/2016	R36648
2-Hexanone	ND	0.50	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	2.5	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Styrene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers	:
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 9 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company **Client Sample ID:** TRIP BLANK

Project: Waste Water Effluent **Collection Date:**

Lab ID: 1608660-002 Matrix: TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	0.50	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl chloride	ND	0.50	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	1.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	0.50	μg/L	1	8/12/2016	R36648
Acrolein	ND	2.5	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
Iodomethane	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	20	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	96.4	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	101	70-130	%Rec	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits Page 10 of 32 J
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

22-Aug-16

	Waste Water Efflu									
Sample ID MB	Samp	Type: m b	olk	Tes	tCode: E	PA Method	300.0: Anions	\$		
Client ID: PBW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	S	SeqNo: 1	128954	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosph	ate (As P ND	0.50								
Sample ID LCS	Samp	Type: Ics	•	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: LCSW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	8	SeqNo: 1	128955	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	104	90	110			
Chloride	4.8	0.50	5.000	0	96.2	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	96.8	90	110			
Bromide	2.4	0.10	2.500	0	96.7	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.0	90	110			
Phosphorus, Orthophosph	ate (As P 4.9	0.50	5.000	0	97.2	90	110			
Sample ID MB	Samp	Type: mb	olk	Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID: PBW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	8	SeqNo: 1	133301	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								
Sample ID LCS	Samp	SampType: Ics TestCode: EPA Method 300.0: Anions							-	
Client ID: LCSW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	S	SeqNo: 1	133302	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Sulfate

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

9.7

0.50

10.00

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

Sample container temperature is out of limit as specified

110

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range Page 11 of 32

Reporting Detection Limit RL

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES **PBW** RunNo: 36648 Client ID: Batch ID: R36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Acetonitrile ND 0.50 ND Allyl chloride 0.50 ND 0.50 Chloroprene Cyclohexane ND 0.50 Diethyl ether ND 0.50 Diisopropyl ether ND 0.50 Epichlorohydrin ND 0.50 Ethyl acetate ND 0.50 Ethyl methacrylate ND 2.5 Ethyl tert-butyl ether ND 0.50 Freon-113 ND 0.50 ND Isobutanol 10 Isopropyl acetate ND 0.50 Methacrylonitrile ND 2.5 Methyl acetate ND 0.50 Methyl ethyl ketone ND 2.5 Methyl isobutyl ketone ND 2.5 Methyl methacrylate ND 2.5 Methylcyclohexane ND 0.50 ND 0.50 n-Amyl acetate n-Hexane ND 0.50 Nitrobenzene ND 0.50 Pentachloroethane ND 0.50 p-isopropyltoluene ND 0.50 Propionitrile ND 2.5 Tetrahydrofuran ND 0.50 Benzene ND 0.50 Toluene ND 0.50 Ethylbenzene ND 0.50 Methyl tert-butyl ether (MTBE) ND 0.50 1,2,4-Trimethylbenzene ND 0.50 1,3,5-Trimethylbenzene ND 0.50 1,2-Dichloroethane (EDC) ND 0.50 1,2-Dibromoethane (EDB) ND 0.50 Naphthalene ND 0.50 Acetone ND 2.5 ND 0.50 Bromobenzene Bromodichloromethane ND 0.50 Bromoform ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.50 Bromomethane 2-Butanone ND 2.5 ND 0.50 Carbon disulfide Carbon Tetrachloride ND 0.50 Chlorobenzene ND 0.50 Chloroethane ND 0.50 Chloroform ND 0.50 ND 0.50 Chloromethane 2-Chlorotoluene ND 0.50 4-Chlorotoluene ND 0.50 cis-1,2-DCE ND 0.50 ND 0.50 cis-1,3-Dichloropropene 1,2-Dibromo-3-chloropropane ND 0.50 Dibromochloromethane ND 0.50 Dibromomethane ND 0.50 1,2-Dichlorobenzene ND 0.50 1,3-Dichlorobenzene ND 0.50 1,4-Dichlorobenzene ND 0.50 Dichlorodifluoromethane ND 0.50 ND 0.50 1.1-Dichloroethane 1,1-Dichloroethene ND 0.50 1,2-Dichloropropane ND 0.50 1,3-Dichloropropane ND 0.50 2,2-Dichloropropane ND 0.50 1,1-Dichloropropene ND 0.50 Hexachlorobutadiene ND 0.50 2-Hexanone ND 0.50 Isopropylbenzene ND 0.50 Methylene Chloride ND 2.5 n-Butylbenzene 0.50 ND n-Propylbenzene ND 0.50 sec-Butylbenzene ND 0.50 Styrene ND 0.50 tert-Butylbenzene ND 0.50 1,1,1,2-Tetrachloroethane ND 0.50 1,1,2,2-Tetrachloroethane ND 0.50 Tetrachloroethene (PCE) ND 0.50 trans-1,2-DCE ND 0.50 trans-1,3-Dichloropropene ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: R36648 RunNo: 36648 Prep Date: Analysis Date: 8/12/2016 SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 1,2,3-Trichlorobenzene ND 0.50 ND 1,2,4-Trichlorobenzene 0.50 ND 0.50 1,1,1-Trichloroethane 1,1,2-Trichloroethane ND 0.50 Trichloroethene (TCE) ND 0.50 Trichlorofluoromethane ND 0.50 1,2,3-Trichloropropane ND 0.50 Vinyl chloride ND 0.50 mp-Xylenes ND 1.0 o-Xylene ND 0.50 tert-Amyl methyl ether ND 0.50 tert-Butyl alcohol ND 0.50 Acrolein ND 2.5 Acrylonitrile ND 2.5 Bromochloromethane ND 0.50 2-Chloroethyl vinyl ether ND 0.50 ND 0.50 Iodomethane trans-1,4-Dichloro-2-butene ND 0.50 Vinyl acetate ND 0.50 1.4-Dioxane ND 0.50

Sample ID LCS-R36648	SampType: LCS TestCode: EPA Method 8260B: VOLATILES									
Client ID: LCSW	Batch	Batch ID: R36648 RunNo: 36648								
Prep Date:	Analysis D	ate: 8/	12/2016	S	SeqNo: 1	135034	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.1	0	10.00	0	90.7	80	120			
Toluene	9.4	0	10.00	0	94.5	80	120			
Ethylbenzene	9.6	0	10.00	0	96.4	80	120			
Chlorobenzene	9.1	0	10.00	0	91.2	80	120			
1,1-Dichloroethene	9.1	0	10.00	0	91.1	80	120			
Tetrachloroethene (PCE)	8.7	0	10.00	0	87.1	80	120			
Trichloroethene (TCE)	8.9	0	10.00	0	89.0	80	120			
o-Xylene	10	0	10.00	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA 8270C: Semivolatiles/Mod Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/17/2016 Prep Date: SeqNo: 1135037 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual N-Nitroso-di-n-butylamine ND 1.0 ND Acetophenone 10 ND 1-Methylnaphthalene 10 2,3,4,6-Tetrachlorophenol ND 10 2,4,5-Trichlorophenol ND 10 2,4,6-Trichlorophenol ND 10 2,4-Dichlorophenol ND 10 2,4-Dimethylphenol ND 10 2,4-Dinitrophenol ND 10 ND 2,4-Dinitrotoluene 10 2,6-Dinitrotoluene ND 10 ND 10 2-Chloronaphthalene 2-Chlorophenol ND 10 2-Methylnaphthalene ND 10 2-Methylphenol ND 10 2-Nitroaniline ND 10 2-Nitrophenol ND 10 3,3´-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 ND 10 4.6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 ND 4-Chloroaniline 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Anthracene ND 10 ND Benzo(g,h,i)perylene 1.0 ND Benz(a)anthracene 1.0 Benzo(a)pyrene ND 1.0 Benzo(b)fluoranthene ND 1.0 Benzo(k)fluoranthene ND 1.0 Bis(2-chloroethoxy)methane ND 10 Bis(2-chloroethyl)ether ND 10 Bis(2-chloroisopropyl)ether ND 10 Bis(2-ethylhexyl)phthalate ND 5.0 Butyl benzyl phthalate ND 10

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648	SampT	уре: МЕ	BLK	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	n ID: R3	6648	R	tunNo: 3	6648				
Prep Date:	Analysis D	Date: 8/	17/2016	S	SeqNo: 1	135037	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Carbazole	ND	10								
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	1.0								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	1.0								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodiphenylamine	ND	2.0								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	5.0								
Pyrene	ND	10								
o-Toluidine	ND	1.0								
Pyridine	ND	1.0								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID LCS-R36648	SampT	ype: LC	s	Tes	tCode: E	ode: EPA 8270C: Semivolatiles/Mod						
Client ID: LCSW	Batch	1D: R3	6648	F	RunNo: 3	6648						
Prep Date:	Analysis D	ate: 8/	17/2016	5	SeqNo: 1	135038	Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
2,4-Dinitrotoluene	4.6	0	5.000	0	91.8	49	134					
2-Chlorophenol	4.6	0	5.000	0	93.0	50	131					
4-Chloro-3-methylphenol	5.1	0	5.000	0	102	42	139					
4-Nitrophenol	4.7	0	5.000	0	94.2	19	137					
Acenaphthene	4.5	0	5.000	0	89.8	36	122					
Bis(2-ethylhexyl)phthalate	5.1	0	5.000	0	102	43	142					

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

Page 16 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-R36648	SampT	ype: LC	s	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: LCSW	Batch	1D: R3	6648	R	RunNo: 36648					
Prep Date:	Analysis D	ate: 8/	17/2016	S	SeqNo: 1	135038	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
N-Nitrosodi-n-propylamine	4.2	0	5.000	0	84.0	46	140			
Pentachlorophenol	2.2	0	5.000	0	45.0	22	138			
Phenol	4.7	0	5.000	0	93.4	45	134			
Pyrene	5.0	0	5.000	0	100	45	138			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26894 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129407 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-26894 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129408 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0053 0.00020 0.005000 0 105 80 120

Sample ID 1608660-001BMS SampType: MS TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129410 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 113 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129411 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 114 75 125 0.473 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-27020 SampType: MBLK TestCode: MERCURY, TCLP

Client ID: PBW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132320 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Mercury ND 0.020

Sample ID LCS-27020 SampType: LCS TestCode: MERCURY, TCLP

Client ID: LCSW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132321 Units: mg/L

Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte PQL Qual

Mercury ND 0.020 0.005000 0 98.1 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Reporting Detection Limit

P Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26942 SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW Batch ID: 26942 RunNo: 36611

Prep Date: 8/11/2016	Analysis	Date: 8/	18/2016	5	SeqNo: 1	134113	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								
Strontium	ND	0.010								
Thallium	ND	0.050								
Zinc	ND	0.020								
Silica	ND	1.1								

Sample ID LCS-26942	SampT	ype: LC	S	Test	tCode: El	PA 6010B:	3: Total Recoverable Metals				
Client ID: LCSW	Batch	n ID: 26 9	942	R	tunNo: 3	6611					
Prep Date: 8/11/2016	Analysis D	ate: 8/	18/2016	S	seqNo: 1	134115	Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Aluminum	0.52	0.020	0.5000	0	103	80	120				
Arsenic	0.49	0.020	0.5000	0	97.6	80	120				
Barium	0.48	0.020	0.5000	0	95.1	80	120				
Beryllium	0.51	0.0030	0.5000	0	101	80	120				
Cadmium	0.47	0.0020	0.5000	0	94.9	80	120				
Calcium	50	1.0	50.00	0	99.0	80	120				
Chromium	0.47	0.0060	0.5000	0	94.7	80	120				
Cobalt	0.46	0.0060	0.5000	0	91.2	80	120				
Copper	0.47	0.0060	0.5000	0	94.2	80	120				
Iron	0.47	0.050	0.5000	0	93.1	80	120				
Lead	0.46	0.0050	0.5000	0	92.8	80	120				

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-26942	Samp	Type: LC	s	Tes	TestCode: EPA 6010B: Total Recoverable Metals							
Client ID: LCSW	Bato	h ID: 26	942	R	tunNo: 3	6611						
Prep Date: 8/11/2016	Analysis	Date: 8/	18/2016	S	SeqNo: 1134115			Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Magnesium	50	1.0	50.00	0	99.0	80	120					
Manganese	0.47	0.0020	0.5000	0	93.4	80	120					
Nickel	0.45	0.010	0.5000	0	90.3	80	120					
Potassium	48	1.0	50.00	0	96.0	80	120					
Selenium	0.50	0.050	0.5000	0	99.0	80	120					
Silver	0.097	0.0050	0.1000	0	96.8	80	120					
Sodium	49	1.0	50.00	0	97.0	80	120					
Strontium	0.11	0.010	0.1000	0	110	80	120					
Thallium	0.49	0.050	0.5000	0	97.0	80	120					
Zinc	0.46	0.020	0.5000	0	91.0	80	120					
Silica	5.4	1.1	5.350	0	101	80	120					

Sample ID	1608660-001BMS	Samp	Туре: М	3	TestCode: EPA 6010B: Total Recoverable Metals								
Client ID:	Wastewater Efflue	nt Bato	ch ID: 26	942	F	RunNo: 30	6611						
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	SeqNo: 1	134120	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Aluminum		0.79	0.020	0.5000	0.2561	106	75	125					
Arsenic		0.52	0.020	0.5000	0.03115	98.4	75	125					
Barium		0.48	0.020	0.5000	0.01539	93.1	75	125					
Beryllium		0.49	0.0030	0.5000	0.0002600	97.2	75	125					
Cadmium		0.47	0.0020	0.5000	0	93.5	75	125					
Chromium		0.46	0.0060	0.5000	0	91.1	75	125					
Cobalt		0.45	0.0060	0.5000	0.002780	89.5	75	125					
Copper		0.51	0.0060	0.5000	0	101	75	125					
Lead		0.45	0.0050	0.5000	0	89.7	75	125					
Magnesium		90	1.0	50.00	41.34	97.7	75	125					
Manganese		0.61	0.0020	0.5000	0.1524	91.0	75	125					
Nickel		0.45	0.010	0.5000	0.01016	88.2	75	125					
Selenium		0.52	0.050	0.5000	0.03028	97.3	75	125					
Silver		0.097	0.0050	0.1000	0	97.3	75	125					
Thallium		0.48	0.050	0.5000	0	95.8	75	125					
Zinc		0.47	0.020	0.5000	0.02456	88.1	75	125					

Sample ID	1608660-001BMSD	SampType:	MSD	Tes	tCode: El	PA 6010B:	Total Recover	able Meta	als	
Client ID:	Wastewater Effluent	Batch ID:	26942	F	RunNo: 3	6611				
Prep Date:	8/11/2016 A	nalysis Date:	8/18/2016	S	SeqNo: 1	134122	Units: mg/L			
Analyte	1	Result PC	QL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.80 0.0	0.5000	0.2561	108	75	125	1.20	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID	1608660-001BMS	D Samp	Туре: М\$	SD	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Wastewater Efflu	R	RunNo: 36611								
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	SeqNo: 1134122					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.54	0.020	0.5000	0.03115	102	75	125	3.44	20	
Barium		0.48	0.020	0.5000	0.01539	93.8	75	125	0.725	20	
Beryllium		0.49	0.0030	0.5000	0.0002600	98.0	75	125	0.895	20	
Cadmium		0.48	0.0020	0.5000	0	95.7	75	125	2.34	20	
Chromium		0.47	0.0060	0.5000	0	93.8	75	125	2.88	20	
Cobalt		0.46	0.0060	0.5000	0.002780	92.2	75	125	2.97	20	
Copper		0.51	0.0060	0.5000	0	102	75	125	1.08	20	
Lead		0.46	0.0050	0.5000	0	92.1	75	125	2.73	20	
Magnesium		91	1.0	50.00	41.34	98.8	75	125	0.587	20	
Manganese		0.61	0.0020	0.5000	0.1524	91.8	75	125	0.656	20	
Nickel		0.46	0.010	0.5000	0.01016	90.5	75	125	2.44	20	
Selenium		0.52	0.050	0.5000	0.03028	97.8	75	125	0.514	20	
Silver		0.097	0.0050	0.1000	0	97.0	75	125	0.216	20	
Thallium		0.48	0.050	0.5000	0	95.2	75	125	0.572	20	
Zinc		0.48	0.020	0.5000	0.02456	90.6	75	125	2.56	20	
Sample ID	1608660-001BMS	Samp	Туре: М\$	3	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Wastewater Efflu	ent Bato	ch ID: 26	942	RunNo: 36611						
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	seqNo: 1	134131	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.9	75	125	72111		
Sample ID	1608660-001BMS	D Samo	Type: MS	SD.	Tes	Code: FI	PA 6010B- '	Total Recove	rable Meta	als	
Client ID:	Wastewater Efflu		th ID: 26			tunNo: 3		Total Roocro	abio iliot		
Prep Date:	8/11/2016	Analysis	∪ate: 8/	18/2016	5	SeqNo: 1	134132	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.4	75	125	0.257	20	
Sample ID	MB-26942	Samp	Туре: МЕ	BLK	Tes	Code: El	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	PBW				R	RunNo: 36628					

Qualifiers:

Analyte

Antimony

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix

Prep Date: 8/11/2016

H Holding times for preparation or analysis exceeded

Analysis Date: 8/19/2016

PQL

0.050

Result

ND

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits

SeqNo: 1134578

SPK value SPK Ref Val %REC LowLimit

Units: mg/L

HighLimit

%RPD

- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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RPDLimit

Qual

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID LCS-26942 SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134579 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Antimony 0.49 0.050 0.5000 97.9 80 120 0

Sample ID 1608660-001BMS SampType: MS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Wastewater Effluent Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134583 Units: mg/L

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Antimony 0.49 0.050 0.5000 0 97.2 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals

Client ID: **Wastewater Effluent** Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134584 Units: mg/L

Result **PQL** SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual Analyte LowLimit

Antimony 0.49 0.050 0.5000 0 98.5 75 125 1.33 20

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

ND

ND

ND

ND

ND

0.0020

0.010

0.050

0.0050

0.050

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26961 SampType: MBLK TestCode: EPA 6010B: TCLP Metals Client ID: **PBW** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130431 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.020 Aluminum Antimony ND 0.050 Arsenic ND 0.020 Barium ND 0.020 Beryllium ND 0.0030 Cadmium ND 0.0020 Chromium ND 0.0060 ND 0.0060 Cobalt Copper ND 0.0060 Lead ND 0.0050

 Vanadium
 ND
 0.050

 Sample ID
 LCS-26961
 SampType: LCS
 TestCode: EPA 6010B: TCLP Metals

 Client ID:
 LCSW
 Batch ID: 26961
 RunNo: 36503

 Prep Date:
 8/12/2016
 Analysis Date: 8/15/2016
 SeqNo: 1130432
 Units: mg/L

 Analyte
 Result
 PQL
 SPK value
 SPK Ref Val
 %REC
 LowLimit
 HighLimit
 %RPD
 RPDLimit
 Qual

 Aluminum
 0.51
 0.020
 0.5000
 0
 98.3
 80
 120

 Antimony
 0.49
 0.050
 0.5000
 0
 98.3
 80
 120

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.51	0.020	0.5000	0	103	80	120			
Antimony	0.49	0.050	0.5000	0	98.3	80	120			
Arsenic	0.48	0.020	0.5000	0	95.2	80	120			
Barium	0.46	0.020	0.5000	0	93.0	80	120			
Beryllium	0.49	0.0030	0.5000	0	97.7	80	120			
Cadmium	0.47	0.0020	0.5000	0	94.7	80	120			
Chromium	0.47	0.0060	0.5000	0	93.1	80	120			
Cobalt	0.46	0.0060	0.5000	0	91.2	80	120			
Copper	0.48	0.0060	0.5000	0	95.2	80	120			
Lead	0.46	0.0050	0.5000	0	92.1	80	120			
Manganese	0.46	0.0020	0.5000	0	92.3	80	120			
Nickel	0.46	0.010	0.5000	0	92.0	80	120			
Selenium	0.49	0.050	0.5000	0	97.2	80	120			
Silver	0.096	0.0050	0.1000	0	95.6	80	120			
Thallium	0.47	0.050	0.5000	0	93.1	80	120			
Vanadium	0.49	0.050	0.5000	0	98.0	80	120			

Qualifiers:

Manganese

Nickel

Silver

Selenium

Thallium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMS SampType: MS TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36503

Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130536 Units: mg/L

Analysis	Date: 8/	15/2016	٤	seqNo: 1	130536	Units: mg/L			
Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
0.78	0.020	0.5000	0.2003	116	75	125			
0.50	0.050	0.5000	0	101	75	125			
0.53	0.020	0.5000	0.02818	101	75	125			
0.48	0.020	0.5000	0.01425	92.4	75	125			
0.49	0.0030	0.5000	0.0004400	97.1	75	125			
0.48	0.0020	0.5000	0	95.8	75	125			
0.46	0.0060	0.5000	0	92.3	75	125			
0.46	0.0060	0.5000	0.001460	91.1	75	125			
0.51	0.0060	0.5000	0	102	75	125			
0.46	0.0050	0.5000	0.003590	90.5	75	125			
0.61	0.0020	0.5000	0.1322	95.0	75	125			
0.47	0.010	0.5000	0.009620	92.8	75	125			
0.56	0.050	0.5000	0.03775	105	75	125			
0.098	0.0050	0.1000	0	97.9	75	125			
0.50	0.050	0.5000	0.006750	98.8	75	125			
	Result 0.78 0.50 0.53 0.48 0.49 0.46 0.46 0.51 0.46 0.61 0.47 0.56 0.098	Result PQL 0.78 0.020 0.50 0.050 0.53 0.020 0.48 0.020 0.49 0.0030 0.48 0.0020 0.46 0.0060 0.51 0.0060 0.46 0.0050 0.61 0.0020 0.47 0.010 0.56 0.050 0.098 0.0050	0.78 0.020 0.5000 0.50 0.050 0.5000 0.53 0.020 0.5000 0.48 0.020 0.5000 0.49 0.0030 0.5000 0.48 0.0020 0.5000 0.46 0.0060 0.5000 0.51 0.0060 0.5000 0.46 0.0050 0.5000 0.61 0.0020 0.5000 0.47 0.010 0.5000 0.56 0.050 0.5000 0.098 0.0050 0.1000	Result PQL SPK value SPK Ref Val 0.78 0.020 0.5000 0.2003 0.50 0.050 0.5000 0 0.53 0.020 0.5000 0.01425 0.48 0.020 0.5000 0.0004400 0.48 0.0020 0.5000 0 0.46 0.0060 0.5000 0 0.46 0.0060 0.5000 0.001460 0.51 0.0060 0.5000 0.001460 0.46 0.0050 0.5000 0.003590 0.61 0.0020 0.5000 0.01322 0.47 0.010 0.5000 0.009620 0.56 0.050 0.5000 0.03775 0.098 0.0050 0.1000 0	Result PQL SPK value SPK Ref Val %REC 0.78 0.020 0.5000 0.2003 116 0.50 0.050 0.5000 0 101 0.53 0.020 0.5000 0.02818 101 0.48 0.020 0.5000 0.01425 92.4 0.49 0.0030 0.5000 0.0004400 97.1 0.48 0.0020 0.5000 0 95.8 0.46 0.0060 0.5000 0 92.3 0.46 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.003590 90.5 0.61 0.0020 0.5000 0.003590 90.5 0.47 0.010 0.5000 0.009620 92.8 0.56 0.050 0.5000 0.03775 105 0.098 0.0050 0.1000 0 97.9	Result PQL SPK value SPK Ref Val %REC LowLimit 0.78 0.020 0.5000 0.2003 116 75 0.50 0.050 0.5000 0 101 75 0.53 0.020 0.5000 0.02818 101 75 0.48 0.020 0.5000 0.01425 92.4 75 0.49 0.0030 0.5000 0.0004400 97.1 75 0.48 0.0020 0.5000 0 95.8 75 0.46 0.0060 0.5000 0 92.3 75 0.46 0.0060 0.5000 0.001460 91.1 75 0.51 0.0060 0.5000 0 102 75 0.46 0.0050 0.5000 0 102 75 0.46 0.0050 0.5000 0.003599 90.5 75 0.61 0.0020 0.5000 0.1322 95.0 75 0.47 <t< td=""><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0.001460 91.1 75 125 0.51 0.0060 0.5000 0.003590 90.5 75 125 0.46 0.0050 0.5000 0.03590</td><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.46 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0.003590<</td><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.51 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0 102 75 125 0.46 0.0050 0.5000<!--</td--></td></t<>	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0.001460 91.1 75 125 0.51 0.0060 0.5000 0.003590 90.5 75 125 0.46 0.0050 0.5000 0.03590	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.46 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0.003590<	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.51 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0 102 75 125 0.46 0.0050 0.5000 </td

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals Client ID: **Wastewater Effluent** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130537 Units: mg/L %RPD SPK value SPK Ref Val %REC LowLimit HighLimit **RPDLimit** Analyte Result PQL Qual 0.79 0.020 0.5000 0.2003 118 75 125 1.17 20 Aluminum 0.47 0.050 0.5000 0 94.6 75 125 6.35 20 **Antimony** 0.5000 0.02818 99.4 75 Arsenic 0.53 0.020 125 1.25 20 0.5000 0.01425 93.4 75 Barium 0.48 0.020 125 1.05 20 Beryllium 0.49 0.0030 0.5000 0.0004400 97.9 75 125 0.828 20 95.9 Cadmium 0.48 0.0020 0.5000 75 125 0.169 20 Chromium 0.46 0.0060 0.5000 0 92.2 75 125 0.119 20 Cobalt 0.46 0.0060 0.5000 0.001460 91.6 75 125 0.583 20 20 104 75 Copper 0.52 0.0060 0.5000 125 1.52 0.46 0.0050 0.5000 0.003590 90.6 75 125 0.0438 20 Lead 0.62 0.0020 0.5000 97.0 75 20 Manganese 0.1322 125 1.70

Qualifiers:

Nickel

Silver

Selenium

Vanadium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

0.47

0.53

0.10

0.51

0.010

0.050

0.0050

0.050

0.5000

0.5000

0.1000

0.5000

0.009620

0.006750

0.03775

0

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

75

75

75

125

125

125

125

0.0190

6.15

2.01

1.05

E Value above quantitation range

92.8

97.9

99.8

99.9

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Project:	· ·	efining Co									
Sample ID	1608660-001CMS	SampT	уре: М	S	TestCode: EPA 6010B: TCLP Metals						
Client ID:	Wastewater Efflue	ent Batch	h ID: 26	961	F	RunNo: 3	6503				
Prep Date:	8/12/2016	Analysis D	Date: 8/	15/2016	5	SeqNo: 1	130575	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.54	0.25	0.5000	0	107	75	125	70.1.1		
Sample ID	1608660-001CMSI	D SampT	ype: M \$	SD	Tes	tCode: FI	PA 6010B- 1	TCI P Metals			
Client ID:	Wastewater Efflue	•	h ID: 26		TestCode: EPA 6010B: TCLP Metals RunNo: 36503						
Prep Date:	8/12/2016	Analysis D	Date: 8/	15/2016	9	SeqNo: 1	130576	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.50	0.25	0.5000	0	100	75	125	11.2	20	Quai
Sample ID	MR-26961	SamnT	ype: MI	RI K	Tes	tCode: FI	PΔ 6010R+ '	TCLP Metals			
Client ID:	PBW	•	n ID: 26			RunNo: 3		TOLI Metals			
Prep Date:		Analysis Date: 8/17/2016				SeqNo: 1		Units: mg/L			
	0/12/2010	•						J	0/ DDD	DDDI imit	01
Analyte Calcium		Result ND	PQL 1.0	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron		ND	0.050								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Sodium		ND	1.0								
Sample ID	LCS-26961	SampT	ype: LC	:s	TestCode: EPA 6010B: TCLP Metals						
Client ID:	LCSW	Batch	n ID: 26	961	F	RunNo: 3	6584				
Prep Date:	8/12/2016	Analysis D	Date: 8 /	17/2016	S	SeqNo: 1	132792	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		50	1.0	50.00	0	101	80	120			
Iron		0.50	0.050	0.5000	0	99.4	80	120			
Magnesium		50	1.0	50.00	0	99.7	80	120			
Potassium		48	1.0	50.00	0	97.0	80	120			
Sodium		49	1.0	50.00	0	98.4	80	120			
Sample ID	1608660-001CMS	SampT	уре: М	<u> </u>	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflue	ent Batch	n ID: 26	961	RunNo: 36584						
Prep Date:	8/12/2016	Analysis D	Date: 8	17/2016	S	SeqNo: 1	132798	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Magnesium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

90

1.0

50.00

35.08

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

125

E Value above quantitation range

110

J Analyte detected below quantitation limits

D Complemental Description

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

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22-Aug-16

Project:	3	ater Effluer										
Sample ID	1608660-001CMSI	D SampTy	/pe: M \$	SD	Tes	tCode: El	PA 6010B:	TCLP Metals				
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	RunNo: 36584							
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	S	SeqNo: 1	132799	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Magnesium		87	1.0	50.00	35.08	104	75	125	3.07	20		
Sample ID	1608660-001CMS	SampTy	/pe: M \$	3	Tes	tCode: El	PA 6010B:	TCLP Metals				
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	RunNo: 36584							
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	8	SeqNo: 1132804 Units: mg/L						
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Potassium		110	5.0	50.00	59.21	104	75	125				
Sample ID	1608660-001CMSI	S ampTy	/pe: M \$	SD	Tes	tCode: El	PA 6010B:	TCLP Metals				
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	F	RunNo: 3	6584					
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	S	SeqNo: 1	132805	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Potassium		110	5.0	50.00	59.21	93.6	75	125	4.76	20		
Sample ID	MB-26961	Tes	tCode: El	PA 6010B:	TCLP Metals							
Client ID:	PBW	Batch	ID: 26	961	RunNo: 36591							
Prep Date:	8/12/2016	Analysis Da	ate: 8/	18/2016	SeqNo: 1133361 Units: mg/L							
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		ND	0.020									
Sample ID	LCS-26961	SampT	/pe: LC	s	Tes	tCode: El	PA 6010B:	TCLP Metals				
Client ID:	LCSW	Batch	ID: 26	961	F	RunNo: 3	6591					
Prep Date:	8/12/2016	Analysis Da	ate: 8/	18/2016	8	SeqNo: 1	133362	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		0.47	0.020	0.5000	0	93.6	80	120				
						TestCode: EPA 6010B: TCLP Metals						
Sample ID	1608660-001CMS	SampT	/pe: M \$	3	Tes	tCode: El	PA 6010B:	TCLP Metals				
Sample ID Client ID:	1608660-001CMS Wastewater Efflue		/pe: M \$			tCode: El		TCLP Metals				
Client ID:			ID: 26	961	F		6591	TCLP Metals Units: mg/L				
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961 18/2016	F	RunNo: 3	6591		%RPD	RPDLimit	Qual	

Qualifiers:

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

Е Value above quantitation range

J

Analyte detected below quantitation limits

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36591

Prep Date: **8/12/2016** Analysis Date: **8/18/2016** SeqNo: **1133468** Units: **mg/L**

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Zinc 0.49 0.020 0.5000 0.02262 92.8 75 125 2.78 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: CYANIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135042 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Cyanide, Reactive ND 1.00

Sample ID LCS-R36648 SampType: LCS TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135043 Units: mg/L

Analyte **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Result Qual

Cyanide, Reactive 0.578 0.5000 0 116 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J

Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: SULFIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135045 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide ND 1.0

Sample ID LCS-R36648 SampType: LCS TestCode: SULFIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135046 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide 0.20 0.2000 0 100 70 130

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

That ye detected in the associated Method Blank

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID mb-1 SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131152 Units: mg/L CaCO3

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID Ics-1 SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131153 Units: mg/L CaCO3

Analyte SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Result PQL Qual

Total Alkalinity (as CaCO3) 79.40 20.00 80.00 0 99.2 110

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26968 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: **PBW** Batch ID: **26968** RunNo: **36519**

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130783 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids ND 20.0

Sample ID LCS-26968 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 26968 RunNo: 36519

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130784 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids 994 20.0 1000 0 99.4 80 120

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

. . . D

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO RÈFINING COM Work Order Number: 1608660 RcptNo: 1 Received by/date: Logged By: Lindsay Mangin 8/11/2016 9:05:00 AM Completed By: Lindsay Mangin 8/11/2016 10:45:24 AM Reviewed By: 08/11/16 Chain of Custody 1 Custody seals intact on sample bottles? Yes No 🗌 Not Present 2. Is Chain of Custody complete? No 🗌 Yes 🐼 Not Present 3 How was the sample delivered? Courier Log In 4. Was an attempt made to cool the samples? Yes 🗌 No ... NA 🛷 5. Were all samples received at a temperature of >0° C to 6.0°C No 🗌 NA 🜌 Yes 🗔 Sample(s) in proper container(s)? No 🗆 Yes 7. Sufficient sample volume for indicated test(s)? Yes 🐼 No 8. Are samples (except VOA and ONG) properly preserved? No \square Yes 9. Was preservative added to bottles? No 🐼 NA 🗌 Yes 📙 10.VOA vials have zero headspace? No VOA Vials Yes 🕏 No 🗀 11. Were any sample containers received broken? No 🛷 Yes # of preserved bottles checked 12. Does paperwork match bottle labels? Yes 🖈 No 🛄 for pH: (Note discrepancies on chain of custody) inless noted) Adjusted⁴ 13. Are matrices correctly identified on Chain of Custody? No [14 Is it clear what analyses were requested? No 🗌 Yes 15. Were all holding times able to be met? Checked by: Yes 🖈 No 🗌 (If no, notify customer for authorization.) Special Handling (if applicable) Yes 16. Was client notified of all discrepancies with this order? No 🗌 NA 🐼 Person Notified: Date: By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition Seal Intact | Seal No Seal Date Signed By 1.5 Good

ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 www.hallenvironmental.com Fax 505-345-4107 Analysis Request 1151 borleM 846 Method 1311 TCLP Metals, only I40 CFR Part Remarks: Send results to Robert Combs Ca, K, Mg, Na/40 CFR 136.3 × 7470 (see attached list 'Metals') Tel. 505-345-3975 Metals/SW-846 Mthd 6010, R,C,I/40 CFR part 261 see attached list 'SVOCs') SVOCs/SW-846 Method 8270D (see attached list 'VOCs') VOCs/SW-846 Method 8260C Cation/anion bal., Br, Eh/40 Specific Gravity, HCO3, CO3, CI, SO4, TDS, pH, cond., FI, 805 Robert Combs Waste Water Effluent 8-10-16 Brady Hubbard X Rush Preservative Neat/H2SO4 Project #: P.O. # 167796 Sample Temperature: HN03 Neat Neat Neat Project Manager: 건 Neat Project Name Container Type and # □ Standar Received by Received by Sampler: On Ice ო and ന N Ç Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Sample Request ID Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 □ Level 4 (Full Validation) Waste Water Effluent 8-10-16 CHAIN-UI-CHOICOLY DECOID Relinquished by: Bred, (L.SLA) Mailing Address: P.O. Box 159 Artesia email or Fax#: 575-746-5451 Matrix Client: Navajo Refining Co. Liquid Liquid Liquid Liquid Liquid Liquid Liguid Phone #: 575-748-3311 Time 8-10-16 4:00 10.55 10.55 10:55 10:55 10:55 10:55 10.55 NM 88211-0159 □ Other □ EDD (Type) QA/QC Package: □ Standard 8/10/16 8/10/16 8/10/16 8/10/16 Date 8/10/16 8/10/16 8/10/16

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

April 28, 2017

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: 2016 Effluent PL Release OrderNo.: 1704B56

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 8 sample(s) on 4/27/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 4/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: SP-1 Test 1

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-005
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.32	0.10	mg/L	1	4/27/2017 3:39:39 PM
Chloride	110	10	mg/L	20	4/27/2017 4:16:53 PM
Sulfate	410	50	* mg/L	20	4/27/2017 4:16:53 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	ND	0.050	mg/L	1	4/28/2017 4:02:23 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Lab Order **1704B56**Date Reported: **4/28/2017**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: SP-2 Test 2

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-006
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.55	0.10	mg/L	1	4/27/2017 4:29:18 PM
Chloride	91	10	mg/L	20	4/27/2017 4:41:43 PM
Sulfate	260	50	* mg/L	20	4/27/2017 4:41:43 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	ND	0.050	mg/L	1	4/28/2017 4:13:32 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 4/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: SP-3 Test 3

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-007
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Result **PQL Qual Units** DF **Date Analyzed** Analyses **EPA METHOD 300.0: ANIONS** Analyst: MRA Fluoride 0.62 0.10 1 4/27/2017 4:54:07 PM mg/L Chloride 0.50 4/27/2017 4:54:07 PM 3.5 mg/L 1 Sulfate ND 50 mg/L 20 4/27/2017 5:06:31 PM **EPA METHOD 6010B: SPLP METALS** Analyst: JLF 4/28/2017 4:15:03 PM Iron 3.6 0.050 mg/L 1

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Lab Order 1704B56

Hall Environmental Analysis Laboratory, Inc. Date Reported: 4/28/2017

CLIENT: Navajo Refining Company Client Sample ID: SP-3 Test 4

Project: 2016 Effluent PL Release **Collection Date:** 4/27/2017 8:00:00 AM Lab ID: 1704B56-008 **Matrix:** LEACHATE **Received Date:** 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.65	0.10	mg/L	1	4/27/2017 5:43:44 PM
Chloride	82	10	mg/L	20	4/27/2017 5:56:09 PM
Sulfate	64	50	mg/L	20	4/27/2017 5:56:09 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	0.25	0.050	mg/L	1	4/28/2017 4:16:09 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: Value exceeds Maximum Contaminant Level. D

Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample Diluted Due to Matrix

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

Analyte detected in the associated Method Blank

E Value above quantitation range

Analyte detected below quantitation limits Page 4 of 6 J

P Sample pH Not In Range

Reporting Detection Limit RL

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B56**

28-Apr-17

Client: Navajo Refining Company
Project: 2016 Effluent PL Release

Sample ID MB-SPLP 2996 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: PBW Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333857 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Fluoride
 ND
 0.10

 Chloride
 ND
 0.50

 Sulfate
 ND
 2.5

Sample ID LCS-SPLP 2996 SampType: Ics TestCode: EPA Method 300.0: Anions

Client ID: LCSW Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333858 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 97.7 Fluoride 0.49 0.10 0.5000 0 90 110 Chloride 4.7 0.50 5.000 0 94.7 90 110 Sulfate 2.5 10.00 0 100 90 110 10

Sample ID 1704B56-005AMS SampType: ms TestCode: EPA Method 300.0: Anions

Client ID: SP-1 Test 1 Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333860 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Fluoride 0.89 0.10 0.5000 0.3220 114 70.4 122

Sample ID 1704B56-005AMSD SampType: msd TestCode: EPA Method 300.0: Anions

Client ID: SP-1 Test 1 Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333861 Units: mg/L

%REC %RPD **RPDLimit** Analyte Result POI SPK value SPK Ref Val LowLimit HighLimit Qual Fluoride 0.89 0.10 0.5000 0.3220 114 70.4 0.0705 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 5 of 6

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B56

28-Apr-17

Client: Navajo Refining Company **Project:** 2016 Effluent PL Release

Sample ID MB-31484 SampType: MBLK TestCode: EPA Method 6010B: SPLP Metals

Client ID: **PBW** Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334411 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 0.050 Iron

Sample ID LCS-31484 SampType: LCS TestCode: EPA Method 6010B: SPLP Metals

Client ID: LCSW Batch ID: 31484 RunNo: 42444

Units: mg/L Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334412

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Iron 0.51 0.050 0.5000 0 101 120

Sample ID 1704B56-005BMSD SampType: MSD TestCode: EPA Method 6010B: SPLP Metals

Client ID: SP-1 Test 1 Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334415 Units: mg/L

SPK value SPK Ref Val %REC Analyte Result **PQL** LowLimit HighLimit %RPD **RPDLimit** Qual

0.50 0.050 0.5000 100 0.405 20 Iron

Sample ID 1704B56-005BMS SampType: MS TestCode: EPA Method 6010B: SPLP Metals

Client ID: Batch ID: 31484 RunNo: 42444 SP-1 Test 1

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334416 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC I owl imit HighLimit %RPD **RPDLimit** Qual

Iron 0.50 0.050 0.5000 0 101 75 125

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

P Reporting Detection Limit

Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

Page 6 of 6



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

NAVAJO REFINING CO Client Name: Work Order Number: 1704B56 RcptNo: 1 Received By: Erin Melendrez 4/26/2017 9:35:00 AM Completed By: **Ashley Gallegos** 4/26/2017 10:02:17 AM SRC 04/26/17 Reviewed By: Chain of Custody No 🗌 1. Custody seals intact on sample bottles? Yes Not Present 🗸 No 🗌 Yes 🗸 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In No 🗆 Yes 🗸 NA 🗌 4. Was an attempt made to cool the samples? 5. Were all samples received at a temperature of >0° C to 6.0°C NA 🗌 Yes 🔽 No 🗌 Yes 🗹 Sample(s) in proper container(s)? No 🗆 7. Sufficient sample volume for indicated test(s)? Yes 🗸 No 🗌 No 🗌 Yes 🗸 8. Are samples (except VOA and ONG) properly preserved? Yes No 🗹 NA 🗌 9. Was preservative added to bottles? No VOA Vials No 🗌 10.VOA vials have zero headspace? Yes Yes \square No 🗸 11. Were any sample containers received broken? # of preserved bottles checked 12. Does paperwork match bottle labels? Yes 🗸 No 🗌 for pH: (<2 or >12 unless noted) (Note discrepancies on chain of custody) Adjusted? Yes 🔽 No 🗆 13. Are matrices correctly identified on Chain of Custody? Yes 🗸 No 🗌 14. Is it clear what analyses were requested? 15. Were all holding times able to be met? Yes 🗹 No Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) 16. Was client notified of all discrepancies with this order? Yes No 🗀 NA 🔽 Person Notified: Date By Whom: Via: eMail Phone Fax Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No | Temp ºC | Condition Seal Intact | Seal No Seal Date 4.1 Good

10 10 10 10 10 10 10 10	Client: HollyFrontier Na	HollyFrontier Navajo Refining LLC	Standard	□ Rush X		HALI	HALL ENVIRONMENTAL ANALYSIS LABORATORY
Froject #: Project Manager: Rethert Combs Scott Denton Sampler: Project Manager: X Level 4 (Full Validation) Sampler: X Ves Dave Boyer L. Project Manager: A Level 4 (Full Validation) Sampler: Project Manager: A Level 4 (Full Validation) Sampler: Project Manager: A Level 4 (Full Validation) Sampler: A Level 4 (Full Validation) Sampler: A Level 4 (Full Validation) A Level 4 (Full Validati			Project Name	2016 Effluent	PL Release	www.ha	allenvironmental.com
Time Reinthorn Seminary Project Manager The Second State Project Manager Project Manager Project Manager Scott Denton		x 159				4901 Hawkins NE	- Albuquerque, NM 87109
Sample Sevel 4 (Full Validation) Sample Revert Combs Soot Denton	Artesia	, NM 88211-0159	Project #:			Tel. 505-345-3975	Fax 505-345-4107
Scott Denton Samples Samp		8-2718		PO: 231642			Ana
Time Reinhams by Sample Record of the Scott Device Sample Sam	Fax#:		Project Manag		Robert Combs		
Time Matrix Sample Request ID Container Preservative HEAL No. Collision Container Preservative HEAL No. Collision	Package: d	X Level 4 (Full Validation)			scott Denton		
Time Matrix Sample Request ID Container Preservative HEAL No. Co. 1365 Soil Sp-2 Test 2			12		Jave Boyer	Fe	
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	Time.	July pour					

I necessary, sar plas submitted to Hall Environmental may be subconfieded to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be planty on the ensiytical report.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Form C-141
Revised August 8, 2011

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

			Relea	se Notifica	tion	and Cor	rective Ac	tion				
					C	PERAT	OR		Initial	Report	\boxtimes	Final Report
				Refining LLC			bert Combs					
		St., Artesia,		10			No.: 575-746-53				~~~	
Facility Nat	ne: Navajo	Refining L	LC		F	Facility Typ	e: Petroleum Ro	efinery				
Surface Ow	ner: Navaj	jo Refining I	LC	Mineral C	wner N	/A			API No	. N/A		
				LOCA	ΓΙΟΝ	OF REL	EASE					
Unit Letter	Section	Township	Range	Feet from the	North/S	South Line	Feet from the	East/W	Vest Line	County		
	18	17S	27E									
			Lati	tude_32°50'5.6	6''N	Longitude	e_104°19'8.12'	'W				
				NATU	JRE O	F RELE	ASE					
Type of Rele	ase: Non-ha	azardous treat	ed wastew	ater effluent			Release: Est. 10		Volume F	Recovered	40 bbls	
						bbls	final est. approx.	40				
of the Artesi	a Refinery		peline app	roximately 5 mile	s east	08/09/16,		ce:	Date and 18:00	Hour of D	iscover	y: 08/09/16,
Was Immedi	ate Notice (Vec [No 🛛 Not Re	equired	If YES, To	Whom? onservation Divis	ion Sant	ta Fe Lef	t message	to Carl	Chavez
			168	J NO 🖂 NOTEC	quircu	NM Oil Co	onservation Divis	ion Arte	sia – Left r	nessage		
						NMED Ha	zardous Waste B	ureau – S	Spoke with	Leona Ts	innajini	nie
By Whom? Richard Orosco, Robert Combs						Date and F	Iour 08/09/16 21	:00, 8/10	0/16 10:00,	8/10/16 1	6:15	
Was a Watercourse Reached?						1	olume Impacting	the Wate	ercourse.			
☐ Yes ⊠ No						None						
If a Waterco	urse was Im	pacted, Descr	ibe Fully.	k								
Describe Car	use of Probl	em and Reme	dial Actio	n Taken.* Pipeli	ne leak v	vas discover	ed based on chan	ge in pip	eline flow/	pressure p	aramete	ers.
						down and in-line valves were blocked-in to minimize flow back. A cene to remove the released water which had accumulated in the im						
				e refinery wastew							Tediate	
		and Cleanup.			~	wastewater treatment unit. An inv			6.1		, ca	1 7
						he investigation results indicate that no further action						
		he attached let										
I hereby cert	ify that the	information g	iven above	e is true and comp	lete to th	ne best of my	knowledge and i	understai	nd that pur	suant to N	MOCD	rules and
regulations a	ill operators	are required t	o report a	nd/or file certain i	elease no	otifications a	nd perform corre	ctive act	ions for rel	eases whi	ch may	endanger
				ce of a C-141 repo								
				investigate and rotance of a C-141								
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Signature:		Mulz										
Printed Nam	e: Robert (Combs			1	Approved by	Environmental S	Specialis	t:			
						A 1 D	4		Danie at	Data		
Title: Enviro	nmentai Sp	ecialist	W.W. A	, , , , , , , , , , , , , , , , , , ,		Approval Da	ie.		Expiration	Date:		<u></u>
E-mail Addr	ess: <u>Rober</u>	t.Combs@ho	ollyfronti	er.com	(Conditions o	f Approval:			Attach	ied 🔲	
Date	5/23/17		Dhone: 5	75 746 5382								

^{*} Attach Additional Sheets If Necessary

Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>

Sent: Friday, May 19, 2017 12:26 PM

To: Chavez, Carl J, EMNRD

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Attachments: 2017-05-18 Follow up report for 2015 WW Effluent Release.pdf

Carl,

Please see attached for the 2015 effluent pipeline release (April 12, 2015) follow-up report. The 2016 release (August 9, 2016) Final C-141 and report will follow next week.

Please let me know if you have any questions or would like to discuss.

Thanks and have a good weekend,

Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Thursday, May 11, 2017 1:21 PM

To: Combs, Robert

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Robert:

End of May 2017 is fine.

Thank you.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, May 10, 2017 9:30 AM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us>; Denton, Scott < Scott.Denton@HollyFrontier.com>

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Hi Carl; on our last phone conversation on 4/21 we agreed to the end of May to provide the updates for the two events. We have the sample results and the consultants are currently preparing the write-ups. I can check with them on their status and possibly move them quicker if needed – please let me know.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, May 10, 2017 8:23 AM

To: Combs, Robert **Cc:** Griswold, Jim, EMNRD

Subject: FW: GW-28 Pipeline Release C-141s Due Today!

Robert:

The New Mexico Oil Conservation Division (OCD) has not received the updates on the pipeline releases that occurred in 2015 and 2016.

OCD had requested updates on the releases on or before May 5, 2017.

Thank you.

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May 18, 2017



Robert Combs Arsin Sahba HollyFrontier Navajo Refining LLC 510 East Main Street Artesia, New Mexico 88210

Soil Pile Sampling
April 12, 2015 Wastewater Pipeline Break near the Former
Evaporation Ponds Area
HollyFrontier Navajo Refining LLC – Artesia, New Mexico
Discharge Permit GW-028

Dear Robert:

Amec Foster Wheeler prepared a release response report that described investigation of the soil and shallow groundwater near a wastewater pipeline break that occurred near the former evaporation ponds located east of the HollyFrontier Navajo Refining LLC (Navajo) Refinery in Artesia, New Mexico. This investigation was performed according to the revised work plan submitted to the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) in October 2015. The release response report was submitted to OCD on July 28, 2016.

In November 2016, OCD requested that the soil that was excavated from the pipeline break area to allow repairs of the pipeline be sampled and analyzed. The request stated that three discrete (grab) soil samples be collected to be analyzed for the following:

- Volatile Organic Compounds (VOCs) by Method 8260
- ► Total Petroleum Hydrocarbons (TPH) by Method 8015 (extended range)
- Iron and Manganese by Method 6010
- Chloride, Fluoride, and Sulfate by Method 300

Three discrete soil samples were collected on April 25, 2017 from the stockpiled, excavated soil. The samples were submitted to Hall Environmental Analysis Laboratory, Inc. (Hall) for the requested analyses. Following initial review of the data, the three samples were additionally analyzed for iron using the synthetic precipitation leaching procedure (SPLP). A copy of the full laboratory report, including quality control data, is provided as Attachment A to this letter.

Robert Combs Arsin Sahba May 18, 2017 Page 2

The analytical results from the soil pile samples are provided in Table 1 along with the results of the soil samples collected during the initial investigation of the release area performed in May 2016. The analytical results presented in Table 1 were compared to the following standards:

- OCD Spill Guidance standards for TPH and benzene
- New Mexico Environment Department (NMED) soil screening levels (SSLs):
 - Cancer and Non-cancer residential exposure scenarios
 - Soil leaching to groundwater exposure scenarios, both risk-based and drinking water standard based, using a dilution attenuation factor (DAF) of 20
- Background threshold values (BTVs) calculated for soils in the vicinity of the nearby former evaporation ponds, approved by the NMED
- Water Quality Control Commission (WQCC) domestic water supply standard for iron (SPLP samples only)

The following is a summary of the comparison of the soil analytical results to the various screening standards:

- ► TPH was not detected in any of the soil pile samples. Samples collected during the 2016 investigation were either not detected or contained low concentrations of TPH well below the screening standards.
- VOCs were not detected in any of the soil pile samples nor the samples collected during the 2016 investigation.
- ▶ Anions (Chloride, Fluoride, and Sulfate) were detected in both the soil pile samples and the samples collected during the 2016 investigation. All reported concentrations of anions were below all of the screening standards.
- ▶ Iron was detected in the soil pile samples at concentrations above the BTV and above the DAF 20 SSL, but below the Residential SSL. The SPLP results indicated that potential leachate from the soil pile would not contain detectable iron, with a detection limit two orders of magnitude below the WQCC standard. The iron concentrations reported in the samples collected during the 2016 investigation ranged from below all of the screening standards to above the DAF 20 SSL but below both the BTV and the Residential SSL.
- Manganese was detected in the soil pile samples and the samples collected during the 2016 investigation at concentrations below all of the screening standards.

Thus, iron is the only constituent of concern that exceeds any of the screening standards. It should be noted that groundwater samples collected during the 2016 investigation contained iron

Robert Combs Arsin Sahba May 18, 2017 Page 3

at a concentration well below the screening standard for "domestic water supply" for iron, as listed in the WQCC regulations (New Mexico Administrative Code 20.6.2.3103.b). This empirical data and the SPLP results indicate that iron does not pose a threat to the shallow groundwater.

We believe that the iron detected in the soil pile does not present a human health risk if left in place.

If you have any questions or comments, please feel free to contact me at 713-929-5674 or 713-249-8548.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Pamela R. Krueger Senior Associate

Pa 0.21

Enclosures:

Table 1 – Soil Analytical Results – 2015 Wastewater Line Break Attachment A – Analytical Report for Soil Pile Samples



TABLE 1

Table 1 - Soil Analytical Results - 2015 Wastewater Line Break

HollyFrontier Navajo Refining, LLC - Artesia, New Mexico

							Location:	South Pile (Sample 1)	Center Pile (Sample 2)	North Pile (Sample 3)	-	rmw-wwL	1		TM	N-WWL2	
						Sample D	Depth (ft bgs):	-	-	-	1	5	12	1	5		12 (Duplicate)
							Sample Date:	4/25/2017	4/25/2017	4/25/2017	05/10/2016	05/10/2016		05/10/2016	05/10/2016	05/10/2016	05/10/2016
Analyte	OCD Spill Guidance	Former EP BTV	Res SSL, Cancer			DAF 20 SSL, MCL-Based	WQCC Domestic										
TPH (mg/kg)																П	
Gasoline Range Organics	1.00E+02			1.00E+03				<4.0	<4.4	<3.6	< 0.108	< 0.108	< 0.108	0.255	< 0.108	< 0.108	< 0.108
Diesel Range Organics	1.00E+02			1.00E+03		2.0E+04		<9.6	<9.8	<9.6	7.31	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
Motor Oil Range Organic	1.00E+02			1.00E+03		2.0E+04		<48	<49	<48	3.15	< 0.274	< 0.274	0.687	< 0.274	< 0.274	< 0.274
Metals (mg/kg)											0110						
Iron		1.73E+04		5.48E+04	6.96E+03			18,000	18,000	19,000	12,200	7,850	2,710	10,500	5,580	2,880	3,950
Manganese		4.88E+02		1.05E+04	2.63E+03			430	360	440	388	162	65	344	71	80	95
Metals by SPLP (mg/L)				1	1												
Iron							1.00E+00	< 0.05	< 0.05	< 0.05							
Anions (mg/kg)				L		•											
Chloride		5.26E+03		1.88E+07				1,200	1,200	330	1,730	1,070	1,690	113	712	712	899
Fluoride		1.79E+01		4.69E+03				8.9	11	11	5.61	16.1	11.8	4.56	15.8	8.01	11.2
Sulfate		2.16E+04						8,200	8,100	7,000	7,580	18,300	18,300	2,590	18,300	17,200	18,200
VOCs (mg/kg)					•												
Benzene	1.00E+01		1.77E+01	1.14E+02	3.80E-02	4.18E-02		<0.020	<0.022	<0.018	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135
Toluene				5.22E+03	1.21E+01	1.11E+01		<0.040	<0.044	<0.036	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00148
Ethylbenzene			7.45E+01	3.92E+03	2.64E-01	1.23E+01		<0.040	<0.044	< 0.036	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148
1,2-Dichloroethane			8.25E+00	5.52E+01	8.14E-03	2.38E-02		< 0.040	<0.044	< 0.036		-					
1,2-Dibromoethane			6.68E-01	1.34E+02	3.52E-04	2.36E-04		< 0.040	<0.044	< 0.036		•					
Carbon Disulfide				1.54E+03	4.42E+00			<0.40	<0.44	<0.36							
Chloroform			5.85E+00	3.04E+02	1.09E-02			<0.040	<0.044	<0.036							
1,1-Dichloroethane			7.79E+01	1.56E+04	1.36E-01			<0.040	<0.044	<0.036							
1,1-Dichloroethene				4.36E+02	1.95E+00	4.79E-02		<0.040	<0.044	<0.036							
Methylene chloride			7.66E+02	4.09E+02	4.71E-01	2.21E-02		<0.12	<0.13	<0.11							
1,1,2,2-Tetrachloroethane			7.93E+00	1.56E+03	4.81E-03			<0.040	<0.044	<0.036							
Tetrachloroethene			3.35E+02	1.10E+02	3.21E-01	3.98E-02		<0.040	<0.044	<0.036							
1,1,1-Trichloroethane				1.43E+04	5.11E+01	1.28E+00		<0.040	<0.044	<0.036							
1,1,2-Trichloroethane			1.86E+01	2.59E+00	2.23E-03	2.68E-02		<0.040	<0.044	<0.036							
Trichloroethene			1.54E+01	6.72E+00	1.61E-02	3.10E-02		<0.040	<0.044	<0.036							
Vinyl chloride			7.41E-01	1.13E+02	2.17E-03	1.34E-02		<0.040	<0.044	<0.036							
Xylene, total				8.63E+02	2.98E+00	1.54E+02		<0.080	<0.087	<0.073	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349

Notes:

< X = result not detected with a detection limit of X

Values shown in italics with green highlight exceed the BTV and DAF 20 SSL but are below the Res SSL Values shown in regular font with blue highlight exceed the DAF 20 SSL but are below the Res SSL and BTV

Definitions

- = sample depth does not apply
- -- = sample was not analyzed for this constituent
- --- = no standard available from this source or for this pathway

BTV = Background Threshold Value

DAF 20 = Soil Leaching to Groundwater Exposure Scenario, with Dilution Attenuation Factor = 20

EP = Evaporation Ponds

ft bgs = feet below ground surface

MCL = Maximum Contaminant Levelfor drinking water

Definitions (continued)

mg/kg = milligrams per kilogram

mg/L = milligrams per Liter

NMAC = New Mexico Administrative Code

NMED = New Mexico Environment Department

OCD = Oil Conservation Division

Res = Residential exposure scenario

SSL = Soil Screening Level from NMED risk assessment guidance, March 2017

TPH = Total Petroleum Hydrocarbons

WQCC Domestic = Water Quality Control Commission limit for domestic water supply (NMAC 20.6.2.3103.B)



ATTACHMENT A



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

May 17, 2017

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: 2015 Effluent PL Release OrderNo.: 1704B58

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 6 sample(s) on 5/12/2017 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued April 28, 2017.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT:Navajo Refining CompanyClient Sample ID: South Pile Sample 1Project:2015 Effluent PL ReleaseCollection Date: 4/25/2017 11:20:00 AMLab ID:1704B58-001Matrix: SOILReceived Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS	3			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6	mg/Kg	1	4/26/2017 2:07:57 PM
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	4/26/2017 2:07:57 PM
Surr: DNOP	104	70-130	%Rec	1	4/26/2017 2:07:57 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	8.9	0.30	mg/Kg	1	4/26/2017 1:21:41 PM
Chloride	1200	150	mg/Kg	100	4/26/2017 2:36:09 PM
Sulfate	8200	150	mg/Kg	100	4/26/2017 2:36:09 PM
EPA METHOD 6010B: SOIL METALS	3				Analyst: MED
Iron	18000	250	mg/Kg	100	4/27/2017 10:06:50 AM
Manganese	430	0.51	mg/Kg	5	4/27/2017 10:08:11 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.020	mg/Kg	1	4/26/2017 11:34:00 AM
Toluene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Ethylbenzene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,2-Dichloroethane (EDC)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,2-Dibromoethane (EDB)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Carbon disulfide	ND	0.40	mg/Kg	1	4/26/2017 11:34:00 AM
Chloroform	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1-Dichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1-Dichloroethene	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Methylene chloride	ND	0.12	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,2,2-Tetrachloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Tetrachloroethene (PCE)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,1-Trichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
1,1,2-Trichloroethane	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Trichloroethene (TCE)	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Vinyl chloride	ND	0.040	mg/Kg	1	4/26/2017 11:34:00 AM
Xylenes, Total	ND	0.080	mg/Kg	1	4/26/2017 11:34:00 AM
Surr: Dibromofluoromethane	98.1	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: 1,2-Dichloroethane-d4	91.0	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 11:34:00 AM
Surr: 4-Bromofluorobenzene	110	70-130	%Rec	1	4/26/2017 11:34:00 AM
EPA METHOD 8015D MOD: GASOL	NE RANGE				Analyst: AG
Gasoline Range Organics (GRO)	ND	4.0	mg/Kg	1	4/26/2017 11:34:00 AM
Surr: BFB	94.7	70-130	%Rec	1	4/26/2017 11:34:00 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Center Pile Sample 2

 Project:
 2015 Effluent PL Release
 Collection Date: 4/25/2017 11:25:00 AM

 Lab ID:
 1704B58-002
 Matrix: SOIL
 Received Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS	3			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	4/26/2017 2:30:04 PM
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	4/26/2017 2:30:04 PM
Surr: DNOP	99.0	70-130	%Rec	1	4/26/2017 2:30:04 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	11	0.30	mg/Kg	1	4/26/2017 1:46:30 PM
Chloride	1200	150	mg/Kg	100	4/26/2017 2:48:34 PM
Sulfate	8100	150	mg/Kg	100	4/26/2017 2:48:34 PM
EPA METHOD 6010B: SOIL METALS	6				Analyst: MED
Iron	18000	250	mg/Kg	100	4/27/2017 10:09:33 AM
Manganese	360	0.50	mg/Kg	5	4/27/2017 10:10:54 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.022	mg/Kg	1	4/26/2017 12:03:19 PM
Toluene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Ethylbenzene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,2-Dichloroethane (EDC)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,2-Dibromoethane (EDB)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Carbon disulfide	ND	0.44	mg/Kg	1	4/26/2017 12:03:19 PM
Chloroform	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1-Dichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1-Dichloroethene	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Methylene chloride	ND	0.13	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,2,2-Tetrachloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Tetrachloroethene (PCE)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,1-Trichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
1,1,2-Trichloroethane	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Trichloroethene (TCE)	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Vinyl chloride	ND	0.044	mg/Kg	1	4/26/2017 12:03:19 PM
Xylenes, Total	ND	0.087	mg/Kg	1	4/26/2017 12:03:19 PM
Surr: Dibromofluoromethane	100	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: 1,2-Dichloroethane-d4	85.3	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 12:03:19 PM
Surr: 4-Bromofluorobenzene	107	70-130	%Rec	1	4/26/2017 12:03:19 PM
EPA METHOD 8015D MOD: GASOLI	NE RANGE				Analyst: AG
Gasoline Range Organics (GRO)	ND	4.4	mg/Kg	1	4/26/2017 12:03:19 PM
Surr: BFB	94.4	70-130	%Rec	1	4/26/2017 12:03:19 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 5/17/2017

CLIENT:Navajo Refining CompanyClient Sample ID: North Pile Sample 3Project:2015 Effluent PL ReleaseCollection Date: 4/25/2017 11:30:00 AMLab ID:1704B58-003Matrix: SOILReceived Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RA	NGE ORGANICS				Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6	mg/Kg	1	4/26/2017 2:52:19 PM
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	4/26/2017 2:52:19 PM
Surr: DNOP	100	70-130	%Rec	1	4/26/2017 2:52:19 PM
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	11	0.30	mg/Kg	1	4/26/2017 2:11:20 PM
Chloride	330	30	mg/Kg	20	4/26/2017 2:23:44 PM
Sulfate	7000	150	mg/Kg	100	4/26/2017 3:25:47 PM
EPA METHOD 6010B: SOIL METALS	5				Analyst: MED
Iron	19000	250	mg/Kg	100	4/27/2017 10:12:16 AM
Manganese	440	0.50	mg/Kg	5	4/27/2017 10:13:38 AM
EPA METHOD 8260B: VOLATILES					Analyst: AG
Benzene	ND	0.018	mg/Kg	1	4/26/2017 12:32:58 PM
Toluene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Ethylbenzene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,2-Dichloroethane (EDC)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,2-Dibromoethane (EDB)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Carbon disulfide	ND	0.36	mg/Kg	1	4/26/2017 12:32:58 PM
Chloroform	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1-Dichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1-Dichloroethene	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Methylene chloride	ND	0.11	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,2,2-Tetrachloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Tetrachloroethene (PCE)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,1-Trichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
1,1,2-Trichloroethane	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Trichloroethene (TCE)	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Vinyl chloride	ND	0.036	mg/Kg	1	4/26/2017 12:32:58 PM
Xylenes, Total	ND	0.073	mg/Kg	1	4/26/2017 12:32:58 PM
Surr: Dibromofluoromethane	101	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: 1,2-Dichloroethane-d4	90.6	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: Toluene-d8	108	70-130	%Rec	1	4/26/2017 12:32:58 PM
Surr: 4-Bromofluorobenzene	110	70-130	%Rec	1	4/26/2017 12:32:58 PM
EPA METHOD 8015D MOD: GASOLI	NE RANGE				Analyst: AG
Gasoline Range Organics (GRO)	ND	3.6	mg/Kg	1	4/26/2017 12:32:58 PM
Surr: BFB	95.0	70-130	%Rec	1	4/26/2017 12:32:58 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Lab Order 1704B58

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: South Pile Sample 1

 Project:
 2015 Effluent PL Release
 Collection Date: 5/12/2017 8:00:00 AM

 Lab ID:
 1704B58-004
 Matrix: LEACHATE
 Received Date: 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qua	ıl Units	DF	Date Analyzed
EPA METHOD 6010B: SPLP METALS					Analyst: MED
Iron	ND	0.050	mg/L	1	5/17/2017 8:35:53 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 13
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Lab Order **1704B58**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 5/17/2017

CLIENT: Navajo Refining Company Client Sample ID: Center Pile Sample 2

Project: 2015 Effluent PL Release Collection Date: 5/12/2017 8:00:00 AM

Lab ID: 1704B58-005 Matrix: LEACHATE Received Date: 5/12/2017 8:40:00 AM

Applying POL Ovel Units DE Date Applying

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 6010B: SPLP METALS					Analyst: MED
Iron	ND	0.050	mg/L	1	5/17/2017 8:41:45 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: * Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits Page 5 of 13

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Lab Order 1704B58

Date Reported: 5/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company **Client Sample ID:** North Pile Sample 3

Project: 2015 Effluent PL Release **Collection Date:** 5/12/2017 8:00:00 AM Lab ID: 1704B58-006 **Matrix:** LEACHATE **Received Date:** 5/12/2017 8:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 6010B: SPLP METALS					Analyst: MED
Iron	ND	0.050	mg/L	1	5/17/2017 8:43:41 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: Value exceeds Maximum Contaminant Level. D

Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample Diluted Due to Matrix

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

Analyte detected in the associated Method Blank

E Value above quantitation range

Analyte detected below quantitation limits Page 6 of 13 J

P Sample pH Not In Range

Reporting Detection Limit RL

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID MB-31441 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: PBS Batch ID: 31441 RunNo: 42386

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1333287 Units: mg/Kg

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Fluoride
 ND
 0.30

 Chloride
 ND
 1.5

 Sulfate
 ND
 1.5

Sample ID LCS-31441 SampType: Ics TestCode: EPA Method 300.0: Anions

Client ID: LCSS Batch ID: 31441 RunNo: 42386

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1333288 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 0.30 0 100 90 Fluoride 1.5 1.500 110 Chloride 15 1.5 15.00 0 97.7 90 110 29 1.5 30.00 0 98.0 90 110 Sulfate

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 7 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID LCS-31439 SampType: LCS TestCode: EPA Method 8015M/D: Diesel Range Organics Client ID: LCSS Batch ID: 31439 RunNo: 42363

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1332305 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Diesel Range Organics (DRO) 10 42 50.00 0 83.8 63.8 116

Surr: DNOP 5.000 86.0 4.3 70 130

TestCode: EPA Method 8015M/D: Diesel Range Organics Sample ID MB-31439 SampType: MBLK

Batch ID: 31439 Client ID: PBS RunNo: 42363

Prep Date: 4/26/2017 Analysis Date: 4/26/2017 SeqNo: 1332306 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Diesel Range Organics (DRO) ND 10 Motor Oil Range Organics (MRO) ND 50

Surr: DNOP 8.1 10.00 80.6 70 130

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Page 8 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID rb	Samp1	уре: МЕ	BLK	TestCode: EPA Method 8260B: Volatiles							
Client ID: PBS	Batch ID: R42377			F	RunNo: 4	2377					
Prep Date:	Analysis Date: 4/26/2017			\$	SeqNo: 1	332328	Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	ND	0.025									
Toluene	ND	0.050									
Ethylbenzene	ND	0.050									
1,2-Dichloroethane (EDC)	ND	0.050									
1,2-Dibromoethane (EDB)	ND	0.050									
Carbon disulfide	ND	0.50									
Chloroform	ND	0.050									
1,1-Dichloroethane	ND	0.050									
1,1-Dichloroethene	ND	0.050									
Methylene chloride	ND	0.15									
1,1,2,2-Tetrachloroethane	ND	0.050									
Tetrachloroethene (PCE)	ND	0.050									
1,1,1-Trichloroethane	ND	0.050									
1,1,2-Trichloroethane	ND	0.050									
Trichloroethene (TCE)	ND	0.050									
Vinyl chloride	ND	0.050									
Xylenes, Total	ND	0.10									
Surr: Dibromofluoromethane	0.53		0.5000		106	70	130				
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		97.1	70	130				
Surr: Toluene-d8	0.50		0.5000		101	70	130				
Surr: 4-Bromofluorobenzene	0.54		0.5000		108	70	130				

Sample ID 100ng Ics	SampType: LCS Batch ID: R42377 Analysis Date: 4/26/2017			Tes	tCode: E					
Client ID: LCSS				RunNo: 42377						
Prep Date:				5	SeqNo: 1	332329	Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.025	1.000	0	119	70	130			
Toluene	1.1	0.050	1.000	0	114	70	130			
1,1-Dichloroethene	1.2	0.050	1.000	0	119	72	146			
Trichloroethene (TCE)	1.1	0.050	1.000	0	113	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		91.9	70	130			
Surr: Toluene-d8	0.48		0.5000		96.3	70	130			
Surr: 4-Bromofluorobenzene	0.56		0.5000		113	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 9 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B58**

17-May-17

Client: Navajo Refining Company
Project: 2015 Effluent PL Release

Sample ID 1704b58-002ams SampType: MS TestCode: EPA Method 8260B: Volatiles

Client ID: Center Pile Sample Batch ID: R42377 RunNo: 42377

Prep Date: Analysis Date: 4/26/2017 SeqNo: 1332784 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.022	0.8726	0	108	61.9	146			
Toluene	1.1	0.044	0.8726	0.02386	120	70	130			
1,1-Dichloroethene	0.98	0.044	0.8726	0	113	37.1	170			
Trichloroethene (TCE)	0.87	0.044	0.8726	0	99.2	49.8	150			
Surr: Dibromofluoromethane	0.41		0.4363		95.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.38		0.4363		87.4	70	130			
Surr: Toluene-d8	0.46		0.4363		105	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.4363		106	70	130			

Sample ID 1704b58-002amsd SampType: MSD TestCode: EPA Method 8260B: Volatiles
Client ID: Center Pile Sample Batch ID: R42377 RunNo: 42377

Prep Date: Analysis Date: 4/26/2017 SeqNo: 1332785 Units: mq/Kq

Tiep Date.	Allalysis Date. 4/20/2011			•	eqivo. I	332763	Office. Hig/F	.g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.022	0.8726	0	99.7	61.9	146	7.73	20	
Toluene	0.99	0.044	0.8726	0.02386	111	70	130	7.09	20	
1,1-Dichloroethene	0.92	0.044	0.8726	0	105	37.1	170	6.93	20	
Trichloroethene (TCE)	0.85	0.044	0.8726	0	97.5	49.8	150	1.71	20	
Surr: Dibromofluoromethane	0.41		0.4363		93.8	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.37		0.4363		85.8	70	130	0	0	
Surr: Toluene-d8	0.46		0.4363		105	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.47		0.4363		108	70	130	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 10 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID MB-31451 SampType: MBLK TestCode: EPA Method 6010B: Soil Metals

Client ID: **PBS** Batch ID: 31451 RunNo: 42402

Prep Date: 4/26/2017 Analysis Date: 4/27/2017 SeqNo: 1333071 Units: mg/Kg

Analyte **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 2.5 Iron ND Manganese 0.10

Sample ID LCS-31451 SampType: LCS TestCode: EPA Method 6010B: Soil Metals

RunNo: 42402 Client ID: LCSS Batch ID: 31451

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333072 4/26/2017 Units: mg/Kg

LowLimit Analyte Result **PQL** SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual 26 2.5 25.00 0 105 80 120 25 25.00 0 101 80 0.10 120 Manganese

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Page 11 of 13

Hall Environmental Analysis Laboratory, Inc.

WO#: 1704B58

17-May-17

Client: Navajo Refining Company **Project:** 2015 Effluent PL Release

Sample ID MB-31758 SampType: MBLK TestCode: EPA Method 6010B: SPLP Metals

Client ID: **PBW** Batch ID: 31758 RunNo: 42833

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347165 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 0.050 Iron

Sample ID LCS-31758 SampType: LCS TestCode: EPA Method 6010B: SPLP Metals

Client ID: LCSW Batch ID: 31758 RunNo: 42833

Units: mg/L Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347166

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Iron 0.53 0.050 0.5000 0 106 120

Sample ID 1704B58-004AMS SampType: MS TestCode: EPA Method 6010B: SPLP Metals

Client ID: South Pile Sample 1 Batch ID: 31758 RunNo: 42833

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347168 Units: mg/L

%REC Analyte **PQL** SPK value SPK Ref Val HighLimit %RPD **RPDLimit** Qual Result LowLimit

0.53 0.050 0.5000 106 Iron

Sample ID 1704B58-004AMSD SampType: MSD TestCode: EPA Method 6010B: SPLP Metals

Client ID: Batch ID: 31758 RunNo: 42833 South Pile Sample 1

Prep Date: 5/16/2017 Analysis Date: 5/17/2017 SeqNo: 1347169 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC I owl imit HighLimit %RPD **RPDLimit** Qual

Iron 0.52 0.050 0.5000 0 104 75 125 1.93 20

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Page 12 of 13

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

Client:

Project:

Analyte

Surr: BFB

Client ID:

Prep Date:

Surr: BFB

Analyte

Sample ID rb

Gasoline Range Organics (GRO)

PBS

Gasoline Range Organics (GRO)

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

2015 Effluent PL Release

Result

27

520

Result

ND

500

SampType: MBLK

Batch ID: A42377

Analysis Date: 4/26/2017

PQL

5.0

WO#: **1704B58**

RPDLimit

RPDLimit

Page 13 of 13

Qual

Qual

%RPD

%RPD

17-May-17

Sample ID 1704b58-001am	Sample ID 1704b58-001ams SampType: MS						TestCode: EPA Method 8015D Mod: Gasoline Range							
Client ID: South Pile Sam	ple 1 Batch	1D: A4	2377	RunNo: 42377										
Prep Date: Analysis Date: 4/26/2017				5	SeqNo: 1332780			Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
Gasoline Range Organics (GRO)	25	4.0	20.03	0	124	63.2	128							
Surr: BFB	370		400.6		93.1	70	130							
Sample ID 1704b58-001amsd SampType: MSD TestCode: EPA Method 8015D Mod: Gasoline Range														
Client ID: South Pile Sam	ple 1 Batch	1D: A4	2377	F	RunNo: 4	2377								
Prep Date:	Analysis D	ate: 4/	26/2017	5	SeqNo: 1	332781	Units: mg/k	(g						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
Gasoline Range Organics (GRO)	23	4.0	20.03	0	116	63.2	128	6.14	20					
Surr: BFB	390		400.6		96.8	70	130	0	0					
Sample ID 2.5ug gro lcs	SampT	ype: LC	s	Tes	tCode: El	PA Method	8015D Mod:	Gasoline	Range					
Client ID: LCSS	ID: LCSS Batch ID: A42377				RunNo: 4	2377								
Prep Date:	Analysis D						Units: mg/k							

%REC

106

104

RunNo: 42377

100

SeqNo: 1332783

LowLimit

LowLimit

70

70

70

TestCode: EPA Method 8015D Mod: Gasoline Range

HighLimit

130

130

Units: mg/Kg

130

HighLimit

SPK value SPK Ref Val

SPK value SPK Ref Val %REC

25.00

500.0

500.0

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

yuamiers.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Sample Log-In Check List

Website: www.hallenvironmental.com NAVAJO REFINING CO Client Name: Work Order Number: 1704B58 RcptNo: 1 am Ih Received By: Erin Melendrez 4/26/2017 9:35:00 AM Completed By: **Anne Thorne** 4/26/2017 10:10:47 AM 04/26/17 Reviewed By: Chain of Custody Yes 🗔 No 🗌 Not Present 🗹 1. Custody seals intact on sample bottles? No 🗌 Yes 🗸 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In No 🗌 4. Was an attempt made to cool the samples? Yes 🔽 NA 🗌 No □ 5. Were all samples received at a temperature of >0° C to 6.0°C Yes 🔽 NA 🗌 No 🗌 Yes 🔽 Sample(s) in proper container(s)? No 🗌 Yes 🗸 7. Sufficient sample volume for indicated test(s)? No 🗔 8. Are samples (except VOA and ONG) properly preserved? Yes 🗹 9. Was preservative added to bottles? Yes 🗌 No 🗹 NA 🗌 10. VOA vials have zero headspace? Yes 🗌 No 🗀 No VOA Viais Yes 🗌 No 🗹 11. Were any sample containers received broken? # of preserved bottles checked Yes 🔽 No \square for pH: 12. Does paperwork match bottle labels? (<2 or >12 unless noted) (Note discrepancies on chain of custody) Adjusted? No 🗌 13. Are matrices correctly identified on Chain of Custody? Yes 🔽 Yes 🗸 No 🗌 14. Is it clear what analyses were requested? No 🗌 Checked by: 15. Were all holding times able to be met? Yes 🔽 (If no, notify customer for authorization.) Special Handling (if applicable) Yes \square 16. Was client notified of all discrepancies with this order? No 🔲 NA 🗹 Person Notified: Date By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition | Seal Intact | Seal No Seal Date Signed By 2.1 Good Yes

HALL ENVIRONMENTAL	ANALYSIS LABORATORY	www.rianelivilolifierial.com	₹	lel. 505-345-3975 Fax 505-345-4107	Analysis Kequest	(nM ,	94) a	letal: 3O, 6	M C	SeoB:WQC	9 >	< <	×××××××××××××××××××××××××××××××××××××××	××××						remarks: cc: Kandy Dade		Schilly Any Sub-contracted data will be a
Standard Rush X	ame 2015		Project #:	PO: 231642	Project Manager: Robert Combs	Scott Denton		X Yes		ative HEAL No.	0504011	000	202	433					1	Market lime		If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted to other accredited laboratories. This serves as notice of this possibility.
HollyFrontier Navajo Refining LLC			Artesia, NM 88211-0159	575-308-2718		X I ovel 4 (Evil Velident	A Lever + (ruii vaiidauori)			Sample Request ID	South Pile sample 1	l.		No M Pile sample 3					2	Day V	R R	bmitted to Hall Environmental may be subcon
HollyFrontier N		35S: PO Box 159	Artesia	575-30	ii.	je:		(a)	-	Time Matrix	lios 48/			130 soil					Time: Relinduished by	^	Relinera	ecessary, samples sur
Client:	 - -	Malling Address:		Phone #:	email or Fax#	QA/QC Package: Standard	□ Other	🗆 EDD (Type)		Date	4/25/2017	-	- 4	4/25/2017						4/02/17	Date: T	, , , , , , , , , , , , , , , , , , ,

other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>

Sent: Wednesday, May 24, 2017 3:32 PM

To: Chavez, Carl J, EMNRD

Cc: Griswold, Jim, EMNRD; Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy)

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Attachments: Artesia Aug2016 WW Effluent Release FINAL to Navajo 052417.pdf; 2017-05-24 Final

C-141 2016 WW Effluent Release 2016-08-09.pdf

Carl,

Please find the attached Final C-141 form and Release Report for the 2016-08-09 Artesia WW effluent release.

Please let us know if you would like to discuss.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Thursday, May 11, 2017 1:21 PM

To: Combs, Robert

Cc: Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Robert:

End of May 2017 is fine.

Thank you.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, May 10, 2017 9:30 AM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Griswold, Jim, EMNRD < Jim.Griswold@state.nm.us >; Denton, Scott < Scott.Denton@HollyFrontier.com >

Subject: RE: GW-28 Pipeline Release C-141s Due Today!

Hi Carl; on our last phone conversation on 4/21 we agreed to the end of May to provide the updates for the two events. We have the sample results and the consultants are currently preparing the write-ups. I can check with them on their status and possibly move them quicker if needed – please let me know.

Thanks, Robert

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Wednesday, May 10, 2017 8:23 AM

To: Combs, Robert **Cc:** Griswold, Jim, EMNRD

Subject: FW: GW-28 Pipeline Release C-141s Due Today!

Robert:

The New Mexico Oil Conservation Division (OCD) has not received the updates on the pipeline releases that occurred in 2015 and 2016.

OCD had requested updates on the releases on or before May 5, 2017.

Thank you.

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District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Form C-141 Revised August 8, 2011

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

	Release Notification and Corrective Action													
					C	OPERATOR								
				Refining LLC			bert Combs							
		St., Artesia, Refining L		10			No.: 575-746-53 e: Petroleum R							
							e. renoieum K	ennery						
Surface Ow	ner: Nava	jo Refining I	LC	Mineral (Owner N	r N/A API No. N/A								
				LOCA	TION	N OF RELEASE								
Unit Letter	Section 18	Township 17S	Range 27E	Feet from the	North/S	North/South Line Feet from the East/West Line County								
	-		Lati	tude_32°50'5.	66''N	Longitud	e_104°19'8.12'	'W			***************************************			
	NATURE OF RELEASE													
Type of Rele	Type of Release: Non-hazardous treated wastewater effluent						Release: Est. 10 final est. approx.		Volume I	Recovered	40 bbls			
Source of Release: Failed collar on pipeline approximately 5 miles east of the Artesia Refinery					es east	Date and F 08/09/16,		ce:	Date and 18:00	Hour of D	iscover	y: 08/09/16,		
Was Immediate Notice Given? ☐ Yes ☐ No ☒ Not Required				equired	If YES, To Whom? NM Oil Conservation Division Santa Fe – Left message to Carl Chavez NM Oil Conservation Division Artesia – Left message NMED Hazardous Waste Bureau – Spoke with Leona Tsinnajinnie									
By Whom?	Richard Or	osco, Robert C	Combs				Iour 08/09/16 21			8/10/16 1	6:15			
Was a Water	course Rea		Yes ⊠	No		If YES, Vo None	olume Impacting	the Wate	ercourse.					
If a Waterco	urse was In	pacted, Descr	ibe Fully.'	k			20.00							
Describe Car Wastewater dispatched to vicinity. The	effluent disc repair the vacuumed	charge pumps line and a vac water was reti	located at uum truck urned to th	n Taken.* Pipel the refinery were was dispatched to the refinery wastev	e shut dov the sce	vn and in-lin ne to remove	e valves were blo	ocked-in	to minimiz	e flow bac	k. A fi	ield crew was		
Pooled water the release to release as de	r was remove ocation was scribed in the	conducted as he attached let	n truck and described ter.	l returned to the r in the attached le	tter. The	investigatio	n results indicate	that no	further acti	on is requi	red rega	arding this		
regulations a public health should their or the enviro	all operators or the envious loperations longers. In a	are required to are failed to	o report and acceptant adequately OCD accep	e is true and comp nd/or file certain ce of a C-141 rep investigate and otance of a C-141	release no ort by the remediate	otifications a NMOCD m contaminat	nd perform corre parked as "Final I ion that pose a the re the operator of	ective act Report" of reat to g	tions for rel does not rel round wate sibility for c	eases which ieve the oper, surface we compliance	th may berator ovater, h with a	endanger of liability numan health		
ask							OIL CON	ISERV	<u>/ATION</u>	DIVIS	<u>ION</u>			
Printed Name: Robert Combs						Approved by	Environmental S	Specialis	st:			:		
Title: Enviro	onmental Sp	ecialist			Approval Date: Expiration Date:									
E-mail Addr	ess: <u>Rober</u>	t.Combs@ho	ollyfrontie	er.com	Conditions of Approval: Attached									
Date:	Date: 5/23/17 Phone: 575-746-5382													

^{*} Attach Additional Sheets If Necessary



505 East Huntland Drive Suite 250 Austin, TX 78752

512.329.6080 PHONE 512.329.8750 FAX

www.TRCsolutions.com

May 24, 2017

Mr. Robert Combs, Mr. Scott Denton, Mr. Arsin Sahba HollyFrontier Navajo Refining LLC PO Box 159 Artesia, New Mexico 88211

Re: August 2016 Wastewater Effluent Pipeline Release Investigation Results and Request for Closure
HollyFrontier Navajo Refining LLC, Artesia Refinery
Discharge Permit GW-028

Dear Mr. Combs, et al.:

TRC Environmental Corporation (TRC) is pleased to provide HollyFrontier Navajo Refining LLC (Navajo) with this letter to document investigation results completed by Navajo related to the August 2016 wastewater effluent release that occurred approximately 5 miles east of Artesia, New Mexico. The release occurred from the Navajo pipeline that conveys treated wastewater from Navajo's Artesia Refinery (refinery) to injection wells for disposal in accordance with Discharge Permit GW-028 and Underground Injection Control (UIC) permits.

BACKGROUND

Wastewater effluent was released at 6:00 PM on August 9, 2016, due to a collar failure in the pipeline that conveys treated wastewater from the refinery to injection wells located approximately 15 miles southeast of the refinery. The refinery and release locations are shown on Figure 1. The pipeline release was discovered based on a sudden change in monitored pipeline flow and pressure. Navajo completed initial release response and abatement activities on August 9, 2016, immediately following the release. Wastewater effluent discharge pumps located at the refinery were shut down and in-line valves were blocked-in to minimize flow back. The initial Form C-141 documented a release of 10 barrels but the release was greater than the original estimate based on recovery of 40 barrels. Operations reported that 10 barrels were initially released to the surface. As the pipeline was further exposed for repairs, the section of pipeline between the nearest block valve and the line breach drained into the excavation, thus the additional volume recovered by the vacuum truck.

Mr. Robert Combs, et al. May 24, 2017 Page 2

The recovered water was returned to the refinery waste water treatment unit for processing. The released water did not migrate from the release location or enter the Pecos River.

The pipeline was repaired and returned to service on August 10, 2016. The maintenance contractor performed the required repairs and backfilled the excavation with the excavated material due to an absence of obvious impacts. The soil investigation below addresses the entire release area including the material that was backfilled.

Navajo notified the New Mexico Oil Conservation Division (OCD), OCD Artesia District office, and the New Mexico Environment Department (NMED) Hazardous Waste Bureau within 24 hours of the release by telephone. An initial Form C-141 was submitted to the OCD on August 12, 2016, to document the release and initial response and abatement activities. The approximate aerial extent of the accumulated released wastewater is shown on Figure 2.

RELEASE INVESTIGATION

Navajo conducted wastewater and surface soil investigation related to the August 2016 wastewater effluent release. The investigation activities and results are discussed below.

Wastewater Investigation

Navajo collected a sample of wastewater from a pipeline pump on August 10, 2016; this sample is considered equivalent to the wastewater that was released. The wastewater sample was submitted to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for analysis of the same analytical suite required for the quarterly effluent monitoring in the UIC permits. The analytical results are summarized and compared to applicable Water Quality Control Commission Groundwater Standards (WQCC Standards) in Table 1. The following parameters were detected in the wastewater effluent sample in exceedance of WQCC Standards: chloride (320 milligrams per liter [mg/L]), fluoride (13 mg/L), sulfate (1,500 mg/L), iron (2.40 mg/L), and total dissolved solids (TDS) (2,800 mg/L).

Soil Investigation

On October 10, 2016, Navajo collected four surface soil samples from within the release area (samples "Test 1" through "Test 4") and four surface soil samples from non-release locations in the general vicinity of the release to provide data representative of background conditions (samples "Background 5" through "Background 8"). The sample locations are shown on Figure 2 and include two samples (Test 2 and Test 3) within the material used to backfill the excavation. The surface soil samples were submitted to Hall for laboratory analysis of chloride, fluoride, sulfate, and iron – consistent with the parameters detected in the wastewater effluent sample that exceeded the WQCC Standards. Surface soil analytical results are presented in Table 2 and Figure 2. Laboratory analytical reports are provided in Attachment A. Surface soil analytical results indicate each parameter is present at a highly variable distribution across the release and non-release areas as follows:



Mr. Robert Combs, et al. May 24, 2017 Page 3

- <u>Chloride</u>: Concentrations ranged from 27 milligrams per kilogram (mg/kg) to 3,100 mg/kg in the release area; and 400 mg/kg to 7,600 mg/kg in the non-release areas. Chloride concentrations ranged by up to two orders of magnitude across the release and non-release areas, and were overall greater at locations outside the release area.
- <u>Fluoride</u>: Concentrations ranged from 0.65 mg/kg to 1.8 mg/kg in the release area; and 0.8 mg/kg to 3.2 mg/kg in the non-release areas. Overall fluoride concentrations were greater outside the release area.
- <u>Sulfate</u>: Concentrations ranged from 1,300 mg/kg to 5,200 mg/kg in the release area; and 370 mg/kg to 3,500 mg/kg in the non-release areas. Overall sulfate concentrations were greater within the release area.
- <u>Iron</u>: Concentrations ranged from 20,000 mg/kg to 27,000 mg/kg in the release area; and 14,000 mg/kg to 27,000 mg/kg in the non-release areas. Overall iron concentrations were similar within the release and non-release areas.

To assess the potential for chloride, fluoride, sulfate, and iron to leach from surface soil within the release area to groundwater, surface soil samples were collected on April 27, 2017 from the same four sample locations ("Test 1" through "Test 4"), and submitted to Hall for synthetic precipitation leaching procedure (SPLP) analysis for each of these parameters. The SPLP results are presented and compared to WQCC Standards in Table 2. The SPLP results indicate that chloride, fluoride, and sulfate do not have the potential to leach from surface soil to groundwater at concentrations greater than WQCC Standards. The SPLP iron results indicate that iron has the potential to leach from surface soil to groundwater at a concentration greater than the WQCC Standard at only one of the four sample locations (Test 3) within the release area. The presence of iron at this sample location (Test 3) is attributed to background conditions and not attributed to the August 2016 wastewater release based on the following:

- The iron concentration in soil at Test 3 (23,000 mg/kg) was less than or equal to three of the four samples collected from the non-release areas that are representative of background concentrations (which ranged from 14,000 mg/kg to 27,000 mg/kg).
- The SPLP iron concentration at Test 3 (3.2 mg/L) was greater than the iron concentration in the released wastewater effluent (2.4 mg/L), thus indicating there is additional background source of iron.

Request for Closure

TRC recommends Navajo request that no further action be required in regards to the August 2016 wastewater effluent release based on the following:

• A majority of the wastewater effluent released was recovered via vacuum truck immediately following the release.



- The parameters present in the wastewater effluent at concentrations above WQCC Standards (chloride, fluoride, sulfate, and iron) are present in background (non-release) soils at concentrations similar to or greater than concentrations in the release area. In addition, the distribution of these parameters is highly variable across the release and non-release areas. Therefore, the presence of these parameters in soil at the release location are attributed to background condition and not attributed to the August 2016 wastewater effluent release.
- Chloride, fluoride, and sulfate in soil does not have the potential to leach to groundwater at concentrations above WQCC Standards based on SPLP laboratory analysis. Iron has the potential to leach to groundwater at a concentration above the WQCC Standard at one of the four locations within the release area, but the presence of iron at this location is attributed to background conditions and not the August 2016 wastewater effluent release as described above.

If you have any questions or comments regarding this letter, please feel free to contact me at 512-684-3148.

Sincerely,

Julie Speer Project Manager

TRC Environmental Corporation

cc: TRC: B. Gilbert, C. Smith

Attachments:

Figure 1 – Site Location Map

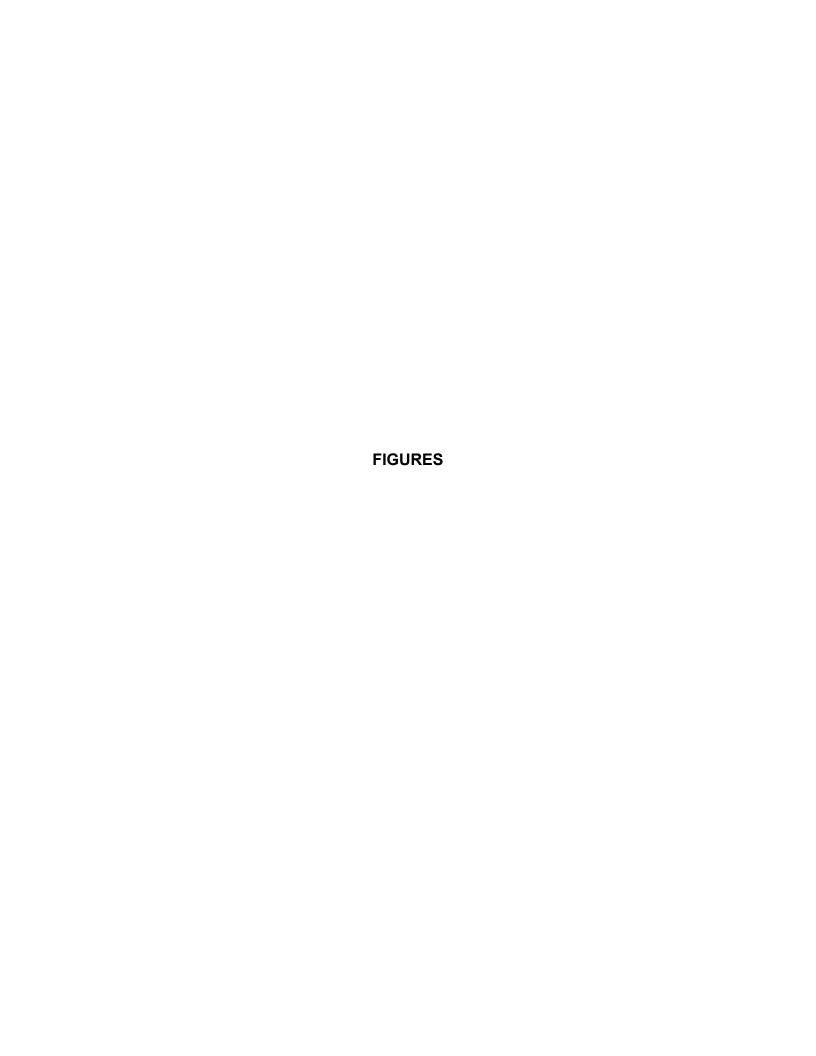
Figure 2 – Sample Location and Results Map

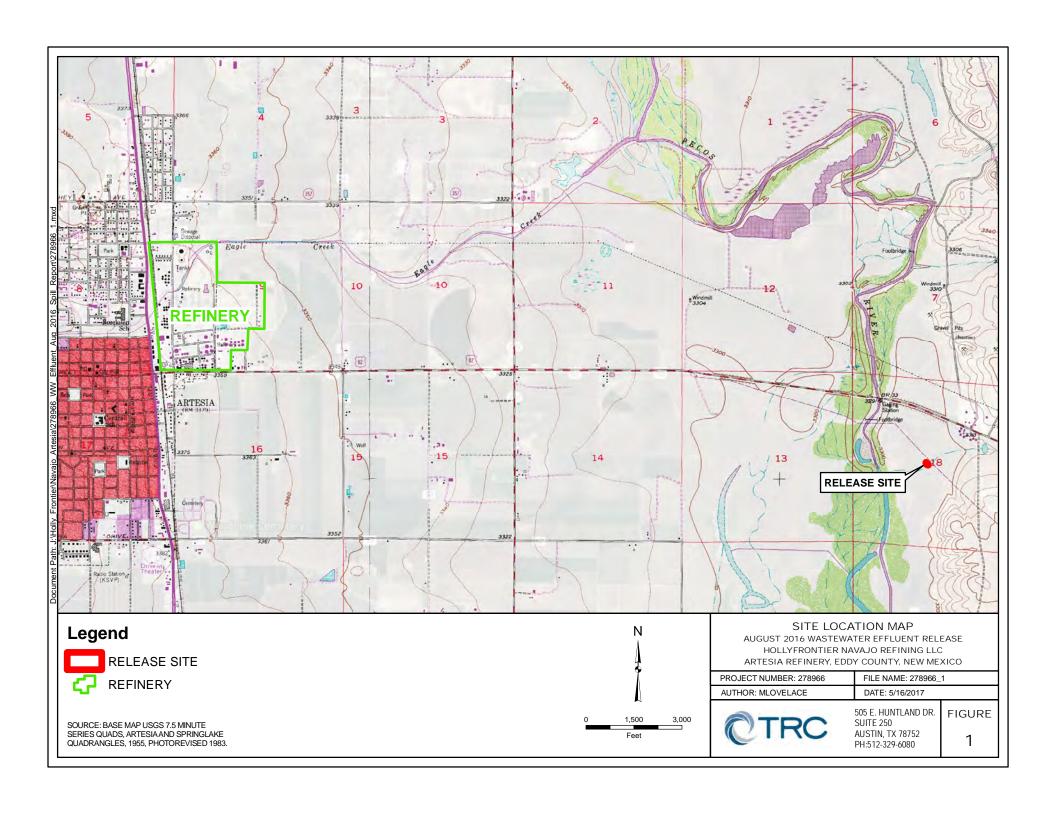
Table 1 – Wastewater Effluent Analytical Results

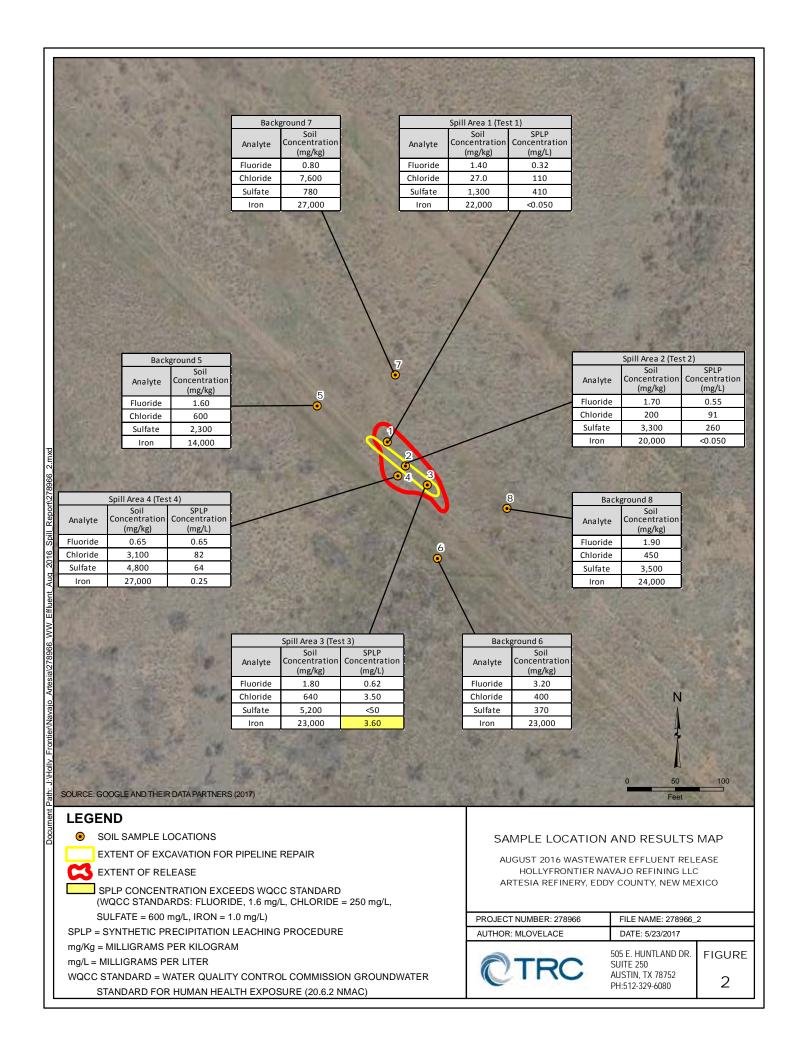
Table 2 – Soil Analytical Results

Attachment A – Laboratory Analytical Reports









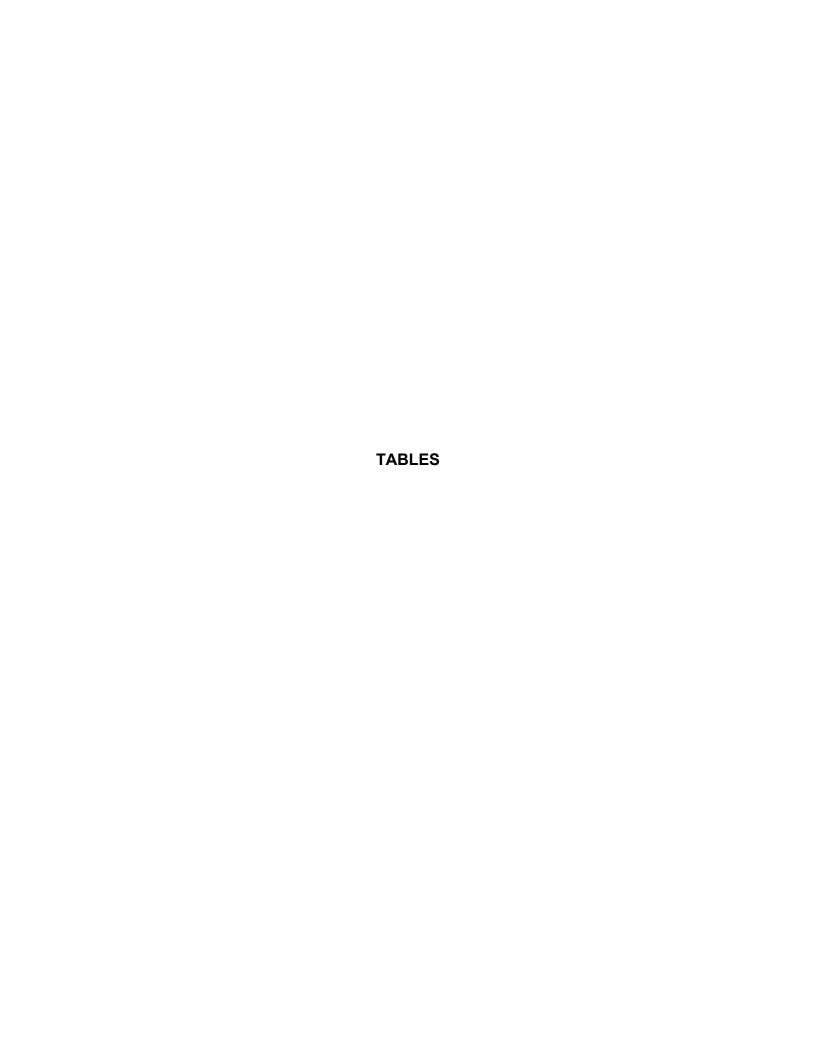


Table 1. Wastewater Effluent Analytical Results Wastewater Pipeline Release Approximately 5 Miles East of Artesia - August 9, 2016 HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

			Sample ID:	Wastewater Effluent
			Date:	8/10/2016
		wqcc		
Analyte	Units	Standard	Screening Standard	Result
VOCs			_	
1,1,1-Trichloroethane	mg/L	0.060	NMED GW Human Health	< 0.0025
1,1,2,2-Tetrachloroethane	mg/L	0.010	NMED GW Human Health	< 0.0025
1,1,2-Trichloroethane	mg/L	0.100	NMED GW Human Health	< 0.0025
1,1-Dichloroethane	mg/L	0.025	NMED GW Human Health	< 0.0025
1,1-Dichloroethene	mg/L	0.005	NMED GW Human Health	< 0.0025
1,2-Dichloroethane	mg/L	0.010	NMED GW Human Health	< 0.0025
Benzene	mg/L	0.010	NMED GW Human Health	< 0.0025
Carbon Tetrachloride	mg/L	0.010	NMED GW Human Health	< 0.0025
Chloroform	mg/L	0.100	NMED GW Human Health	< 0.0025
Ethylbenzene	mg/L	0.750	NMED GW Human Health	< 0.0025
Methylene Chloride	mg/L	0.100	NMED GW Human Health	< 0.012
Tetrachloroethene	mg/L	0.020	NMED GW Human Health	< 0.0025
Toluene	mg/L	0.750	NMED GW Human Health	0.012
Total Xylenes	mg/L	0.620	NMED GW Human Health	< 0.005
Trichloroethene	mg/L	0.100	NMED GW Human Health	< 0.0025
Vinyl Chloride	mg/L	0.001	NMED GW Human Health	< 0.0025
SVOCs				
1-Methylnaphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
2-Methylnaphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
Naphthalene	mg/L	0.03	NMED GW Human Health	< 0.010
Benzo(a)Pyrene	mg/L	0.0002	EPA MCL	< 0.0002
Total Metals (mg/L)				
Aluminum	mg/L	5.00	NMED GW Irrigation	0.260
Arsenic	mg/L	0.100	NMED GW Human Health	0.031
Barium	mg/L	1.00	NMED GW Human Health	< 0.020
Cadmium	mg/L	0.010	NMED GW Human Health	< 0.0020
Calcium	mg/L			130
Chromium	mg/L	0.050	NMED GW Human Health	< 0.0060
Cobalt	mg/L	0.050	NMED GW Irrigation	< 0.0060
Copper	mg/L	1.00	NMED GW Irrigation	< 0.0060
Iron	mg/L	1.00	NMED GW Irrigation	2.40
Lead	mg/L	0.050	NMED GW Human Health	< 0.0050
Manganese	mg/L	0.200	NMED GW Domestic	0.15
Mercury	mg/L	0.002	NMED GW Human Health	< 0.0002
Nickel	mg/L	0.200	NMED GW Irrigation	0.010
Potassium	mg/L			60.0
Selenium	mg/L	0.050	NMED GW Human Health	< 0.050
Silver	mg/L	0.050	NMED GW Human Health	< 0.0050
Sodium	mg/L			630
Zinc	mg/L	10.0	NMED GW Domestic	0.025
Anions				
Bromide	mg/L			1.60
Chloride	mg/L	250	NMED GW Domestic	320
Fluoride (F-, Anion)	mg/L	1.60	NMED GW Human Health	13.0
Nitrite (as N)	mg/L	1.00	NMED GW Human Health	0.96
Nitrate (as N)	mg/L	1.00	NMED GW Human Health	0.50
Sulfate	mg/L	600	NMED GW Domestic	1,500
Other Parameters		ļ		
Total Dissolved Solids	mg/L	1,000	NMED GW Domestic	2,800

Notes:

Yellow highlighted concentration exceeds applicable WQCC Standard

mg/L = milligrams per liter

NMED = New Mexico Environment Department

NMED GW Human Health = NMED groundwater standard for human health exposure, NMAC 20.6.2.3103.A

NMED GW Irrigation = NMED groundwater standard for irrigation exposure, NMAC 20.6.2.3103.C

 $NMED\ GW\ Domestic = NMED\ groundwater\ standard\ for\ domestic\ exposure,\ NMAC\ 20.6.2.3103.B$

NMAC = New Mexico Administrative Code WQCC = Water Quality Control Commission

Table 2. Soil Analytical Results

Wastewater Effluent Pipeline Release Approximately 5 Miles East of Artesia - August 9, 2016 HollyFrontier Navajo Refining, LLC, GW-028, Artesia, New Mexico

		Release Area	Soil Samples ⁽¹⁾		Noi	n-Release "Back	Max Release	Max					
Sample Location:	Test 1 Test 2 Test 3 Test 4 Background 5 Background 6 Background 7 Background 8									Background			
Analyte		Concentration (mg/kg)											
Fluoride	1.40	1.70	1.80	0.65	1.60	3.20	0.80	1.90	1.80	3.20			
Chloride	27.0	200	640	3,100	600	400	7,600	450	3,100	7,600			
Sulfate	1,300 3,300 5,200 4,800 2,300 370 780 3,500 5,200 3,5												
Iron	22,000 20,000 23,000 27,000 14,000 23,000 27,000 24,000									27,000			

	R	elease Area So	(2)	Wastewater	wacc							
Sample Location:	Test 1	Test 2	Test 3	Effluent ⁽³⁾	Standard ⁽⁴⁾							
Analyte		Concentration (mg/L)										
Fluoride	0.32	0.55	0.62	0.65	13.0	1.6						
Chloride	110	91	3.5	82	320	250						
Sulfate	410	260	<50	64	1,500	600						
Iron	<0.050	<0.050 <0.050 3.6 0.25				1.0						

Notes:

Yellow highlighted concentration exceeds applicable WQCC Standard

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

Concentrations highlighted in yellw

⁽¹⁾ Soil samples were collected on October 10, 2016 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽²⁾ Soil samples were collected on April 27, 2017 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽³⁾ Wastewater effluent sample was collected on August 10, 2016 and analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico

⁽⁴⁾ Water Quality Control Commission Groundwater Standard for human health exposure (20.6.2 NMAC)

ATTACHMENT A Laboratory Analytical Reports



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

December 05, 2016

Robert Combs
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Effluent Release 8/10/16 OrderNo.: 1610723

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 11 sample(s) on 10/14/2016 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued October 31, 2016.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,<<>>>

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 1

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:27:00 AM

 Lab ID:
 1610723-001
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result PQL Qual Units		DF	Date Analyzed	
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.4	0.30	mg/Kg	1	10/21/2016 2:58:57 PM
Chloride	27	1.5	mg/Kg	1	10/21/2016 2:58:57 PM
Sulfate	1300	30	mg/Kg	20	10/21/2016 3:36:12 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	22000	250	mg/Kg	100	10/18/2016 9:21:23 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company Client Sample ID: Test 2

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:32:00 AM

 Lab ID:
 1610723-002
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result PQL Qual Units		al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.7	0.30	mg/Kg	1	10/21/2016 3:48:36 PM
Chloride	200	30	mg/Kg	20	10/21/2016 4:01:01 PM
Sulfate	3300	75	mg/Kg	50	10/25/2016 10:03:43 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	20000	240	mg/Kg	100	10/18/2016 9:22:56 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 3

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:37:00 AM

 Lab ID:
 1610723-003
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.8	0.30	mg/Kg	1	10/21/2016 4:13:25 PM
Chloride	640	30	mg/Kg	20	10/21/2016 4:25:50 PM
Sulfate	5200	75	mg/Kg	50	10/25/2016 10:16:08 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	23000	240	mg/Kg	100	10/18/2016 9:24:29 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 4

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:44:00 AM

 Lab ID:
 1610723-004
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	0.65	0.30	mg/Kg	1	10/21/2016 4:38:14 PM
Chloride	3100	150	mg/Kg	100	10/25/2016 10:28:33 PM
Sulfate	4800	150	mg/Kg	100	10/25/2016 10:28:33 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	27000	490	mg/Kg	200	10/18/2016 10:03:51 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company Client Sample ID: Background 5

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 8:56:00 AM

 Lab ID:
 1610723-005
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Fluoride	1.6	0.30	mg/Kg	1	10/21/2016 5:27:53 PM
Chloride	600	30	mg/Kg	20	10/21/2016 5:40:18 PM
Sulfate	2300	30	mg/Kg	20	10/21/2016 5:40:18 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	14000	250	mg/Kg	100	10/18/2016 9:27:36 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Background 6

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:01:00 AM

 Lab ID:
 1610723-006
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	3.2	0.30	mg/Kg	1	10/25/2016 12:56:59 PM
Chloride	400	30	mg/Kg	20	10/25/2016 1:34:13 PM
Sulfate	370	30	mg/Kg	20	10/25/2016 1:34:13 PM
EPA METHOD 6010B: SOIL METALS					Analyst: MED
Iron	23000	250	mg/Kg	100	10/18/2016 9:29:09 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Background 7

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:08:00 AM

 Lab ID:
 1610723-007
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	Result PQL Qual Units		DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: MRA		
Fluoride	0.80	0.30	mg/Kg	1	10/25/2016 1:46:37 PM		
Chloride	7600	300	mg/Kg	200	10/26/2016 11:36:39 PM		
Sulfate	780	30	mg/Kg	20	10/25/2016 1:59:02 PM		
EPA METHOD 6010B: SOIL METALS					Analyst: MED		
Iron	27000	500	mg/Kg	200	10/18/2016 10:05:25 AM		

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 7 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc. Date Reported: 12/5/2016

CLIENT: Navajo Refining Company

Client Sample ID: Background 8

 Project:
 Effluent Release 8/10/16
 Collection Date: 10/12/2016 9:14:00 AM

 Lab ID:
 1610723-008
 Matrix: SOIL
 Received Date: 10/14/2016 8:45:00 AM

Analyses	Result	sult PQL Qual Units		DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: MRA		
Fluoride	1.9	0.30	mg/Kg	1	10/25/2016 2:11:26 PM		
Chloride	450	30	mg/Kg	20	10/25/2016 2:23:51 PM		
Sulfate	3500	75	mg/Kg	50	10/26/2016 11:49:03 PM		
EPA METHOD 6010B: SOIL METALS					Analyst: MED		
Iron	24000	250	mg/Kg	100	10/18/2016 9:37:54 AM		

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 8 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1610723**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/5/2016

CLIENT: Navajo Refining Company Client Sample ID: Test 3

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-009 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS				Analyst: LGT
Fluoride	0.53	0.10 mg/L	1	11/11/2016 6:35:12 PM
Sulfate	520	10 * mg/L	20	11/10/2016 2:59:00 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 9 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Test 4

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-010 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	PQL Qual Units		DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LGT
Chloride	150	10	mg/L	20	11/10/2016 3:48:38 AM
EPA 6010B: TOTAL RECOVERABL		Analyst: MED			
Iron	ND	0.050	mg/L	1	11/13/2016 2:46:08 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 10 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 12/5/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: SPLP BLANK

Project: Effluent Release 8/10/16 **Collection Date:**

Lab ID: 1610723-011 **Matrix:** LEACHATE **Received Date:** 10/14/2016 8:45:00 AM

Analyses	Result	esult PQL Qual Units		DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: LGT		
Fluoride	ND	0.10	mg/L	1	11/10/2016 4:01:03 AM		
Chloride	ND	0.50	mg/L	1	11/10/2016 4:01:03 AM		
Sulfate	ND	0.50	mg/L	1	11/10/2016 4:01:03 AM		
EPA 6010B: TOTAL RECOVERABL		Analyst: MED					
Iron	ND	0.050	mg/L	1	11/13/2016 2:52:13 PM		

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limit Page 11 of 16
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID MB-28232 SampType: MBLK TestCode: EPA Method 300.0: Anions

Client ID: **PBS** Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190570 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

0.30 Fluoride ND Chloride ND 1.5 ND Sulfate 1.5

Sample ID LCS-28232 SampType: LCS TestCode: EPA Method 300.0: Anions

LCSS Client ID: Batch ID: 28232 RunNo: 38151

Analysis Date: 10/21/2016 SeqNo: 1190571 Prep Date: 10/21/2016 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 0.30 0 106 90 110 1.6 1.500 Chloride 14 15.00 0 94.3 90 110 1.5 29 0 96.3 Sulfate 1.5 30.00 90 110

Sample ID 1610723-001AMS TestCode: EPA Method 300.0: Anions SampType: MS

Client ID: Test 1 Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190594 Units: mg/Kg

SPK Ref Val %REC %RPD **RPDLimit** Analyte Result **PQL** SPK value LowLimit HighLimit Qual Fluoride 1.5 0.30 1.500 1.352 8.14 15 S 110 Chloride 47 1.5 15.00 26.77 138 70.8 119 S

Sample ID 1610723-001AMSD TestCode: EPA Method 300.0: Anions SampType: MSD

Client ID: Test 1 Batch ID: 28232 RunNo: 38151

Prep Date: 10/21/2016 Analysis Date: 10/21/2016 SeqNo: 1190595 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 1.3 0.30 1.500 1.352 -1.32 15 10.1 20 S 110 0.00989 20 S Chloride 47 1.5 15.00 26.77 138 70.8 119

Sample ID MB-28251 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: **PBS** Batch ID: 28251 RunNo: 38161

Prep Date: Analysis Date: 10/24/2016 10/24/2016 SeqNo: 1191020 Units: mg/Kg

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Fluoride ND 0.30 Chloride ND 1.5 Sulfate ND 1.5

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID LCS-28251	SampT	ype: Ics	;	Tes	tCode: El					
Client ID: LCSS	Batch	n ID: 28	251	F	RunNo: 38161					
Prep Date: 10/24/2016	Analysis Date: 10/24/2016			SeqNo: 1191021			Units: mg/k	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.30	1.500	0	103	90	110			
Chloride	14	1.5	15.00	0	96.6	90	110			
Sulfate	29	1.5	30.00	0	97.9	90	110			

Sample ID 1610723-006AMS SampType: MS TestCode: EPA Method 300.0: Anions Client ID: Background 6 Batch ID: 28251 RunNo: 38187 Prep Date: 10/24/2016 Analysis Date: 10/25/2016 SeqNo: 1193030 Units: mg/Kg Analyte Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride 3.5 0.30 1.500 3.210 21.9 15 110

Sample ID	1610723-006AMSE	SampTy	ре: М	SD	Tes	TestCode: EPA Method 300.0: Anions					
Client ID:	Background 6	Batch	Batch ID: 28251 RunNo: 38187								
Prep Date:	10/24/2016	Analysis Da	ite: 10	0/25/2016	SeqNo: 1193031			Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		3.4	0.30	1.500	3.210	9.98	15	110	5.17	20	S

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix
- В
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified

Analyte detected in the associated Method Blank

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Hall Environmental Analysis Laboratory, Inc.

Result

0.54

0.10

WO#: 1610723

05-Dec-16

Client: Project:		Navajo Refining Com Effluent Release 8/10										
Sample ID	МВ	SampTyp	TestCode: EPA Method 300.0: Anions									
Client ID:	PBW	Batch I	D: A3	8595	F	tunNo: 3	8595					
Prep Date:		Analysis Dat	e: 11	/9/2016	S	SeqNo: 1	205622	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Chloride Sulfate		ND ND	0.50 0.50									
Sample ID	LCS	SampTyp	e: LC	s	Tes	Code: El	PA Method	300.0: Anions	3			
Client ID:	LCSW	Batch I	Batch ID: A38595			tunNo: 3	8595					
Prep Date:		Analysis Dat	e: 11	/9/2016	SeqNo: 1205623			Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Chloride		4.8	0.50	5.000	0	96.0	90	110				
Sulfate		9.8	0.50	10.00	0	97.7	90	110				
Sample ID	МВ	SampTyp	e: ME	BLK	Tes	Code: El	PA Method	300.0: Anions	5			
Client ID:	PBW	Batch I	D: R3	8671	F	tunNo: 3	8671					
Prep Date:		Analysis Dat	e: 11	/11/2016	S	SeqNo: 1	207765	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Fluoride		ND	0.10									
Sample ID	LCS	SampTyp	e: LC	s	Tes	tCode: El	EPA Method 300.0: Anions					
Client ID:	LCSW	Batch I	D: R3	8671	F	RunNo: 38671						
Prep Date:		Analysis Dat	e: 11	/11/2016	8	SeqNo: 1	207766	Units: mg/L				

SPK value SPK Ref Val %REC

0

0.5000

Qualifiers:

Analyte

Fluoride

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix
- В
- E
- J
- Reporting Detection Limit
- P Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

Analyte detected in the associated Method Blank

LowLimit

90

108

HighLimit

110

Value above quantitation range

Analyte detected below quantitation limits Page 14 of 16

%RPD

RPDLimit

Qual

Hall Environmental Analysis Laboratory, Inc.

WO#: 1610723

05-Dec-16

Client: Navajo Refining Company **Project:** Effluent Release 8/10/16

Sample ID MB-28097 SampType: MBLK TestCode: EPA Method 6010B: Soil Metals

Client ID: **PBS** Batch ID: 28097 RunNo: 38014

Prep Date: 10/17/2016 Analysis Date: 10/18/2016 SeqNo: 1185141 Units: mg/Kg

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 2.5 Iron

Sample ID LCS-28097 SampType: LCS TestCode: EPA Method 6010B: Soil Metals

Client ID: LCSS Batch ID: 28097 RunNo: 38014

Prep Date: 10/17/2016 Analysis Date: 10/18/2016 SeqNo: 1185142 Units: mg/Kg

SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result Qual

Iron 25 2.5 25.00 0 101 120

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Page 15 of 16

Hall Environmental Analysis Laboratory, Inc.

WO#: **1610723**

05-Dec-16

Client: Navajo Refining Company
Project: Effluent Release 8/10/16

Sample ID MB-28558 SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207448 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron ND 0.050

Sample ID LCS-28558 SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207452 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

lron 0.48 0.050 0.5000 0 96.8 80 120

Sample ID 1610723-010BMS SampType: MS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Test 4 Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207457 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

ron 0.50 0.500 0.5000 0.008830 97.5 75 125

Sample ID 1610723-010BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Test 4 Batch ID: 28558 RunNo: 38660

Prep Date: 11/10/2016 Analysis Date: 11/13/2016 SeqNo: 1207458 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

lron 0.49 0.050 0.5000 0.008830 95.6 75 125 1.95 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

Carrala all Nat la Danas

Page 16 of 16

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified



Bioll Environmental Analysis Laboratory 4901 Hawkins NI Albuquerque, NM 87109

TEL: 505-345-39/5 FAX: 505-345-4107 Website, www.itallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO REFINING CO Work Order Number: 1610723 ReptNo: 1 10/4/16 Received by/date: Logged By: 10/14/2016 8:45:00 AM Michelle Garcia Completed By: Michelle Garcia 10/14/2016 1:12:57 PM Reviewed By: 10 14/16 Chain of Custody 1. Custody seals intact on sample bottles? No Yes Not Present V No. 2. Is Chain of Custody complete? Yes V Not Present 3 How was the sample delivered? UPS Log In Was an attempt made to cool the samples? No NA I Yes V Were all samples received at a temperature of >0° C to 6.0°C No Yes V NA . Sample(s) in proper container(s)? Yes V No _ Sufficient sample volume for indicated lest(s)? Yes V No I 8. Are samples (except VOA and ONG) properly preserved? Yes V No. 9. Was preservative added to bottles? No V NA Yes 10. VOA vials have zero headspace? Yes No -No VOA Vials Yes 11. Were any sample containers received broken? No V # of preserved bottles checked 12. Does paperwork match bottle labels? No L for pH: Yes V (Note discrepancies on chair of custody) (<2 or >12 unless noted) Adjusted? 13. Are matrices correctly identified on Chain of Custody? No. 14. Is it clear what analyses were requested? V No Yes 15. Were all holding times able to be met? Yes Y No _ Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) 16. Was client notified of all discrepancies with this order? Yes | No L NA V Person Notified: Date By Whom. Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition Seal Intact | Seal No Seal Date 4.7 Good

CIIO	0-10-11	Citalit-or-Custody Record	DIRO CHIN			
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KTESIA	A, D	m 88211	Project #:			Tel: 505-345-3975 Fax 505-345-4107
10ne #: 575	1	746-5281	SAS/vent	Place		Anal
nail or Fax#:	# 522	-246-5451		ger.		
VQC Package:	:age:		9	0		97,
Standard		L Level 4 (Full Validation)	NOBER	NOBER! COMOS		PSY
creditation:			Sampler:			in)s
NELAP	Other	10	On Ice:	- 1	□ No	0
EDD (Type)	(ac		Sample Temperature:		78° when collected	100 P
)ate Tin	Time Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL NO.	Chlay Fluar Sular Jedn
116 8:27 Am	Soil	Tesr 1	len # 1	on dec	001	×
116 8324	*	Test 2	1 42	1	COD	
16 8:37 Am	*	Test 3	#3		200	
16 8:44 m	4	Tot 4	24		700	
116 8:56m	40	Back Stoud S	75		2020	
116 9:01A	1.9	Backshauel Co	# C		000	
1/6 9:08m	9.Am		47		100	
4/16 9: 1/m	- W	Booksland 8	#00#		100g	7 7
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If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

August 22, 2016

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Waste Water Effluent OrderNo.: 1608660

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/11/2016 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT:Navajo Refining CompanyClient Sample ID: Wastewater Effluent 8-10-16Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
IGNITABILITY METHOD 1010						Analys	t: SUB
Ignitability	>200	0		°F	1	8/17/2016	R36648
SULFIDE, REACTIVE						Analys	t: SUB
Reactive Sulfide	ND	0.20		mg/L	1	8/17/2016	R36648
SPECIFIC GRAVITY						Analys	t: LGT
Specific Gravity	1.002	0			1	8/15/2016 4:29:00 PM	R36512
EPA METHOD 300.0: ANIONS						Analys	t: MRA
Fluoride	13	0.50	*	mg/L	5	8/11/2016 3:26:00 PM	R36408
Chloride	320	10		mg/L	20	8/11/2016 3:38:24 PM	R36408
Nitrogen, Nitrite (As N)	0.96	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Bromide	1.6	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	8/11/2016 3:26:00 PM	R36408
Sulfate	1500	25		mg/L	50	8/18/2016 2:24:04 AM	R36593
SM2510B: SPECIFIC CONDUCTANC	E					Analys	t: JRR
Conductivity	4400	1.0		µmhos/cm	1	8/15/2016 3:14:28 PM	R36527
SM2320B: ALKALINITY						Analys	t: JRR
Bicarbonate (As CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Total Alkalinity (as CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analys	t: KS
Total Dissolved Solids	2800	40.0	*	mg/L	1	8/16/2016 8:21:00 AM	26968
CORROSIVITY						Analys	t: SUB
рН	6.99			pH Units	1	8/17/2016	R36648
CYANIDE, REACTIVE						Analys	t: SUB
Cyanide, Reactive	0.120	0.0100		mg/L	1	8/16/2016	R36648
SM4500-H+B: PH						Analys	t: JRR
рН	7.49	1.68	Н	pH units	1	8/15/2016 3:14:28 PM	R36527
EPA METHOD 7470: MERCURY						Analys	t: pmf
Mercury	ND	0.00020		mg/L	1	8/12/2016 11:14:45 AM	1 26894
MERCURY, TCLP						Analys	t: pmf
Mercury	ND	0.020		mg/L	1	8/17/2016 10:49:54 AM	1 27020
EPA 6010B: TOTAL RECOVERABLE	METALS					Analys	t: MED
Aluminum	0.26	0.020		mg/L	1	8/18/2016 5:02:57 PM	26942

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 32
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF I	Date Analyzed	Batch
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	MED
Antimony	ND	0.050	mg/L	1	8/19/2016 10:36:34 AM	26942
Arsenic	0.031	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Barium	ND	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Beryllium	ND	0.0030	mg/L	1	8/18/2016 5:02:57 PM	26942
Cadmium	ND	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Calcium	130	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Chromium	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Cobalt	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Copper	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Iron	2.4	0.25	mg/L	5	8/18/2016 5:10:17 PM	26942
Lead	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Magnesium	41	1.0	mg/L	1	8/18/2016 5:02:57 PM	26942
Manganese	0.15	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Nickel	0.010	0.010	mg/L	1	8/18/2016 5:02:57 PM	26942
Potassium	60	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Selenium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Silver	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Sodium	630	10	mg/L	10	8/18/2016 5:21:39 PM	26942
Strontium	1.9	0.10	mg/L	10	8/18/2016 5:21:39 PM	26942
Thallium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Zinc	0.025	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Silica	14	5.4	mg/L	5	8/18/2016 5:10:17 PM	26942
EPA 6010B: TCLP METALS					Analyst	MED
Arsenic	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Barium	ND	100	mg/L	1	8/15/2016 1:30:42 PM	26961
Cadmium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Chromium	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Lead	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Selenium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Silver	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
EPA METHOD 8260B: VOLATILES					Analyst	SUB
Acetonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Allyl chloride	ND	2.5	μg/L		8/12/2016	R36648
Chloroprene	ND	2.5	μg/L		8/12/2016	R36648
Cyclohexane	ND	2.5	μg/L		8/12/2016	R36648
Diethyl ether	ND	2.5	μg/L		8/12/2016	R36648
Diisopropyl ether	ND	2.5	μg/L		8/12/2016	R36648
Epichlorohydrin	ND	25	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES				Aı	nalyst: SUB
Ethyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	2.5	μg/L	1 8/12/2016	R36648
Freon-113	ND	2.5	μg/L	1 8/12/2016	R36648
Isobutanol	ND	50	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	12	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	5.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
n-Hexane	ND	2.5	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	25	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	25	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	2.5	μg/L	1 8/12/2016	R36648
Propionitrile	ND	12	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	2.5	μg/L	1 8/12/2016	R36648
Benzene	ND	2.5	μg/L	1 8/12/2016	R36648
Toluene	12	2.5	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	50	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	2.8	2.5	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	4.5	2.5	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	2.5	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	2.5	μg/L	1 8/12/2016	R36648
Naphthalene	ND	2.5	μg/L	1 8/12/2016	R36648
Acetone	350	12	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	2.5	μg/L	1 8/12/2016	R36648
Bromoform	ND	2.5	μg/L	1 8/12/2016	R36648
Bromomethane	ND	2.5	μg/L	1 8/12/2016	R36648
2-Butanone	47	12	μg/L	1 8/12/2016	R36648
Carbon disulfide	ND	2.5	μg/L	1 8/12/2016	R36648
Carbon Tetrachloride	ND	2.5	μg/L	1 8/12/2016	R36648
Chlorobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroethane	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroform	ND	2.5	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Aı	nalyst: SUB
Chloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	2.5	μg/L	1	8/12/2016	R36648
2-Hexanone	28	2.5	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	12	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Styrene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	2.5	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					А	nalyst: SUB
Vinyl chloride	ND	2.5	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	5.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	2.5	μg/L	1	8/12/2016	R36648
Acrolein	ND	12	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	12	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
Iodomethane	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	2.5	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	100	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	99.6	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	102	70-130	%Rec	1	8/12/2016	R36648
EPA 8270C: SEMIVOLATILES/MOD					А	nalyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	8/17/2016	R36648
Atrazine	ND	5.0	μg/L	1	8/17/2016	R36648
Benzaldehyde	ND	5.0	μg/L	1	8/17/2016	R36648
Caprolactam	ND	5.0	μg/L	1	8/17/2016	R36648
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	8/17/2016	R36648
Acetophenone	ND	10	μg/L	1	8/17/2016	R36648
1-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,5-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,6-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dimethylphenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2,6-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2-Chloronaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Chlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Methylphenol	ND	10	μg/L	1	8/17/2016	R36648
2-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
2-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
3,3´-Dichlorobenzidine	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent

Collection Date: 8/10/2016 10:55:00 AM

Lab ID: 1608660-001 **Matrix:** AQUEOUS **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD					An	nalyst: SUB
3-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Bromophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Chloro-3-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Chloroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthene	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthylene	ND	10	μg/L	1	8/17/2016	R36648
Anthracene	ND	10	μg/L	1	8/17/2016	R36648
Benzo(g,h,i)perylene	ND	10	μg/L	1	8/17/2016	R36648
Benz(a)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(a)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(b)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(k)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroethyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	8/17/2016	R36648
Butyl benzyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Carbazole	ND	10	μg/L	1	8/17/2016	R36648
Chrysene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenz(a,h)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenzofuran	ND	10	μg/L	1	8/17/2016	R36648
Diethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Dimethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-butyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-octyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Fluoranthene	ND	10	μg/L	1	8/17/2016	R36648
Fluorene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorobenzene	ND	2.0	μg/L	1	8/17/2016	R36648
Hexachlorobutadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorocyclopentadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachloroethane	ND	10	μg/L	1	8/17/2016	R36648
Indeno(1,2,3-cd)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Isophorone	ND	10	μg/L	1	8/17/2016	R36648
Naphthalene	ND	10	μg/L	1	8/17/2016	R36648
Nitrobenzene	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
N-Nitrosodi-n-propylamine	ND	4.0	μg/L	1	8/17/2016	R36648
N-Nitrosodiphenylamine	ND	10	μg/L	1	8/17/2016	R36648
Pentachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
Phenanthrene	ND	10	μg/L	1	8/17/2016	R36648
Phenol	ND	10	μg/L	1	8/17/2016	R36648
Pyrene	ND	10	μg/L	1	8/17/2016	R36648
o-Toluidine	ND	4.0	μg/L	1	8/17/2016	R36648
Pyridine	ND	10	μg/L	1	8/17/2016	R36648
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	8/17/2016	R36648
Surr: 2,4,6-Tribromophenol	90.0	63-110	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorobiphenyl	60.4	58-112	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorophenol	69.0	47-109	%Rec	1	8/17/2016	R36648
Surr: Nitrobenzene-d5	72.0	58-110	%Rec	1	8/17/2016	R36648
Surr: Phenol-d5	67.8	52-105	%Rec	1	8/17/2016	R36648
Surr: Terphenyl-d14	28.7	22-133	%Rec	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 7 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analy	zed Batch
EPA METHOD 8260B: VOLATILES					Analyst: SUB
Acetonitrile	ND	0.50	μg/L	1 8/12/2016	R36648
Allyl chloride	ND	0.50	μg/L	1 8/12/2016	R36648
Chloroprene	ND	0.50	μg/L	1 8/12/2016	R36648
Cyclohexane	ND	0.50	μg/L	1 8/12/2016	R36648
Diethyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Diisopropyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Epichlorohydrin	ND	5.0	μg/L	1 8/12/2016	R36648
Ethyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Freon-113	ND	0.50	μg/L	1 8/12/2016	R36648
Isobutanol	ND	10	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	1.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
n-Hexane	ND	0.50	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	5.0	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	5.0	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	0.50	μg/L	1 8/12/2016	R36648
Propionitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	0.50	μg/L	1 8/12/2016	R36648
Benzene	ND	0.50	μg/L	1 8/12/2016	R36648
Toluene	ND	0.50	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1 8/12/2016	R36648
Naphthalene	ND	0.50	μg/L	1 8/12/2016	R36648
Acetone	ND	2.5	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	0.50	μg/L	1 8/12/2016	R36648
Bromoform	ND	0.50	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 8 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Butanone	ND	2.5	μg/L	1	8/12/2016	R36648
Carbon disulfide	ND	0.50	μg/L	1	8/12/2016	R36648
Carbon Tetrachloride	ND	0.50	μg/L	1	8/12/2016	R36648
Chlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroform	ND	0.50	μg/L	1	8/12/2016	R36648
Chloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	0.50	μg/L	1	8/12/2016	R36648
2-Hexanone	ND	0.50	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	2.5	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Styrene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers	:
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 9 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company **Client Sample ID:** TRIP BLANK

Project: Waste Water Effluent **Collection Date:**

Lab ID: 1608660-002 Matrix: TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	0.50	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl chloride	ND	0.50	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	1.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	0.50	μg/L	1	8/12/2016	R36648
Acrolein	ND	2.5	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
Iodomethane	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	20	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	96.4	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	101	70-130	%Rec	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits Page 10 of 32 J
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

22-Aug-16

	Waste Water Efflu									
Sample ID MB	Samp	Type: m b	olk	Tes	tCode: E	PA Method	300.0: Anions	\$		
Client ID: PBW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	S	SeqNo: 1	128954	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosph	ate (As P ND	0.50								
Sample ID LCS	Samp	Type: Ics	•	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: LCSW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	8	SeqNo: 1	128955	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	104	90	110			
Chloride	4.8	0.50	5.000	0	96.2	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	96.8	90	110			
Bromide	2.4	0.10	2.500	0	96.7	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.0	90	110			
Phosphorus, Orthophosph	ate (As P 4.9	0.50	5.000	0	97.2	90	110			
Sample ID MB	Samp	Type: mb	olk	Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID: PBW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	8	SeqNo: 1	133301	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								
Sample ID LCS	Samp	Type: Ics	}	Tes	tCode: E	PA Method	300.0: Anions	5		-
Client ID: LCSW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	S	SeqNo: 1	133302	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Sulfate

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

9.7

0.50

10.00

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

Sample container temperature is out of limit as specified

110

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range Page 11 of 32

Reporting Detection Limit RL

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES **PBW** RunNo: 36648 Client ID: Batch ID: R36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Acetonitrile ND 0.50 ND Allyl chloride 0.50 ND 0.50 Chloroprene Cyclohexane ND 0.50 Diethyl ether ND 0.50 Diisopropyl ether ND 0.50 Epichlorohydrin ND 0.50 Ethyl acetate ND 0.50 Ethyl methacrylate ND 2.5 Ethyl tert-butyl ether ND 0.50 Freon-113 ND 0.50 ND Isobutanol 10 Isopropyl acetate ND 0.50 Methacrylonitrile ND 2.5 Methyl acetate ND 0.50 Methyl ethyl ketone ND 2.5 Methyl isobutyl ketone ND 2.5 Methyl methacrylate ND 2.5 Methylcyclohexane ND 0.50 ND 0.50 n-Amyl acetate n-Hexane ND 0.50 Nitrobenzene ND 0.50 Pentachloroethane ND 0.50 p-isopropyltoluene ND 0.50 Propionitrile ND 2.5 Tetrahydrofuran ND 0.50 Benzene ND 0.50 Toluene ND 0.50 Ethylbenzene ND 0.50 Methyl tert-butyl ether (MTBE) ND 0.50 1,2,4-Trimethylbenzene ND 0.50 1,3,5-Trimethylbenzene ND 0.50 1,2-Dichloroethane (EDC) ND 0.50 1,2-Dibromoethane (EDB) ND 0.50 Naphthalene ND 0.50 Acetone ND 2.5 ND 0.50 Bromobenzene Bromodichloromethane ND 0.50 Bromoform ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 12 of 32

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.50 Bromomethane 2-Butanone ND 2.5 ND 0.50 Carbon disulfide Carbon Tetrachloride ND 0.50 Chlorobenzene ND 0.50 Chloroethane ND 0.50 Chloroform ND 0.50 ND 0.50 Chloromethane 2-Chlorotoluene ND 0.50 4-Chlorotoluene ND 0.50 cis-1,2-DCE ND 0.50 ND 0.50 cis-1,3-Dichloropropene 1,2-Dibromo-3-chloropropane ND 0.50 Dibromochloromethane ND 0.50 Dibromomethane ND 0.50 1,2-Dichlorobenzene ND 0.50 1,3-Dichlorobenzene ND 0.50 1,4-Dichlorobenzene ND 0.50 Dichlorodifluoromethane ND 0.50 ND 0.50 1.1-Dichloroethane 1,1-Dichloroethene ND 0.50 1,2-Dichloropropane ND 0.50 1,3-Dichloropropane ND 0.50 2,2-Dichloropropane ND 0.50 1,1-Dichloropropene ND 0.50 Hexachlorobutadiene ND 0.50 2-Hexanone ND 0.50 Isopropylbenzene ND 0.50 Methylene Chloride ND 2.5 n-Butylbenzene 0.50 ND n-Propylbenzene ND 0.50 sec-Butylbenzene ND 0.50 Styrene ND 0.50 tert-Butylbenzene ND 0.50 1,1,1,2-Tetrachloroethane ND 0.50 1,1,2,2-Tetrachloroethane ND 0.50 Tetrachloroethene (PCE) ND 0.50 trans-1,2-DCE ND 0.50 trans-1,3-Dichloropropene ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 13 of 32

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: R36648 RunNo: 36648 Prep Date: Analysis Date: 8/12/2016 SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 1,2,3-Trichlorobenzene ND 0.50 ND 1,2,4-Trichlorobenzene 0.50 ND 0.50 1,1,1-Trichloroethane 1,1,2-Trichloroethane ND 0.50 Trichloroethene (TCE) ND 0.50 Trichlorofluoromethane ND 0.50 1,2,3-Trichloropropane ND 0.50 Vinyl chloride ND 0.50 mp-Xylenes ND 1.0 o-Xylene ND 0.50 tert-Amyl methyl ether ND 0.50 tert-Butyl alcohol ND 0.50 Acrolein ND 2.5 Acrylonitrile ND 2.5 Bromochloromethane ND 0.50 2-Chloroethyl vinyl ether ND 0.50 ND 0.50 Iodomethane trans-1,4-Dichloro-2-butene ND 0.50 Vinyl acetate ND 0.50 1.4-Dioxane ND 0.50

Sample ID LCS-R36648	SampType: LCS TestCode: EPA Method 8260B: VOLATILES									
Client ID: LCSW	Batch	n ID: R3	6648	F	RunNo: 3	6648				
Prep Date:	Analysis D	ate: 8/	12/2016	S	SeqNo: 1	135034	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.1	0	10.00	0	90.7	80	120			
Toluene	9.4	0	10.00	0	94.5	80	120			
Ethylbenzene	9.6	0	10.00	0	96.4	80	120			
Chlorobenzene	9.1	0	10.00	0	91.2	80	120			
1,1-Dichloroethene	9.1	0	10.00	0	91.1	80	120			
Tetrachloroethene (PCE)	8.7	0	10.00	0	87.1	80	120			
Trichloroethene (TCE)	8.9	0	10.00	0	89.0	80	120			
o-Xylene	10	0	10.00	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Page 14 of 32

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA 8270C: Semivolatiles/Mod Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/17/2016 Prep Date: SeqNo: 1135037 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual N-Nitroso-di-n-butylamine ND 1.0 ND Acetophenone 10 ND 1-Methylnaphthalene 10 2,3,4,6-Tetrachlorophenol ND 10 2,4,5-Trichlorophenol ND 10 2,4,6-Trichlorophenol ND 10 2,4-Dichlorophenol ND 10 2,4-Dimethylphenol ND 10 2,4-Dinitrophenol ND 10 ND 2,4-Dinitrotoluene 10 2,6-Dinitrotoluene ND 10 ND 10 2-Chloronaphthalene 2-Chlorophenol ND 10 2-Methylnaphthalene ND 10 2-Methylphenol ND 10 2-Nitroaniline ND 10 2-Nitrophenol ND 10 3,3´-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 ND 10 4.6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 ND 4-Chloroaniline 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Anthracene ND 10 ND Benzo(g,h,i)perylene 1.0 ND Benz(a)anthracene 1.0 Benzo(a)pyrene ND 1.0 Benzo(b)fluoranthene ND 1.0 Benzo(k)fluoranthene ND 1.0 Bis(2-chloroethoxy)methane ND 10 Bis(2-chloroethyl)ether ND 10 Bis(2-chloroisopropyl)ether ND 10 Bis(2-ethylhexyl)phthalate ND 5.0 Butyl benzyl phthalate ND 10

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648	SampType: MBLK			Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	n ID: R3	6648	R	tunNo: 3	6648				
Prep Date:	Analysis D	Date: 8/	17/2016	S	SeqNo: 1	135037	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Carbazole	ND	10								
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	1.0								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	1.0								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodiphenylamine	ND	2.0								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	5.0								
Pyrene	ND	10								
o-Toluidine	ND	1.0								
Pyridine	ND	1.0								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID LCS-R36648	SampT	ype: LC	s	Tes						
Client ID: LCSW	Batch	1D: R3	6648	F	RunNo: 3	6648				
Prep Date:	Analysis D	ate: 8/	17/2016	5	SeqNo: 1	135038	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	4.6	0	5.000	0	91.8	49	134			
2-Chlorophenol	4.6	0	5.000	0	93.0	50	131			
4-Chloro-3-methylphenol	5.1	0	5.000	0	102	42	139			
4-Nitrophenol	4.7	0	5.000	0	94.2	19	137			
Acenaphthene	4.5	0	5.000	0	89.8	36	122			
Bis(2-ethylhexyl)phthalate	5.1	0	5.000	0	102	43	142			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-R36648	SampT	ype: LC	s	TestCode: EPA 8270C: Semivolatiles/Mod						
Client ID: LCSW	Batch	1D: R3	6648	R	RunNo: 3	6648				
Prep Date:	Analysis Date: 8/17/2016			S	SeqNo: 1	135038	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
N-Nitrosodi-n-propylamine	4.2	0	5.000	0	84.0	46	140			
Pentachlorophenol	2.2	0	5.000	0	45.0	22	138			
Phenol	4.7	0	5.000	0	93.4	45	134			
Pyrene	5.0	0	5.000	0	100	45	138			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26894 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129407 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-26894 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129408 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0053 0.00020 0.005000 0 105 80 120

Sample ID 1608660-001BMS SampType: MS TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129410 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 113 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129411 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 114 75 125 0.473 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-27020 SampType: MBLK TestCode: MERCURY, TCLP

Client ID: PBW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132320 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Mercury ND 0.020

Sample ID LCS-27020 SampType: LCS TestCode: MERCURY, TCLP

Client ID: LCSW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132321 Units: mg/L

Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte PQL Qual

Mercury ND 0.020 0.005000 0 98.1 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Reporting Detection Limit

P Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26942 SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW Batch ID: 26942 RunNo: 36611

Prep Date: 8/11/2016	Analysis	Date: 8/	18/2016	5	SeqNo: 1	134113	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								
Strontium	ND	0.010								
Thallium	ND	0.050								
Zinc	ND	0.020								
Silica	ND	1.1								

Sample ID LCS-26942	SampT	ype: LC	S	Test	tCode: El	PA 6010B:	Total Recover	able Meta	als	
Client ID: LCSW	Batch	n ID: 26 9	942	R	tunNo: 3	6611				
Prep Date: 8/11/2016	Analysis D	ate: 8/	18/2016	S	seqNo: 1	134115	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.52	0.020	0.5000	0	103	80	120			
Arsenic	0.49	0.020	0.5000	0	97.6	80	120			
Barium	0.48	0.020	0.5000	0	95.1	80	120			
Beryllium	0.51	0.0030	0.5000	0	101	80	120			
Cadmium	0.47	0.0020	0.5000	0	94.9	80	120			
Calcium	50	1.0	50.00	0	99.0	80	120			
Chromium	0.47	0.0060	0.5000	0	94.7	80	120			
Cobalt	0.46	0.0060	0.5000	0	91.2	80	120			
Copper	0.47	0.0060	0.5000	0	94.2	80	120			
Iron	0.47	0.050	0.5000	0	93.1	80	120			
Lead	0.46	0.0050	0.5000	0	92.8	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-26942	Samp	Type: LC	s	Tes	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID: LCSW	Bato	h ID: 26	942	R	tunNo: 3	6611					
Prep Date: 8/11/2016	Analysis	Date: 8/	18/2016	S	seqNo: 1	134115	Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Magnesium	50	1.0	50.00	0	99.0	80	120				
Manganese	0.47	0.0020	0.5000	0	93.4	80	120				
Nickel	0.45	0.010	0.5000	0	90.3	80	120				
Potassium	48	1.0	50.00	0	96.0	80	120				
Selenium	0.50	0.050	0.5000	0	99.0	80	120				
Silver	0.097	0.0050	0.1000	0	96.8	80	120				
Sodium	49	1.0	50.00	0	97.0	80	120				
Strontium	0.11	0.010	0.1000	0	110	80	120				
Thallium	0.49	0.050	0.5000	0	97.0	80	120				
Zinc	0.46	0.020	0.5000	0	91.0	80	120				
Silica	5.4	1.1	5.350	0	101	80	120				

Sample ID	1608660-001BMS	Samp	Туре: М	3	Tes	tCode: El	PA 6010B:	Total Recover	able Meta	als	
Client ID:	Wastewater Efflue	nt Bato	ch ID: 26	942	F	RunNo: 30	6611				
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	SeqNo: 1	134120	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.79	0.020	0.5000	0.2561	106	75	125			
Arsenic		0.52	0.020	0.5000	0.03115	98.4	75	125			
Barium		0.48	0.020	0.5000	0.01539	93.1	75	125			
Beryllium		0.49	0.0030	0.5000	0.0002600	97.2	75	125			
Cadmium		0.47	0.0020	0.5000	0	93.5	75	125			
Chromium		0.46	0.0060	0.5000	0	91.1	75	125			
Cobalt		0.45	0.0060	0.5000	0.002780	89.5	75	125			
Copper		0.51	0.0060	0.5000	0	101	75	125			
Lead		0.45	0.0050	0.5000	0	89.7	75	125			
Magnesium		90	1.0	50.00	41.34	97.7	75	125			
Manganese		0.61	0.0020	0.5000	0.1524	91.0	75	125			
Nickel		0.45	0.010	0.5000	0.01016	88.2	75	125			
Selenium		0.52	0.050	0.5000	0.03028	97.3	75	125			
Silver		0.097	0.0050	0.1000	0	97.3	75	125			
Thallium		0.48	0.050	0.5000	0	95.8	75	125			
Zinc		0.47	0.020	0.5000	0.02456	88.1	75	125			

Sample ID	1608660-001BMSD	SampType:	MSD	Tes	tCode: El	PA 6010B:	Total Recover	able Meta	als	
Client ID:	Wastewater Effluent	Batch ID:	26942	F	RunNo: 3	6611				
Prep Date:	ep Date: 8/11/2016 Analysis Date: 8/18/2016 SeqNo: 1134122 Units: mg/L									
Analyte	1	Result PC	QL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.80 0.0	0.5000	0.2561	108	75	125	1.20	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID	1608660-001BMS	D Samp	Туре: М\$	SD	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Wastewater Efflu	ent Bato	h ID: 26	942	RunNo: 36611						
Prep Date:	8/11/2016	8/11/2016 Analysis Date: 8/18/2016				SeqNo: 1134122 Units: mg					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.54	0.020	0.5000	0.03115	102	75	125	3.44	20	
Barium		0.48	0.020	0.5000	0.01539	93.8	75	125	0.725	20	
Beryllium		0.49	0.0030	0.5000	0.0002600	98.0	75	125	0.895	20	
Cadmium		0.48	0.0020	0.5000	0	95.7	75	125	2.34	20	
Chromium		0.47	0.0060	0.5000	0	93.8	75	125	2.88	20	
Cobalt		0.46	0.0060	0.5000	0.002780	92.2	75	125	2.97	20	
Copper		0.51	0.0060	0.5000	0	102	75	125	1.08	20	
Lead		0.46	0.0050	0.5000	0	92.1	75	125	2.73	20	
Magnesium		91	1.0	50.00	41.34	98.8	75	125	0.587	20	
Manganese		0.61	0.0020	0.5000	0.1524	91.8	75	125	0.656	20	
Nickel		0.46	0.010	0.5000	0.01016	90.5	75	125	2.44	20	
Selenium		0.52	0.050	0.5000	0.03028	97.8	75	125	0.514	20	
Silver		0.097	0.0050	0.1000	0	97.0	75	125	0.216	20	
Thallium		0.48	0.050	0.5000	0	95.2	75	125	0.572	20	
Zinc		0.48	0.020	0.5000	0.02456	90.6	75	125	2.56	20	
Sample ID	1608660-001BMS	Samp	Туре: М\$	3	Tes	Code: El	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	Wastewater Efflu	ent Bato	ch ID: 26	942	RunNo: 36611						
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	seqNo: 1	134131	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.9	75	125	72111		
Sample ID	Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals										
Client ID:	Wastewater Efflu		th ID: 26		RunNo: 36611						
Prep Date:	8/11/2016 Analysis Date: 8/18/2016				SeqNo: 1134132			Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.4	75	125	0.257	20	
Sample ID	MB-26942	Samp	Туре: МЕ	BLK	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	PBW	RunNo: 36628									

Qualifiers:

Analyte

Antimony

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix

Prep Date: 8/11/2016

H Holding times for preparation or analysis exceeded

Analysis Date: 8/19/2016

PQL

0.050

Result

ND

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits

SeqNo: 1134578

SPK value SPK Ref Val %REC LowLimit

Units: mg/L

HighLimit

%RPD

- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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RPDLimit

Qual

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID LCS-26942 SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134579 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Antimony 0.49 0.050 0.5000 97.9 80 120 0

Sample ID 1608660-001BMS SampType: MS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Wastewater Effluent Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134583 Units: mg/L

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Antimony 0.49 0.050 0.5000 0 97.2 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals

Client ID: **Wastewater Effluent** Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134584 Units: mg/L

Result **PQL** SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual Analyte LowLimit

Antimony 0.49 0.050 0.5000 0 98.5 75 125 1.33 20

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

ND

ND

ND

ND

ND

0.0020

0.010

0.050

0.0050

0.050

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26961 SampType: MBLK TestCode: EPA 6010B: TCLP Metals Client ID: **PBW** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130431 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.020 Aluminum Antimony ND 0.050 Arsenic ND 0.020 Barium ND 0.020 Beryllium ND 0.0030 Cadmium ND 0.0020 Chromium ND 0.0060 ND 0.0060 Cobalt Copper ND 0.0060 Lead ND 0.0050

 Vanadium
 ND
 0.050

 Sample ID
 LCS-26961
 SampType: LCS
 TestCode: EPA 6010B: TCLP Metals

 Client ID:
 LCSW
 Batch ID: 26961
 RunNo: 36503

 Prep Date:
 8/12/2016
 Analysis Date: 8/15/2016
 SeqNo: 1130432
 Units: mg/L

 Analyte
 Result
 PQL
 SPK value
 SPK Ref Val
 %REC
 LowLimit
 HighLimit
 %RPD
 RPDLimit
 Qual

 Aluminum
 0.51
 0.020
 0.5000
 0
 98.3
 80
 120

 Antimony
 0.49
 0.050
 0.5000
 0
 98.3
 80
 120

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.51	0.020	0.5000	0	103	80	120			
Antimony	0.49	0.050	0.5000	0	98.3	80	120			
Arsenic	0.48	0.020	0.5000	0	95.2	80	120			
Barium	0.46	0.020	0.5000	0	93.0	80	120			
Beryllium	0.49	0.0030	0.5000	0	97.7	80	120			
Cadmium	0.47	0.0020	0.5000	0	94.7	80	120			
Chromium	0.47	0.0060	0.5000	0	93.1	80	120			
Cobalt	0.46	0.0060	0.5000	0	91.2	80	120			
Copper	0.48	0.0060	0.5000	0	95.2	80	120			
Lead	0.46	0.0050	0.5000	0	92.1	80	120			
Manganese	0.46	0.0020	0.5000	0	92.3	80	120			
Nickel	0.46	0.010	0.5000	0	92.0	80	120			
Selenium	0.49	0.050	0.5000	0	97.2	80	120			
Silver	0.096	0.0050	0.1000	0	95.6	80	120			
Thallium	0.47	0.050	0.5000	0	93.1	80	120			
Vanadium	0.49	0.050	0.5000	0	98.0	80	120			

Qualifiers:

Manganese

Nickel

Silver

Selenium

Thallium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMS SampType: MS TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36503

Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130536 Units: mg/L

Analysis	Date: 8/	15/2016	٤	seqNo: 1	130536	Units: mg/L			
Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
0.78	0.020	0.5000	0.2003	116	75	125			
0.50	0.050	0.5000	0	101	75	125			
0.53	0.020	0.5000	0.02818	101	75	125			
0.48	0.020	0.5000	0.01425	92.4	75	125			
0.49	0.0030	0.5000	0.0004400	97.1	75	125			
0.48	0.0020	0.5000	0	95.8	75	125			
0.46	0.0060	0.5000	0	92.3	75	125			
0.46	0.0060	0.5000	0.001460	91.1	75	125			
0.51	0.0060	0.5000	0	102	75	125			
0.46	0.0050	0.5000	0.003590	90.5	75	125			
0.61	0.0020	0.5000	0.1322	95.0	75	125			
0.47	0.010	0.5000	0.009620	92.8	75	125			
0.56	0.050	0.5000	0.03775	105	75	125			
0.098	0.0050	0.1000	0	97.9	75	125			
0.50	0.050	0.5000	0.006750	98.8	75	125			
	Result 0.78 0.50 0.53 0.48 0.49 0.46 0.46 0.51 0.46 0.61 0.47 0.56 0.098	Result PQL 0.78 0.020 0.50 0.050 0.53 0.020 0.48 0.020 0.49 0.0030 0.48 0.0020 0.46 0.0060 0.51 0.0060 0.46 0.0050 0.61 0.0020 0.47 0.010 0.56 0.050 0.098 0.0050	0.78 0.020 0.5000 0.50 0.050 0.5000 0.53 0.020 0.5000 0.48 0.020 0.5000 0.49 0.0030 0.5000 0.48 0.0020 0.5000 0.46 0.0060 0.5000 0.51 0.0060 0.5000 0.46 0.0050 0.5000 0.61 0.0020 0.5000 0.47 0.010 0.5000 0.56 0.050 0.5000 0.098 0.0050 0.1000	Result PQL SPK value SPK Ref Val 0.78 0.020 0.5000 0.2003 0.50 0.050 0.5000 0 0.53 0.020 0.5000 0.01425 0.48 0.020 0.5000 0.0004400 0.48 0.0020 0.5000 0 0.46 0.0060 0.5000 0 0.46 0.0060 0.5000 0.001460 0.51 0.0060 0.5000 0.001460 0.46 0.0050 0.5000 0.003590 0.61 0.0020 0.5000 0.01322 0.47 0.010 0.5000 0.009620 0.56 0.050 0.5000 0.03775 0.098 0.0050 0.1000 0	Result PQL SPK value SPK Ref Val %REC 0.78 0.020 0.5000 0.2003 116 0.50 0.050 0.5000 0 101 0.53 0.020 0.5000 0.02818 101 0.48 0.020 0.5000 0.01425 92.4 0.49 0.0030 0.5000 0.0004400 97.1 0.48 0.0020 0.5000 0 95.8 0.46 0.0060 0.5000 0 92.3 0.46 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.003590 90.5 0.61 0.0020 0.5000 0.003590 90.5 0.47 0.010 0.5000 0.009620 92.8 0.56 0.050 0.5000 0.03775 105 0.098 0.0050 0.1000 0 97.9	Result PQL SPK value SPK Ref Val %REC LowLimit 0.78 0.020 0.5000 0.2003 116 75 0.50 0.050 0.5000 0 101 75 0.53 0.020 0.5000 0.02818 101 75 0.48 0.020 0.5000 0.01425 92.4 75 0.49 0.0030 0.5000 0.0004400 97.1 75 0.48 0.0020 0.5000 0 95.8 75 0.46 0.0060 0.5000 0 92.3 75 0.46 0.0060 0.5000 0.001460 91.1 75 0.51 0.0060 0.5000 0 102 75 0.46 0.0050 0.5000 0 102 75 0.46 0.0050 0.5000 0.003599 90.5 75 0.61 0.0020 0.5000 0.1322 95.0 75 0.47 <t< td=""><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0.001460 91.1 75 125 0.51 0.0060 0.5000 0.003590 90.5 75 125 0.46 0.0050 0.5000 0.003590</td><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.46 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0.003590<</td><td>Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.51 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0 102 75 125 0.46 0.0050 0.5000<!--</td--></td></t<>	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0.001460 91.1 75 125 0.51 0.0060 0.5000 0.003590 90.5 75 125 0.46 0.0050 0.5000 0.003590	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.46 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0.003590<	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.51 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0 102 75 125 0.46 0.0050 0.5000 </td

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals Client ID: **Wastewater Effluent** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130537 Units: mg/L %RPD SPK value SPK Ref Val %REC LowLimit HighLimit **RPDLimit** Analyte Result PQL Qual 0.79 0.020 0.5000 0.2003 118 75 125 1.17 20 Aluminum 0.47 0.050 0.5000 0 94.6 75 125 6.35 20 **Antimony** 0.5000 0.02818 99.4 75 Arsenic 0.53 0.020 125 1.25 20 0.5000 0.01425 93.4 75 Barium 0.48 0.020 125 1.05 20 Beryllium 0.49 0.0030 0.5000 0.0004400 97.9 75 125 0.828 20 95.9 Cadmium 0.48 0.0020 0.5000 75 125 0.169 20 Chromium 0.46 0.0060 0.5000 0 92.2 75 125 0.119 20 Cobalt 0.46 0.0060 0.5000 0.001460 91.6 75 125 0.583 20 20 104 75 Copper 0.52 0.0060 0.5000 125 1.52 0.46 0.0050 0.5000 0.003590 90.6 75 125 0.0438 20 Lead 0.62 0.0020 0.5000 97.0 75 20 Manganese 0.1322 125 1.70

Qualifiers:

Nickel

Silver

Selenium

Vanadium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

0.47

0.53

0.10

0.51

0.010

0.050

0.0050

0.050

0.5000

0.5000

0.1000

0.5000

0.009620

0.006750

0.03775

0

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

75

75

75

125

125

125

125

0.0190

6.15

2.01

1.05

E Value above quantitation range

92.8

97.9

99.8

99.9

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Project:	ū	tefining Co ater Efflue									
Sample ID	1608660-001CMS	Tes	tCode: El	PA 6010B:	TCLP Metals						
Client ID:	Wastewater Effluent Batch ID: 26961			F	RunNo: 3	6503					
Prep Date:	8/12/2016	Analysis D	ate: 8 /	15/2016	5	SeqNo: 1	130575	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.54	0.25	0.5000	0	107	75	125	70.1.1.2	- 11 - 2 - 11 - 11	
Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals											
Client ID:	Wastewater Efflu	•	າ ID: 26			RunNo: 3		. OZ. motaro			
Prep Date:	8/12/2016	Analysis D)ate: 8 /	/15/2016	5	SeqNo: 1	130576	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.50	0.25	0.5000	0	100	75	125	11.2	20	Quai
Sample ID	MR-26961	SamnT	ype: MI	RI K	Tes	tCode: F I	PΔ 6010R+ '	TCI P Motals			
Client ID:	PBW	961	TestCode: EPA 6010B: TCLP Metals RunNo: 36584								
Prep Date:		Analysis D				132791					
	0/12/2010	•				·		Units: mg/L	0/ DDD	DDDI (m)	01
Analyte Calcium		Result ND	PQL 1.0	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron		ND	0.050								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Sodium		ND	1.0								
Sample ID	LCS-26961	SampT	ype: LC	:s	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	LCSW	Batch	n ID: 26	961	F	6584					
Prep Date:	8/12/2016	Analysis D)ate: 8	17/2016	SeqNo: 1132792 Units: mg/L						
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		50	1.0	50.00	0	101	80	120			
Iron		0.50	0.050	0.5000	0	99.4	80	120			
Magnesium		50	1.0	50.00	0	99.7	80	120			
Potassium		48	1.0	50.00	0	97.0	80	120			
Sodium		49	1.0	50.00	0	98.4	80	120			
Sample ID	1608660-001CMS	SampT	уре: М	<u> </u>	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflu	ent Batch	n ID: 26	961	RunNo: 36584						
Prep Date:	8/12/2016	Analysis D	oate: 8,	17/2016	S	SeqNo: 1	132798	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Magnesium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

90

1.0

50.00

35.08

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

125

E Value above quantitation range

110

J Analyte detected below quantitation limits

D. Camala all Nat la Danas

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

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22-Aug-16

Project:	· ·	ater Effluer										
Sample ID	1608660-001CMSI	SampT	ype: MS	SD.	TestCode: EPA 6010B: TCLP Metals							
Client ID:	Wastewater Efflue	961	R	RunNo: 36584								
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	S	SeqNo: 1	132799	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Magnesium		87	1.0	50.00	35.08	104	75	125	3.07	20		
Sample ID	1608660-001CMS	SampT	/pe: MS	;	Tes	tCode: El	PA 6010B: ⁻	TCLP Metals				
Client ID:	Wastewater Effluent Batch ID: 26961				R	RunNo: 30	6584					
Prep Date:	e: 8/12/2016 Analysis Date: 8/17/2016			8	SeqNo: 1	132804	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Potassium		110	5.0	50.00	59.21	104	75	125				
Sample ID	1608660-001CMSI	SampT	ype: MS	SD	Tes	tCode: El	PA 6010B: ⁻	TCLP Metals				
Client ID:	Wastewater Effluent Batch ID: 26961				RunNo: 36584							
Prep Date:	: 8/12/2016 Analysis Date: 8/17/2016				9	SeqNo: 1	132805					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Potassium		110	5.0	50.00	59.21	93.6	75	125	4.76	20		
Sample ID	MB-26961	SampT	ype: ME	3LK	TestCode: EPA 6010B: TCLP Metals							
Client ID:	PBW	Batch	ID: 26	961	RunNo: 36591							
Prep Date:	8/12/2016	Analysis Da	ate: 8/	18/2016	SeqNo: 1133361 Units: mg/L							
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		ND	0.020									
Sample ID	LCS-26961	SampT	ype: LC	.s	TestCode: EPA 6010B: TCLP Metals							
Client ID:	LCSW	Batch	ID: 26	961	RunNo: 36591							
Prep Date:	8/12/2016	Analysis Da	ate: 8/	18/2016	S	SeqNo: 1	133362	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		0.47	0.020	0.5000	0	93.6	80	120				
Sample ID	1608660-001CMS	SampT	/pe: MS		TestCode: EPA 6010B: TCLP Metals							
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	R	RunNo: 30	6591					
Prep Date:	8/12/2016	Analysis D	ate: 8/	18/2016	S	SeqNo: 1	133467	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		0.50	0.020	0.5000	0.02262	95.6	75	125				

Qualifiers:

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

E Value above quantitation range

J

Analyte detected below quantitation limits

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36591

Prep Date: **8/12/2016** Analysis Date: **8/18/2016** SeqNo: **1133468** Units: **mg/L**

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Zinc 0.49 0.020 0.5000 0.02262 92.8 75 125 2.78 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: CYANIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135042 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive ND 1.00

Sample ID LCS-R36648 SampType: LCS TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135043 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive 0.578 0.5000 0 116 80 120

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

quantitation limits Page 29 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

D 20 (

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: SULFIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135045 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Reactive Sulfide ND 1.0

Sample ID LCS-R36648 SampType: LCS TestCode: SULFIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135046 Units: mg/L

Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Qual

Reactive Sulfide 0.20 0.2000 0 100 70 130

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID mb-1 SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131152 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID Ics-1 SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131153 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 79.40 20.00 80.00 0 99.2 90 110

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

D C 1 HN / I D

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-26968 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 26968 RunNo: 36519

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130783 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Total Dissolved Solids ND 20.0

Sample ID LCS-26968 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 26968 RunNo: 36519

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130784 Units: mg/L

SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result PQL Qual

Total Dissolved Solids 994 20.0 1000 0 99.4 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO RÈFINING COM Work Order Number: 1608660 RcptNo: 1 Received by/date: Logged By: Lindsay Mangin 8/11/2016 9:05:00 AM Completed By: Lindsay Mangin 8/11/2016 10:45:24 AM Reviewed By: 08/11/16 Chain of Custody 1 Custody seals intact on sample bottles? Yes No 🗌 Not Present 2. Is Chain of Custody complete? No 🗌 Yes 🐼 Not Present 3 How was the sample delivered? Courier Log In 4. Was an attempt made to cool the samples? Yes 🗌 No ... NA 🛷 5. Were all samples received at a temperature of >0° C to 6.0°C No 🗌 NA 🜌 Yes 🗔 Sample(s) in proper container(s)? No 🗆 Yes 7. Sufficient sample volume for indicated test(s)? Yes 🐼 No 8. Are samples (except VOA and ONG) properly preserved? No \square Yes 9. Was preservative added to bottles? No 🐼 NA 🗌 Yes 📙 10.VOA vials have zero headspace? No VOA Vials Yes 🕏 No 🗀 11. Were any sample containers received broken? No 🛷 Yes # of preserved bottles checked 12. Does paperwork match bottle labels? Yes 🖈 No 🛄 for pH: (Note discrepancies on chain of custody) inless noted) Adjusted⁴ 13. Are matrices correctly identified on Chain of Custody? No [14 Is it clear what analyses were requested? No 🗌 Yes 15. Were all holding times able to be met? Checked by: Yes 🖈 No 🗌 (If no, notify customer for authorization.) Special Handling (if applicable) Yes 16. Was client notified of all discrepancies with this order? No 🗌 NA 🐼 Person Notified: Date: By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition Seal Intact | Seal No Seal Date Signed By 1.5 Good

ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 www.hallenvironmental.com Fax 505-345-4107 Analysis Request 1151 borleM 846 Method 1311 TCLP Metals, only I40 CFR Part Remarks: Send results to Robert Combs Ca, K, Mg, Na/40 CFR 136.3 × 7470 (see attached list 'Metals') Tel. 505-345-3975 Metals/SW-846 Mthd 6010, R,C,I/40 CFR part 261 see attached list 'SVOCs') SVOCs/SW-846 Method 8270D (see attached list 'VOCs') VOCs/SW-846 Method 8260C Cation/anion bal., Br, Eh/40 Specific Gravity, HCO3, CO3, CI, SO4, TDS, pH, cond., FI, 805 Robert Combs Waste Water Effluent 8-10-16 Brady Hubbard X Rush Preservative Neat/H2SO4 Project #: P.O. # 167796 Sample Temperature: HN03 Neat Neat Neat Project Manager: 건 Neat Project Name Container Type and # □ Standar Received by Received by Sampler: On Ice ო and ന N Ç Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Sample Request ID Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 □ Level 4 (Full Validation) Waste Water Effluent 8-10-16 CHAIN-UI-CHOICOLY DECOIL Relinquished by: Bred, (L.SLA) Mailing Address: P.O. Box 159 Artesia email or Fax#: 575-746-5451 Matrix Client: Navajo Refining Co. Liquid Liquid Liquid Liquid Liquid Liquid Liguid Phone #: 575-748-3311 Time 8-10-16 4:00 10.55 10.55 10:55 10:55 10:55 10:55 10.55 NM 88211-0159 □ Other □ EDD (Type) QA/QC Package: □ Standard 8/10/16 8/10/16 8/10/16 8/10/16 Date 8/10/16 8/10/16 8/10/16

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

April 28, 2017

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: 2016 Effluent PL Release OrderNo.: 1704B56

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 8 sample(s) on 4/27/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109

Analytical Report Lab Order 1704B56

Date Reported: 4/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: SP-1 Test 1

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-005
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.32	0.10	mg/L	1	4/27/2017 3:39:39 PM
Chloride	110	10	mg/L	20	4/27/2017 4:16:53 PM
Sulfate	410	50	* mg/L	20	4/27/2017 4:16:53 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	ND	0.050	mg/L	1	4/28/2017 4:02:23 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 1 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1704B56**Date Reported: **4/28/2017**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: SP-2 Test 2

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-006
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.55	0.10	mg/L	1	4/27/2017 4:29:18 PM
Chloride	91	10	mg/L	20	4/27/2017 4:41:43 PM
Sulfate	260	50	* mg/L	20	4/27/2017 4:41:43 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	ND	0.050	mg/L	1	4/28/2017 4:13:32 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: * Valu

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1704B56

Date Reported: 4/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: SP-3 Test 3

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-007
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Result **PQL Qual Units** DF **Date Analyzed** Analyses **EPA METHOD 300.0: ANIONS** Analyst: MRA Fluoride 0.62 0.10 1 4/27/2017 4:54:07 PM mg/L Chloride 0.50 4/27/2017 4:54:07 PM 3.5 mg/L 1 Sulfate ND 50 mg/L 20 4/27/2017 5:06:31 PM **EPA METHOD 6010B: SPLP METALS** Analyst: JLF 4/28/2017 4:15:03 PM Iron 3.6 0.050 mg/L 1

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1704B56**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/28/2017

CLIENT: Navajo Refining Company

Client Sample ID: SP-3 Test 4

 Project:
 2016 Effluent PL Release
 Collection Date: 4/27/2017 8:00:00 AM

 Lab ID:
 1704B56-008
 Matrix: LEACHATE
 Received Date: 4/27/2017 8:15:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MRA
Fluoride	0.65	0.10	mg/L	1	4/27/2017 5:43:44 PM
Chloride	82	10	mg/L	20	4/27/2017 5:56:09 PM
Sulfate	64	50	mg/L	20	4/27/2017 5:56:09 PM
EPA METHOD 6010B: SPLP METALS					Analyst: JLF
Iron	0.25	0.050	mg/L	1	4/28/2017 4:16:09 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 6
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B56**

28-Apr-17

Client: Navajo Refining Company
Project: 2016 Effluent PL Release

Sample ID MB-SPLP 2996 SampType: mblk TestCode: EPA Method 300.0: Anions

Client ID: PBW Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333857 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

 Fluoride
 ND
 0.10

 Chloride
 ND
 0.50

 Sulfate
 ND
 2.5

Sample ID LCS-SPLP 2996 SampType: Ics TestCode: EPA Method 300.0: Anions

Client ID: LCSW Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333858 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 97.7 Fluoride 0.49 0.10 0.5000 0 90 110 Chloride 4.7 0.50 5.000 0 94.7 90 110 Sulfate 2.5 10.00 0 100 90 110 10

Sample ID 1704B56-005AMS SampType: ms TestCode: EPA Method 300.0: Anions

Client ID: SP-1 Test 1 Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333860 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Fluoride 0.89 0.10 0.5000 0.3220 114 70.4 122

Sample ID 1704B56-005AMSD SampType: msd TestCode: EPA Method 300.0: Anions

Client ID: SP-1 Test 1 Batch ID: R42410 RunNo: 42410

Prep Date: Analysis Date: 4/27/2017 SeqNo: 1333861 Units: mg/L

%REC %RPD **RPDLimit** Analyte Result POI SPK value SPK Ref Val LowLimit HighLimit Qual Fluoride 0.89 0.10 0.5000 0.3220 114 70.4 0.0705 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 5 of 6

Hall Environmental Analysis Laboratory, Inc.

WO#: **1704B56**

28-Apr-17

Client: Navajo Refining Company
Project: 2016 Effluent PL Release

Sample ID MB-31484 SampType: MBLK TestCode: EPA Method 6010B: SPLP Metals

Client ID: PBW Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334411 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron ND 0.050

Sample ID LCS-31484 SampType: LCS TestCode: EPA Method 6010B: SPLP Metals

Client ID: LCSW Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334412 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron 0.51 0.050 0.5000 0 101 80 120

Sample ID 1704B56-005BMSD SampType: MSD TestCode: EPA Method 6010B: SPLP Metals

Client ID: SP-1 Test 1 Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334415 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Iron 0.50 0.050 0.5000 0 100 75 125 0.405 20

Sample ID 1704B56-005BMS SampType: MS TestCode: EPA Method 6010B: SPLP Metals

Client ID: SP-1 Test 1 Batch ID: 31484 RunNo: 42444

Prep Date: 4/28/2017 Analysis Date: 4/28/2017 SeqNo: 1334416 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

lron 0.50 0.050 0.5000 0 101 75 125

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Page 6 of 6



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

NAVAJO REFINING CO Client Name: Work Order Number: 1704B56 RcptNo: 1 Received By: Erin Melendrez 4/26/2017 9:35:00 AM Completed By: **Ashley Gallegos** 4/26/2017 10:02:17 AM SRC 04/26/17 Reviewed By: Chain of Custody No 🗌 1. Custody seals intact on sample bottles? Yes Not Present 🗸 No 🗌 Yes 🗸 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In No 🗆 Yes 🗸 NA 🗌 4. Was an attempt made to cool the samples? 5. Were all samples received at a temperature of >0° C to 6.0°C NA 🗌 Yes 🔽 No 🗌 Yes 🗹 Sample(s) in proper container(s)? No 🗆 7. Sufficient sample volume for indicated test(s)? Yes 🗸 No 🗌 No 🗌 Yes 🗸 8. Are samples (except VOA and ONG) properly preserved? Yes No 🗹 NA 🗌 9. Was preservative added to bottles? No VOA Vials No 🗌 10.VOA vials have zero headspace? Yes Yes \square No 🗸 11. Were any sample containers received broken? # of preserved bottles checked 12. Does paperwork match bottle labels? Yes 🗸 No 🗌 for pH: (<2 or >12 unless noted) (Note discrepancies on chain of custody) Adjusted? Yes 🔽 No 🗆 13. Are matrices correctly identified on Chain of Custody? Yes 🗸 No 🗌 14. Is it clear what analyses were requested? 15. Were all holding times able to be met? Yes 🗹 No Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) 16. Was client notified of all discrepancies with this order? Yes No 🗀 NA 🔽 Person Notified: Date By Whom: Via: eMail Phone Fax Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No | Temp ºC | Condition Seal Intact | Seal No Seal Date 4.1 Good

10 10 10 10 10 10 10 10	Client: HollyFrontier Na	HollyFrontier Navajo Refining LLC	Standard	□ Rush X		HALI	HALL ENVIRONMENTAL ANALYSIS LABORATORY
Froject #: Project Manager: Rethert Combs Scott Denton Sampler: Project Manager: X Level 4 (Full Validation) Sampler: Project Manager: Rethert Combs Scott Denton Dave Boyer Line Matrix Sample Request ID Project Manager: A-C Cold Container: A-C Cold Container: A-C Cold			Project Name	2016 Effluent	PL Release	www.ha	allenvironmental.com
Time Reinthorn Seminary Project Manager The Second State Project Manager Project Manager Project Manager Scott Denton		x 159				4901 Hawkins NE	- Albuquerque, NM 87109
Sample Sevel 4 (Full Validation) Sample Revert Combs Soot Denton	Artesia	, NM 88211-0159	Project #:			Tel. 505-345-3975	Fax 505-345-4107
Scott Denton Samples Samp		8-2718		PO: 231642			Ana
Time Reinhams by Sample Record of the Scott Device Sample Sam	Fax#:		Project Manag		Robert Combs		
Time Matrix Sample Request ID Container Preservative HEAL No. Collision Container Preservative HEAL No. Collision	Package: d	X Level 4 (Full Validation)			scott Denton		
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	Time.	July pour					

I necessary, sar plas submitted to Hall Environmental may be subconfieded to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be planty on the ensiytical report.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Tuesday, November 15, 2016 3:19 PM

To: Combs, Robert (Robert.Combs@hollyfrontier.com)

Cc: Holder, Mike (Michael.Holder@hollyfrontier.com); Denton, Scott (Scott.Denton@HollyFrontier.com);

Griswold, Jim, EMNRD

Subject: Artesia Refinery (GW-28) 2015 Effluent Pipeline Release

Robert, et al.:

Good afternoon. The New Mexico Oil Conservation Division (OCD) has re-evaluated the release information from the July 27, 2016 Investigation Report, subsequent to the telephone communication call on Nov. 9th. OCD comments and requirements are provided below based on a review of information to date.

OCD comments:

- 1) The water table is less than 10 ft. bgl and the release location is within the Pecos River Flood Plain Watershed area.
- 2) The soil removed to repair the line is estimated to be 50-60 cubic yards, and were not sampled for waste determination because HF was not convinced that the removed sols were actually waste. The excavated soils are stockpiled on land surface, and clean fill was used to backfill the excavation area.
- 3) Two soil borings were advanced (TMW-WWL1 and TMW-WWL2) in areas believed to have been unimpacted by the pipeline release with soil samples taken at depths of 1, 6 and 12 feet bgs in each boring. The 12 foot samples would have been in the capillary fringe or saturated zone. Those soil samples were analyzed for the constituents provided in Table 2. These "background" soils appear elevated in iron and sulfate, at a minimum. No sampling was done upon the 50 to 60 yards of excavated soils and no sampling was done on the sides or at the base of the excavation.
- 4) The approach used on this 2015 effluent line release appears to be what is also needed on 2016 effluent pipeline release; however, OCD requires sampling along the sidewalls and base of excavations in order to verify soil remediation is acceptable, and the waste must also be sampled for a waste determination. Consequently, HF must not re-emplace excavated soils back into the excavation until the analytical data is reviewed and a determination is made by OCD.
- 5) OCD generally relies on soil screening limits DAF1 and DAF20 for evaluation of soil contamination and protection of groundwater when and where feasible. Establishment of background soil quality does simplify the final cleanup criteria for parameters lacking a DAF1 or DAF20.
- 6) For soil reuse proposals related to the effluent pipeline, submittals to OCD is in order. OCD will likely use a similar approach as the NMED for final determination.

OCD requirements:

- 1) OCD requires that the excavated soils be sampled and similarly analyzed for the constituents in Table 2. OCD requires at least 3 discreet grab samples (no composites), one sample for every ~20 yards of material. Environmental analyses shall consist of Organics by Method 8260 full list; Method 8015 extended range; Iron and Manganese by Method 6010; along with Chloride, Fluoride, and Sulfate by Method 300. If the excavation is still open, a sample from the base of excavation should also be collected and analyzed.
- 2) HF shall submit the environmental analytical data with QA/QC to OCD to compare with the background information to decide on the next step (if any) on or before December 31, 2016.

3)	HF shall	follow EPA	A QA/QC and	d DQOs for all	I field and	laboratory work.
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Please contact me if you have questions. Thank you.

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Dissolved Metals (mg/L)	CGWSL	CGWSL Source	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Sampled	Detected x	ceedances
Numinum, Dissolved	5.00E+00	NMED GW Irrigation (20.6.2.3103.C)	0.0265		0.00848		0.00888	0.00865			0.00714		0.349		0.0126			0.0289	0.0184		0.0298		0.00796	0.00992	0.0103	1				0.00668	0.00529		0.0567	31	1 27	0
rsenic, Dissolved	1.00E-02		0.00561				0.00499					0.00274	0.00502		0.00535	0.00526			0.00367	0.00559	0.00347		0.0146	0.0156	0.0125				0.00438		0.0025					4
arium, Dissolved		NMED GW Human Health (20.6.2.3103.A)		0.0129						0.0106	0.011		0.0111		0.00928			0.0235				0.0145		0.0099	0.00964						0.0464					0
oron, Dissolved		NMED GW Irrigation (20.6.2.3103.C)	0.139	0.101	0.132	0.816	0.865	0.635	0.605	0.782	0.858	0.22	0.238	0.281	0.304	0.307	0.312	0.207	0.175	0.202	0.204	0.226	0.23	0.307	0.288	0.0987	0.13	0.183	0.219	0.143	0.104	0.0934	0.109			4
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aldium, Dissolved			600	576	672		518	495	511	622	606	624	578	631	588	616	606	568	524	550	556	563	530	543	532	494	491	635	551	625	397	410		31 31		0
hromium, Dissolved obalt, Dissolved	5.00E-02	NMED GW Human Health (20.6.2.3103.A) NMED GW Irrigation (20.6.2.3103.C)	0.00738	0.00451	0.00718	0.00119	0.0029	-	-	 			0.00119					0.00256							0.00105	0.000871		-	0.00116	-	-	0.00114	1	31	1 5	0
		NMED GW Irrigation (20.6.2.3103.C)	0.00/36	0.00451	0.00/18		0.0029	0.00151		1			0.00176					0.00236			0.00345	0.00156	0.00156		0.00338	0.0008/1	0.00137	1	0.00311	0.00177	!	1	0.00218	31	1 14	0
		NMED GW Irrigation (20.6.2.3103.C)			0.00197	0.167	0.00704	0.00131		1			0.201			0.132		0.0141		_	0.00343	0.00130	0.00130		0.179	0.00303	0.00137		0.185	0.001//		1-	0.113	31		n
ad, Dissolved	1.50E-02																				0.00125				0.00107									31	1 2	ō
inganese, Dissolved		NMED GW Domestic (20.6.2.3103.B)	1.51	0.844	1.42	0.035	0.255	0.023	0.0267	0.0362	0.0249	0.0437	0.0342	0.00366	0.00478	0.00576	0.0092	0.108	0.00978	0.00502	0.00982	0.0232			0.00526	0.0424			0.00459				0.0111	31	1 24	4
ercury, Dissolved	2.00E-03	NMED GW Human Health (20.6.2.3103.A)										0.000131	0.000046	0.00006	0.000061							0.000042												31	1 5	0
olybdenum, Dissolved	1.00E+00	NMED GW Irrigation (20.6.2.3103.C)	0.0103	0.00978	0.0116	0.00815	0.00877	0.00723	0.0075	0.00663	0.00738	0.00348	0.00308	0.003	0.00304	0.00336	0.0035	0.0112	0.00664	0.014	0.0114	0.0195	0.0179	0.0162	0.0141	0.0083	0.00745	0.00846	0.00861	0.0125	0.00622	0.00604	4 0.00815	31	1 31	0
kel, Dissolved	2.00E-01	NMED GW Irrigation (20.6.2.3103.C)	0.00651							0.00208	0.00206		0.00204	0.00112	0.00115	0.00144		0.00413		0.00189	0.00305	0.00173	0.00184		0.00214	0.00174		0.0014	0.00222	0.00264		0.00329			1 28	0
tassium, Dissolved			2.86				1.78	0.766	0.78	0.782	0.709	1.06	1.38	1.22	1.21	1.37	1.3	6.92	4.37		7.54	7.95	7.2	7.69	6.92	0.87		0.993	1.1	4.41	2.91	2.72				0
lenium, Dissolved		NMED GW Human Health (20.6.2.3103.A)	0.00222	0.00636	0.00245	0.00451	0.0081	0.00734	0.00654	0.00568	0.00506	0.00203	0.00733	0.00558	0.00493	0.00582	0.00611	0.00427	0.00585	0.00316	0.0038	0.00861	0.0127	0.0129	0.00327	0.00246	0.00506	0.0066	0.00144	0.013	0.0075	0.00669	0.00481			0
lver, Dissolved	5.00E-02	NMED GW Human Health (20.6.2.3103.A)	L							I																I	1	L	L		L	I		31		0
odium, Dissolved		l		123			199	201	206		261	206		230	235	235	235	176	160	118	115	218	229	215	163	127		133	98.8		40.4	45.7	83.9	31		0
ranium		NMED GW Human Health (20.6.2.3103.A)		0.0108	0.0138				0.0825		0.0874	0.0331	0.0343	U.U388	0.04	0.0387		0.0263	0.0247		0.0182	0.037	0.033	0.0395	0.0311	0.0244	0.0222	0.0275		0.00601	0.00516	0.00077	0.00000	31		16
	1.00≿+01	NMED GW Domestic (20.6.2.3103.B)	0.00343		1	0.0806	0.00973		0.00821		0.0257					0.0218	0.0311	0.0123		0.00266	0.0343				0.0407		1		0.0241	0.0132	0.00516	0.00672	0.00909	31	1 16	U
nions (mg/L) nloride	2 505 : 02	NMED GW Domestic (20.6.2.3103.B)	150	150	199	422	422	264	272	530	428	389	330	339	244	331	331	154	137	71	92.4	296	287	132	90.1	116	110	244	185	67.5	38.2	61.1	134	31	1 31	14
uoride (F-, Anion)		NMED GW Human Health (20.6.2.3103.A)		1.91			1.1	1.15		0.845	1.36	1.31	1.19	1.11	1.17	1.51	1.61	2 77	2.29	2.8	3 05	5.16	5.39	4.48						3.32	2.15	2.26		31		20
itrate/Nitrite	1.00ET00	THE CAN HUMBH HEBIUT (20.0.2.3103.A)	1.70	1.91	1.02	1.3/	1.1	1.13	1.10	0.073	1.30	1.31	1.19	1.11	1.1/	0.487	0.457	2.73	2.23	2.0	3.93	3.10	2.09	4.40	0.78	2.30	1.91	2.20	3.17	3.32	2.13	2.20	1.06	31		0
itrate/Nitrite	1.00E+00	NMED GW Human Health (20.6.2.3103.A)	1.43	_	+		0.821	 	 			1.37				0.40/	0.73/			_		2,39	2.03			2.35	1.71	1	1	3.22	2.11	1	1.00	31		5
itrite			2.73	1	1		0.021	1	1	1		1.07						t				2.00				2.00	1	1	1		1	1	1	31		ő
ilfate	6.00E+02	NMED GW Domestic (20.6.2.3103.B)	2200	1800	1950	3060	2790	2420	2490	2900	3090	2250	2080	2140	2180	2470	2470	2310	2010	2020	2190	2450	2250	2310	2470	2090	1970	1940	2210	1690	1080	1030	1240	31		31
vanide	2.00E-01			0.00432	2																					1	1				0.00487	1	1	31		0
																				•		•														
adium (pCi/L)																																		_		
tadium-226			0.43															0.54				0.38												31	1 3	0
adium-228	-		0.74															0.89				0.87												31		0
	5.00E+00	USEPA MCL	1.17	1 _			0		1 -	1		0						1.43				1.25				0						1		31	1 6	0
otal Dissolved Solids (mg/L)	0.000		1.17																																	
otal Dissolved Solids		NMED GW Domestic (20.6.2.3103.B)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	4610	5090	4550	4640	3670	4030	4030	4130	3150	2410	2290	2770	31	1 31	31
otal Dissolved Solids PH (mg/L)	1.00E+03	NMED GW Domestic (20.6.2.3103.B)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130	3150	2410	2290	2770			31
otal Dissolved Solids PH (mg/L) assoline Range Organics	1.00E+03	,		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	3670 0.0371		4030	4130	3150	2410	2290	2770	31	1 2	31
otal Dissolved Solids PH (mg/L) asoline Range Organics PH Diesel Range	1.00E+03 2.00E-01	NMED TPH		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31	1 2 1 0	31 0 0
otal Dissolved Solids PH (mg/L) asoline Range Organics PH Diesel Range	1.00E+03 2.00E-01	,		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130	3150 0.17	2410	2290	2770	31	1 2 1 0	31 0 0
otal Dissolved Solids PH (mg/L) asoline Range Organics PH Diesel Range II OCs (mg/L)	1.00E+03 2.00E-01 2.00E-01	NMED TPH NMED TPH		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31	1 2 1 0	31 0 0 0
otal Dissolved Solids PH (mg/L) asoline Range Organics PH Diesel Range II OCs (mg/L) 1,1-Trichloroethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31	1 2 1 0 1 1	31 0 0 0
Ital Dissolved Solids "H (mg/L) ssoline Range Organics H Diesel Range DOS (mg/L) 1,1-Trichloroethane 1,2,2-Tetrachloroethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02 1.00E-02	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A) NMED GW Human Health (20.6.2.3103.A)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31 31	1 2 1 0 1 1	31 0 0 0
tal Dissolved Solids PH (mg/L) sooline Range Organics PH Diesel Range H Diesel Range 1 DOS (mg/L) 1,1-Trichloroethane 1,2,2-Tetvachloroethane 1,2-Trichloroethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02 1.00E-02 5.00E-03	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A) NMED GW Human Health (20.6.2.3103.A) EPA MCL		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31 31 31	1 2 1 0 1 1 1 0 1 0 1 0	31 0 0 0 0
otal Dissolved Solids PM (mg/L) ssoline Range Organics H Dissel Range I DOs (mg/L) 1,1-Trichloroethane 1,2,2-Tetrachloroethane 1,2-Trichloroethane 1,2-Trichloroethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02 1.00E-02 5.00E-03 2.50E-02	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A) NMED GW Human Health (20.6.2.3103.A)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31 31	1 2 1 0 1 1 1 0 1 0 1 0 1 0	31 0 0 0 0
otal Dissolved Solids H (mg/L) sooline Range Organics H Diesel Range 1,1-Trichloroethane 1,2-Terkachloroethane 1,2-Trichloroethane 1-Dichloroethane 1-Dichloroethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02 1.00E-02 5.00E-03 2.50E-02	NMED TPH NMED TPH NMED GM Human Health (20.6.2.3103.A) NMED GW Human Health (20.6.2.3103.A) NMED GW Human Health (20.6.2.3103.A) USED MCL NMED GW Human Health (20.6.2.3103.A)		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31 31 31 31	1 2 1 0 1 1 1 0 1 0 1 0 1 0 1 0 1 0	31 0 0 0 0 0 0
otal Dissolved Solids PH (mg/L) sooline Range Organics PH Diesel Range II DOs (mg/L) 1,1-trichloroethane 1,2-2-Tetrachloroethane 1,2-1-chloroethane 1-Dichloroethane 1-Dichloroethane 1-Dichloroethane	1.00E+03 	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A) EPA MCL FPA MCL FPA MCL FPA MCL		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31	1 2 1 0 1 1 1 1 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1	31 0 0 0 0 0 0 0
otal Dissolved Solids PH (mg/L) ssoline Range Organics H Diese Range 10 (Soc (mg/L) 1,1-Trichloroethane 1,2,2-Tetrachloroethane 1-Dichloroethane 1-Dichloroethane 1-Dichloroethane 2-Dibromoethane 2-Dibromoethane	1.00E+03 2.00E-01 2.00E-01 6.00E-02 1.00E-02 5.00E-03 2.50E-02 7.00E-03 5.00E-05	NMED TPH NMED TPH NMED GW Human Health (20.6.2.3103.A) EPA MCL FPA MCL FPA MCL FPA MCL		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150		5090	4550	4640			4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31	1 2 1 0 1 1 1 1 1 0 1 0 1 0 0 1 0 0 1 0 0 1	31 0 0 0 0 0 0 0 0
Jatal Dissolved Solidis PM (mg/L) ssoline Range Organics H Olesel Range Oos (mg/L) 1,1-Trichloroethane 1,2-Z-Tetachloroethane 1-Dichloroethane 1-Dichloroethane 1-Dichloroethane 2-Dibromoethane 2-Dibromoethane stones 1-Dichloroethane	1.00E+03	INMED TPH INMED		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31	1 2 1 0 1 1 1 1 1 0 1 0 1 0 0 1 0 0 1 0 0 1	31 0 0 0 0 0 0 0 0 0
Just Dissolved Solids PH (mg/L) section Range Organics H Dissel Range Ocs (mg/L) 1,1-Trichioroethane 1,2-Trechioroethane 1,0-Chioroethane 1-Ochioroethane 2-Ochioroethane 2-Ochioroethane 2-Ochioroethane 2-Ochioroethane 2-Ochioroethane 2-Ochioroethane 2-Ochioroethane	1.00E+03	NNED TPH NNED TPH NNED TWH NNE		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31	1 2 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1	31 0 0 0 0 0 0 0 0 0 0
tal Dissolved Solidis **M (mg/L) solinie Range Organics **H (Diesel Range **Des (mg/L) - L) - Trickhoroethane -	1.00E+03	NNED TPH INNED TPH INNED TPH INNED ON Human Health (26.5.2.3103.4) INNED GW Human Health (26.6.2.3103.4) INNED GW Human Health (26.6.2.3103.4) ISPA MCL IPAN		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31	1 2 1 0 1 1 1 1 1 0 1 1 0 0 1	31 0 0 0 0 0 0 0 0 0 0
Isol Dissolved Solidis H (mgl.1) soline Range Organics 1 Dissel Range Organics 1 Dissel Range 2-Sa (mgl.1) 2-Sa (mgl.1	1.00E+03 	NMED TPH INNED TPH INNED TPH INNED TWH Human Health (26.6.2.3103.A) INNED GW HUMAN HUMAN HEA		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 1 1 1 1 1 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0	31 0 0 0 0 0 0 0 0 0 0 0
tal Dissolved Solidis H (mg/L) soline Range Organics H (Desid Range Organics H Diesel Range Organics H	1.00E+03	INNEC 17PH		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	31 0 0 0 0 0 0 0 0 0 0
tal Dissolved Solidis **H (mg/L) sosiline Range Organics **H (Dissel Range Organics **Dissoline Range Organics **Dissoline Range Organics **Junitarious Organics **Junit	1.00E+03	INNED TPH INNED		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	31 0 0 0 0 0 0 0 0 0 0 0
Isal Dissolved Solidis H (mg/L) solidine Range Organics H (mg/L) Solidine Range Organics DOs (mg/L) 1,3 Trichisroethane 1,2,2 Testa-Inforcethane 1,2,2 Testa-Inforcethane 1,2,2 Testa-Inforcethane 1,2,2 Testa-Inforcethane 1,2,1 Trichisroethane 1,2,1 Trichisroethane 1,2,1 Trichisroethane 1,2,1 Trichisroethane 1,2,2 Trichisroethane 1,2,2 Trichisroethane 1,2,3 Trichisroethane 1,2,3 Trichisroethane 1,2,3 Trichisroethane 1,3 Trichisroethane 1,4 Trichisroethane 1,5 Trichisr	1.00E+03	NMED TPH INSED TPH INSED TPH INSED OF Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN MCI.		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436	5090	4550	4640	0.0371		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 1 1 1 1 1 0 1 1 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	31 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Isal Dissolved Solids H (mg/L) soline Range Organics soline Range Organics SCA (mg/L) - 1-Trickforcethane - 2-1-Trickforcethane - 1-1-Trickforcethane -	1.00E+03	NMED TPH INNED TPH INNED TPH Human Health (20.6.2.3103.4) INNED GW Human Health (20.6.2.3103.4) INNED GW Human Health (20.6.2.3103.4) ISPA MCL ISPA		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1	31 0 0 0 0 0 0 0 0 0 0 0 0
Isol Dissolved Solidis H (mg/L) solinie Range Organics T Diesel Range Des Ingel Des	1.00E+03	NMED TPH INSED TPH INSED TPH INSED OF Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN EQ OK Human Health (20.6.2.3103.A) ISBN MCI.		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1	31 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
tal Dissolved Solids PH (mg/L) solidine Range Organics the Hosel Range Organics the Hosel Range Des (mg/L) Li-Trichbrorethane L, 2, 2-Tectandhorethane L, 2, 2-Tectandhorethane L-Dichbrorethane	1.00E+03 2.00E-01 2.00E-01 2.00E-01 6.00E-02 1.00E-02 3.00E-03 5.00E-03 5.00E-03 5.00E-03 5.00E-03 5.00E-03 5.00E-03 5.00E-03 5.00E-03 6.00E-03	NMED TPH INNED TPH INNED TPH Human Health (20.6.2.3103.4) INNED GW Human Health (20.6.2.3103.4) INNED GW Human Health (20.6.2.3103.4) ISPA MCL ISPA		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	311 311 311 311 311 311 311 311 311 311	1 2 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1	31 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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otal Dissolved Soldis PH (mgL) sacoline Range Organics PH (bleef Range Organics PH Dissel Range Continue Contin	1.00E+03 2.00E-01 2.00E-01 2.00E-01 2.00E-02 5.00E-03	INNED TPH INNED		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 0 1 1	31
oxal Dissolved Solids PRI (mgtL) sosoline Range Organics He Dissel Range Organics He Dissel Range OCs (mgtL)	1.00E+03 2.00E-01 2.00E-01 2.00E-01 2.00E-02 1.00E-02 1.00E-03 2.50E-02 5.00E-03	INNED TPH INNED		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 1 1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	31
oxal Dissolved Solids PRI (mgtL) sosoline Range Organics He Dissel Range Organics He Dissel Range OCs (mgtL)	1.00E+03 2.00E-01 2.00E-01 2.00E-01 2.00E-02 5.00E-03	INNED TPH INNED		3990	3870	5390	4960	4990	5510	6130	5370	3650	4480	4470	4440	4210	4570	3910	4260	3970	4150	0.0436 0.0042 0.0042 0.0024	5090	4550	4640	0.0371 0.0036 0.0021		4030	4130		2410	2290	2770	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 0 1 1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	31 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Ital Dissolved Solidis H (IngiL) soline Range Organics soline Range Organics Soline Range Organics Des (IngiL) Li-Trickhorethane 2, 2, 2-Terta-loroethane 2, 2, 2-Terta-loroethane 1, 2, 2-Terta-loroethane 1, 2, 2-Terta-loroethane 1, 2, 2-Terta-loroethane 1, 2-Tert	1.00E+03 2.00E-01 2.00E-01 2.00E-01 6.00E-02 5.00E-03	INNED TPH INNED		3990		5390	4960	4990	5510	6130			4480		7.2				4260		6.75	0.0436 0.0042 0.0042 0.0024	5090	7.1		0.0371 0.0036 0.0021			6.87	0.17	2410		7.54	31 31 31 31 31 31 31 31 31 31 31 31 31 3	1 2 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1	31

Chavez, Carl J, EMNRD

From: Combs, Robert < Robert.Combs@HollyFrontier.com>

Sent: Thursday, September 8, 2016 4:23 PM

To: Chavez, Carl J, EMNRD

Cc: Denton, Scott; Dade, Lewis (Randy); Bratcher, Mike, EMNRD; Tsinnajinnie, Leona, NMENV; Orosco,

Richard; Griswold, Jim, EMNRD

Subject: RE: 2016-08-12 Initial C-141 Effluent spill 2016-08-09

Attachments: Rpt_1608660_Final_v1.pdf; Wasterwater Results August 2016.xlsx

Carl,

In reference to the treated waste water release on August 9, 2016, we have the following to report:

On the day of the release, during the pipeline repair, a sample of the water was collected from discharge of the pipeline pump. We sent the sample to be analyzed for the same suite as the samples sent for the quarterly effluent monitoring (UIC permits). The lab report and comparison table are attached. The constituents present at concentrations above WQCC standards were chloride (320 mg/L), fluoride (13 mg/L), sulfate (1500 mg/L), iron (2.4 mg/L) and total dissolved solids (TDS, 2800 mg/L).

We propose to collect surface soil samples within the impacted area and topographically upgradient, within 50 feet of the impacted area, and analyze for chloride, fluoride, iron and sulfate (TDS is not applicable). We will collect 3-4 samples in the spill area and 3-4 samples outside of the spill area for baseline. We will present those results in a table, however, since iron and fluoride are the only constituents with approved cleanup standards, we will use the baseline sample concentrations to approximate natural conditions for chloride and sulfate. We can then discuss if further action is necessary.

Please let me know if you have any questions or would like to discuss.

Thanks, Robert

From: Orosco, Richard

Sent: Friday, August 12, 2016 9:17 AM

To: CarlJ.Chavez@state.nm.us; Leona.Tsinnajinnie@state.nm.us

Cc: Denton, Scott; Dade, Lewis (Randy); Combs, Robert; mike.bratcher@state.nm.us

Subject: 2016-08-12 Initial C-141 Effluent spill 2016-08-09

Carl and Leona,

Please see the attached Initial C-141 form for the effluent spill that occurred on 8/10. Please call or email if you have any questions or would like to discuss.

Thanks,

Richard L. Orosco

Environmental Tech III HollyFrontier Navajo Refining LLC (575) 746-5398 Office (575) 703-2409 Cell This e-mail may contain information that is privileged and confidential. If you received this message in error, please advise the sender immediately and delete this email. Unless expressly stated, this message is not a digital or electronic signature or a commitment to a binding agreement.

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Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

August 22, 2016

Robert Combs Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Waste Water Effluent OrderNo.: 1608660

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/11/2016 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT:Navajo Refining CompanyClient Sample ID: Wastewater Effluent 8-10-16Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
IGNITABILITY METHOD 1010						Analys	t: SUB
Ignitability	>200	0		°F	1	8/17/2016	R36648
SULFIDE, REACTIVE						Analys	t: SUB
Reactive Sulfide	ND	0.20		mg/L	1	8/17/2016	R36648
SPECIFIC GRAVITY						Analys	t: LGT
Specific Gravity	1.002	0			1	8/15/2016 4:29:00 PM	R36512
EPA METHOD 300.0: ANIONS						Analys	t: MRA
Fluoride	13	0.50	*	mg/L	5	8/11/2016 3:26:00 PM	R36408
Chloride	320	10		mg/L	20	8/11/2016 3:38:24 PM	R36408
Nitrogen, Nitrite (As N)	0.96	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Bromide	1.6	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	8/11/2016 3:26:00 PM	R36408
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	8/11/2016 3:26:00 PM	R36408
Sulfate	1500	25		mg/L	50	8/18/2016 2:24:04 AM	R36593
SM2510B: SPECIFIC CONDUCTANC	E					Analys	t: JRR
Conductivity	4400	1.0		µmhos/cm	1	8/15/2016 3:14:28 PM	R36527
SM2320B: ALKALINITY						Analys	t: JRR
Bicarbonate (As CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
Total Alkalinity (as CaCO3)	289.3	20.00		mg/L CaCO3	1	8/15/2016 4:49:30 PM	R36527
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analys	t: KS
Total Dissolved Solids	2800	40.0	*	mg/L	1	8/16/2016 8:21:00 AM	26968
CORROSIVITY						Analys	t: SUB
рН	6.99			pH Units	1	8/17/2016	R36648
CYANIDE, REACTIVE						Analys	t: SUB
Cyanide, Reactive	0.120	0.0100		mg/L	1	8/16/2016	R36648
SM4500-H+B: PH						Analys	t: JRR
рН	7.49	1.68	Н	pH units	1	8/15/2016 3:14:28 PM	R36527
EPA METHOD 7470: MERCURY						Analys	t: pmf
Mercury	ND	0.00020		mg/L	1	8/12/2016 11:14:45 AM	1 26894
MERCURY, TCLP						Analys	t: pmf
Mercury	ND	0.020		mg/L	1	8/17/2016 10:49:54 AM	1 27020
EPA 6010B: TOTAL RECOVERABLE	METALS					Analys	t: MED
Aluminum	0.26	0.020		mg/L	1	8/18/2016 5:02:57 PM	26942

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 32
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF I	Date Analyzed	Batch
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	MED
Antimony	ND	0.050	mg/L	1	8/19/2016 10:36:34 AM	26942
Arsenic	0.031	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Barium	ND	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Beryllium	ND	0.0030	mg/L	1	8/18/2016 5:02:57 PM	26942
Cadmium	ND	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Calcium	130	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Chromium	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Cobalt	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Copper	ND	0.0060	mg/L	1	8/18/2016 5:02:57 PM	26942
Iron	2.4	0.25	mg/L	5	8/18/2016 5:10:17 PM	26942
Lead	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Magnesium	41	1.0	mg/L	1	8/18/2016 5:02:57 PM	26942
Manganese	0.15	0.0020	mg/L	1	8/18/2016 5:02:57 PM	26942
Nickel	0.010	0.010	mg/L	1	8/18/2016 5:02:57 PM	26942
Potassium	60	5.0	mg/L	5	8/18/2016 5:10:17 PM	26942
Selenium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Silver	ND	0.0050	mg/L	1	8/18/2016 5:02:57 PM	26942
Sodium	630	10	mg/L	10	8/18/2016 5:21:39 PM	26942
Strontium	1.9	0.10	mg/L	10	8/18/2016 5:21:39 PM	26942
Thallium	ND	0.050	mg/L	1	8/18/2016 5:02:57 PM	26942
Zinc	0.025	0.020	mg/L	1	8/18/2016 5:02:57 PM	26942
Silica	14	5.4	mg/L	5	8/18/2016 5:10:17 PM	26942
EPA 6010B: TCLP METALS					Analyst	MED
Arsenic	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Barium	ND	100	mg/L	1	8/15/2016 1:30:42 PM	26961
Cadmium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Chromium	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Lead	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Selenium	ND	1.0	mg/L	1	8/15/2016 1:30:42 PM	26961
Silver	ND	5.0	mg/L	1	8/15/2016 1:30:42 PM	26961
EPA METHOD 8260B: VOLATILES					Analyst	SUB
Acetonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Allyl chloride	ND	2.5	μg/L		8/12/2016	R36648
Chloroprene	ND	2.5	μg/L		8/12/2016	R36648
Cyclohexane	ND	2.5	μg/L		8/12/2016	R36648
Diethyl ether	ND	2.5	μg/L		8/12/2016	R36648
Diisopropyl ether	ND	2.5	μg/L		8/12/2016	R36648
Epichlorohydrin	ND	25	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES				Aı	nalyst: SUB
Ethyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	2.5	μg/L	1 8/12/2016	R36648
Freon-113	ND	2.5	μg/L	1 8/12/2016	R36648
Isobutanol	ND	50	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	12	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	12	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	12	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	5.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	2.5	μg/L	1 8/12/2016	R36648
n-Hexane	ND	2.5	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	25	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	25	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	2.5	μg/L	1 8/12/2016	R36648
Propionitrile	ND	12	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	2.5	μg/L	1 8/12/2016	R36648
Benzene	ND	2.5	μg/L	1 8/12/2016	R36648
Toluene	12	2.5	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	50	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	2.8	2.5	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	4.5	2.5	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	2.5	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	2.5	μg/L	1 8/12/2016	R36648
Naphthalene	ND	2.5	μg/L	1 8/12/2016	R36648
Acetone	350	12	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	2.5	μg/L	1 8/12/2016	R36648
Bromoform	ND	2.5	μg/L	1 8/12/2016	R36648
Bromomethane	ND	2.5	μg/L	1 8/12/2016	R36648
2-Butanone	47	12	μg/L	1 8/12/2016	R36648
Carbon disulfide	ND	2.5	μg/L	1 8/12/2016	R36648
Carbon Tetrachloride	ND	2.5	μg/L	1 8/12/2016	R36648
Chlorobenzene	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroethane	ND	2.5	μg/L	1 8/12/2016	R36648
Chloroform	ND	2.5	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project:Waste Water EffluentCollection Date: 8/10/2016 10:55:00 AMLab ID:1608660-001Matrix: AQUEOUSReceived Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Aı	nalyst: SUB
Chloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	2.5	μg/L	1	8/12/2016	R36648
2-Hexanone	28	2.5	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	12	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
Styrene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	2.5	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	2.5	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	2.5	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	2.5	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					А	nalyst: SUB
Vinyl chloride	ND	2.5	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	5.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	2.5	μg/L	1	8/12/2016	R36648
Acrolein	ND	12	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	12	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	2.5	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	2.5	μg/L	1	8/12/2016	R36648
Iodomethane	ND	2.5	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	2.5	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	2.5	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	100	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	99.6	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	102	70-130	%Rec	1	8/12/2016	R36648
EPA 8270C: SEMIVOLATILES/MOD					А	nalyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	8/17/2016	R36648
Atrazine	ND	5.0	μg/L	1	8/17/2016	R36648
Benzaldehyde	ND	5.0	μg/L	1	8/17/2016	R36648
Caprolactam	ND	5.0	μg/L	1	8/17/2016	R36648
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	8/17/2016	R36648
Acetophenone	ND	10	μg/L	1	8/17/2016	R36648
1-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,5-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4,6-Trichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dichlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dimethylphenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrophenol	ND	10	μg/L	1	8/17/2016	R36648
2,4-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2,6-Dinitrotoluene	ND	10	μg/L	1	8/17/2016	R36648
2-Chloronaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Chlorophenol	ND	10	μg/L	1	8/17/2016	R36648
2-Methylnaphthalene	ND	10	μg/L	1	8/17/2016	R36648
2-Methylphenol	ND	10	μg/L	1	8/17/2016	R36648
2-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
2-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
3,3´-Dichlorobenzidine	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent

Collection Date: 8/10/2016 10:55:00 AM

Lab ID: 1608660-001 **Matrix:** AQUEOUS **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD					An	nalyst: SUB
3-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Bromophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Chloro-3-methylphenol	ND	10	μg/L	1	8/17/2016	R36648
4-Chloroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	8/17/2016	R36648
4-Nitroaniline	ND	10	μg/L	1	8/17/2016	R36648
4-Nitrophenol	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthene	ND	10	μg/L	1	8/17/2016	R36648
Acenaphthylene	ND	10	μg/L	1	8/17/2016	R36648
Anthracene	ND	10	μg/L	1	8/17/2016	R36648
Benzo(g,h,i)perylene	ND	10	μg/L	1	8/17/2016	R36648
Benz(a)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(a)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(b)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Benzo(k)fluoranthene	ND	0.20	μg/L	1	8/17/2016	R36648
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroethyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	8/17/2016	R36648
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	8/17/2016	R36648
Butyl benzyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Carbazole	ND	10	μg/L	1	8/17/2016	R36648
Chrysene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenz(a,h)anthracene	ND	0.20	μg/L	1	8/17/2016	R36648
Dibenzofuran	ND	10	μg/L	1	8/17/2016	R36648
Diethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Dimethyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-butyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Di-n-octyl phthalate	ND	10	μg/L	1	8/17/2016	R36648
Fluoranthene	ND	10	μg/L	1	8/17/2016	R36648
Fluorene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorobenzene	ND	2.0	μg/L	1	8/17/2016	R36648
Hexachlorobutadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachlorocyclopentadiene	ND	10	μg/L	1	8/17/2016	R36648
Hexachloroethane	ND	10	μg/L	1	8/17/2016	R36648
Indeno(1,2,3-cd)pyrene	ND	0.20	μg/L	1	8/17/2016	R36648
Isophorone	ND	10	μg/L	1	8/17/2016	R36648
Naphthalene	ND	10	μg/L	1	8/17/2016	R36648
Nitrobenzene	ND	10	μg/L	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Date Reported: 8/22/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: Wastewater Effluent 8-10-16

Project: Waste Water Effluent
 Collection Date: 8/10/2016 10:55:00 AM

 Lab ID: 1608660-001
 Matrix: AQUEOUS
 Received Date: 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
N-Nitrosodi-n-propylamine	ND	4.0	μg/L	1	8/17/2016	R36648
N-Nitrosodiphenylamine	ND	10	μg/L	1	8/17/2016	R36648
Pentachlorophenol	ND	10	μg/L	1	8/17/2016	R36648
Phenanthrene	ND	10	μg/L	1	8/17/2016	R36648
Phenol	ND	10	μg/L	1	8/17/2016	R36648
Pyrene	ND	10	μg/L	1	8/17/2016	R36648
o-Toluidine	ND	4.0	μg/L	1	8/17/2016	R36648
Pyridine	ND	10	μg/L	1	8/17/2016	R36648
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	8/17/2016	R36648
Surr: 2,4,6-Tribromophenol	90.0	63-110	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorobiphenyl	60.4	58-112	%Rec	1	8/17/2016	R36648
Surr: 2-Fluorophenol	69.0	47-109	%Rec	1	8/17/2016	R36648
Surr: Nitrobenzene-d5	72.0	58-110	%Rec	1	8/17/2016	R36648
Surr: Phenol-d5	67.8	52-105	%Rec	1	8/17/2016	R36648
Surr: Terphenyl-d14	28.7	22-133	%Rec	1	8/17/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 7 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF Date Analy	zed Batch
EPA METHOD 8260B: VOLATILES					Analyst: SUB
Acetonitrile	ND	0.50	μg/L	1 8/12/2016	R36648
Allyl chloride	ND	0.50	μg/L	1 8/12/2016	R36648
Chloroprene	ND	0.50	μg/L	1 8/12/2016	R36648
Cyclohexane	ND	0.50	μg/L	1 8/12/2016	R36648
Diethyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Diisopropyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Epichlorohydrin	ND	5.0	μg/L	1 8/12/2016	R36648
Ethyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Ethyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Ethyl tert-butyl ether	ND	0.50	μg/L	1 8/12/2016	R36648
Freon-113	ND	0.50	μg/L	1 8/12/2016	R36648
Isobutanol	ND	10	μg/L	1 8/12/2016	R36648
Isopropyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methacrylonitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl ethyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl isobutyl ketone	ND	2.5	μg/L	1 8/12/2016	R36648
Methyl methacrylate	ND	2.5	μg/L	1 8/12/2016	R36648
Methylcyclohexane	ND	1.0	μg/L	1 8/12/2016	R36648
n-Amyl acetate	ND	0.50	μg/L	1 8/12/2016	R36648
n-Hexane	ND	0.50	μg/L	1 8/12/2016	R36648
Nitrobenzene	ND	5.0	μg/L	1 8/12/2016	R36648
Pentachloroethane	ND	5.0	μg/L	1 8/12/2016	R36648
p-isopropyltoluene	ND	0.50	μg/L	1 8/12/2016	R36648
Propionitrile	ND	2.5	μg/L	1 8/12/2016	R36648
Tetrahydrofuran	ND	0.50	μg/L	1 8/12/2016	R36648
Benzene	ND	0.50	μg/L	1 8/12/2016	R36648
Toluene	ND	0.50	μg/L	1 8/12/2016	R36648
Ethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1 8/12/2016	R36648
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1 8/12/2016	R36648
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1 8/12/2016	R36648
Naphthalene	ND	0.50	μg/L	1 8/12/2016	R36648
Acetone	ND	2.5	μg/L	1 8/12/2016	R36648
Bromobenzene	ND	0.50	μg/L	1 8/12/2016	R36648
Bromodichloromethane	ND	0.50	μg/L	1 8/12/2016	R36648
Bromoform	ND	0.50	μg/L	1 8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 8 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order **1608660**Date Reported: **8/22/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Waste Water Effluent Collection Date:

Lab ID: 1608660-002 **Matrix:** TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Butanone	ND	2.5	μg/L	1	8/12/2016	R36648
Carbon disulfide	ND	0.50	μg/L	1	8/12/2016	R36648
Carbon Tetrachloride	ND	0.50	μg/L	1	8/12/2016	R36648
Chlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Chloroform	ND	0.50	μg/L	1	8/12/2016	R36648
Chloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
4-Chlorotoluene	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
Dibromomethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Dichlorodifluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloroethene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,3-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
2,2-Dichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648
Hexachlorobutadiene	ND	0.50	μg/L	1	8/12/2016	R36648
2-Hexanone	ND	0.50	μg/L	1	8/12/2016	R36648
Isopropylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Methylene Chloride	ND	2.5	μg/L	1	8/12/2016	R36648
n-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
n-Propylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
sec-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
Styrene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butylbenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,2-DCE	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers	:
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- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 9 of 32
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 8/22/2016

CLIENT: Navajo Refining Company **Client Sample ID:** TRIP BLANK

Project: Waste Water Effluent **Collection Date:**

Lab ID: 1608660-002 Matrix: TRIP BLANK **Received Date:** 8/11/2016 9:05:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,1-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,1,2-Trichloroethane	ND	0.50	μg/L	1	8/12/2016	R36648
Trichloroethene (TCE)	ND	0.50	μg/L	1	8/12/2016	R36648
Trichlorofluoromethane	ND	0.50	μg/L	1	8/12/2016	R36648
1,2,3-Trichloropropane	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl chloride	ND	0.50	μg/L	1	8/12/2016	R36648
mp-Xylenes	ND	1.0	μg/L	1	8/12/2016	R36648
o-Xylene	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Amyl methyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
tert-Butyl alcohol	ND	0.50	μg/L	1	8/12/2016	R36648
Acrolein	ND	2.5	μg/L	1	8/12/2016	R36648
Acrylonitrile	ND	2.5	μg/L	1	8/12/2016	R36648
Bromochloromethane	ND	0.50	μg/L	1	8/12/2016	R36648
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	8/12/2016	R36648
Iodomethane	ND	0.50	μg/L	1	8/12/2016	R36648
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	8/12/2016	R36648
Vinyl acetate	ND	0.50	μg/L	1	8/12/2016	R36648
1,4-Dioxane	ND	20	μg/L	1	8/12/2016	R36648
Surr: 1,2-Dichlorobenzene-d4	101	70-130	%Rec	1	8/12/2016	R36648
Surr: 4-Bromofluorobenzene	96.4	70-130	%Rec	1	8/12/2016	R36648
Surr: Toluene-d8	101	70-130	%Rec	1	8/12/2016	R36648

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits Page 10 of 32 J
- P Sample pH Not In Range
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

22-Aug-16

	Waste Water Efflu									
Sample ID MB	Samp	Type: m b	olk	Tes	tCode: E	PA Method	300.0: Anions	\$		
Client ID: PBW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	S	SeqNo: 1	128954	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosph	ate (As P ND	0.50								
Sample ID LCS	Samp	Type: Ics	•	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: LCSW	Bato	h ID: R3	6408	F	RunNo: 3	6408				
Prep Date:	Analysis I	Date: 8/	11/2016	8	SeqNo: 1	128955	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	104	90	110			
Chloride	4.8	0.50	5.000	0	96.2	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	96.8	90	110			
Bromide	2.4	0.10	2.500	0	96.7	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.0	90	110			
Phosphorus, Orthophosph	ate (As P 4.9	0.50	5.000	0	97.2	90	110			
Sample ID MB	Samp	Type: mb	olk	Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID: PBW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	8	SeqNo: 1	133301	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								
Sample ID LCS	Samp	Type: Ics	}	Tes	tCode: E	PA Method	300.0: Anions	5		-
Client ID: LCSW	Bato	h ID: R3	6593	F	RunNo: 3	6593				
Prep Date:	Analysis I	Date: 8/	17/2016	S	SeqNo: 1	133302	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Sulfate

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

9.7

0.50

10.00

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

Sample container temperature is out of limit as specified

110

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range Page 11 of 32

Reporting Detection Limit RL

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES **PBW** RunNo: 36648 Client ID: Batch ID: R36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Acetonitrile ND 0.50 ND Allyl chloride 0.50 ND 0.50 Chloroprene Cyclohexane ND 0.50 Diethyl ether ND 0.50 Diisopropyl ether ND 0.50 Epichlorohydrin ND 0.50 Ethyl acetate ND 0.50 Ethyl methacrylate ND 2.5 Ethyl tert-butyl ether ND 0.50 Freon-113 ND 0.50 ND Isobutanol 10 Isopropyl acetate ND 0.50 Methacrylonitrile ND 2.5 Methyl acetate ND 0.50 Methyl ethyl ketone ND 2.5 Methyl isobutyl ketone ND 2.5 Methyl methacrylate ND 2.5 Methylcyclohexane ND 0.50 ND 0.50 n-Amyl acetate n-Hexane ND 0.50 Nitrobenzene ND 0.50 Pentachloroethane ND 0.50 p-isopropyltoluene ND 0.50 Propionitrile ND 2.5 Tetrahydrofuran ND 0.50 Benzene ND 0.50 Toluene ND 0.50 Ethylbenzene ND 0.50 Methyl tert-butyl ether (MTBE) ND 0.50 1,2,4-Trimethylbenzene ND 0.50 1,3,5-Trimethylbenzene ND 0.50 1,2-Dichloroethane (EDC) ND 0.50 1,2-Dibromoethane (EDB) ND 0.50 Naphthalene ND 0.50 Acetone ND 2.5 ND 0.50 Bromobenzene Bromodichloromethane ND 0.50 Bromoform ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/12/2016 Prep Date: SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.50 Bromomethane 2-Butanone ND 2.5 ND 0.50 Carbon disulfide Carbon Tetrachloride ND 0.50 Chlorobenzene ND 0.50 Chloroethane ND 0.50 Chloroform ND 0.50 ND 0.50 Chloromethane 2-Chlorotoluene ND 0.50 4-Chlorotoluene ND 0.50 cis-1,2-DCE ND 0.50 ND 0.50 cis-1,3-Dichloropropene 1,2-Dibromo-3-chloropropane ND 0.50 Dibromochloromethane ND 0.50 Dibromomethane ND 0.50 1,2-Dichlorobenzene ND 0.50 1,3-Dichlorobenzene ND 0.50 1,4-Dichlorobenzene ND 0.50 Dichlorodifluoromethane ND 0.50 ND 0.50 1.1-Dichloroethane 1,1-Dichloroethene ND 0.50 1,2-Dichloropropane ND 0.50 1,3-Dichloropropane ND 0.50 2,2-Dichloropropane ND 0.50 1,1-Dichloropropene ND 0.50 Hexachlorobutadiene ND 0.50 2-Hexanone ND 0.50 Isopropylbenzene ND 0.50 Methylene Chloride ND 2.5 n-Butylbenzene 0.50 ND n-Propylbenzene ND 0.50 sec-Butylbenzene ND 0.50 Styrene ND 0.50 tert-Butylbenzene ND 0.50 1,1,1,2-Tetrachloroethane ND 0.50 1,1,2,2-Tetrachloroethane ND 0.50 Tetrachloroethene (PCE) ND 0.50 trans-1,2-DCE ND 0.50 trans-1,3-Dichloropropene ND 0.50

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA Method 8260B: VOLATILES Client ID: PBW Batch ID: R36648 RunNo: 36648 Prep Date: Analysis Date: 8/12/2016 SeqNo: 1135033 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 1,2,3-Trichlorobenzene ND 0.50 ND 1,2,4-Trichlorobenzene 0.50 ND 0.50 1,1,1-Trichloroethane 1,1,2-Trichloroethane ND 0.50 Trichloroethene (TCE) ND 0.50 Trichlorofluoromethane ND 0.50 1,2,3-Trichloropropane ND 0.50 Vinyl chloride ND 0.50 mp-Xylenes ND 1.0 o-Xylene ND 0.50 tert-Amyl methyl ether ND 0.50 tert-Butyl alcohol ND 0.50 Acrolein ND 2.5 Acrylonitrile ND 2.5 Bromochloromethane ND 0.50 2-Chloroethyl vinyl ether ND 0.50 ND 0.50 Iodomethane trans-1,4-Dichloro-2-butene ND 0.50 Vinyl acetate ND 0.50 1.4-Dioxane ND 0.50

Sample ID LCS-R36648	SampType: LCS TestCode: EPA Method 8260B: VOLATILES									
Client ID: LCSW	Batch	n ID: R3	6648	F	RunNo: 3	6648				
Prep Date:	Analysis D	ate: 8/	12/2016	S	SeqNo: 1	135034	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.1	0	10.00	0	90.7	80	120			
Toluene	9.4	0	10.00	0	94.5	80	120			
Ethylbenzene	9.6	0	10.00	0	96.4	80	120			
Chlorobenzene	9.1	0	10.00	0	91.2	80	120			
1,1-Dichloroethene	9.1	0	10.00	0	91.1	80	120			
Tetrachloroethene (PCE)	8.7	0	10.00	0	87.1	80	120			
Trichloroethene (TCE)	8.9	0	10.00	0	89.0	80	120			
o-Xylene	10	0	10.00	0	100	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: EPA 8270C: Semivolatiles/Mod Client ID: **PBW** Batch ID: R36648 RunNo: 36648 Analysis Date: 8/17/2016 Prep Date: SeqNo: 1135037 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual N-Nitroso-di-n-butylamine ND 1.0 ND Acetophenone 10 ND 1-Methylnaphthalene 10 2,3,4,6-Tetrachlorophenol ND 10 2,4,5-Trichlorophenol ND 10 2,4,6-Trichlorophenol ND 10 2,4-Dichlorophenol ND 10 2,4-Dimethylphenol ND 10 2,4-Dinitrophenol ND 10 ND 2,4-Dinitrotoluene 10 2,6-Dinitrotoluene ND 10 ND 10 2-Chloronaphthalene 2-Chlorophenol ND 10 2-Methylnaphthalene ND 10 2-Methylphenol ND 10 2-Nitroaniline ND 10 2-Nitrophenol ND 10 3,3´-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 ND 10 4.6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 ND 4-Chloroaniline 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Anthracene ND 10 ND Benzo(g,h,i)perylene 1.0 ND Benz(a)anthracene 1.0 Benzo(a)pyrene ND 1.0 Benzo(b)fluoranthene ND 1.0 Benzo(k)fluoranthene ND 1.0 Bis(2-chloroethoxy)methane ND 10 Bis(2-chloroethyl)ether ND 10 Bis(2-chloroisopropyl)ether ND 10 Bis(2-ethylhexyl)phthalate ND 5.0 Butyl benzyl phthalate ND 10

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648	SampT	уре: МЕ	BLK	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	n ID: R3	6648	R	tunNo: 3	6648				
Prep Date:	Analysis D	Date: 8/	17/2016	S	SeqNo: 1	135037	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Carbazole	ND	10								
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	1.0								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	1.0								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodiphenylamine	ND	2.0								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	5.0								
Pyrene	ND	10								
o-Toluidine	ND	1.0								
Pyridine	ND	1.0								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID LCS-R36648	SampT	ype: LC	s	Tes	TestCode: EPA 8270C: Semivolatiles/Mod						
Client ID: LCSW	Batch	1D: R3	6648	F	RunNo: 36648						
Prep Date:	Analysis D	ate: 8/	17/2016	5	SeqNo: 1	135038	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4-Dinitrotoluene	4.6	0	5.000	0	91.8	49	134				
2-Chlorophenol	4.6	0	5.000	0	93.0	50	131				
4-Chloro-3-methylphenol	5.1	0	5.000	0	102	42	139				
4-Nitrophenol	4.7	0	5.000	0	94.2	19	137				
Acenaphthene	4.5	0	5.000	0	89.8	36	122				
Bis(2-ethylhexyl)phthalate	5.1	0	5.000	0	102	43	142				

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-R36648	SampT	ype: LC	s	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: LCSW	Batch	1D: R3	6648	R	RunNo: 3	6648				
Prep Date:	Analysis D	ate: 8/	17/2016	S	SeqNo: 1	135038	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
N-Nitrosodi-n-propylamine	4.2	0	5.000	0	84.0	46	140			
Pentachlorophenol	2.2	0	5.000	0	45.0	22	138			
Phenol	4.7	0	5.000	0	93.4	45	134			
Pyrene	5.0	0	5.000	0	100	45	138			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26894 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129407 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-26894 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129408 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0053 0.00020 0.005000 0 105 80 120

Sample ID 1608660-001BMS SampType: MS TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129410 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 113 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA Method 7470: Mercury

Client ID: Wastewater Effluent Batch ID: 26894 RunNo: 36465

Prep Date: 8/10/2016 Analysis Date: 8/12/2016 SeqNo: 1129411 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0057 0.00020 0.005000 0 114 75 125 0.473 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-27020 SampType: MBLK TestCode: MERCURY, TCLP

Client ID: PBW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132320 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Mercury ND 0.020

Sample ID LCS-27020 SampType: LCS TestCode: MERCURY, TCLP

Client ID: LCSW Batch ID: 27020 RunNo: 36563

Prep Date: 8/16/2016 Analysis Date: 8/17/2016 SeqNo: 1132321 Units: mg/L

Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte PQL Qual

Mercury ND 0.020 0.005000 0 98.1 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Reporting Detection Limit

P Sample pH Not In Range

RL

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26942 SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW Batch ID: 26942 RunNo: 36611

Prep Date: 8/11/2016	Analysis	Date: 8/	18/2016	5	SeqNo: 1	134113	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								
Strontium	ND	0.010								
Thallium	ND	0.050								
Zinc	ND	0.020								
Silica	ND	1.1								

Sample ID LCS-26942	SampT	ype: LC	S	Test	als					
Client ID: LCSW	Batch	n ID: 26 9	942	RunNo: 36611						
Prep Date: 8/11/2016	Analysis Date: 8/18/2016			S	seqNo: 1	134115	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.52	0.020	0.5000	0	103	80	120			
Arsenic	0.49	0.020	0.5000	0	97.6	80	120			
Barium	0.48	0.020	0.5000	0	95.1	80	120			
Beryllium	0.51	0.0030	0.5000	0	101	80	120			
Cadmium	0.47	0.0020	0.5000	0	94.9	80	120			
Calcium	50	1.0	50.00	0	99.0	80	120			
Chromium	0.47	0.0060	0.5000	0	94.7	80	120			
Cobalt	0.46	0.0060	0.5000	0	91.2	80	120			
Copper	0.47	0.0060	0.5000	0	94.2	80	120			
Iron	0.47	0.050	0.5000	0	93.1	80	120			
Lead	0.46	0.0050	0.5000	0	92.8	80	120			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

Page 20 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#:

1608660

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID LCS-26942	Samp	Type: LC	s	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID: LCSW	Batch ID: 26942			R	tunNo: 3	6611				
Prep Date: 8/11/2016	Analysis Date: 8/18/2016			S	seqNo: 1	134115	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.0	80	120			
Manganese	0.47	0.0020	0.5000	0	93.4	80	120			
Nickel	0.45	0.010	0.5000	0	90.3	80	120			
Potassium	48	1.0	50.00	0	96.0	80	120			
Selenium	0.50	0.050	0.5000	0	99.0	80	120			
Silver	0.097	0.0050	0.1000	0	96.8	80	120			
Sodium	49	1.0	50.00	0	97.0	80	120			
Strontium	0.11	0.010	0.1000	0	110	80	120			
Thallium	0.49	0.050	0.5000	0	97.0	80	120			
Zinc	0.46	0.020	0.5000	0	91.0	80	120			
Silica	5.4	1.1	5.350	0	101	80	120			

Sample ID	1608660-001BMS	Samp	Туре: М	3	TestCode: EPA 6010B: Total Recoverable Metals								
Client ID:	Client ID: Wastewater Effluent Batch ID: 26942					RunNo: 36611							
Prep Date:	8/11/2016	Analysis	Date: 8/	18/2016	S	SeqNo: 1	134120	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Aluminum		0.79	0.020	0.5000	0.2561	106	75	125					
Arsenic		0.52	0.020	0.5000	0.03115	98.4	75	125					
Barium		0.48	0.020	0.5000	0.01539	93.1	75	125					
Beryllium		0.49	0.0030	0.5000	0.0002600	97.2	75	125					
Cadmium		0.47	0.0020	0.5000	0	93.5	75	125					
Chromium		0.46	0.0060	0.5000	0	91.1	75	125					
Cobalt		0.45	0.0060	0.5000	0.002780	89.5	75	125					
Copper		0.51	0.0060	0.5000	0	101	75	125					
Lead		0.45	0.0050	0.5000	0	89.7	75	125					
Magnesium		90	1.0	50.00	41.34	97.7	75	125					
Manganese		0.61	0.0020	0.5000	0.1524	91.0	75	125					
Nickel		0.45	0.010	0.5000	0.01016	88.2	75	125					
Selenium		0.52	0.050	0.5000	0.03028	97.3	75	125					
Silver		0.097	0.0050	0.1000	0	97.3	75	125					
Thallium		0.48	0.050	0.5000	0	95.8	75	125					
Zinc		0.47	0.020	0.5000	0.02456	88.1	75	125					

Sample ID	1608660-001BMSD	SampType:	MSD	Tes	tCode: El	PA 6010B:	Total Recover	able Meta	als	
Client ID:	Wastewater Effluent	Batch ID:	26942	F	RunNo: 3	6611				
Prep Date:	8/11/2016 A	SeqNo: 1134122			Units: mg/L					
Analyte	1	Result PC	QL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.80 0.0	0.5000	0.2561	108	75	125	1.20	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

Page 21 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID	1608660-001BMS	D Samp	Type: MS	SD.	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Wastewater Efflu	ent Bato	h ID: 269	942	F	tunNo: 3	6611				
Prep Date:	8/11/2016	Analysis I	Date: 8/	18/2016	8	SeqNo: 1	134122	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.54	0.020	0.5000	0.03115	102	75	125	3.44	20	
Barium		0.48	0.020	0.5000	0.01539	93.8	75	125	0.725	20	
Beryllium		0.49	0.0030	0.5000	0.0002600	98.0	75	125	0.895	20	
Cadmium		0.48	0.0020	0.5000	0	95.7	75	125	2.34	20	
Chromium		0.47	0.0060	0.5000	0	93.8	75	125	2.88	20	
Cobalt		0.46	0.0060	0.5000	0.002780	92.2	75	125	2.97	20	
Copper		0.51	0.0060	0.5000	0	102	75	125	1.08	20	
Lead		0.46	0.0050	0.5000	0	92.1	75	125	2.73	20	
Magnesium		91	1.0	50.00	41.34	98.8	75	125	0.587	20	
Manganese		0.61	0.0020	0.5000	0.1524	91.8	75	125	0.656	20	
Nickel		0.46	0.010	0.5000	0.01016	90.5	75	125	2.44	20	
Selenium		0.52	0.050	0.5000	0.03028	97.8	75	125	0.514	20	
Silver		0.097	0.0050	0.1000	0	97.0	75	125	0.216	20	
Thallium		0.48	0.050	0.5000	0	95.2	75	125	0.572	20	
Zinc		0.48	0.020	0.5000	0.02456	90.6	75	125	2.56	20	
Sample ID	1608660-001BMS	Samp	Туре: МЅ	;	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Wastewater Efflu	ent Bato	h ID: 269	942	RunNo: 36611						
Prep Date:	8/11/2016	Analysis I	Date: 8/	18/2016	S	SeqNo: 1	134131	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.9	75	125			
Sample ID	1608660-001BMS	D Samp	Туре: МЅ	SD	Tes	Code: El	PA 6010B: ¹	Total Recover	rable Meta	als	
Client ID:	Wastewater Efflu	ent Bato	h ID: 269	942	F	tunNo: 3	6611				
Prep Date:	8/11/2016	Analysis I	Date: 8/	18/2016	8	seqNo: 1	134132	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	60.03	97.4	75	125	0.257	20	
Sample ID	D MB-26942 SampType: MBLK				TestCode: EPA 6010B: Total Recoverable Metals						

Qualifiers:

Analyte

Antimony

Client ID: PBW

Prep Date: 8/11/2016

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

Batch ID: 26942

Analysis Date: 8/19/2016

PQL

0.050

Result

ND

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

RunNo: 36628

SPK value SPK Ref Val %REC LowLimit

SeqNo: 1134578

Units: mg/L

HighLimit

%RPD

J Analyte detected below quantitation limits

D G 1 HN I D

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RPDLimit

Qual

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID LCS-26942 SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134579 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Antimony 0.49 0.050 0.5000 97.9 80 120 0

Sample ID 1608660-001BMS SampType: MS TestCode: EPA 6010B: Total Recoverable Metals

Client ID: Wastewater Effluent Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134583 Units: mg/L

SPK value SPK Ref Val %REC LowLimit %RPD **RPDLimit** Analyte Result PQL HighLimit Qual

Antimony 0.49 0.050 0.5000 0 97.2 75 125

Sample ID 1608660-001BMSD SampType: MSD TestCode: EPA 6010B: Total Recoverable Metals

Client ID: **Wastewater Effluent** Batch ID: 26942 RunNo: 36628

Prep Date: 8/11/2016 Analysis Date: 8/19/2016 SeqNo: 1134584 Units: mg/L

Result **PQL** SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual Analyte LowLimit

Antimony 0.49 0.050 0.5000 0 98.5 75 125 1.33 20

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Sample pH Not In Range

P RLReporting Detection Limit

Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

ND

ND

ND

ND

ND

ND

0.47

0.49

0.050

0.050

0.5000

0.5000

0.0020

0.010

0.050

0.0050

0.050

0.050

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-26961 SampType: MBLK TestCode: EPA 6010B: TCLP Metals Client ID: **PBW** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130431 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Aluminum ND 0.020 Antimony ND 0.050 Arsenic ND 0.020 Barium ND 0.020 Beryllium ND 0.0030 Cadmium ND 0.0020 Chromium ND 0.0060 ND 0.0060 Cobalt Copper ND 0.0060 ND 0.0050 Lead

Sample ID LCS-26961 SampType: LCS TestCode: EPA 6010B: TCLP Metals Client ID: LCSW Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130432 Units: mg/L **PQL** SPK Ref Val %REC HighLimit %RPD **RPDLimit** Analyte Result SPK value LowLimit Qual 0.51 0.020 0.5000 0 103 80 120 Aluminum 98.3 Antimony 0.49 0.050 0.5000 0 80 120 0.5000 95.2 Arsenic 0.48 0.020 0 80 120 Barium 0.46 0.020 0.5000 0 93.0 80 120 97.7 Beryllium 0.49 0.0030 0.5000 0 80 120 Cadmium 0.47 0.0020 0.5000 0 94.7 80 120 Chromium 0.47 0.0060 0.5000 0 93.1 80 120 0.0060 0 91.2 80 Cobalt 0.46 0.5000 120 0.48 0.0060 0.5000 0 95.2 80 120 Copper 0.0050 0.5000 0 92.1 80 Lead 0.46 120 Manganese 0.46 0.0020 0.5000 0 92.3 80 120 92.0 Nickel 0.46 0.010 0.5000 0 80 120 97.2 Selenium 0.49 0.050 0.5000 0 80 120 0.096 0.0050 0 95.6 Silver 0.1000 80 120

0

0

Qualifiers:

Thallium

Vanadium

Manganese

Nickel

Silver

Selenium

Thallium

Vanadium

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank

80

80

120

120

E Value above quantitation range

93.1

98.0

- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMS SampType: MS TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36503

Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130536 Units: mg/l

Analysis Date: 8/15/2016		٤	SeqNo: 1130536						
Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
0.78	0.020	0.5000	0.2003	116	75	125			
0.50	0.050	0.5000	0	101	75	125			
0.53	0.020	0.5000	0.02818	101	75	125			
0.48	0.020	0.5000	0.01425	92.4	75	125			
0.49	0.0030	0.5000	0.0004400	97.1	75	125			
0.48	0.0020	0.5000	0	95.8	75	125			
0.46	0.0060	0.5000	0	92.3	75	125			
0.46	0.0060	0.5000	0.001460	91.1	75	125			
0.51	0.0060	0.5000	0	102	75	125			
0.46	0.0050	0.5000	0.003590	90.5	75	125			
0.61	0.0020	0.5000	0.1322	95.0	75	125			
0.47	0.010	0.5000	0.009620	92.8	75	125			
0.56	0.050	0.5000	0.03775	105	75	125			
0.098	0.0050	0.1000	0	97.9	75	125			
0.50	0.050	0.5000	0.006750	98.8	75	125			
	Result 0.78 0.50 0.53 0.48 0.49 0.46 0.46 0.51 0.46 0.61 0.47 0.56 0.098	Result PQL 0.78 0.020 0.50 0.050 0.53 0.020 0.48 0.020 0.49 0.0030 0.48 0.0020 0.46 0.0060 0.51 0.0060 0.46 0.0050 0.61 0.0020 0.47 0.010 0.56 0.050 0.098 0.0050	0.78 0.020 0.5000 0.50 0.050 0.5000 0.53 0.020 0.5000 0.48 0.020 0.5000 0.49 0.0030 0.5000 0.48 0.0020 0.5000 0.46 0.0060 0.5000 0.51 0.0060 0.5000 0.46 0.0050 0.5000 0.61 0.0020 0.5000 0.47 0.010 0.5000 0.56 0.050 0.5000 0.098 0.0050 0.1000	Result PQL SPK value SPK Ref Val 0.78 0.020 0.5000 0.2003 0.50 0.050 0.5000 0 0.53 0.020 0.5000 0.01425 0.48 0.020 0.5000 0.0004400 0.48 0.0020 0.5000 0 0.46 0.0060 0.5000 0 0.46 0.0060 0.5000 0.001460 0.51 0.0060 0.5000 0.001460 0.46 0.0050 0.5000 0.003590 0.61 0.0020 0.5000 0.01322 0.47 0.010 0.5000 0.009620 0.56 0.050 0.5000 0.03775 0.098 0.0050 0.1000 0	Result PQL SPK value SPK Ref Val %REC 0.78 0.020 0.5000 0.2003 116 0.50 0.050 0.5000 0 101 0.53 0.020 0.5000 0.02818 101 0.48 0.020 0.5000 0.01425 92.4 0.49 0.0030 0.5000 0.0004400 97.1 0.48 0.0020 0.5000 0 95.8 0.46 0.0060 0.5000 0 92.3 0.46 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.001460 91.1 0.51 0.0060 0.5000 0.003590 90.5 0.61 0.0020 0.5000 0.003590 90.5 0.47 0.010 0.5000 0.009620 92.8 0.56 0.050 0.5000 0.03775 105 0.098 0.0050 0.1000 0 97.9	Result PQL SPK value SPK Ref Val %REC LowLimit 0.78 0.020 0.5000 0.2003 116 75 0.50 0.050 0.5000 0 101 75 0.53 0.020 0.5000 0.02818 101 75 0.48 0.020 0.5000 0.01425 92.4 75 0.49 0.0030 0.5000 0.0004400 97.1 75 0.48 0.0020 0.5000 0 95.8 75 0.46 0.0060 0.5000 0 92.3 75 0.46 0.0060 0.5000 0.001460 91.1 75 0.51 0.0060 0.5000 0.001460 91.1 75 0.46 0.0050 0.5000 0.003590 90.5 75 0.46 0.0050 0.5000 0.03590 90.5 75 0.47 0.010 0.5000 0.003590 92.8 75 0.47	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0.001460 91.1 75 125 0.51 0.0060 0.5000 0.003590 90.5 75 125 0.46 0.0050 0.5000 0.003590	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.46 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0.003590<	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit 0.78 0.020 0.5000 0.2003 116 75 125 0.50 0.050 0.5000 0 101 75 125 0.53 0.020 0.5000 0.02818 101 75 125 0.48 0.020 0.5000 0.01425 92.4 75 125 0.49 0.0030 0.5000 0.0004400 97.1 75 125 0.48 0.0020 0.5000 0 95.8 75 125 0.46 0.0060 0.5000 0 92.3 75 125 0.46 0.0060 0.5000 0 91.1 75 125 0.51 0.0060 0.5000 0 102 75 125 0.46 0.0050 0.5000 0 102 75 125 0.46 0.0050 0.5000 </td

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals Client ID: **Wastewater Effluent** Batch ID: 26961 RunNo: 36503 Prep Date: 8/12/2016 Analysis Date: 8/15/2016 SeqNo: 1130537 Units: mg/L %RPD SPK value SPK Ref Val %REC LowLimit HighLimit **RPDLimit** Analyte Result PQL Qual 0.79 0.020 0.5000 0.2003 118 75 125 1.17 20 Aluminum 0.47 0.050 0.5000 0 94.6 75 125 6.35 20 **Antimony** 0.5000 0.02818 99.4 75 Arsenic 0.53 0.020 125 1.25 20 0.5000 0.01425 93.4 75 Barium 0.48 0.020 125 1.05 20 Beryllium 0.49 0.0030 0.5000 0.0004400 97.9 75 125 0.828 20 95.9 Cadmium 0.48 0.0020 0.5000 75 125 0.169 20 Chromium 0.46 0.0060 0.5000 0 92.2 75 125 0.119 20 Cobalt 0.46 0.0060 0.5000 0.001460 91.6 75 125 0.583 20 20 104 75 Copper 0.52 0.0060 0.5000 125 1.52 0.46 0.0050 0.5000 0.003590 90.6 75 125 0.0438 20 Lead 0.62 0.0020 0.5000 97.0 75 20 Manganese 0.1322 125 1.70

Qualifiers:

Nickel

Silver

Selenium

Vanadium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

0.47

0.53

0.10

0.51

0.010

0.050

0.0050

0.050

0.5000

0.5000

0.1000

0.5000

0.009620

0.006750

0.03775

0

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

75

75

75

125

125

125

125

0.0190

6.15

2.01

1.05

E Value above quantitation range

92.8

97.9

99.8

99.9

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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20

20

20

20

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Project:	ū	tefining Co ater Efflue									
Sample ID	1608660-001CMS	SampT	уре: М	3	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflu	ent Batch	n ID: 26	961	F	RunNo: 3	6503				
Prep Date:	8/12/2016	Analysis D	ate: 8 /	15/2016	5	SeqNo: 1	130575	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.54	0.25	0.5000	0	107	75	125	70.1.1	- 11 - 2 - 11 - 11	
Sample ID	1608660-001CMS	D SampT	vpe: MS	SD	Tes	tCode: FI	PA 6010B- 1	TCLP Metals			
Client ID:	Wastewater Efflu	•	າ ID: 26		RunNo: 36503						
Prep Date:	8/12/2016	Analysis D)ate: 8 /	15/2016	SeqNo: 1130576 Units: mg/L						
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium		0.50	0.25	0.5000	0	100	75	125	11.2	20	Quai
Sample ID	MR-26961	SamnT	vne: MI	BI K	Tes	tCode: FI	PΔ 6010R+ '	TCLP Metals			
Client ID:	MB-26961 SampType: MBLK PBW Batch ID: 26961					RunNo: 3		TOLI Metals			
Prep Date:		Analysis D				SeqNo: 1		Units: mg/L			
	0/12/2010	•						J	0/ DDD	DDDI (m)	01
Analyte Calcium		Result ND	PQL 1.0	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron		ND	0.050								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Sodium		ND	1.0								
Sample ID	LCS-26961	SampT	ype: LC	:s	TestCode: EPA 6010B: TCLP Metals						
Client ID:	LCSW	Batch	n ID: 26	961	F	RunNo: 3	6584				
Prep Date:	8/12/2016	Analysis D)ate: 8	17/2016	S	SeqNo: 1	132792	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		50	1.0	50.00	0	101	80	120			
Iron		0.50	0.050	0.5000	0	99.4	80	120			
Magnesium		50	1.0	50.00	0	99.7	80	120			
Potassium		48	1.0	50.00	0	97.0	80	120			
Sodium		49	1.0	50.00	0	98.4	80	120			
Sample ID	1608660-001CMS	SampT	уре: М	<u> </u>	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflu	ent Batch	n ID: 26	961	RunNo: 36584						
Prep Date:	8/12/2016	Analysis D	oate: 8,	17/2016	S	SeqNo: 1	132798	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

Magnesium

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

90

1.0

50.00

35.08

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

75

125

E Value above quantitation range

110

J Analyte detected below quantitation limits

D. Camala all Nat la Danas

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P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Client:

Hall Environmental Analysis Laboratory, Inc.

Navajo Refining Company

WO#: 1608660

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22-Aug-16

Project:	· ·	ater Effluer									
Sample ID	1608660-001CMSI	SampT	ype: MS	SD	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	R	RunNo: 30	6584				
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	S	SeqNo: 1	132799	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium		87	1.0	50.00	35.08	104	75	125	3.07	20	
Sample ID	1608660-001CMS	SampT	/pe: MS	;	Tes	tCode: El	PA 6010B: ⁻	TCLP Metals			
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	RunNo: 36584						
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	9	SeqNo: 1	132804	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	59.21	104	75	125			
Sample ID	1608660-001CMSI	SampT	/pe: MS	SD.	Tes	tCode: El	PA 6010B: ⁷	TCLP Metals			
Client ID:	Wastewater Efflue	Wastewater Effluent Batch ID: 26961					6584				
Prep Date:	8/12/2016	Analysis Da	ate: 8/	17/2016	9	SeqNo: 1	132805	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium		110	5.0	50.00	59.21	93.6	75	125	4.76	20	
Sample ID	MB-26961	SampT	ype: ME	3LK	Tes	tCode: El	PA 6010B: ⁻	TCLP Metals			
Client ID:	PBW	Batch	ID: 26	961	R	RunNo: 30	6591				
Prep Date:	8/12/2016	Analysis Da	ate: 8/	18/2016	S	SeqNo: 1	133361	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc		ND	0.020								
Sample ID	LCS-26961	SampT	ype: LC	.s	Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	LCSW	Batch	ID: 26	961	R	RunNo: 30	6591				
Prep Date:	8/12/2016	Analysis D	ate: 8/	18/2016	S	SeqNo: 1	133362	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc		0.47	0.020	0.5000	0	93.6	80	120			
Sample ID	1608660-001CMS	SampT	/pe: MS		Tes	tCode: El	PA 6010B:	TCLP Metals			
Client ID:	Wastewater Efflue	ent Batch	ID: 26	961	R	RunNo: 30	6591				
Prep Date:	8/12/2016	Analysis D	ate: 8/	18/2016	S	SeqNo: 1	133467	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc		0.50	0.020	0.5000	0.02262	95.6	75	125			

Qualifiers:

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

% Recovery outside of range due to dilution or matrix

В Analyte detected in the associated Method Blank

Е Value above quantitation range

J

Analyte detected below quantitation limits

P Sample pH Not In Range

RLReporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID 1608660-001CMSD SampType: MSD TestCode: EPA 6010B: TCLP Metals

Client ID: Wastewater Effluent Batch ID: 26961 RunNo: 36591

Prep Date: **8/12/2016** Analysis Date: **8/18/2016** SeqNo: **1133468** Units: **mg/L**

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Zinc 0.49 0.020 0.5000 0.02262 92.8 75 125 2.78 20

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: CYANIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135042 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive ND 1.00

Sample ID LCS-R36648 SampType: LCS TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/16/2016 SeqNo: 1135043 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive 0.578 0.5000 0 116 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-R36648 SampType: MBLK TestCode: SULFIDE, Reactive

Client ID: PBW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135045 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Reactive Sulfide ND 1.0

Sample ID LCS-R36648 SampType: LCS TestCode: SULFIDE, Reactive

Client ID: LCSW Batch ID: R36648 RunNo: 36648

Prep Date: Analysis Date: 8/17/2016 SeqNo: 1135046 Units: mg/L

Result SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Qual

Reactive Sulfide 0.20 0.2000 0 100 70 130

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Page 30 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: **1608660**

22-Aug-16

Client: Navajo Refining Company
Project: Waste Water Effluent

Sample ID mb-1 SampType: mblk TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131152 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20.00

Sample ID Ics-1 SampType: Ics TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R36527 RunNo: 36527

Prep Date: Analysis Date: 8/15/2016 SeqNo: 1131153 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 79.40 20.00 80.00 0 99.2 90 110

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limits

D C 1 HN / I D

Page 31 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

WO#: 1608660

22-Aug-16

Client: Navajo Refining Company **Project:** Waste Water Effluent

Sample ID MB-26968 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 26968 RunNo: 36519

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130783 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Total Dissolved Solids ND 20.0

Sample ID LCS-26968 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 26968 RunNo: 36519

Prep Date: 8/13/2016 Analysis Date: 8/16/2016 SeqNo: 1130784 Units: mg/L

SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result PQL Qual

Total Dissolved Solids 994 20.0 1000 0 99.4 120

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

J Analyte detected below quantitation limits

Page 32 of 32

P Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: NAVAJO RÈFINING COM Work Order Number: 1608660 RcptNo: 1 Received by/date: Logged By: Lindsay Mangin 8/11/2016 9:05:00 AM Completed By: Lindsay Mangin 8/11/2016 10:45:24 AM Reviewed By: 08/11/16 Chain of Custody 1 Custody seals intact on sample bottles? Yes No 🗌 Not Present 2. Is Chain of Custody complete? No 🗌 Yes 🐼 Not Present 3 How was the sample delivered? Courier Log In 4. Was an attempt made to cool the samples? Yes 🗌 No ... NA 🛷 5. Were all samples received at a temperature of >0° C to 6.0°C No 🗌 NA 🜌 Yes 🗔 Sample(s) in proper container(s)? No 🗆 Yes 7. Sufficient sample volume for indicated test(s)? Yes 🐼 No 8. Are samples (except VOA and ONG) properly preserved? No \square Yes 9. Was preservative added to bottles? No 🐼 NA 🗌 Yes 📙 10.VOA vials have zero headspace? No VOA Vials Yes 🕏 No 🗀 11. Were any sample containers received broken? No 🛷 Yes # of preserved bottles checked 12. Does paperwork match bottle labels? Yes 🖈 No 🛄 for pH: (Note discrepancies on chain of custody) inless noted) Adjusted⁴ 13. Are matrices correctly identified on Chain of Custody? No [14 Is it clear what analyses were requested? No 🗌 Yes 15. Were all holding times able to be met? Checked by: Yes 🖈 No 🗌 (If no, notify customer for authorization.) Special Handling (if applicable) Yes 16. Was client notified of all discrepancies with this order? No 🗌 NA 🐼 Person Notified: Date: By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C Condition Seal Intact | Seal No Seal Date Signed By 1.5 Good

ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 www.hallenvironmental.com Fax 505-345-4107 Analysis Request 1151 borleM 846 Method 1311 TCLP Metals, only I40 CFR Part Remarks: Send results to Robert Combs Ca, K, Mg, Na/40 CFR 136.3 × 7470 (see attached list 'Metals') Tel. 505-345-3975 Metals/SW-846 Mthd 6010, R,C,I/40 CFR part 261 see attached list 'SVOCs') SVOCs/SW-846 Method 8270D (see attached list 'VOCs') VOCs/SW-846 Method 8260C Cation/anion bal., Br, Eh/40 Specific Gravity, HCO3, CO3, CI, SO4, TDS, pH, cond., FI, 805 Robert Combs Waste Water Effluent 8-10-16 Brady Hubbard X Rush Preservative Neat/H2SO4 Project #: P.O. # 167796 Sample Temperature: HN03 Neat Neat Neat Project Manager: 건 Neat Project Name Container Type and # □ Standar Received by Received by Sampler: On Ice ო and ന N Ç Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 Sample Request ID Waste Water Effluent 8-10-16 Waste Water Effluent 8-10-16 □ Level 4 (Full Validation) Waste Water Effluent 8-10-16 CHAIN-UI-CHOICOLY DECOIL Relinquished by: Bred, (L.SLA) Mailing Address: P.O. Box 159 Artesia email or Fax#: 575-746-5451 Matrix Client: Navajo Refining Co. Liquid Liquid Liquid Liquid Liquid Liquid Liguid Phone #: 575-748-3311 Time 8-10-16 4:00 10.55 10.55 10:55 10:55 10:55 10:55 10.55 NM 88211-0159 □ Other □ EDD (Type) QA/QC Package: □ Standard 8/10/16 8/10/16 8/10/16 8/10/16 Date 8/10/16 8/10/16 8/10/16

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

		- We	ell:	MW
		Dat	te: 2/3/2013	######
Analyte	CGWSL	CGWSL Source	Result	Result
Dissolved Metals (mg/L)	T			1
Aluminum, Dissolved	5.00E+00	NMED GW Irrigation (20.6.2.3103.C)	0.0265	
Arsenic, Dissolved	1.00E-02	EPA MCL	0.00561	0.00437
Barium, Dissolved	1.00E+00	NMED GW Human Health (20.6.2.3103.A)	0.0204	0.0129
Boron, Dissolved	7.50E-01	NMED GW Irrigation (20.6.2.3103.C)	0.139	0.101
Cadmium, Dissolved	5.00E-03	EPA MCL		
Calcium, Dissolved			600	576
Chromium, Dissolved	5.00E-02	NMED GW Human Health (20.6.2.3103.A)		
Cobalt, Dissolved	5.00E-02	NMED GW Irrigation (20.6.2.3103.C)	0.00738	0.00451
Copper, Dissolved	1.00E+00	NMED GW Irrigation (20.6.2.3103.C)		
Iron, Dissolved	1.00E+00	NMED GW Irrigation (20.6.2.3103.C)		
Lead, Dissolved	1.50E-02	EPA MCL		
Manganese, Dissolved	2.00E-01	NMED GW Domestic (20.6.2.3103.B)	<i>1.51</i>	0.844
Mercury, Dissolved	2.00E-03	NMED GW Human Health (20.6.2.3103.A)		
Molybdenum, Dissolved	1.00E+00	NMED GW Irrigation (20.6.2.3103.C)	0.0103	0.00978
Nickel, Dissolved	2.00E-01	NMED GW Irrigation (20.6.2.3103.C)	0.00651	0.0041
Potassium, Dissolved			2.86	2.76
Selenium, Dissolved	5.00E-02	NMED GW Human Health (20.6.2.3103.A)	0.00222	0.00636
Silver, Dissolved	5.00E-02	NMED GW Human Health (20.6.2.3103.A)		
Sodium, Dissolved			146	123
Uranium	3.00E-02	NMED GW Human Health (20.6.2.3103.A)	0.0156	0.0108
Zinc, Dissolved	1.00E+01	NMED GW Domestic (20.6.2.3103.B)	0.00343	
Anions (mg/L)	•	,	<u> </u>	
Chloride	2.50E+02	NMED GW Domestic (20.6.2.3103.B)	158	150
Fluoride (F-, Anion)	1.60E+00	NMED GW Human Health (20.6.2.3103.A)	1.76	1.91
Nitrate/Nitrite				
Nitrate-N	1.00E+00	NMED GW Human Health (20.6.2.3103.A)	1.43	
Nitrite		,		
Sulfate	6.00E+02	NMED GW Domestic (20.6.2.3103.B)	2200	1800
Cyanide	2.00E-01	EPA MCL		0.00432
- Cyaniae	2.002 01	1.777702		0.00 .02
Radium (pCi/L)				
Radium-226			0.43	
Radium-228			0.74	
Radium-226 & Radium-228	5.00E+00	USEPA MCL	1.17	
Total Dissolved Solids (mg/L)	0.002	GGEI 7 TIMOL	1117	
Total Dissolved Solids	1.00E+03	NMED GW Domestic (20.6.2.3103.B)	<i>3760</i>	3990
	11002 1 03	THIED ON DOMESCE (EGIGIZISTOSIS)	5700	5550
TPH (mg/L)		T		1
Gasoline Range Organics		NMED TOU	+	1
TPH Diesel Range	2.00E-01	NMED TPH		
Oil	2.00E-01	NMED TPH		
VOCs (mg/L)	6.005.00	NIMED CWILLIAM HH- (20 C 2 2402 A)		1
1,1,1-Trichloroethane	6.00E-02	NMED GW Human Health (20.6.2.3103.A)		
1,1,2,2-Tetrachloroethane	1.00E-02	NMED GW Human Health (20.6.2.3103.A)		
1,1,2-Trichloroethane	5.00E-03	EPA MCL		
1,1-Dichloroethane	2.50E-02	NMED GW Human Health (20.6.2.3103.A)	_	
1,1-Dichloroethene	7.00E-03	USEPA MCL		

1,2-Dibromoethane	5.00E-05	EPA MCL	
1,2-Dichloroethane	5.00E-03	EPA MCL	
Benzene	5.00E-03	EPA MCL	
Carbon Tetrachloride	5.00E-03	EPA MCL	
Chloroform	8.00E-02	NMED GW Human Health (20.6.2.3103.A)	
Dichloromethane	5.00E-03	EPA MCL	
Ethylbenzene	7.00E-01	EPA MCL	
Tetrachloroethene	5.00E-03	EPA MCL	
Toluene	7.50E-01	NMED GW Human Health (20.6.2.3103.A)	
Total Xylenes	6.20E-01	NMED GW Human Health (20.6.2.3103.A)	
Trichloroethene	5.00E-03	EPA MCL	
Vinyl Chloride	1.00E-03	NMED GW Human Health (20.6.2.3103.A)	
SVOCs (mg/L)			
1-Methylnaphthalene			
2-Methylnaphthalene			
Naphthalene	3.00E-02	NMED GW Human Health (20.6.2.3103.A)	
Benzo(a)Pyrene	2.00E-04	EPA MCL	
рН	6 to 9	NMED GW Domestic (20.6.2.3103.B)	

-114								
9/5/2013	11/21/2013	2/3/2013	5/15/2013	5/15/2013	9/4/2013	######	2/3/2013	5/16/2013
Result	Result	Result	Result	Result	Result	Result	Result	Result
0.00040	0.00012	0.00000	0.00065	0.00016	0.00640	0.0074.4		0.240
0.00848	0.00813	0.00888	0.00865	0.00816	0.00648	0.00714	0.00274	0.349
0.00502	0.00539	0.00499	0.00427	0.00478	0.00467	0.00616	0.00274	0.00502
0.017	0.0112	0.0309	0.011	0.0107	0.0106	0.011	0.0161	0.0111
0.132	0.816	0.865	0.635	0.605	0.782	0.858	0.22	0.238
C72	FFO	F10	405	F1.1	(22	COC	624	F70
672	558	518	495	511	622	606	624	578
0.00710	0.00119	0.0000						0.00119
0.00718		0.0029	0.00151					0.00176
0.00197	0.167	0.00704	0.00151					0.00176
	0.167							0.201
1.42	0.025	0.255	0.022	0.0267	0.0262	0.0240	0.0427	0.0242
1.42	0.035	0.255	0.023	0.0267	0.0362	0.0249	0.0437	0.0342
0.0116	0.00015	0.00077	0.00733	0.0075	0.00663	0.00720	0.000131	0.000046
0.0116	0.00815	0.00877	0.00723	0.0075	0.00663	0.00738	0.00348	0.00308
0.00558	0.00369	0.00483	0.00225	0.70	0.00208	0.00206	0.0012	0.00204
2.94	0.678	1.78	0.766	0.78	0.782	0.709	1.06	1.38
0.00245	0.00451	0.0081	0.00734	0.00654	0.00568	0.00506	0.00203	0.00733
420	250	100	201	206	2.47	264	206	101
138	250	199	201	206	247	261	206	194
0.0138	0.0856	0.0843	0.0731	0.0825	0.0936	0.0874	0.0331	0.0343
	0.0806	0.00973		0.00821		0.0257		
199	422	422	364	<i>373</i>	<i>530</i>	428	389	330
199 1.82	1.37	1.1	1.15	1.18	0.845	1.36	1.31	1.19
1.02	1.37	1.1	1.15	1.10	0.043	1.30	1.31	1.19
		0.821					1.37	
		0.021					1.57	
1950	3060	2790	2420	2490	2900	3090	2250	2080
1950	5000	2/90	2720	2430	2900	3090	2230	2000
		0					0	
2070	5200	1050	1000	EE10	6120	5270	2650	1100
3870	<i>5390</i>	4960	4990	<i>5510</i>	<i>6130</i>	<i>5370</i>	<i>3650</i>	4480
3870	<i>5390</i>	4960	4990	<i>5510</i>	6130	<i>5370</i>	3650	4480
3870	5390	4960	4990	<i>5510</i>	6130	<i>5370</i>	<u>3650</u>	4480
3870	5390	4960	4990	<i>5510</i>	6130	<i>5370</i>	3650	4480
3870	5390	4960	4990	<i>5510</i>	6130	<i>5370</i>	<i>3650</i>	4480
3870	5390	4960	4990	<i>5510</i>	6130	5370	3650	4480
3870	5390	4960	4990	5510	6130	5370	3650	4480
3870	5390	4960	4990	5510	6130	5370	3650	4480
3870	5390	4960	4990	5510	6130	5370	3650	4480
3870	5390	4960	4990	5510	6130	5370	3650	4480

	•				
7.07	6.73		7.07	6.73	

MW-	116				MW	MW-			
9/4/2013	9/4/2013	######	######	2/3/2013	######	9/4/2013	######	2/5/2013	5/15/2013
Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
0.0110	0.0126	0.0072	0.00014	0.0200	0.0104	0.0160	0.0200		0.00706
0.0118	0.0126	0.0073	0.00814	0.0289	0.0184	0.0169	0.0298	0.011	0.00796
0.00467	0.00535	0.00526	0.00525	0.00498	0.00367	0.00559	0.00347	0.011	<i>0.0146</i>
0.00946	0.00928	0.011	0.00989	0.0235	0.0113	0.0108	0.0108	0.0145	0.00919
0.281	0.304	0.307	0.312	0.207	0.175	0.202	0.204	0.226	0.23
621	F00	C1C	COC	FC0	F24	FFO	FFC	F62	F20
631	588	616	606	568	524	550	556	563	530
				0.00256					
				0.00256 0.0141			0.00345	0.00156	0.00156
		0.122		0.0141			0.00343	0.00136	0.00156
		0.132					0.00125		
0.00366	0.00478	0.00576	0.0092	0.108	0.00978	0.00502	0.00123	0.0232	
0.00006	0.000061	0.00370	0.0032	0.100	0.00376	0.00302	0.00902	0.000042	
0.0000	0.000001	0.00336	0.0035	0.0112	0.00664	0.014	0.0114	0.000042	0.0179
0.003	0.00304	0.00336	0.0033	0.00413	0.00004	0.0014	0.00305	0.0193	0.0179
1.22	1.21	1.37	1.3	6.92	4.37	8.92	7.54	7.95	7.2
0.00558	0.00493	0.00582	0.00611	0.00427	0.00585	0.00316	0.0038	0.00861	0.0127
0.00556	0.00493	0.00362	0.00011	0.00427	0.00565	0.00310	0.0036	0.00801	0.0127
230	235	235	235	176	160	118	115	218	229
<i>0.0388</i>	0.04	0.0387	0.0391	0.0263	0.0247	0.0224	0.0182	0.037	0.033
0.0388	0.04	0.0218	0.0391	0.0203	0.0247	0.00266	0.0162	0.037	0.033
		0.0210	0.0311	0.0123		0.00200	0.0575		
339	344	331	331	154	137	71	92.4	296	287
1.11	1.17	1.51	1.61	2.73	2.29	2.8	3.95	5.16	5.39
	1117	0.487	0.457				<u> </u>	0120	2.09
		01.107	01.107					2.39	
2140	2180	2470	2470	2310	2010	2020	2190	2450	2250
				0.54				0.38	
				0.89				0.87	
				1.43				1.25	
4470	4440	<i>4210</i>	<i>4570</i>	<i>3910</i>	<i>4260</i>	<i>3970</i>	<i>4150</i>	<i>4610</i>	<i>5090</i>
								0.0436	
		1	1	1	1				

							0.0042	
							0.0024	
							0.0033	
							0.0047	
7.19	7.2	6.86	6.81		7.1	6.75		

118			MW-	119		RO Discharge				
9/4/2013	######	2/5/2013	######	9/4/2013	######	2/3/2013			######	
Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
0.00002	0.0102		0.0206	0.0112	0.0140	0.00660	0.00530	0.00000	0.0567	
0.00992 0.0156	0.0103 0.0125	0.00294	0.0296 0.00537	0.0113 0.00595	0.0149 0.00438	0.00668 0.00494	0.00529 0.0025	0.00809 0.00244	0.0567 0.00125	
0.0099	0.00964	0.00294	0.00537	0.00393	0.00438	0.0628	0.0023	0.00244	0.00123	
0.307	0.288	0.0987	0.13	0.183	0.219	0.143	0.104	0.0934	0.109	
0.507	01200	010307	0113	01103	0.215	01113	01101	0.0551	0.103	
543	532	494	491	635	551	625	397	410	459	
	0.00105				0.00116			0.00114		
		0.000871								
	0.00338	0.00309	0.00137		0.00311	0.00177			0.00218	
	0.179				0.185				0.113	
	0.00107									
	0.00526	0.0424			0.00459				0.0111	
0.51.55		0.0000	0.05=:=	0.000:5	0.0000	22:27	0.05.555	0.05.55	0.000:-	
0.0162	0.0141	0.0083	0.00745	0.00846	0.00861	0.0125	0.00622	0.00604	0.00815	
0.00131	0.00214	0.00174	0.00163	0.0014	0.00222	0.00264	2.01	0.00329	0.00127	
7.69	6.92	0.87	0.794	0.993 0.0066	1.1	4.41	2.91	2.72	3.04	
0.0129	0.00327	0.00246	0.00506	0.0000	0.00144	0.013	0.0075	0.00669	0.00481	
215	163	127	120	133	98.8	65.4	40.4	45.7	83.9	
0.0395	0.0311	0.0244	0.0222	0.0275	0.0213	0.00601	10.1	15.7	05.5	
0.0000	0.0407	0.0211	010222	010273	0.0241	0.0132	0.00516	0.00672	0.00909	
132	90.1	116	118	244	185	67.5	38.2	61.1	134	
4.48	6.78	2.36	2.43	2.28	3.17	3.32	2.15	2.26	2.67	
			1.91				2.11		1.06	
		2.35				3.22				
2212	2470	2000	4070	1010	2240	1500	1000	1000	1010	
2310	2470	2090	1970	1940	2210	<u>1690</u>	1080	1030	1240	
							0.00487			
		0								
		U								
<i>4550</i>	4640	3670	4030	4030	4130	<i>3150</i>	2410	2290	<i>2770</i>	
		0.0274							1	
		0.0371								
						0.17				
						0.1/				

		0.0036					
		0.0021					
		0.0027					
		0.0037					
7.1	6.5		7.3	6.87		7.82	7.54

ı			
Sampled [Detected xcee	dancoe	
Sampleu	Jelecieu Xcee	uances	Dissolved Metals (mg/L)
31	27	0	Aluminum, Dissolved
31	31	4	Arsenic, Dissolved
31	31	0	Barium, Dissolved
31	31	4	Boron, Dissolved
31	0	0	Cadmium, Dissolved
31	31	0	Calcium, Dissolved
31	5	0	Chromium, Dissolved
31	6	0	Cobalt, Dissolved
31	14	0	Copper, Dissolved
31	7	0	Iron, Dissolved
31	2	0	Lead, Dissolved
31	24	4	Manganese, Dissolved
31	5	0	Mercury, Dissolved
31	31	0	Molybdenum, Dissolved
31	28	0	Nickel, Dissolved
31	31	0	Potassium, Dissolved
31	31	0	Selenium, Dissolved
31	0	0	Silver, Dissolved
31	31	0	Sodium, Dissolved
31	28	16	Uranium
31	16	0	Zinc, Dissolved
			Anions (mg/L)
31	31	14	Chloride
31	31	20	Fluoride (F-, Anion)
31	6	0	Nitrate/Nitrite
31	6	5	Nitrate-N
31	1	0	Nitrite
31	31	31	Sulfate
31	2	0	Cyanide
			Radium
21	2	0	(pCi/L)
31 31	3 3	0	Radium-226
31	5 6	0 0	Radium-228 Radium-226 & Radium-228
21	U	U	Total Dissolved Solids (mg/L)
31	31	31	Total Dissolved Solids (mg/L)
21	31	31	
24	2	0	TPH (mg/L)
31 31	2 0	0 0	Gasoline Range Organics
			TPH Diesel Range
31	1	0	Oil
31	0	Λ	VOCs (mg/L)
31	0 0	0 0	1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane
31	0	0	1,1,2-Trichloroethane
31	0	0	1,1-Dichloroethane
31	0	0	1,1-Dichloroethene
31	U	U	T,T DIGITORGIETE

31	0	0	1,2-Dibromoethane
31	0	0	1,2-Dichloroethane
31	2	0	Benzene
31	0	0	Carbon Tetrachloride
31	0	0	Chloroform
31	0	0	Dichloromethane
31	2	0	Ethylbenzene
31	0	0	Tetrachloroethene
31	2	0	Toluene
31	2	0	Total Xylenes
31	0	0	Trichloroethene
31	0	0	Vinyl Chloride
			SVOCs (mg/L)
31	0	0	1-Methylnaphthalene
31	0	0	2-Methylnaphthalene
31	0	0	Naphthalene
31	0	0	Benzo(a)Pyrene
31	16	0	рH

Chavez, Carl J, EMNRD

From: Orosco, Richard < Richard.Orosco@HollyFrontier.com>

Sent: Friday, August 12, 2016 9:17 AM

To: Chavez, Carl J, EMNRD; Tsinnajinnie, Leona, NMENV

Cc: Denton, Scott; Dade, Lewis (Randy); Combs, Robert; Bratcher, Mike, EMNRD

Subject: 2016-08-12 Initial C-141 Effluent spill 2016-08-09

Attachments: 2016-08-09 Spill Effluent Pipeline.pdf

Carl and Leona,

Please see the attached Initial C-141 form for the effluent spill that occurred on 8/10. Please call or email if you have any questions or would like to discuss. Thanks,

Richard L. Orasca

Environmental Tech III HollyFrontier Navajo Refining LLC (575) 746-5398 Office (575) 703-2409 Cell

CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged and confidential. If you received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any attachments. Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.

District I 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Form C-141 Revised August 8, 2011

Final Report

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action OPERATOR ☐ Initial Report

Name of Company: Navajo Refining Company, L.L.C.							Contact: Robert Combs					
Address: 501 E. Main St., Artesia, NM 88210						Telephone No.: 575-746-5382						
Facility Name: Navajo Refining Company, L.L.C.						Facility Type: Petroleum Refinery						
							T/ A			ADIAL	N/A	
Surface Owner: Navajo Refining Company, Mineral Owner						wner r	N/A			API No	. N/A	
L.L.C.										<u> </u>		
					LOCA	OITA	N OF RE	LEASE				
Unit Letter	Section	Township	Range	Feet	t from the	North/	South Line	Feet from the	East/W	est Line	County	
	18	17S	27E									
									<u></u>			
			Lat	titud	le_32°50'5	.66",N	Longitu	de_104°19'8.12	2"W			
							OF REL	_				
Type of Rele	ase: Non-ha	azardous treate	ed wastewa	ater e				Release: Est. 10	bbls	Volume F	Recovered 40 bbls	
Source of Re		d collar on pip				s east		Hour of Occurrence	ee:	Date and	Hour of Discovery: 08/09/16,	
of Artesia							08/09/16,			18:00	***************************************	
Was Immedia	ate Notice (N.T	N N D	. 1	If YES, To			D 1 0	0.10	
		Ŭ.	Yes	No	⊠ Not R	equired		onservation Divis onservation Divis			message to Carl Chavez	
											Leona Tsinnajinnie	
										1	3	
		osco, Robert C	Combs				Date and Hour 08/09/16 21:00, 8/10/16 10:00, 8/10/16 16:15					
Was a Water	course Read			N.T.			If YES, Volume Impacting the Watercourse.					
		L.	Yes ⊠	No			None					
If a Watercou	urse was Im	pacted, Descr	ibe Fully.*							7711		
N/A												
Danasila Car	C D l. l	em and Reme	J: 1 A -4:	T-1-	*							
						re naran	neters Waster	water effluent dis	charge ni	umns locat	ed at the refinery were shut	
											im truck was dispatched to the	
											ery wastewater treatment unit.	
Describe Area Affected and Cleanup Action Taken.* Pooled water was removed by vacuum truck. Samples of the water were collected from the pipeline and submitted to a third-party lab for analysis. Any												
further corrective actions will be documented in a final C-141 report.												
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and												
regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger												
public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability												
should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other												
federal, state, or local laws and/or regulations.												
Signature: Ruhard L Wosw							OIL CONSERVATION DIVISION Approved by Environmental Specialist:					
Printed Name: Richard Orosco												
Title: Environmental Technician III							Approval Da	te:	I	Expiration	Date:	
E-mail Address: Richard.orosco@hollyfrontier.com												
L-man Address. Mchard.orosco@nonyfronder.com							Conditions of Approval: Attached □					
Date: 8/12/16 Phone: 575-746-3311												

^{*} Attach Additional Sheets If Necessary



July 28, 2016

Mr, Carl Chavez
Oil Conservation Division-Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Investigation of the June 2015 Wastewater Pipeline Break near the Former Evaporation

Ponds Area

HollyFrontier Navajo Refining LLC - Artesia Refinery

GW-028

Dear Mr. Chavez:

Enclosed is a letter describing the investigation performed in response to the HollyFrontier Navajo Refining LLC (Navajo) Artesia Refinery June 2015 wastewater pipeline break near the former evaporation ponds. The investigation was performed according to the approved work plan for this investigation.

If you have any questions or comments regarding this request, please feel free to contact me at 575-746-5487 or Robert Combs at 575-746-5382.

Sincerely,

Scott M. Denton Environmental Manager

HollyFrontier Navajo Refining LLC

c: Robert Combs, Navajo

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II District III
1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Form C-141 Revised August 8, 2011

Release Notification and Corrective Action											
						OPERATOR Initial Report Sinal Report					
							bert Combs				
						***************************************	No.: 575-746-53		444		
						часину тур	e: Petroleum Re	ennery			
Surface Owner: Navajo Refining Company, Mineral Owner N L.L.C.						/A		API	No. N/A		
LOCATION OF RELEASE											
Unit Letter	Section	Township	Range	Feet from the		South Line Feet from the East/We			est Line County		
Latitude_32°51'0.32''N Longitude_104°20'20.03''W											
NATURE OF RELEASE											
Type of Rele	ase: Non-ha	zardous treate	ed wastew	ater effluent					e Recovered: 75 bbls		
Artesia	iease: Smai	i noie in pipei	ine approx	simately 3 miles e	east of	Date and Hour of Occurrence: Date and 10:30 am			nd Hour of Discovery: 04/12/15		
Was Immedia	ate Notice (Given?				If YES, To		10.50	4111		
		\boxtimes	Yes [No Not R	equired				eft message to Carl Chavez		
						Dade	inservation Divisi	on Artesia – Le	ft message, return call by Randy		
						NMED Hazardous Waste Bureau – Left message					
By Whom? 1	Ray Smalte					National R	esponse Center – $\frac{1}{10000000000000000000000000000000000$	Incident report	# 1113386		
Was a Water		ched?					olume Impacting t				
☐ Yes ⊠ No							None				
If a Watercourse was Impacted, Describe Fully.* N/A											
Describe Cause of Problem and Remedial Action Taken.*											
Pipeline leak	was discov	ered during da k was dispatel	aily visual hed to the	monitoring of the	e pipeline	e route. Wast	ewater effluent di	ischarge pumps	located at the refinery were shut ow-lying depression in the pipeline		
path across a	field. The v	acuumed wat	er was reti	arned to the refin	ery waste	ewater treatm	ent unit.	iam water m a i	ow-rying depression in the pipeline		
	path across a field. The vacuumed water was returned to the refinery wastewater treatment unit.										
	Describe Area Affected and Cleanup Action Taken.* The release area is located approximately 3 miles from the refinery in a vacant field in the flood plane of the Pecos River. Pooled water was removed by										
vacuum truck and the pipeline was repaired. Investigation of the soil and groundwater in the vicinity of the release was performed, including the											
installation and sampling of two soil borings, conversion to temporary monitor wells and collection groundwater samples. The temporary wells were											
plugged after sampling was complete. The investigation report is attached. No further action for soil or groundwater was recommended.											
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger											
regulations a	II operators or the envi	are required to conment. The	o report ar acceptanc	id/or file certain r	elease no	otifications an	nd perform correct arked as "Final P	tive actions for	releases which may endanger relieve the operator of liability		
should their of	operations h	ave failed to a	dequately	investigate and r	emediate	contaminati	on that pose a thre	eat to ground w	ater, surface water, human health		
should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other											
federal, state, or local laws and/or regulations.							OIL CONSERVATION DIVISION				
and the state of t							OIL CONSERVATION DIVISION				
Signature:											
Printed Name: Robert Combs A							Approved by Environmental Specialist:				
Title: Environmental Specialist A							Approval Date: Expi		piration Date:		
E-mail Address:						Conditions of Approval:			Attached		
	/28/16		hone:	575-746-5382							
Attach Addi	tional Shee	ets If Necess	arv								

July 27, 2016



Mr. Robert Combs HollyFrontier Navajo LLC 510 East Main Street Artesia, New Mexico 88210

Investigation of the June 2015 Wastewater Pipeline Break near the Former Evaporation Ponds Area HollyFrontier Navajo Refinery, Artesia, New Mexico Discharge Permit GW-028

Dear Robert:

This release response report describes investigation of the soil and shallow groundwater near a wastewater pipeline break that occurred near the former evaporation ponds located east of the HollyFrontier Navajo LLC (Navajo) Refinery in Artesia, New Mexico. This investigation was performed according to the revised work plan¹ submitted to the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) in October 2015.

Release History

The release occurred due to a break in the pipeline that conveys treated wastewater from the Refinery to injection wells located approximately 12 miles east of the Refinery. The break occurred approximately three miles east of the Refinery, and south of the Evaporation Ponds (Figure 1).

The wastewater that is conveyed through the pipeline is sampled quarterly and analyzed for waste characterization purposes. A copy of the first quarter 2015 wastewater analytical report was provided in Attachment 1 to the work plan. The sample was analyzed for total metals, anions, cations, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), corrosivity, reactivity, ignitability, specific conductance, specific gravity, total dissolved solids (TDS), and pH. In addition, the sample was analyzed for eight metals using the toxicity characteristic leaching procedure (TCLP). The analytical suite includes the majority of the constituents of concern (COCs) listed in the New Mexico Water Quality Control Commission (WQCC) standards found at New Mexico Administrative Code 20.6.2.3013 and additional analyses required for waste characterization purposes.

¹ Arcadis. Final Work Plan for the Soil and Groundwater Investigation at the Wastewater Pipeline Break near the Evaporation Ponds Area, Navajo Refining Company Artesia Refinery. October 14, 2015.

The analytical results indicate that the wastewater is not corrosive, not reactive, not ignitable, not toxic (no TCLP metals detected), and contains no VOCs above the WQCC standards. The following compounds were reported above the WQCC standards:

- Phenol was reported at 0.0081 mg/L, above the WQCC standard of 0.005mg/L
- ▶ Iron was reported at 3.7 mg/L, above the WQCC standard of 1.0 mg/L
- ▶ Manganese was reported at 0.25 mg/L, above the WQCC standard of 0.2 mg/L
- Chloride was reported at 300 mg/L, above the WQCC standard of 250 mg/L
- ► Fluoride was reported at 11 mg/L, above the WQCC standard of 1.6 mg/L
- Sulfate was reported at 2,100 mg/L, above the WQCC standard of 600 mg/L
- ▶ TDS was reported at 3,710 mg/L, above the WQCC standard of 1,000 mg/L

Based on the analytical results of the wastewater, OCD requested that soil and shallow groundwater samples be collected from the vicinity of the pipeline break to evaluate whether impacts had occurred as a result of the break. An initial work plan was submitted in June 2015 and a final work plan, incorporating requested revisions from OCD, was submitted in October 2015.

Scope of Work Performed

Sample Locations

Two soil borings were advanced at the locations specified in the work plan and were converted to temporary monitoring wells. Figure 2 shows the locations of the two borings/temporary wells. Location TMW-WWL2 was located northwest of the pipeline break, in the upgradient direction, while TMW-WWL1 was located as close as possible to the pipeline break location, within the spill area in the downgradient direction. The borings/temporary wells were located a minimum of 25 feet from the pipeline due to subsurface clearance policies.

Prior to initiating the investigation, well drilling permits were obtained from the Office of the State Engineer (OSE) and a plugging plan for the temporary wells was filed with the OSE. A copy of the permits and plugging plan is provided in Attachment A to this letter.

Soil Samples

Soil samples were collected continuously by advancing a sample collection tool lined with acetate sleeves using a convertible GeoprobeTM 9520 rig, followed by the use of a hollow-stem auger to enlarge the boring. The soil samples were screened using a photo-ionization detector (PID) and were visually inspected. Field observations were recorded on boring logs, which are provided in Attachment B to this letter.

Soil samples were collected at depths of 1, 5, and 12 feet below ground surface (ft bgs) in both borings. The soil samples were placed in containers provided by the analytical laboratory, labelled, and placed into a sample cooler. The samples were shipped by overnight courier to the laboratory under proper chain of custody to be analyzed for the following:

- ► Total Petroleum Hydrocarbons (TPH):
 - Gasoline Range Organics (GRO)
 - Diesel Range Organics (DRO)
 - Oil Range Organics (ORO)
- ▶ Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- Chloride
- ▶ Fluoride
- Sulfate
- ▶ Iron
- Manganese
- Phenol

One field duplicate sample was collected and one equipment blank was collected during the soil sampling effort. A copy of the laboratory report is provided, in electronic format, in Attachment C to this letter. Analytical results are discussed below.

Groundwater Samples

Shallow groundwater was encountered at a depth of 12 ft bgs in each boring. Each boring was advanced to a depth of approximately 16 ft bgs and a temporary well screen was installed from 15 ft bgs to 5 ft bgs. The well screen was schedule 40 polyvinyl chloride (PVC) with 0.010 inch slots. A solid PVC riser was installed from 5 ft bgs to slightly above the ground surface. Silica sand, grade 20/40, was installed in the annular space around the well screen, extending 2 feet above the well screen. A 2-foot thick bentonite seal was placed above the sand pack.

The temporary wells were developed by pumping, with the intention of purging the wells until the water quality parameters stabilized. During the initial development efforts on May 10, 2016, both wells pumped dry. The wells were developed by allowing the groundwater to recover overnight, then purging them dry two more times each on May 11, 2016. The wells were then allowed to settle overnight prior to sample collection on May 12, 2016. Table 1 provides a summary of the well development process.

Groundwater samples were collected from each well and placed into containers provided by the laboratory. A duplicate sample was collected from TMW-WWL2, located on the eastern (downgradient) side of the pipeline break. The normal and duplicate samples were analyzed for the same parameters as the soil samples. A copy of the laboratory report is provided, in electronic format, in Attachment C to this letter. Analytical results are discussed below.

Data Evaluation

Soil Screening Values

Table 2 provides a summary of the soil analytical results, along with screening levels used in the soil data evaluation. The three sources of screening levels included:

- ▶ OCD Spill Guidance document²
- ► New Mexico Environment Department (NMED) Soil Screening Levels (SSLs) for the soil leaching to groundwater pathway with a diffusion attenuation factor of 20 (DAF 20)³
- ▶ Background threshold values (BTVs) developed from background soil samples collected near the former evaporation ponds⁴

As discussed in the work plan, previous investigations of the former evaporation ponds performed under the guidance of the NMED Hazardous Waste Bureau (HWB) included collection and analysis of shallow soil samples for inorganic parameters from background areas not affected by historical operations associated with the Refinery, including operation of the evaporation ponds. These background soil samples were used to determine BTVs for inorganics that are known to be present naturally in the soils in this area. The background soil sample locations are shown in Figure 2 and are within similar soil types to those observed in the borings installed as part of this investigation. The Phase IV Corrective Action Investigation Report – Revised⁴ contained the results of the background soil investigation and statistical evaluation of those results, including calculation of upper tolerance limits (UTLs) to be used as BTVs for this area. Because these BTVs are from similar soil types located within 1,000 to 5,000 feet of the investigation area, it is appropriate to apply these BTVs as a screening level for this investigation. OCD had previously stated that the BTVs would not be accepted because they had not yet been approved; however, subsequent to that discussion, the NMED approved the report⁵. Therefore, the BTVs for inorganic compounds are shown in Table 2 along with the NMED SSLs.

Soil Analytical Results

TPH: The analytical results for TPH were either not detectable or were significantly below the OCD Spill Guidance screening value of 100 mg/kg.

BTEX: None of the soil samples contained BTEX above the method detection limits and all method detection limits were at least one order of magnitude below the SSLs.

Phenol: None of the soil samples contained phenol above the method detection limit and the method detection limit was four orders of magnitude below the SSL.

² New Mexico Oil Conservation Division. *Guidelines for Remediation of Leaks, Spills and Releases.* August 13, 1993.

³ New Mexico Environment Department. *Risk Assessment Guidance for Site Investigations and Remediation*. July 2015.

⁴ Arcadis. Evaporation Ponds Phase IV Corrective Action Investigation Report – Revised. May 2015.

⁵ New Mexico Environment Department. *Approval with Modifications: Evaporation Ponds Phase IV Corrective Action Investigation Report – Revised, May 2015.* October 6, 2015.

Iron: All of the soil samples contained iron at concentrations above the method detection limits. The samples collected from 1 ft bgs at both locations, and from 5 ft bgs from TMW-WWL1, contained iron at a concentration above the DAF 20 SSL, but below the BTV. The concentrations from the 1 and 5 ft bgs intervals were slightly higher from locations TMW-WWL1 than from location TMW-WWL2. Because the iron concentrations are below the BTV, this constituent is not considered to indicate the presence of impacts from the wastewater pipeline break.

Manganese: All of the soil samples contained manganese at concentrations above the method detection limits. All of the reported manganese concentrations were below both the DAF 20 SSL and the BTV for manganese. Therefore, there does not appear to have been any impact to the shallow soil.

Chloride: All of the soil samples contained chloride at concentrations above the method detection limits. All of the reported chloride concentrations were below the BTV for chloride and there is no DAF 20 SSL for chloride. Therefore, there does not appear to have been a significant impact to the shallow soil.

Fluoride: All of the soil samples contained fluoride at concentrations above the method detection limits. All of the reported fluoride concentrations were below both the DAF 20 SSL and the BTV for fluoride. Therefore, there does not appear to have been any impact to the shallow soil.

Sulfate: All of the soil samples contained sulfate at concentrations above the method detection limits. All of the reported sulfate concentrations were below the BTV for sulfate and there is no DAF 20 SSL for sulfate. Therefore, there does not appear to have been an impact to the shallow soil.

Groundwater Screening Values

Table 3 provides a summary of the groundwater analytical results, along with screening levels used in the groundwater data evaluation. The screening levels include the NMED TPH screening levels for TPH in groundwater³, the WQCC standards for groundwater with total dissolved solids (TDS) less than 10,000 milligrams per liter (mg/L).

Groundwater Analytical Results

TPH: The analytical results for TPH were either not detectable or were below the NMED TPH screening level of 0.2 mg/L.

BTEX: None of the groundwater samples contained BTEX above the method detection limits and all method detection limits were at least two orders of magnitude below the WQCC standards.

Phenol: None of the groundwater samples contained phenol above the method detection limit and the method detection limit was five orders of magnitude below the WQCC standard.

Iron: All of the groundwater samples contained iron at concentrations above the method detection limits; however, all of the concentrations were below the WQCC standard.

Manganese: All of the groundwater samples contained manganese at concentrations above the method detection limits and all of the concentrations were above the WQCC standard for manganese.

Chloride: All of the groundwater samples contained chloride at concentrations above the method detection limits. All of the reported chloride concentrations were above the WQCC standard. However, the chloride concentrations in the groundwater are three orders of magnitude higher than the chloride concentration in the wastewater sample. Thus, the wastewater could not have caused the elevated concentrations of chloride in the groundwater.

Fluoride: All of the groundwater samples contained fluoride at concentrations above the method detection limits. All of the reported fluoride concentrations were above the WQCC standard.

Sulfate: All of the groundwater samples contained sulfate at concentrations above the method detection limits. All of the reported sulfate concentrations were above the WQCC standard. However, the sulfate concentrations in the groundwater are an order of magnitude above the concentration of sulfate in the wastewater sample. Thus, the wastewater could not have caused the elevated concentrations of sulfate in the groundwater.

Comparison of Groundwater Analytical Results to Nearby Monitoring Wells

A comparison of the reported concentrations of manganese, chloride, fluoride and sulfate in the temporary wells to the reported concentrations in nearby permanent groundwater monitoring wells was performed to further evaluate the potential impacts from the wastewater pipeline break. The shallow groundwater flow direction in the vicinity of the former Evaporation Ponds and the wastewater pipeline break is to the south-southeast at a gradient of approximately 0.0012 feet per foot. The following monitoring wells were selected for comparison to the temporary wells:

- MW-120, located outside of the former Evaporation Ponds, near the termination of Three Mile Ditch, approximately 1600 feet north of the pipeline break
- ► MW-6A, located approximately 330 feet downgradient from MW-120, approximately 1430 feet north of the pipeline break
- ► MW-4A, located approximately 800 feet downgradient and slightly cross-gradient from MW-6A, approximately 1460 feet northeast of the pipeline break
- ► MW-88, located approximately 1270 feet downgradient of MW-6A, approximately 1250 feet east of the pipeline break
- ► MW-10, located approximately 1035 feet downgradient of MW-88, approximately 2100 east-southeast of the pipeline break
- ► MW-123, located approximately 780 feet south of MW-10, approximately 2560 feet southeast of the pipeline break

Trend charts were constructed using the reported concentrations of manganese, chloride, fluoride, and sulfate for each of these wells from the spring sampling event of 2012 through the spring sampling event of 2016. The trend charts are provided in Attachment D to this letter. As can be seen in the trend charts, the concentrations of these compounds fluctuate over time;

however, no obvious increasing trend in concentrations is observed in the well closest to the pipeline break area (MW-88) or in the downgradient direction (MW-10 and MW-123) following the June 2015 release.

In addition to the trend charts, a plot of the concentration reported from the April 2016 sampling for the wells listed above was constructed as a function of distance along a line connecting the wells from northwest to southeast. The locations of the temporary wells were projected onto the line between MW-4A and MW-88 and the concentrations reported from the May 2016 samples from the temporary wells were added to the plots. A concentration versus distance plot was constructed for manganese, chloride, fluoride, and sulfate and are included in Attachment D to this letter.

The comparisons of the temporary well sample results to the nearby monitoring well data (plots of concentration versus distance and trend plots over time) demonstrate that the manganese concentrations from the temporary wells are similar to the manganese concentrations in the general area. The concentrations of chloride, fluoride, and sulfate in the temporary wells appear to be elevated in one or both of the temporary wells when compared to the concentrations in the general area. Based on the concentrations of the chloride and sulfate in the wastewater sample, the wastewater is not the source of the elevated inorganic compounds in this area.

Conclusions and Recommendations

The investigation results indicate that no significant impact to soil has occurred. Although the reported concentrations of iron in the shallow soil samples are above the DAF 20 SSL, the concentrations are below the BTV for shallow soil in this area. The concentrations of chloride and sulfate in the shallow soil at location TMW-WWL1 are higher than those observed at location TMW-WWL2, but are below the BTV for shallow soil in this area. Therefore, no further action is recommended for soils.

The investigation results indicate that no impact from organic COCs has been observed in shallow groundwater; however, chloride, fluoride, and sulfate concentrations appear to be elevated in the temporary wells samples when compared to nearby downgradient monitoring wells. Based on the concentrations of the chloride and sulfate in the wastewater sample, the wastewater is not the source of the elevated inorganic compounds in this area. Because the wastewater is not a likely source for the elevated concentrations observed in the shallow groundwater, it is recommended that monitoring of the existing downgradient permanent monitoring wells continue according to the facility-wide monitoring program.

If you have any questions or comments, please feel free to contact me at 713-929-5674 or 713-249-8548.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Pamela R. Krueger Senior Associate

c: David R. Hoffman, PE, Amec Foster Wheeler

Figures:

- 1 Site Location Map
- 2 Boring/Temporary Well Location Map

Tables:

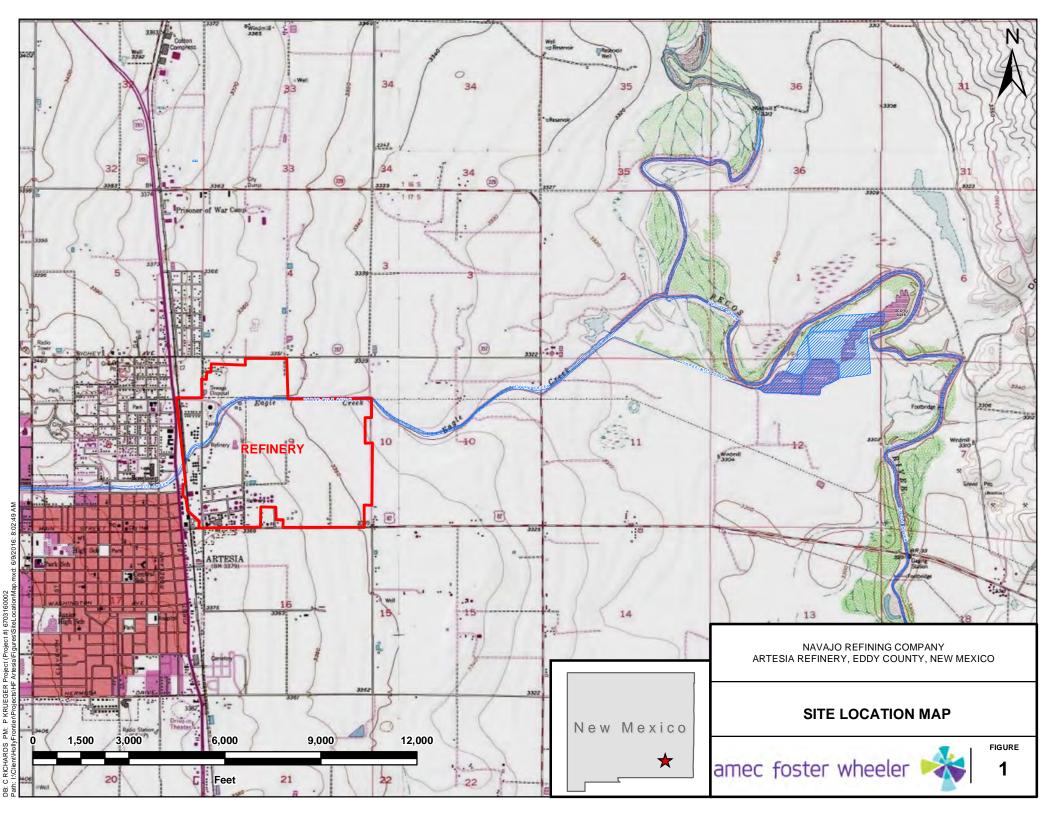
- 1 Temporary Well Development Purge Parameters
- 2 Soil Analytical Results from the Wastewater Pipeline Investigation
- 3 Groundwater Analytical Results from the Wastewater Pipeline Investigation

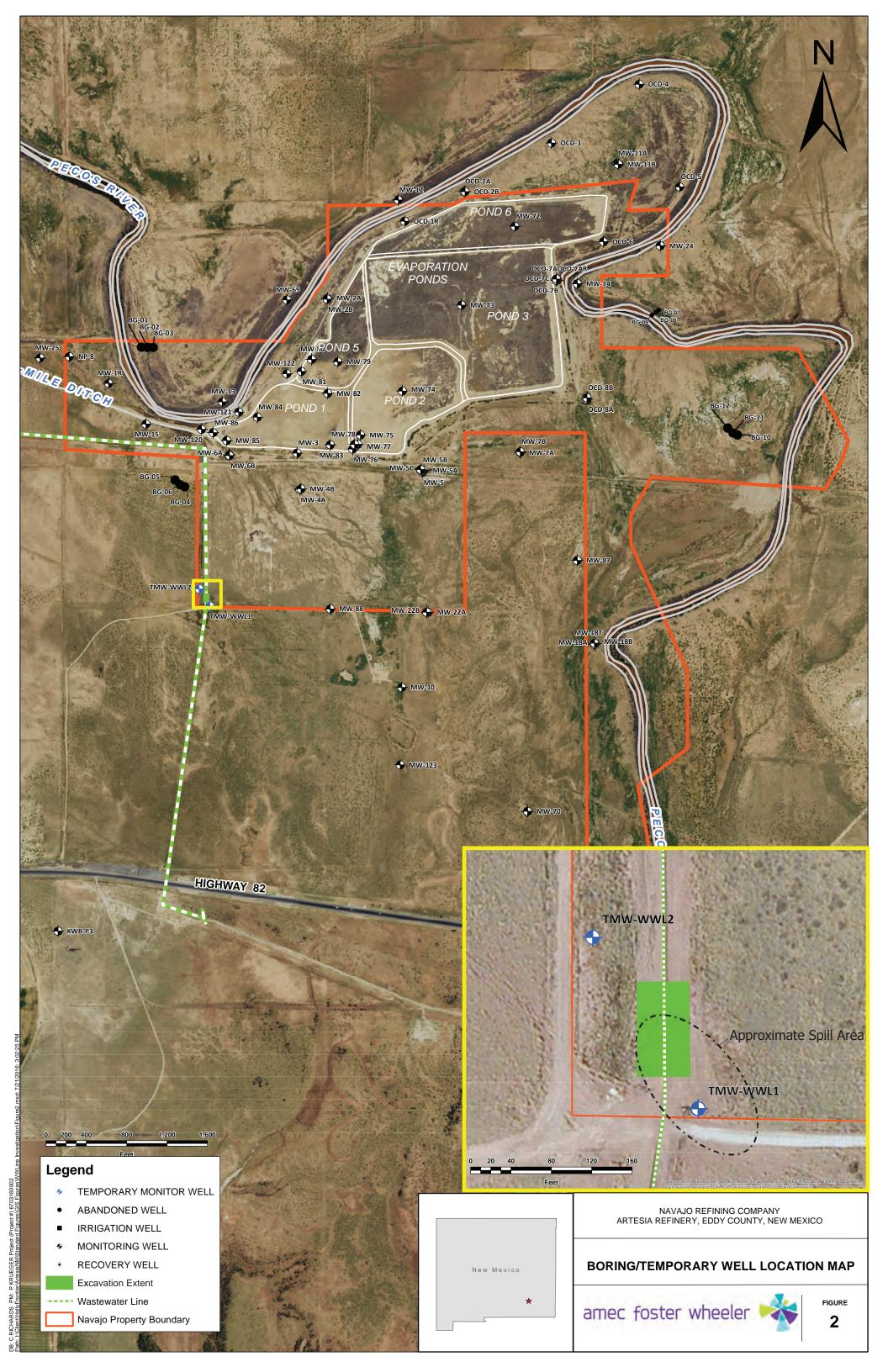
Attachments:

- A Well Installation Permits and Plugging Plan
- B Boring and Temporary Well Completion Logs
- C Laboratory Reports (electronic format)
- D Trend Plots of Inorganic in Nearby Monitoring Wells



FIGURES







TABLES

Table 1 - Temporary Well Development Purge Parameters

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

Location	TOC (ft msl)	Date	Time	Depth to Water (feet)	GW Elevation (ft msl)	Volume Purged (gallons)	Temperature (°C)	pH (SU)	Comments
TMW-WWL1	3284.25	5/10/2016	5:10 PM	6.95	3277.30	10			Purged dry
		5/11/2016	1:10 PM	6.98	3277.27	[18.8	7.19	Slightly
			1:12 PM				18.3	7.15	cloudy, no
			1:14 PM				18.2	7.20	odor, fines
			1:15 PM	9.60	3274.65	5	18.1	7.17	Dry, rising
			5:25 PM	6.98	3277.27		18.8	7.23	Slow
			5:27 PM				18.0	7.21	recovery
			5:29 PM	9.00	3275.25	5	17.9	7.20	\square
		5/12/2016	8:30 AM	7.02	3277.23				Sampled
TMW-WWL2	3284.36	5/10/2016	5:10 PM	7.00	3277.36	10			Purged dry
		5/11/2016	1:00 PM	7.12	3277.24		19.1	7.15	Cloudy,
			1:01 PM				17.9	7.20	fines
			1:03 PM				17.6	7.21	
			1:05 PM	7.85	3276.51	5	17.5	7.17	
			5:14 PM	7.12	3277.24		18.0	7.25	Slow
			5:16 PM				17.9	7.17	recovery
			5:19 PM	7.50	3276.86	5	17.9	7.16	
		5/12/2016	9:00 AM	7.16	3277.20				Sampled

Definitions

°C = degrees Celsius ft msl = feet mean sea level GW = groundwater SU = standard units

Table 2 - Soil Analytical Results from the Wastewater Line Investigation

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

				Location:		TMW-WWL1			TMW-	-WWL2	
				Depth (ft bgs):	1	5	12	1	5	12	12 (Duplicate)
				Date:	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016
			Screening Levels								
Analyte	Units	OCD Spill Guidance	NMED DAF 20 SSL	Former EP BTV							
GRO	mg/kg	100			< 0.108	< 0.108	< 0.108	0.255 J	< 0.108	< 0.108 J3 J6	< 0.108
DRO	mg/kg	100			7.31	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
ORO	mg/kg	100			3.15 J	< 0.274	< 0.274	0.687 J	< 0.274	< 0.274	< 0.274
Benzene	mg/kg	10	0.038		< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135
Ethylbenzene	mg/kg		0.262		< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148
Toluene	mg/kg		12.1		< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00148
Total Xylenes	mg/kg		2.98		< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349
Phenol	mg/kg		52.3		< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695
Iron	mg/kg		6,960	17,344	12,200	7,850	2,710	10,500	5,580	2,880	3,950
Manganese	mg/kg		2,630	488	388	162	65	344	71	80	95
Chloride	mg/kg			5,264	1,730	1,070	1,690	113	712	712	899
Fluoride	mg/kg		3,560	17.9	5.61	16.1	11.8	4.56	15.8	8.01	11.2
Sulfate	mg/kg			21,620	7,580	18,300	18,300	2,590	18,300	17,200	18,200

Notes and Definitions:

< X = Result reported as not detectable with a method detection limit equal to X

Values shown in bold font with blue shading indicate that the result was above the lower of the DAF 20 SSL or BTV, but less than the higher of the DAF 20 SSL or BTV.

Values shown in bold italics font with lavendar shading indicate that the result was above both the DAF 20 SSL and the BTV. No results met this screening criteria.

BTV = Background Threshold Value

DAF 20 = Soil leaching to groundwater pathway with dilution attenuation factor of 20

DRO = Diesel Range Organics

EP = Evaporation Ponds

GRO = Gasoline Range Organics

J = Estimated result reported at a concentration above the method detection limit but below the reporting limit.

J3 = Associated laboratory batch quality control sample was outsied the established control range for precision.

J6 = Sample matrix interfered with the ability to make an accurate determination of concentration; spike value is low.

mg/kg = milligrams per kilogram

NMED = New Mexico Environment Department

OCD = Oil Conservation Division

ORO = Motor Oil Range Organics

SSL = Soil Screening Level

Table 3 - Groundwater Analytical Results from the Wastewater Line Investigation

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

				Wastewater	TMW-WWL1	TMW-WWL2		
				2/23/2105	5/12/2016	5/12/2016	5/12/2016 (Duplicate)	
Analyte	Units	NMED TPH	WQCC					
GRO	mg/L				< 0.0314	< 0.0314	< 0.0314	
DRO	mg/L	0.2			0.0851 J	0.182	0.0892 J	
ORO	mg/L	0.2			0.0419 J	0.175	0.0898 J	
Benzene	mg/L		0.01	< 0.0005	< 0.000331	< 0.000331	< 0.000331	
Ethylbenzene	mg/L		0.75	< 0.0005	< 0.000384	< 0.000384	< 0.000384	
Toluene	mg/L		0.75	< 0.0005	< 0.000780	< 0.000780	< 0.000780	
Total Xylenes	mg/L		0.62	0.0041	< 0.00106	< 0.00106	< 0.00106	
Phenol	mg/L		0.005	0.0081	< 0.000297	< 0.000297	< 0.000297	
Iron	mg/L		1.0	3.7	0.234 J	0.169 J	0.981	
Manganese	mg/L		0.2	0.25	0.954	0.836	0.910	
Chloride	mg/L		250	300	12,200	7,130	7,100	
Fluoride	mg/L		1.6	11	6.21	2.59	3.10	
Sulfate	mg/L		600	2,100	18,800	14,600	16,800	

Notes and Definitions:

< X = Result reported as not detectable with a method detection limit equal to X

Values shown in bold font with blue shading indicate that the result was above the lower of the WQCC or BTV, but less than the higher of the WQCC or BTV. Values shown in bold italics font with lavendar shading indicate that the result was above both the WQCC and the BTV.

DRO = Diesel Range Organics

GRO = Gasoline Range Organics

J = Estimated result reported at a concentration above the method detection limit but below the reporting limit.

mg/L = milligrams per liter

NMED = New Mexico Environment Department

ORO = Motor Oil Range Organics

TPH = Total Petroleum Hydrocarbons

WQCC = Water Quality Control Comission



ATTACHMENTS



ATTACHMENT A

Tom Blaine, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 586987 File Nbr: RA 12403

May. 10, 2016

SCOTT DENTON
HOLLYFRONTIER NAVAJO REFINING
501 EAST MAIN STREET
ARTESIA, NM 88210

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 05/31/2017, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 05/31/2017.

Appropriate forms can be downloaded from the CSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

duan Hernandez (575)622-6521

Enclosure

explore

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

	For fees, see State Engineer web	site: http://www.ose.state.nm.u	<u>\$/</u>
Purpose:	☐ Pollution Control And / Or Recovery	☐ Geo-Thermal	
☐ Exploratory	☐ Construction Site De-Watering	Other (Describe):	
Monitoring	☐ Mineral De-Watering		
A separate permit will be	required to apply water to beneficial use.		
Temporary Request -	Requested Start Date: 5/1/2016	Requested	End Date: 6/1/2016
Plugging Plan of Operation	ons Submitted? Yes No		
1. APPLICANT(S)			
Name: HollyFront	ier Navajo Refining LLC	Name:	
Contact or Agent: Scott Denton	check here if Agent	Contact or Agent:	check here if Agent 🗌
Mailing Address: 501	East Main Street	Mailing Address:	
^{City:} Artesia		City:	
State: NM	Zip Code: 88210	State:	Zip Code:
Phone: Phone (Work): 575-74	■ Home □ Cell 6-5487	Phone: Phone (Work): 575-746	☐ Home ☐ Cell 6-5487
E-mail (optional): Scott	t.Denton@HollyFrontier.com	E-mail (optional):	

	FOR OSE INTERNAL USE	Application for Permit, Form wr-07,	Rev 6/14/12	
# #: 50	File No.: 12403	Trn. No.:586987	Receipt No.:	
	Trans Description (optional):	POD 1,2		
الاستقالية اعتدادة	Sub-Basin:	PCW/LOG Due I	Date: 5-31-17	
	and a second of the same wife in the same			Dago 1 of 3

2. WELL(S) Describe the well(s) applicable to this application.

(Lat/Long - WGS84).			State Plane (NAD 83), UTM (NAD 83), <u>or</u> Latitude/Longitude e a PLSS location in addition to above.
☐ NM State Plane (NAD83) ☐ NM West Zone ☐ NM East Zone ☐ NM Central Zone		TM (NAD83) (Met Zone 12N Zone 13N	ers) Lat/Long (WGS84) (to the nearest 1/10 th of second)
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
TMW-WWLine1	104 20' 20.1" W	32 51' 0.1" N	T17S, R26E, S12, Q4 1, Q16 3
TMW-WWLine2	104 20' 20.3" W	32 51' 0.7" N	T17S, R26E, S12, Q4 1, Q16 3
NOTE: If more well location Additional well descriptions			m WR-08 (Attachment 1 – POD Descriptions) If yes, how many
Other description relating well Temporary wells to be installed			r: er line south of former evaporation ponds, north of US Highway 82.
Well is on land owned by: Holl	lyFrontier Navajo Refin	ing, LLC	
Well Information: NOTE: If r	nore than one (1) we	Il needs to be de	scribed, provide attachment. Attached? Yes No
Approximate depth of well (fe-			Outside diameter of well casing (inches): 2
Driller Name: Envirotech Drillin	ng Services LLC		Driller License Number: WD-1757
3. ADDITIONAL STATEMENTS	OR EXPLANATION	s	
only), then plugged and	l abandoned. Th	ne purpose of	eloped, allowed to rest for 24 hours, sampled (once the temporary monitoring wells is to determine break may have impacted the shallow groundwater

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

Trn No.: 536987

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Exploratory: Pollution Control and/or Recovery: Construction Mine De-Watering: ☐ Include a ☐ Include a plan for pollution De-Watering: ☐ Include a plan for pollution Include a description of the description of control/recovery, that includes the control/recovery, that includes the following: any proposed following: proposed dewatering A description of the need for mine pump test, if A description of the need for the operation, dewatering. pollution control or recovery operation. ☐ The estimated duration of applicable. ☐ The estimated maximum period of time ☐ The estimated maximum period of the operation, for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the time for completion of the operation. The maximum amount of ☐ The annual diversion amount. water to be diverted, ☐ The annual consumptive use A description of the need aquifer(s). amount. for the dewatering operation. The maximum amount of water to be ☐ The maximum amount of water to be diverted per annum. diverted and injected for the duration of A description of how the ☐The maximum amount of water to be the operation. diverted water will be disposed diverted for the duration of the operation. ☐The quality of the water. ☐ The method and place of discharge. of. Monitoring: ☐ The method of measurement of Geo-Thermal: The method of measurement of water water produced and discharged. Include the Include a description of the diverted. ☐ The source of water to be injected. ☐The recharge of water to the aquifer. reason for the geothermal heat exchange monitoring ☐ The method of measurement of project, Description of the estimated area of well, and, water injected. hydrologic effect of the project. ☐ The amount of water to be ■ The ☐ The characteristics of the aquifer. The method and place of discharge. diverted and re-injected for the duration ☐ The method of determining the ☐An estimation of the effects on surface project, resulting annual consumptive use of water rights and underground water rights of the planned The time frame for water and depletion from any related constructing the geothermal from the mine dewatering project. monitoring. stream system. heat exchange project, and, A description of the methods employed to ☐ The duration of the project. ☐ Preliminary surveys, design Proof of any permit required from the estimate effects on surface water rights and New Mexico Environment Department. underground water rights. An access agreement if the ☐ Information on existing wells, rivers, data, and additional applicant is not the owner of the land on information shall be included to springs, and wetlands within the area of which the pollution plume control or provide all essential facts hydrologic effect. recovery well is to be located. relating to the request. **ACKNOWLEDGEMENT** I, We (name of applicant(s)), Scott Denton on behalf of HollyFrontier Navajo Refining LLC Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Mrs Robert Combs for Scott M. Denton **ACTION OF THE STATE ENGINEER** This application is: approved partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. Witness my hand and seal this day of May 20 16 , for the State Engineer, Tom Blaine, P.E. ___, State Engineer Signature Title: Juan Hernandez, Engr Specialist Supervisor Print 2016 HAYY -2 PM 41: 20 ENSIME OF BLEND Application for Permit, Form wr-07 FOR OSE INTERNAL USE

File No.:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 1A Depth of the well shall not exceed the thickness of the valley fill.
- 4 No water shall be appropriated and beneficially used under this permit.
- The well shall be plugged upon completion of the permitted use, and a plugging report shall be filed with the State Engineer within 10 days.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
- O Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.
- P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

- Q The State Engineer retains jurisdiction over this permit.
- LOG The Point of Diversion RA 12403 POD1 must be completed and the Well Log filed on or before 05/31/2017.
- LOG The Point of Diversion RA 12403 POD2 must be completed and the Well Log filed on or before 05/31/2017.

IT IS THE PERMITTEES RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

SHOULD THE PERMITTEE CHANGE THE PURPOSE OF USE TO OTHER THAN MONITORING PURPOSES, AN APPLICATION SHALL BE ACQUIRED FROM THE OFFICE OF THE STATE ENGINEER.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd: Date Rcvd. Corrected: Formal Application Rcvd: 05/02/2016 Pub. of Notice Ordered: Date Returned - Correction: Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 10 day of May A.D., 2016

Tom Blaine, P.E. , State Engineer

By:
Juan Remandez

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

Locator Tool Report

General Information:

Application ID:29

Date: 05-10-2016

Time: 08:42:10

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE2

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.7 Seconds N

Longitude:

104 Degrees 20 Minutes 20.3 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,873
 E: 561,855

 NAD 1983(92) (Survey Feet)
 N: 11,925,413
 E: 1,843,353

 NAD 1927 (Meters)
 N: 3,634,670
 E: 561,905

 NAD 1927 (Survey Feet)
 N: 11,924,748
 E: 1,843,516

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,141
 E: 164,472

 NAD 1983(92) (Survey Feet)
 N: 673,034
 E: 539,606

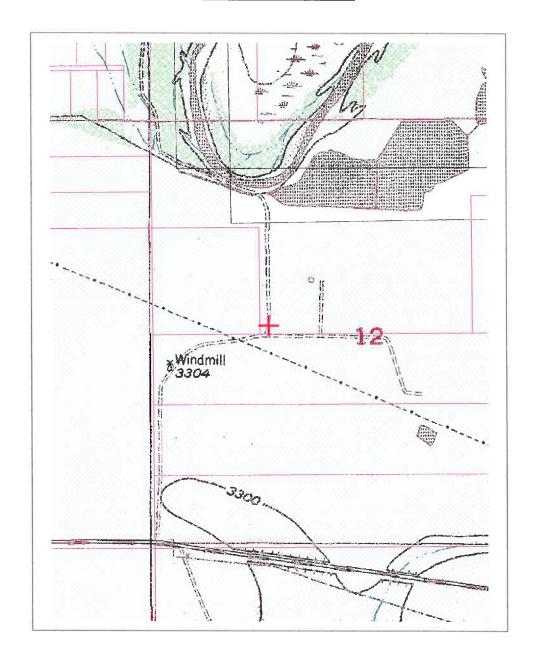
 NAD 1927 (Meters)
 N: 205,122
 E: 151,921

 NAD 1927 (Survey Feet)
 N: 672,971
 E: 498,427

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,873 E: 561,855

Northing/Easting: SPCS83(92) (Feet): N: 673,034 E: 539,606

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016

Locator Tool Report

General Information:

Application ID: 29

Date: 05-10-2016

Time: 08:40:32

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE1

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.1 Seconds N

Longitude:

104 Degrees 20 Minutes 20.1 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,855
 E: 561,860

 NAD 1983(92) (Survey Feet)
 N: 11,925,353
 E: 1,843,371

 NAD 1927 (Meters)
 N: 3,634,652
 E: 561,910

 NAD 1927 (Survey Feet)
 N: 11,924,687
 E: 1,843,534

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,123
 E: 164,477

 NAD 1983(92) (Survey Feet)
 N: 672,973
 E: 539,623

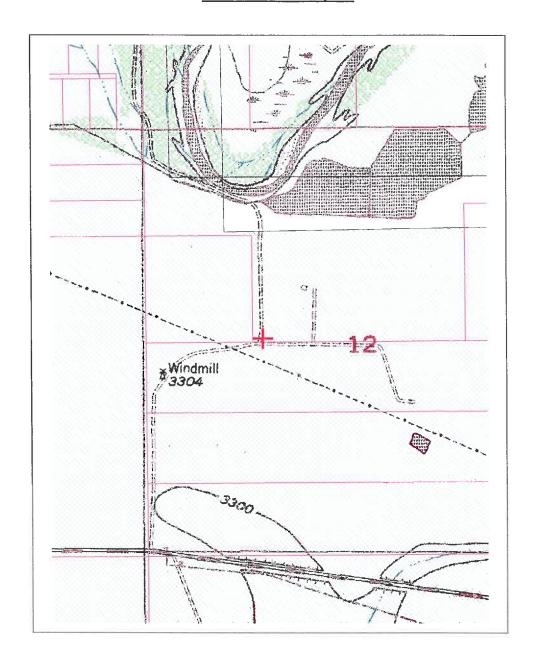
 NAD 1927 (Meters)
 N: 205,103
 E: 151,926

 NAD 1927 (Survey Feet)
 N: 672,910
 E: 498,444

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,855 E: 561,860

Northing/Easting: SPCS83(92) (Feet): N: 672,973 E: 539,623

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016



WELL PLUGGING PLAN OF OPERATIONS



		_						
NOTE	: A Well Plugging Plan o to plugging.	f Operations sh	all be filed wi	ith and	accepted by the	Office of the	State Engineer	prior
I. FIL	NG FEE: There is no fili	ng fee for this fo	orm.					
II. GE	NERAL / WELL OWNE	RSHIP:				- A		
Existing	g Office of the State Eng	ineer POD Nun	nber (Well Ni	umber) i	for well to be pla	ugged: KA	1-12403	
Name o	of well owner: HollyFro	ntier Navajo F	Refining, LL0	3	_			
Mailing	g address: 501 East Ma	ain Street						
City: _	Artesia number: <u>575-746-5487</u>		State:	NM			Zip code: 882	10
Phone 1	number: 575-746-5487			E-mail:	Scott.Denton@	@HollyFron	tier.com	
Well D	ELL DRILLER INFORMATION OF THE PROPERTY OF THE	plugging servic	es: Envirote	ech Dril	ing Services L	LC		
New M	lexico Well Driller License	No.: WD-175	57		Expirat	ion Date: 1/	31/2018	
	ELL INFORMATION: A copy of the existing Wel GPS Well Location:		•		ould be attached t	•	c , NAD 83	
2)	Reason(s) for plugging v	vell:						
	This plan is for two will be plugged and		_					ınd
3)	Was well used for any ty what hydrogeologic par water, authorization from	ameters were m	ionitored. If	the wel	was used to m	onitor conta	minated or poor	o detai quality
4)	Does the well tap brack	ish, saline, or of	herwise poor o	quality v	vater? Yes	If yes, p	orovide additional	l de tail
	including analytical resul							
	Temporary wells are lo semiannual monitoring TDS values ranging fro	program. Data	from those w					
5)	Static water level:	5 - 7 feet b	pelow land sur	face/ fe	et above land sur	face (circle	one)	
6)	Depth of the well: 1	0 - 12 feet	50	市制	2016 MAY -2			

DATE ALLANDING STALLS

7)	Inside diameter of innermost casing:inches.
8)	Casing material: PVC
9)	The well was constructed with: an open-hole production interval, state the open interval: a well screen or perforated pipe, state the screened interval(s): 2 to 10 (or 2 to 12)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? N/A
11)	Was the well built with surface casing? No No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
	if yes, prease describe.
12)	Has all pumping equipment and associated piping been removed from the well?If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DES	CRIPTION OF PLANNED WELL PLUGGING:
pipe, a c	this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie letailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional linformation, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:
	Lean cement grout will be placed in the boring from the bottom up using a tremie pipe.
2)	Will well head be cut-off below land surface after plugging? PVC casing will be removed
VI. PL	UGGING AND SEALING MATERIALS:
Note: T	he plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 1.6 - 2 gallons
4)	Type of Cement proposed: Portland cement
5)	Proposed cement grout mix: 5 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

2016 MAY -2 FM 4: 20

7)	Grout additives requested, and percent by dry weight relative to cement:
0)	
8)	Additional notes and calculations:
VII.	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):
VIII.	SIGNATURE:
	ott Denton, say that I have carefully read the foregoing Well Plugging Plan of
	tions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State
	eer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well ing Plan of Operations and attachments are true to the best of my knowledge and belief.
	Joshu R Robert Combs for Scott M. Danton 5/2/16
	Signature of Applicant Date
IX. A	CTION OF THE STATE ENGINEER:
This V	Well Plugging Plan of Operations is:
	Approved subject to the attached conditions
	Approved subject to the attached conditions. Not approved for the reasons provided on the attached letter.
	Witness my hand and official seal this
	Tom Blaine P.E., New Mexico State Engineer
	De la DA CENTA
	02:17 HJ Z- AVH 9107 Fox Andy Morley Dr. Mil T. Manager Well Plugging Plan Version: August 11, 2015 Page 3 of 5
	Dichof The Well Plugging Plan
	Version: August 11, 2015 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			0
Bottom of proposed interval of grout placement (ft bgl)			10-12
Theoretical volume of grout required per interval (gallons)			1.6 to 2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			5
Mixed on-site or batch- mixed and delivered?			mixed on-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

2016 MAY -2 FM 4: 20

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			



ATTACHMENT B

			_	Log of Well No. TMW-WWL-1 GROUND SURFACE ELEVATION AND DATUM:				
ORING LOC	ATION:		GROUND	SURFACE ELEVA	HON AND L	ATOW:		
RILLING CO	NTRACTOR:	Envirotech Services	DATE STAI 5/10/16	RTED:	DATE FIN 5/10/16	ISHED:		
RILLING ME	THOD: Ha	ollow Stem Auger	TOTAL DEI	PTH (ft.):	SCREEN	INTERVAL (ft.):		
	000000000000000000000000000000000000000		16.0 DEPTH TO	WATER ATD:	10' CASING:			
RILLING EQ	UIPMENT:	Geoprobe 9520	12'		2'			
AMPLING M	ETHOD: A	Auger	William S					
AMMER WE	ight: N A	A DROP: NA	RESPONSI William S	IBLE PROFESSIO Smith	NAL:	REG. NO.		
	Blows/Sample Foot OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, str cementation, react. w/HCl, geo. inter. Surface Elevation:		Siliai	DET	CONSTRUCTION AILS AND/OR ING REMARKS		
- to -	0	SANDY CLAY (CL): reddish-brown, dry, low carb induration, low-medium plasticity, no odor, no sta			- Open	Casina		
-					2" DiametBentonite	er Casing		
		SANDY CLAY (CL): reddish-brown, low carbona induration, medium-high plasticity, no odor, no st	I		– 20/40 Gra	de Silica Sand		
5-8	0	SANDY CLAY (CL): light brown, low plasticity, no no staining	odor,					
		SANDY CLAY (CL):brown, low plasticity, gypsum crystals, no odor, no staining	1					
10-	0	SANDY CLAY (CL): light reddish-brown, low cart induration, low-medium plasticity, damp, containe some gypsum crystals, no odor, no staining			– Sch 40 0.0 Screen	010 Slot PVC		
	0	Gypsiferrous SANDY CLAY (CL): whitish-green, plasticity, moist, no odor, no staining	low					
15-		Total Depth = 15.5'						
-		Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15.5'		_				
20								

ROJE			J	er Navajo Wastewater Line Release Investigati	L	<u> </u>	lo. TMW-WWL-2
ORIN	G LO	CATION:			GROU	ND SURFACE ELEVA	TION AND DATUM:
RILLII	NG C	ONTRAC	TOR:	Envirotech Services	5/10/1		DATE FINISHED: 5/10/16
RILLII	NG M	ETHOD:	Ho	ollow Stem Auger	16.0	DEPTH (ft.):	SCREEN INTERVAL (ft.): 10'
RILLII	NG E	QUIPMEI	NT:	Geoprobe 9520	DEPTH 12'	TO WATER ATD:	CASING: 2'
AMPL	ING I	METHOD	: <i>F</i>	Auger	LOGGE Willia	ED BY: m Smith	
AMME	ER W	EIGHT:	N/	DROP: NA	RESPO	NSIBLE PROFESSIOM Smith	DNAL: REG. NO.
(feet)	Sample No.	Sample M Blows/ ST Foot	OVM	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, s cementation, react. w/HCl, geo. inter.	·		WELL CONSTRUCTION DETAILS AND/OR
5=	Sar	Sar	8	Surface Elevation:			DRILLING REMARKS
_	- 01 -		0	SILTY SAND (SM): light brown, damp, non-pla odor, no stain	stic, no		─ Open─ 2" Diameter Casing
_							Bentonite
_				SANDY CLAY (CL): brown, damp, medium pla contains some gypsum crystals, no odor, no sta	-		Zonto mo
_				SANDY CLAY (CL): light reddish-brown, damp medium to high plasticity, contains some gymsi			— 20/40 Grade Silica Sand
5- -	- 05		0	crystals, no odor, no stain,			
10-			0				— Sch 40 0.010 Slot PVC
- - - 15-	- 12 -		0	SANDY CLAY (CL): reddish-brown, moist, low plasticity, low-moderate carbonate induration be more gymsiferous with depth, no odor, organic, stain			Screen
-				TOTAL DEDTU- 16'			
				TOTAL DEPTH = 16'			
_				Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15'			
20							



ATTACHMENT C



ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835078

Samples Received: 05/12/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation
Site: HOLLEY FRONTIER NAVAJO

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, forh

Chris McCord

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures; 06/302, 06/303, and 06/304.



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TMW-WWL1-12 L835078-03	10
TMW-WWL2-01 L835078-04	12
TMW-WWL2-05 L835078-05	14
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⁹Sc: Chain of Custody

45



TMW-WWL1-01 L835078-01 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:00	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:06	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:05	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 12:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 07:06	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 08:15	DWR
Wet Chemistry by Method 9056A	WG872631	20	05/16/16 17:26	05/17/16 11:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 01:04	СМ
TMW-WWL1-05 L835078-02 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:10	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
Mark WORLD Mark 19940	W00700F7		date/time	date/time	0.05
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:08	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:29	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 10:49	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:12	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5 50	05/19/16 00:02 05/16/16 17:26	05/19/16 08:37	DWR CM
Wet Chemistry by Method 9056A Wet Chemistry by Method 9056A	WG872631 WG873240	1	05/18/16 17:26	05/17/16 12:04 05/19/16 01:52	CM
Wet elicilisity by Method 3030A	W0073240	ı	03/10/10 13.30	03/13/10 01.32	CIVI
TMW-WWL1-12 L835078-03 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:17	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:52	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:35	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:00	DWR
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 12:28	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:16	СМ
TMW-WWL2-01 L835078-04 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:20	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 17:15	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:50	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:58	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:22	DWR
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:29	CM
Wet Chemistry by Method 9056A	WG872631	10	05/16/16 17:26	05/17/16 12:52	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:40	CM
TMW-WWL2-05 L835078-05 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:30	Received date/time 05/12/16 09:00
	Batch	Dilution	Preparation	Analysis	Analyst
Method			date/time	date/time	
Method Metals (ICP) by Method 6010B	WG872357	1	date/time 05/14/16 08:15	date/time 05/14/16 14:23	BRJ

















SAMPLE SUMMARY

Collected by

	NINT		
IAB	INAI	IONW	11) 🗠

Collected date/time

05/17/16 11:26

05/18/16 20:23

05/19/16 15:53

05/17/16 07:17

05/17/16 13:40

05/19/16 04:16

05/10/16 16:55

Collected date/time

Collected date/time

05/10/16 18:00

Received date/time

TMW-WWL2-05 L835078-05 Solid			William R. Smith	05/10/16 16:30	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:14	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 10:21	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:29	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:53	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:16	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 03:04	CM
			Collected by	Collected date/time	Received date/time
TMW-WWL2-12 L835078-06 Solid			William R. Smith	05/10/16 16:50	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:26	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 18:02	JF

WG872902

WG873220

WG873800

WG872631

WG872631

WG873240

1

5

5

1

50

1

05/16/16 23:00

05/18/16 18:29

05/19/16 11:42

05/16/16 17:26

05/16/16 17:26

05/18/16 15:50

Collected by

Collected by

William R. Smith

William R. Smith



















TMW-WWL2-12D L835078-07 Solid

Semi-Volatile Organic Compounds (GC) by Method 8015

Volatile Organic Compounds (GC) by Method 8015D/GRO

Volatile Organic Compounds (GC/MS) by Method 8260B

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:29	CCE
emi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 12:33	JF
emi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:38	DMG
olatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:46	JAH
platile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 16:17	BMB
et Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 09:36	CM
et Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 14:04	CM
et Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 04:40	CM

		1	

DMG

JAH

BMB

CM

 CM

CM

Received date/time

Received date/time

05/12/16 09:00

05/12/16 09:00

TMW-WW6-EQ L835078-08 GW

110100-00000					
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872401	1	05/16/16 10:43	05/16/16 15:27	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872427	1	05/12/16 21:03	05/15/16 18:23	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872369	1	05/12/16 20:58	05/15/16 10:41	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872916	1	05/17/16 19:24	05/17/16 19:24	LRL
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872248	1	05/13/16 18:16	05/13/16 18:16	LRL
Wet Chemistry by Method 9056A	WG873772	1	05/20/16 04:02	05/20/16 04:02	SAM

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the

Ss













Technical Service Representative

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1730		15.9	200	20	05/17/2016 11:40	WG872631
Fluoride	5.61		0.261	1.00	1	05/19/2016 01:04	WG873240
Sulfate	7580		11.4	1000	20	05/17/2016 11:40	WG872631





Ss

Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	12200		1.41	10.0	1	05/14/2016 14:06	WG872357
Manganese	388		0.120	1.00	1	05/14/2016 14:06	WG872357



Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 07:06	WG873092
(S) a,a,a-Trifluorotoluene(FID	99.2			59.0-128		05/18/2016 07:06	WG873092



Gl

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:15	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:15	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 08:15	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 08:15	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:15	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 08:15	WG872230
(S) a,a,a-Trifluorotoluene	95.8			87.2-117		05/19/2016 08:15	WG872230
(S) 4-Bromofluorobenzene	96.7			69.7-129		05/19/2016 08:15	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	7.31		1.61	4.00	1	05/17/2016 12:02	WG872902
C28-C40 Oil Range	3.15	<u>J</u>	0.274	4.00	1	05/17/2016 12:02	WG872902
(S) o-Terphenyl	91.8			50.0-150		05/17/2016 12:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:05	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:05	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:05	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:05	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:05	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:05	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:05	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:05	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:05	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:05	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:05	WG872189
(S) 2-Fluorophenol	67.0			21.1-116		05/18/2016 16:05	WG872189
(S) Phenol-d5	68.0			26.3-121		05/18/2016 16:05	WG872189
(S) Nitrobenzene-d5	83.5			21.9-129		05/18/2016 16:05	WG872189
(S) 2-Fluorobiphenyl	74.9			34.9-129		05/18/2016 16:05	WG872189

TMW-WWL1-01

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

	'	\	/ /					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	62.6			21.6-142		05/18/2016 16:05	WG872189	
(S) p-Terphenyl-d14	63.6			21.5-128		05/18/2016 16:05	WG872189	



















Analyte

Manganese

Iron

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

Metals (ICP) by Method 6010B

Result

mg/kg

7850

162

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1070		39.8	500	50	05/17/2016 12:04	WG872631
Fluoride	16.1		0.261	1.00	1	05/19/2016 01:52	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:04	WG872631

Dilution

1

Analysis

date / time

05/14/2016 14:08

05/14/2016 14:08

Batch

WG872357

WG872357

RDL

mg/kg

10.0

1.00







Cn

СQс











Volatile Organic Compounds (GC) by Method 8015D/GRO

Qualifier

MDL

mg/kg

1.41

0.120

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:12	WG873092
(S) a,a,a-Trifluorotoluene(Flu	D) 98.8			59.0-128		05/18/2016 09:12	WG873092

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:37	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:37	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 08:37	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 08:37	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:37	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 08:37	WG872230
(S) a,a,a-Trifluorotoluene	95.5			87.2-117		05/19/2016 08:37	WG872230
(S) 4-Bromofluorobenzene	99.6			69.7-129		05/19/2016 08:37	WG872230

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 10:49	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 10:49	WG872902
(S) o-Terphenyl	98.1			50.0-150		05/17/2016 10:49	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:29	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:29	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:29	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:29	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:29	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:29	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:29	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:29	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:29	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:29	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:29	WG872189
(S) 2-Fluorophenol	57.1			21.1-116		05/18/2016 16:29	WG872189
(S) Phenol-d5	46.4			26.3-121		05/18/2016 16:29	WG872189
(S) Nitrobenzene-d5	64.5			21.9-129		05/18/2016 16:29	WG872189
(S) 2-Fluorobiphenyl	66.2			34.9-129		05/18/2016 16:29	WG872189

TMW-WWL1-05

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	39.8			21.6-142		05/18/2016 16:29	WG872189	
(S) p-Terphenvl-d14	39.6			21.5-128		05/18/2016 16:29	WG872189	



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1690		39.8	500	50	05/17/2016 12:28	WG872631
Fluoride	11.8		0.261	1.00	1	05/19/2016 02:16	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:28	WG872631

СР



³Ss

Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2710		1.41	10.0	1	05/14/2016 14:17	WG872357
Manganese	64.7		0.120	1.00	1	05/14/2016 14:17	WG872357



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:35	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 09:35	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:00	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:00	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:00	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:00	WG872230
(S) Toluene-d8	106			88.7-115		05/19/2016 09:00	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 09:00	WG872230
(S) a,a,a-Trifluorotoluene	96.3			87.2-117		05/19/2016 09:00	WG872230
(S) 4-Bromofluorobenzene	98.8			69.7-129		05/19/2016 09:00	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:02	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:02	WG872902
(S) o-Terphenyl	95.4			50.0-150		05/17/2016 11:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	_
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:52	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:52	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:52	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:52	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:52	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:52	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:52	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:52	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:52	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:52	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:52	WG872189
(S) 2-Fluorophenol	64.9			21.1-116		05/18/2016 16:52	WG872189
(S) Phenol-d5	58.7			26.3-121		05/18/2016 16:52	WG872189
(S) Nitrobenzene-d5	64.9			21.9-129		05/18/2016 16:52	WG872189
(S) 2-Fluorobiphenyl	56.2			34.9-129		05/18/2016 16:52	WG872189

TMW-WWL1-12

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

L835078

		•	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	51.6			21.6-142		05/18/2016 16:52	WG872189	
(S) p-Terphenyl-d14	46.8			21.5-128		05/18/2016 16:52	WG872189	



















SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	113		0.795	10.0	1	05/17/2016 06:29	WG872631
Fluoride	4.56		0.261	1.00	1	05/19/2016 02:40	WG873240
Sulfate	2590		5.70	500	10	05/17/2016 12:52	WG872631





Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	10500		1.41	10.0	1	05/14/2016 14:20	WG872357
Manganese	344		0.120	1.00	1	05/14/2016 14:20	WG872357



[°]Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.255	<u>J</u>	0.108	0.500	5	05/18/2016 09:58	WG873092
(S) a,a,a-Trifluorotoluene(FIL	0) 99.7			59.0-128		05/18/2016 09:58	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:22	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:22	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:22	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:22	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:22	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 09:22	WG872230
(S) a,a,a-Trifluorotoluene	97.8			87.2-117		05/19/2016 09:22	WG872230
(S) 4-Bromofluorobenzene	100			69.7-129		05/19/2016 09:22	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:50	WG872902
C28-C40 Oil Range	0.687	<u>J</u>	0.274	4.00	1	05/17/2016 11:50	WG872902
(S) o-Terphenyl	84.3			50.0-150		05/17/2016 11:50	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:15	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:15	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:15	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:15	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:15	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:15	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:15	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:15	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:15	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:15	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:15	WG872189
(S) 2-Fluorophenol	63.6			21.1-116		05/18/2016 17:15	WG872189
(S) Phenol-d5	67.5			26.3-121		05/18/2016 17:15	WG872189
(S) Nitrobenzene-d5	72.4			21.9-129		05/18/2016 17:15	WG872189
(S) 2-Fluorobiphenyl	77.4			34.9-129		05/18/2016 17:15	WG872189

TMW-WWL2-01

SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

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		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	71.5			21.6-142		05/18/2016 17:15	WG872189	
(S) p-Terphenvl-d14	67.0			21.5-128		05/18/2016 17:15	WG872189	



















SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 06:53	WG872631
Fluoride	15.8		0.261	1.00	1	05/19/2016 03:04	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 13:16	WG872631





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	5580		1.41	10.0	1	05/14/2016 14:23	WG872357
Manganese	70.6		0.120	1.00	1	05/14/2016 14:23	WG872357



СQс

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 10:21	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 10:21	WG873092







Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	<u> </u>
Benzene	U		0.00135	0.00500	5	05/19/2016 15:29	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 15:29	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:29	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:29	WG873800
(S) Toluene-d8	101			88.7-115		05/19/2016 15:29	WG873800
(S) Dibromofluoromethane	102			76.3-123		05/19/2016 15:29	WG873800
(S) a,a,a-Trifluorotoluene	101			87.2-117		05/19/2016 15:29	WG873800
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:29	WG873800

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:14	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:14	WG872902
(S) o-Terphenyl	96.4			50.0-150		05/17/2016 11:14	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:39	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:39	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:39	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:39	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:39	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:39	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:39	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:39	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:39	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:39	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:39	WG872189
(S) 2-Fluorophenol	59.4			21.1-116		05/18/2016 17:39	WG872189
(S) Phenol-d5	58.8			26.3-121		05/18/2016 17:39	WG872189
(S) Nitrobenzene-d5	64.1			21.9-129		05/18/2016 17:39	WG872189
(S) 2-Fluorobiphenyl	56.5			34.9-129		05/18/2016 17:39	WG872189

TMW-WWL2-05

SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

L835078

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	58.0			21.6-142		05/18/2016 17:39	WG872189	
(S) n-Ternhenvl-d14	66.9			21.5-128		05/18/2016 17:39	WG872189	



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 07:17	WG872631
Fluoride	8.01		0.261	1.00	1	05/19/2016 04:16	WG873240
Sulfate	17200		28.5	2500	50	05/17/2016 13:40	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2880		1.41	10.0	1	05/14/2016 14:26	WG872357
Manganese	80.3		0.120	1.00	1	05/14/2016 14:26	WG872357



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U	<u>J3 J6</u>	0.108	0.500	5	05/18/2016 20:23	WG873220
(S) a,a,a-Trifluorotoluene(FIL	99.8			59.0-128		05/18/2016 20:23	WG873220





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
Benzene	U		0.00135	0.00500	5	05/19/2016 15:53	WG873800	
Toluene	U		0.00217	0.0250	5	05/19/2016 15:53	WG873800	
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:53	WG873800	
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:53	WG873800	
(S) Toluene-d8	103			<i>88.7-115</i>		05/19/2016 15:53	WG873800	
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 15:53	WG873800	
(S) a,a,a-Trifluorotoluene	100			87.2-117		05/19/2016 15:53	WG873800	
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:53	WG873800	

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:26	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:26	WG872902
(S) o-Terphenyl	102			50.0-150		05/17/2016 11:26	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 18:02	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 18:02	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 18:02	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 18:02	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 18:02	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 18:02	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 18:02	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 18:02	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 18:02	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 18:02	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 18:02	WG872189
(S) 2-Fluorophenol	45.8			21.1-116		05/18/2016 18:02	WG872189
(S) Phenol-d5	45.5			26.3-121		05/18/2016 18:02	WG872189
(S) Nitrobenzene-d5	52.8			21.9-129		05/18/2016 18:02	WG872189
(S) 2-Fluorobiphenyl	48.0			34.9-129		05/18/2016 18:02	WG872189

TMW-WWL2-12

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

L835078

		· · · · · · · · · · · · · · · · · · ·	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	44.1			21.6-142		05/18/2016 18:02	WG872189	
(S) n-Ternhenvl-d14	42.5			21.5-128		05/18/2016 18:02	WG872189	



















SAMPLE RESULTS - 07

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

L835078

Wet Chemistry by Method 9056A

	, ,						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	899		0.795	10.0	1	05/17/2016 09:36	WG872631
Fluoride	11.2		0.261	1.00	1	05/19/2016 04:40	WG873240
Sulfate	18200		28.5	2500	50	05/17/2016 14:04	WG872631

Ср



³Ss

Metals (ICP) by Method 6010B

Result <u>Qualifier</u> MDL RDL Dilution Analysis <u>Batch</u>	
Analyte mg/kg mg/kg mg/kg date / time	
Iron 3950 1.41 10.0 1 05/14/2016 14:29 <u>WG872357</u>	
Manganese 95.4 0.120 1.00 1 05/14/2016 14:29 <u>WG872357</u>	



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 20:46	WG873220
(S) a,a,a-Trifluorotoluene(FID)	99.5			59.0-128		05/18/2016 20:46	WG873220





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 16:17	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 16:17	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 16:17	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 16:17	WG873800
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 16:17	WG873800
(S) Dibromofluoromethane	98.9			76.3-123		05/19/2016 16:17	WG873800
(S) a,a,a-Trifluorotoluene	105			87.2-117		05/19/2016 16:17	WG873800
(S) 4-Bromofluorobenzene	99.8			69.7-129		05/19/2016 16:17	WG873800

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:38	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:38	WG872902
(S) o-Terphenyl	94.5			50.0-150		05/17/2016 11:38	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 12:33	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 12:33	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 12:33	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 12:33	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 12:33	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 12:33	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 12:33	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 12:33	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 12:33	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 12:33	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 12:33	WG873908
(S) 2-Fluorophenol	77.5			21.1-116		05/20/2016 12:33	WG873908
(S) Phenol-d5	72.1			26.3-121		05/20/2016 12:33	WG873908
(S) Nitrobenzene-d5	67.2			21.9-129		05/20/2016 12:33	WG873908
(S) 2-Fluorobiphenyl	<i>7</i> 5. <i>7</i>			34.9-129		05/20/2016 12:33	WG873908

TMW-WWL2-12D

SAMPLE RESULTS - 07

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

L835078

	'	\	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	64.1			21.6-142		05/20/2016 12:33	WG873908	
(S) p-Terphenyl-d14	64.6			21.5-128		05/20/2016 12:33	WG873908	



















SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	0.244	<u>J</u>	0.0519	1.00	1	05/20/2016 04:02	WG873772
Fluoride	U		0.00990	0.100	1	05/20/2016 04:02	WG873772
Sulfate	0.269	<u>J</u>	0.0774	5.00	1	05/20/2016 04:02	WG873772







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.0241	<u>B J</u>	0.0141	0.100	1	05/16/2016 15:27	WG872401
Manganese	U		0.00120	0.0100	1	05/16/2016 15:27	WG872401



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 19:24	WG872916
(S) a,a,a-Trifluorotoluene(FID)	94.6			62.0-128		05/17/2016 19:24	WG872916





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Patch
		Qualifier		KDL	Dilution	•	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	0.000509	J	0.000331	0.00100	1	05/13/2016 18:16	WG872248
Toluene	U		0.000780	0.00500	1	05/13/2016 18:16	WG872248
Ethylbenzene	U		0.000384	0.00100	1	05/13/2016 18:16	WG872248
Total Xylenes	U		0.00106	0.00300	1	05/13/2016 18:16	WG872248
(S) Toluene-d8	105			90.0-115		05/13/2016 18:16	WG872248
(S) Dibromofluoromethane	106			79.0-121		05/13/2016 18:16	WG872248
(S) a,a,a-Trifluorotoluene	98.5			90.4-116		05/13/2016 18:16	WG872248
(S) 4-Bromofluorobenzene	102			80.1-120		05/13/2016 18:16	WG872248

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Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0358	<u>J</u>	0.0222	0.100	1	05/15/2016 10:41	WG872369
C28-C40 Oil Range	U		0.0118	0.100	1	05/15/2016 10:41	WG872369
(S) o-Terphenyl	109			50.0-150		05/15/2016 10:41	WG872369

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U	<u>J4</u>	0.000263	0.0100	1	05/15/2016 18:23	WG872427
2-Chlorophenol	U		0.000283	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/15/2016 18:23	WG872427
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dinitrophenol	U		0.00325	0.0100	1	05/15/2016 18:23	WG872427
2-Nitrophenol	U		0.000320	0.0100	1	05/15/2016 18:23	WG872427
4-Nitrophenol	U		0.00201	0.0100	1	05/15/2016 18:23	WG872427
Pentachlorophenol	U		0.000313	0.0100	1	05/15/2016 18:23	WG872427
Phenol	U	<u>J4</u>	0.000334	0.0100	1	05/15/2016 18:23	WG872427
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/15/2016 18:23	WG872427
(S) 2-Fluorophenol	71.8			10.0-77.9		05/15/2016 18:23	WG872427
(S) Phenol-d5	58.8			5.00-70.1		05/15/2016 18:23	WG872427
(S) Nitrobenzene-d5	82.5			21.8-123		05/15/2016 18:23	WG872427
(S) 2-Fluorobiphenyl	79.0			29.5-131		05/15/2016 18:23	WG872427

TMW-WW6-EQ

SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	51.3			11.2-130		05/15/2016 18:23	WG872427	
(S) p-Terphenyl-d14	91.0			29.3-137		05/15/2016 18:23	WG872427	



















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137464-1	05/16/16 20:07	
	MB Res	ult <u>MB Qualifier</u>

1.2/1.0.07 10 1 1 00/10/10 20.07												
	MB Result	MB Qualifier	MB MDL	MB RDL								
Analyte	mg/kg		mg/kg	mg/kg								
Chloride	U		0.795	10.0								
Sulfate	H		0.57	50.0								







L835458-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835458-01 05/1	/16/16 22:07 • (DUP)	R3137464-4	05/16/16 22:30
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(03) 2033430-01 03/10/	10 22.07 (DOI)	1(3137 +0+-+	03/10/10 2	2.50		
	Original Result (dry)	DUP Result (dry) Dilution I		DUP RPD <u>DUP Qualif</u>		DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	15.8	17.1	1	8		15
Sulfate	ND	2.85	1	0		15









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137464-2 05/16/16 20:31 • (LCSD) R3137464-3 05/16/16 20:55

' '	, ,									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	192	192	96	96	80-120			0	15
Sulfate	200	194	195	97	97	80-120			0	15





L834994-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834994-01 05/17/16 03:18 • (MS) R3137464-5 05/17/16 03:42 • (MSD) R3137464-6 05/17/16 04:06

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	559	13.1	595	564	104	99	1	80-120			5	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3138282-1	05/18/16 23:05

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Fluoride	U		0.261	1.00

Ср





L835078-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835078-01 05/19/16	01:04 • (DUP) F	R3138282-4 05	5/19/16 01:	28		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Eluarida	E 61	E E2	1	1		15







L835938-02 Original Sample (OS) • Duplicate (DUP)

(OS) L835938-02 05/19/16 09:16 • (DUP) R3138282-5 05/19/16 09:50

(,	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Fluoride	6.25	7.86	1	23	<u>J3</u>	15





Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138282-2 05/18/16 23:28 • (LCSD) R3138282-3 05/18/16 23:52

(200) 10100202 2 00/1	0/10/20:20 (200)	D) 110100202	0 00/10/10 20:0	-						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Fluoride	20.0	19.9	20.0	100	100	80-120			0	15

L835938-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835938-03 05/19/16 10:14 • (MS) R3138282-6 05/19/16 11:26 • (MSD) R3138282-7 05/19/16 11:50

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Fluoride	50.0	5.27	36.6	33.9	63	57	1	80-120	<u>J6</u>	<u>J6</u>	7	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-08

Method Blank (MB)

Sulfate

(MB) R3138709-1	05/19/16 20:49				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/l		mg/l	mg/l	
Chloride	U		0.0519	1.00	
Fluoride	U		0.0099	0.100	

0.0774

5.00











U

(OS) | 83/161/LOA | 05/20/16 | 02:49 • (DLIP) | P3138709-5 | 05/20/16 | 03:04

(03) 2034014-04 03/20/10	02.43 (001)	113130703-3 1	00/20/10	JJ.UT		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	1.51	1.52	1	0		15
Fluoride	ND	0.0592	1	0		15
Sulfate	18.1	18.1	1	0		15









(LCS) R3138709-2 05/19/16 21:03 • (LCSD) R3138709-3 05/19/16 21:18

(200)	10710 21100 (2002	,	00,10,10 = 1.10							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.2	39.2	98	98	80-120			0	15
Fluoride	8.00	7.89	7.89	99	99	80-120			0	15
Sulfate	40.0	39.6	39.6	99	99	80-120			0	15





L834185-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L834185-02 05/20/16 00:54 • (MS) R3138709-4 05/20/16 01:09

(00) 200 1100 02 00/20/			0,20,100.00				
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	40.1	92.4	104	1	80-120	
Fluoride	5.00	0.558	5.88	106	1	80-120	
Sulfate	50.0	6.65	60.4	107	1	80-120	

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Wet Chemistry by Method 9056A

L834409-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834409-03 05/20/16 04:45 • (MS) R3138709-6 05/20/16 04:59 • (MSD) R3138709-7 05/20/16 05:14

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	31.0	80.0	81.0	98	100	1	80-120			1	15
Fluoride	5.00	ND	5.21	5.34	102	105	1	80-120			2	15
Sulfate	50.0	ND	53.0	53.9	101	103	1	80-120			2	15



















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Metals (ICP) by Method 6010B

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3136806-1 (05/14/16 13:43
-------------------	----------------

Analyta	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Iron	1.56	<u>J</u>	1.41	10.0
Manganese	П		0.12	1.00









(LCS) R3136806-2	05/14/16 13:46 •	(LCSD) B3136806-3	05/14/16 13:48
(LC3) N3130000-Z	03/14/10 13.40	(LC3D) N3 130000-3	03/14/10 13.40

(ECS) NS130000 2 03/14/1	10 15.40 - (ECSE) 113130000 3	03/14/10 13.40	•						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Iron	1000	937	924	94	92	80-120			1	20
Manganese	100	93.2	92.0	93	92	80-120			1	20







L835281-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835281-01 05/14/16 13:51 • (MS) R3136806-6 05/14/16 14:00 • (MSD) R3136806-7 05/14/16 14:03

,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Iron	1090	20800	20900	23500	15	254	1	75-125	$\underline{\vee}$	V	12	20
Manganese	109	608	701	714	85	97	1	75-125			2	20







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Metals (ICP) by Method 6010B

L835078-08

Method Blank (MB)

(MB) R3137224-7 05/16/16	6 19:15			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	0.0473	<u>J</u>	0.0141	0.100
Manganese	U		0.0012	0.0100







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

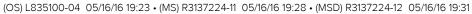
(LCS) R3137224-8 05/16	/16 19:17 • (LCSD)) R313/224-9	05/16/16 19:20								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Iron	10.0	10.2	10.3	102	103	80-120			1	20	
Manganese	1.00	0.997	1.00	100	100	80-120			1	20	







L835100-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)



(03) 2033100 04 0	3/10/10 13.23 - (1413) 10	3137224 11 03	10/10 15.20	(14130) 1(313722	+ 12 03/10/10	15.51						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Iron	10.0	0.0740	10.3	10.3	102	102	1	75-125			0	20
Manganese	100	0.00612	102	102	102	101	1	75-125			1	20







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-08

Method Blank (MB)

(MB) R3137716-5 05/17/16	12:58						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	0.0333	<u>J</u>	0.0314	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 94.7			62.0-128			



³Ss

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137716-3 05/17/16	5 11:43 • (LCSD) I	R3137716-4 0	5/17/16 12:06							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.24	5.58	95.3	101	67.0-132			6.28	20
(S) a,a,a-Trifluorotoluene(FIL	0)			104	104	62.0-128				







⁷ GI

L835661-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835661-01 05/17/16	17:33 • (MS) R3	137716-8 05/17	/16 16:27 • (MS	D) R3137716-9	05/17/16 16:49							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	ND	5.49	5.50	99.1	99.3	1	50.0-143			0.200	20
(S) a,a,a-Trifluorotoluene(FID)				103	104		62.0-128				







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-01,02,03,04,05

Method Blank (MB)

(MB) R3137718-3 05/18/16	01:00						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 99.8			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137718-1 05/17/16	5 23:52 • (LCSD)	R3137718-2	05/18/16 00:14							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	6.45	6.44	117	117	63.5-137			0.140	20
(S) a,a,a-Trifluorotoluene(Fi	ID)			99.0	99.6	59.0-128				





[©]Qc

⁷Gl



(OS) L835078-04 05/18/16 09:58 • (MS) R3137718-4 05/18/16 01:46 • (MSD) R3137718-5 05/18/16 02:09													
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	0.255	18.3	14.9	65.7	53.1	5	28.5-138			20.9	23.6	
(S) a.a.a-Trifluorotoluene(Fli	DI				96.5	97.4		59.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-06,07

Method Blank (MB)

(MB) R3138234-3 05/18/16	3 17:50						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(FIL) 100			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138234-1 05/18/16 16:42 • (LCSD) R3138234-2 05/18/16 17:04												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
TPH (GC/FID) Low Fraction	5.50	5.59	6.61	102	120	63.5-137			16.8	20		
(S) a,a,a-Trifluorotoluene(Fl	D)			99.3	99.1	59.0-128						







⁷Gl

L835078-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-06 05/18/16 20:23 • (MS) R3138234-4 05/18/16 19:15 • (MSD) R3138234-5 05/18/16 19:38													
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	U	4.61	9.33	16.8	33.9	5	28.5-138	<u>J6</u>	<u>J3</u>	67.8	23.6	
(S) a,a,a-Trifluorotoluene(Fl	D)				98.4	98.4		59.0-128					





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-01,02,03,04

Method Blank (MB)

(MB) R3138213-3 05/19/16 (/IB) R3138213-3 05/19/16 01:28									
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/kg		mg/kg	mg/kg						
Benzene	U		0.000270	0.00100						
Ethylbenzene	U		0.000297	0.00100						
Toluene	U		0.000434	0.00500						
Xylenes, Total	U		0.000698	0.00300						
(S) Toluene-d8	105			88.7-115						
(S) Dibromofluoromethane	101			76.3-123						
(S) a,a,a-Trifluorotoluene	94.8			87.2-117						
(S) 4-Bromofluorobenzene	100			69.7-129						



(LCS) R3138213-1 05/18/16	3 23:58 • (LCSD) R3138213-2	05/19/16 00:21								— ⁷
,	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0232	0.0234	92.7	93.6	72.6-120			1.03	20	
Ethylbenzene	0.0250	0.0248	0.0244	99.2	97.6	78.6-124			1.62	20	
Toluene	0.0250	0.0243	0.0247	97.2	98.7	76.7-116			1.52	20	
Xylenes, Total	0.0750	0.0724	0.0729	96.5	97.1	78.1-123			0.620	20	
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				103	103	76.3-123					
(S) a,a,a-Trifluorotoluene				95.8	96.3	87.2-117					
(S) 4-Bromofluorobenzene				102	101	69.7-129					

L835057-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835057-12 05/19/16 03:21 • (MS) R3138213-4 05/19/16 02:13 • (MSD) R3138213-5 05/19/16 02:36												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0250	ND	0.0727	0.122	58.2	97.3	5	47.8-131		<u>J3</u>	50.4	22.8
Ethylbenzene	0.0250	ND	0.0847	0.121	67.8	97.1	5	44.8-135		<u>J3</u>	35.6	26.9
Toluene	0.0250	ND	0.0832	0.122	66.5	97.9	5	47.8-127		<u>J3</u>	38.1	24.3
Xylenes, Total	0.0750	ND	0.253	0.362	67.6	96.6	5	42.7-135		<u>J3</u>	35.4	26.6
(S) Toluene-d8					104	103		88.7-115				
(S) Dibromofluoromethane					102	104		76.3-123				
(S) a,a,a-Trifluorotoluene					95.0	94.8		87.2-117				
(S) 4-Bromofluorobenzene					98.2	99.3		69.7-129				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

Method Blank (MB)

(MB) R3138352-3 05/19/16	IB) R3138352-3 05/19/16 10:31									
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/kg		mg/kg	mg/kg						
Benzene	U		0.000270	0.00100						
Ethylbenzene	U		0.000297	0.00100						
Toluene	U		0.000434	0.00500						
Xylenes, Total	U		0.000698	0.00300						
(S) Toluene-d8	105			88.7-115						
(S) Dibromofluoromethane	95.5			76.3-123						
(S) a,a,a-Trifluorotoluene	106			87.2-117						
(S) 4-Bromofluorobenzene	103			69.7-129						

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138352-1 05/19/16 08:30 • (LCSD) R3138352-2 05/19/16 08:54												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		l
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
Benzene	0.0250	0.0228	0.0223	91.1	89.3	72.6-120			2.05	20		·
Ethylbenzene	0.0250	0.0259	0.0253	103	101	78.6-124			2.09	20		Ιi
Toluene	0.0250	0.0229	0.0232	91.6	92.9	76.7-116			1.39	20		
Xylenes, Total	0.0750	0.0751	0.0738	100	98.4	78.1-123			1.75	20		Į l
(S) Toluene-d8				105	106	88.7-115						
(S) Dibromofluoromethane				99.3	96.4	76.3-123						
(S) a,a,a-Trifluorotoluene				105	107	87.2-117						
(S) 4-Bromofluorobenzene				102	103	69.7-129						

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835074-10 05/19/16 14:41 • (MS) R3138352-6 05/19/16 12:16 • (MSD) R3138352-7 05/19/16 12:40

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0336	ND	1.40	1.36	90.6	87.5	45	47.8-131			3.33	22.8
Ethylbenzene	0.0336	ND	1.38	1.33	87.5	84.4	45	44.8-135			3.38	26.9
Toluene	0.0336	ND	1.40	1.37	90.6	88.7	45	47.8-127			2.13	24.3
Xylenes, Total	0.101	1.60	5.48	5.40	85.5	83.9	45	42.7-135			1.35	26.6
(S) Toluene-d8					104	104		88.7-115				
(S) Dibromofluoromethane					101	98.8		76.3-123				
(S) a,a,a-Trifluorotoluene					102	104		87.2-117				















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					95.1	99.8		69.7-129				



















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-08

Method Blank (MB)

(MB) R3136703-3 05/13/16	13:23			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	105			90.0-115
(S) Dibromofluoromethane	105			79.0-121
(S) a,a,a-Trifluorotoluene	98.8			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136703-1 05/13/16	6 12:14 • (LCSD)	R3136703-2	05/13/16 12:31								. [
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0259	0.0255	103	102	73.0-122			1.27	20	
Ethylbenzene	0.0250	0.0260	0.0246	104	98.2	80.9-121			5.57	20	9
Toluene	0.0250	0.0264	0.0251	105	100	77.9-116			5.02	20	
Xylenes, Total	0.0750	0.0786	0.0747	105	99.6	79.2-122			5.11	20	L
(S) Toluene-d8				105	104	90.0-115					
(S) Dibromofluoromethane				102	106	79.0-121					
(S) a,a,a-Trifluorotoluene				99.7	99.5	90.4-116					
(S) 4-Bromofluorobenzene				97.8	98.1	80.1-120					

L835078-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-08 05/13/16	5 18:16 • (MS) R3	3136703-4 05/	13/16 18:33 • (M	ISD) R3136703-	5 05/13/16 18:	50						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	0.000509	0.0233	0.0247	91.1	96.9	1	58.6-133			6.06	20
Ethylbenzene	0.0250	U	0.0217	0.0232	86.9	92.7	1	62.7-136			6.45	20
Toluene	0.0250	U	0.0224	0.0240	89.4	95.8	1	67.8-124			6.96	20
Xylenes, Total	0.0750	U	0.0658	0.0704	87.8	93.9	1	65.6-133			6.70	20
(S) Toluene-d8					104	106		90.0-115				
(S) Dibromofluoromethane					106	108		79.0-121				
(S) a,a,a-Trifluorotoluene					97.8	102		90.4-116				
(S) 4-Bromofluorobenzene					98.4	98.0		80.1-120				

















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-08

Method Blank (MB)

(MB) R3139237-1 05/15	/16 09:51			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	112			50.0-150









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139237-2 05/15/	16 10:07 • (LCSD) R3139237-3	05/15/16 10:24							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
C10-C28 Diesel Range	1.50	1.53	1.54	102	102	70.0-130			0.680	20
(S) o-Terphenyl				110	117	50.0-150				













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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137450-1 05/17/16	10:13			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	103			50.0-150











(LCS) R3137450-2 05/17/16 10:25 • (LCSD) R3137450-3 05/17/16 10:37

(200) 1000 2 00/1//	10 10.20 (2002) 110107 100 0	00/1//10 10.0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	48.2	52.7	80.3	87.9	50.0-100			9.05	20
(S) o-Terphenyl				93.1	93.4	50.0-150				











(OS) L835078-01 05/17/16 12:02 • (MS) R3137450-4 05/17/16 12:15 • (MSD) R3137450-5 05/17/16 12:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	7.31	57.8	64.7	84.1	95.7	1	50.0-100			11.4	20
(S) o-Terphenyl					72.6	68.2		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Method Blank (MB)

(MB) R3138162-3 05/18/16	6 13:22				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	80.9			21.9-129	
(S) 2-Fluorobiphenyl	83.1			34.9-129	
(S) p-Terphenyl-d14	85.7			21.5-128	
(S) Phenol-d5	80.4			26.3-121	
(S) 2-Fluorophenol	74.3			21.1-116	
(S) 2,4,6-Tribromophenol	74.1			21.6-142	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16	6 12:35 • (LCSD)	R3138162-2	05/18/16 12:58								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
4-Chloro-3-methylphenol	0.667	0.587	0.686	88.0	103	51.1-113			15.6	20	
2-Chlorophenol	0.667	0.469	0.525	70.3	78.7	40.8-103			11.3	20	
2,4-Dichlorophenol	0.667	0.551	0.617	82.6	92.5	46.2-109			11.3	20	
2,4-Dimethylphenol	0.667	0.557	0.647	83.6	97.1	42.2-110			15.0	20	
4,6-Dinitro-2-methylphenol	0.667	0.536	0.586	80.3	87.8	23.1-119			8.86	23.7	
2,4-Dinitrophenol	0.667	0.332	0.345	49.8	51.7	10.0-105			3.82	36.5	
2-Nitrophenol	0.667	0.532	0.620	79.7	93.0	44.2-113			15.3	20.9	
4-Nitrophenol	0.667	0.538	0.600	80.7	90.0	34.8-109			10.9	20	
Pentachlorophenol	0.667	0.550	0.574	82.5	86.1	16.2-102			4.25	22.9	
Phenol	0.667	0.497	0.599	74.6	89.8	41.5-106			18.5	20	
2,4,6-Trichlorophenol	0.667	0.565	0.620	84.7	93.0	44.4-108			9.39	20	
(S) Nitrobenzene-d5				86.7	99.9	21.9-129					
(S) 2-Fluorobiphenyl				83.6	94.3	34.9-129					



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16	6 12:35 • (LCSD)	R3138162-2	05/18/16 12:58								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
(S) p-Terphenyl-d14				81.3	84.5	21.5-128					
(S) Phenol-d5				74.6	82.2	26.3-121					
(S) 2-Fluorophenol				71.3	82.1	21.1-116					
(S) 2.4.6-Tribromophenol				83.7	84.4	21.6-142					



L835035-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
4-Chloro-3-methylphenol	0.142	U	0.632	0.663	89.0	93.4	5	27.0-154			4.76	26.6	
2-Chlorophenol	0.142	U	0.524	0.563	73.8	79.2	5	33.2-121			7.06	29.3	
2,4-Dichlorophenol	0.142	U	0.634	0.639	89.2	90.0	5	34.8-134			0.890	27.3	
2,4-Dimethylphenol	0.142	U	0.638	0.651	89.9	91.7	5	12.3-149			2.00	32.3	
4,6-Dinitro-2-methylphenol	0.142	U	ND	ND	0.000	0.000	5	10.0-144	<u>J6</u>	<u>J6</u>	0.000	32.7	
2,4-Dinitrophenol	0.142	U	ND	ND	0.000	0.000	5	10.0-121	<u>J6</u>	<u>J6</u>	0.000	39.4	
2-Nitrophenol	0.142	U	0.636	0.652	89.5	91.8	5	29.5-144			2.53	29.9	
4-Nitrophenol	0.142	U	0.586	0.569	82.6	80.1	5	20.0-133			3.03	30.2	
Pentachlorophenol	0.142	U	0.655	0.671	92.3	94.5	5	10.0-139			2.43	28.3	
Phenol	0.142	U	0.565	0.644	79.5	90.7	5	25.1-130			13.1	29.6	
2,4,6-Trichlorophenol	0.142	U	0.633	0.675	89.1	95.1	5	33.8-133			6.52	28.1	
(S) Nitrobenzene-d5					86.3	94.0		21.9-129					
(S) 2-Fluorobiphenyl					83.0	81.1		34.9-129					
(S) p-Terphenyl-d14					82.2	60.4		21.5-128					
(S) Phenol-d5					80.2	86.0		26.3-121					
(S) 2-Fluorophenol					78.2	82.9		21.1-116					
(S) 2,4,6-Tribromophenol					80.1	84.2		21.6-142					











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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	61.8			21.9-129
(S) 2-Fluorobiphenyl	61.7			34.9-129
(S) p-Terphenyl-d14	68.7			21.5-128
(S) Phenol-d5	70.1			26.3-121
(S) 2-Fluorophenol	64.2			21.1-116
(S) 2,4,6-Tribromophenol	52.9			21.6-142

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138667-1 05/20/	.CS) R3138667-1 05/20/16 10:08 • (LCSD) R3138667-2 05/20/16 10:32									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(I CS) D3139667 1	0E/20/16 10·02	 (LCSD) R3138667-2 	0E/20/16 10·32
IECOI KOIGOUU/-I	U3/ZU/IU IU.U0	• ILCODI ROBODO/-Z	U3/ZU/IU IU.3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128				
(S) Phenol-d5				56.0	67.8	26.3-121				
(S) 2-Fluorophenol				59.1	73.1	21.1-116				
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142				







⁴Cn

L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6











(S) 2,4,6-Tribromophenol

68.4

21.6-142

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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Method Blank (MB)

(MB) R3136946-3 05/15/16	6 16:02					
	MB Result	MB Qualifier	MB MDL	MB RDL	- -	6
Analyte	mg/l		mg/l	mg/l		ĺ
4-Chloro-3-methylphenol	U		0.000263	0.0100		-
2-Chlorophenol	U		0.000283	0.0100		3
2,4-Dichlorophenol	U		0.000284	0.0100		L
2,4-Dimethylphenol	U		0.000624	0.0100		4
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100		ı
2,4-Dinitrophenol	U		0.00325	0.0100		-
2-Nitrophenol	U		0.000320	0.0100		5
4-Nitrophenol	U		0.00201	0.0100		L
Pentachlorophenol	U		0.000313	0.0100	1	6
Phenol	U		0.000334	0.0100		
2,4,6-Trichlorophenol	U		0.000297	0.0100		
(S) Nitrobenzene-d5	85.3			21.8-123		7
(S) 2-Fluorobiphenyl	<i>75.7</i>			29.5-131		L
(S) p-Terphenyl-d14	88.4			29.3-137		8
(S) Phenol-d5	53.1			5.00-70.1		ĺ
(S) 2-Fluorophenol	72.7			10.0-77.9		
(S) 2,4,6-Tribromophenol	44.8			11.2-130		ç

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	.CS) R3136946-1 05/15/16 15:16 • (LCSD) R3136946-2 05/15/16 15:39									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0516	0.0536	103	107	35.7-100	<u>J4</u>	<u>J4</u>	3.90	22.9
2-Chlorophenol	0.0500	0.0350	0.0353	70.1	70.6	26.2-91.5			0.760	26.5
2,4-Dichlorophenol	0.0500	0.0414	0.0421	82.8	84.1	31.4-103			1.56	24.9
2,4-Dimethylphenol	0.0500	0.0402	0.0453	80.3	90.6	31.9-107			12.0	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0450	0.0490	89.9	98.1	18.4-148			8.69	24.4
2,4-Dinitrophenol	0.0500	0.0286	0.0321	57.1	64.3	24.2-128			11.8	20.5
2-Nitrophenol	0.0500	0.0429	0.0419	85.7	83.9	25.9-106			2.18	26.9
4-Nitrophenol	0.0500	0.0259	0.0255	51.9	50.9	10.0-52.7			1.86	40
Pentachlorophenol	0.0500	0.0325	0.0346	65.0	69.1	10.0-97.4			6.22	35.1
Phenol	0.0500	0.0280	0.0295	55.9	59.1	10.0-57.9		<u>J4</u>	5.49	35
2,4,6-Trichlorophenol	0.0500	0.0418	0.0443	83.7	88.6	29.8-107			5.71	24.1
(S) Nitrobenzene-d5				93.0	96.0	21.8-123				
(S) 2-Fluorobiphenyl				80.1	80.5	29.5-131				

















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	LCS) R3136946-1 05/15/16 15:16 • (LCSD) R3136946-2 05/15/16 15:39											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
(S) p-Terphenyl-d14				88.1	101	29.3-137						
(S) Phenol-d5				55.5	52.7	5.00-70.1						
(S) 2-Fluorophenol				66.2	67.0	10.0-77.9						
(S) 2,4,6-Tribromophenol				62.1	62.8	11.2-130						



















GLOSSARY OF TERMS





SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
В	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















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Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
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ndiana	C-TN-01	Pennsylvania	68-02979
owa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky 1	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
ouisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
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Massachusetts	M-TN003	Vermont	VT2006
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Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
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Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















	Billing Information: Accounts Payable 585 N. Dairy Ashford Houston, TX 77079 Email To: pamela.krueger@amecfw.com			100	1	A	nalysis /	Contain	ner / Pre	er / Preservative				Chain of Custody	Page of				
AMEC Foster Wheeler - Houston, TX 585 N. Dairy Ashford Houston, TX 77079 Report to: Pamela Krueger				S	Sc		T	NoPres	ال 2 ح			res	A COLUMN AND A COL	LA-B S-C	SC				
														12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859					
Project Description: Wastewater Line Investigation			Collected: ARTESEA, NM										9.0						
Phone: 713-929-5674	Client Project # 6703160012.001			Lab Project # AMECFWHTX-WW LINE		nl Amb NoPres	5mlHDPE-NoPres	SO4 4ozClr-NoPres	DROOROLVI 40mlAmb-HCl-BT	DRORLA, SV8270ACID 4 oz CIr-No Pres	FEICP, MNICP 250mlHDPE-HNO3	FEICP, MNICP 202CIr-NoPres	нсі	X 2ozClr-NoPres	HCI	K079 Acctnum: AMECFWHTX Template:T112078			
Collected by (print):	Site/Facility ID# Holias FRONT; MANAS														40mlAmb-HCl				
Collected by (signature):	4 90 100	ıy		Date Results Needed Email?No XYes FAX?NoYes of		8270ACID 100ml	FI, SO4 125n	504 40	JOROLVI 40	DRLA,SV827	CP, MINICP 2	P,MNICP 2	GRO 40mlAmb HCI	GRO, V8260BTEX	V8260BTEX 401	Prelogin: P552541 TSR: 526 - Chris McCord PB: 5 - 4 - 6 KM Shipped Via: FedEX Ground			
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	Ω,	C, F	DRC	DRC	FEIG	FEIG	GRC	GRC	V82	Rem./Contaminant	Sample # (lab on	
TMW-WWL1-01		SS	1	5/10/16	15:00	4			X		X		X		X			-01	
TMW-WULL-05		SS	5	5/10/16	15:10	4			X		X		X		X			-02	
TMW-WWL1-12	100	SS	12	5/10/16	15:20	4			X		X		X		X			-03	
TMW-WWLZ-01		SS	1	5/10/16	16:20	4			X		X		X		X	_	1 1 2 2 3	-04	
TMW-WWLZ-05		SS	5	5/10/16		4			X		Х		X		X	_		-05	
TMW-WWLZ-12D		SS	12	5/10/16	-	4			X		X		X		X	_		-14	
TMW-WWL2-121)		SS	12	5/10/16	16:55	4			X		X		X		X			-57	
n		_\$5		1		4	>		X		×		X		X				
TMW-WW6-EQ		Ø ₩	_	5/10/10	18:00	11	X	X		Х		Х		X		Х	100	-08	
111	/	GW	1	1		111	×	X		X		X		X		X	- P		
Matrix: SS - Soil GW - Groundwater Remarks:	WW - WasteW	ater DW - D	rinking Wate	er OT - Other						pH _	2	Tem			Но	47/	10132	8168	
Relinquished by : (Signature)	y: (Signature) Date: 3/11/16			15700	eceived by: (Sign	130					Samples returned via: UPS					Condition: (lab use only)			
elinquished by : (Signature) / Date:					Received by: (Signature)					01110							Seal Intact:Y N NA		
Relinquished by : (Signature) Date:				Time: R	Received for lab by: (Signature)					5-12-16 900 PH Ch						Checke	ecked: NCF:		



ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835353

Samples Received: 05/13/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, fagh

Chris McCord

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the lutroratory. Where applicable, sampling conducted by ESC is performed per guidance provided in lutroratory standard operating procedures 56/300, 06/303, and 06/304.



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⁹Sc: Chain of Custody

38

ONE	LAB.	NAT	TION	WID

TMW-WWL1 L835353-01 GW			Collected by	Collected date/time 05/12/16 08:30	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:15	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 15:12	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:33	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:32	05/17/16 00:32	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:20	05/19/16 00:20	DAH
Net Chemistry by Method 9056A	WG874711	1	05/24/16 13:02	05/24/16 13:02	CM
Wet Chemistry by Method 9056A	WG875355	500	05/26/16 11:11	05/26/16 11:11	CM
TMW-WWL2 L835353-02 GW			Collected by	Collected date/time 05/12/16 09:00	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:12	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:26	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:50	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:53	05/17/16 00:53	ACG
/olatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:43	05/19/16 00:43	DAH

SAMPLE SUMMARY



'Ss

Cn

Sr

СQс



CM

 CM

CM

Received date/time

05/13/16 09:00

TMW-WWL2D L835353-03 GW

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Method	Batch	Dilution	Preparation	Analysis	Analyst	
			date/time	date/time		
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:18	ST	
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:49	JF	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 05:07	JNS	
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 01:15	05/17/16 01:15	ACG	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 01:05	05/19/16 01:05	DAH	
Wet Chemistry by Method 9056A	WG874225	1	05/23/16 13:58	05/23/16 13:58	SAM	
Wet Chemistry by Method 9056A	WG874225	500	05/23/16 12:55	05/23/16 12:55	SAM	
			Collected by	Collected date/time	Received date/time	
TRIP BLANK 1 835353-04 GW				05/12/16 00:00	05/13/16 09:00	

WG874711

WG874711

WG875355

1

100

500

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected by

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected date/time 05/12/16 09:05

	Collected by	Collected date/time	Received date/time
RIP BLANK L835353-04 GW		05/12/16 00:00	05/13/16 09:00

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:12	05/18/16 20:12	DAH
			Collected by	Collected date/time	Received date/time
TRIP BLANK L835353-05 GW				05/12/16 00:00	05/13/16 09:00

TRIP DLAINE LOSSSSS-US GW					
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:34	05/18/16 20:34	DAH

Collected by

Collected date/time

Received date/time



WWL-SPC L835353-06 Solid				05/12/16 00:00	05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Mercury by Method 7471A	WG873476	1	05/18/16 17:22	05/19/16 09:44	NJB
Metals (ICP) by Method 6010B	WG873554	1	05/20/16 11:08	05/20/16 13:52	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 14:58	SNR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG873587	1	05/19/16 21:44	05/20/16 19:28	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG874253	5	05/20/16 17:57	05/20/16 22:59	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG874942	5	05/24/16 16:07	05/25/16 02:00	DWR
Wet Chemistry by Method 9056A	WG874228	1	05/23/16 09:00	05/23/16 17:37	CM
Wet Chemistry by Method 9056A	WG874228	10	05/23/16 09:00	05/23/16 18:01	CM
Wet Chemistry by Method 9056A	WG874228	50	05/23/16 09:00	05/24/16 09:03	CM





















All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

















Technical Service Representative

Analyte

Manganese

Iron

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

Metals (ICP) by Method 6010B

Result

mg/l

0.234

0.954

Qualifier

MDL

mg/l

0.0705

0.00600

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	12200		26.0	500	500	05/26/2016 11:11	WG875355
Fluoride	6.21		0.00990	0.100	1	05/24/2016 13:02	WG874711
Sulfate	18800		38.7	2500	500	05/26/2016 11:11	WG875355

Dilution

5

5

Analysis

date / time

05/17/2016 17:15

05/17/2016 17:15

Batch

WG872666

WG872666

RDL

mg/l

0.500

0.0500





Cn



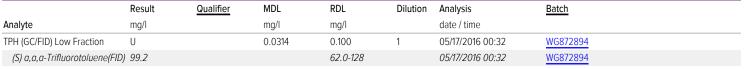












Volatile Organic Compounds (GC/MS) by Method 8260B

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:20	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:20	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:20	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:20	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:20	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/19/2016 00:20	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/19/2016 00:20	WG872872
(S) 4-Bromofluorobenzene	101			80.1-120		05/19/2016 00:20	WG872872

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0851	<u>J</u>	0.0222	0.100	1	05/17/2016 04:33	WG872740
C28-C40 Oil Range	0.0419	<u>J</u>	0.0118	0.100	1	05/17/2016 04:33	WG872740
(S) o-Terphenyl	95.3			50.0-150		05/17/2016 04:33	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 15:12	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 15:12	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 15:12	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 15:12	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 15:12	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 15:12	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 15:12	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 15:12	WG872936
(S) 2-Fluorophenol	43.8			10.0-77.9		05/19/2016 15:12	WG872936
(S) Phenol-d5	32.9			5.00-70.1		05/19/2016 15:12	WG872936
(S) Nitrobenzene-d5	76.8			21.8-123		05/19/2016 15:12	WG872936
(S) 2-Fluorobiphenyl	87.2			29.5-131		05/19/2016 15:12	WG872936

TMW-WWL1

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

L835353

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	71.9			11.2-130		05/19/2016 15:12	WG872936	
(S) n-Ternhenvl-d14	98.2			29.3-137		05/19/2016 15:12	WG872936	



















SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7130		5.19	100	100	05/24/2016 13:45	WG874711
Fluoride	2.59		0.00990	0.100	1	05/24/2016 13:31	WG874711
Sulfate	14600		38.7	2500	500	05/26/2016 11:25	WG875355







	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.169	<u>J</u>	0.0705	0.500	5	05/17/2016 17:12	WG872666
Manganese	0.836		0.00600	0.0500	5	05/17/2016 17:12	WG872666



Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 00:53	WG872894
(S) a,a,a-Trifluorotoluene(FIL	99.5			62.0-128		05/17/2016 00:53	WG872894



Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:43	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:43	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:43	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:43	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:43	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 00:43	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 00:43	WG872872
(S) 4-Bromofluorobenzene	114			80.1-120		05/19/2016 00:43	WG872872



ΆΙ

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.182		0.0222	0.100	1	05/17/2016 04:50	WG872740
C28-C40 Oil Range	0.175		0.0118	0.100	1	05/17/2016 04:50	WG872740
(S) o-Terphenyl	104			50.0-150		05/17/2016 04:50	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:26	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:26	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:26	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:26	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:26	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:26	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:26	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:26	WG872936
(S) 2-Fluorophenol	52.9			10.0-77.9		05/19/2016 19:26	WG872936
(S) Phenol-d5	38.1			5.00-70.1		05/19/2016 19:26	WG872936
(S) Nitrobenzene-d5	84.9			21.8-123		05/19/2016 19:26	WG872936
(S) 2-Fluorobiphenyl	88.9			29.5-131		05/19/2016 19:26	WG872936

TMW-WWL2

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

	<u>'</u>	•	, ,				
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
(S) 2,4,6-Tribromophenol	78.3			11.2-130		05/19/2016 19:26	WG872936
(S) p-Terphenyl-d14	99.5			29.3-137		05/19/2016 19:26	WG872936



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7100		26.0	500	500	05/23/2016 12:55	WG874225
Fluoride	3.10		0.00990	0.100	1	05/23/2016 13:58	WG874225
Sulfate	16800		38.7	2500	500	05/23/2016 12:55	WG874225







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.981		0.0705	0.500	5	05/17/2016 17:18	WG872666
Manganese	0.910		0.00600	0.0500	5	05/17/2016 17:18	WG872666



Sr ⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 01:15	WG872894
(S) a,a,a-Trifluorotoluene(FID)	98.8			62.0-128		05/17/2016 01:15	WG872894





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
		Qualifier			Dilution	,	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 01:05	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 01:05	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 01:05	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 01:05	WG872872
(S) Toluene-d8	103			90.0-115		05/19/2016 01:05	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 01:05	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 01:05	WG872872
(S) 4-Bromofluorobenzene	116			80.1-120		05/19/2016 01:05	WG872872

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0892	<u>J</u>	0.0222	0.100	1	05/17/2016 05:07	WG872740
C28-C40 Oil Range	0.0898	<u>J</u>	0.0118	0.100	1	05/17/2016 05:07	WG872740
(S) o-Terphenyl	97.7			50.0-150		05/17/2016 05:07	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:49	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:49	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:49	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:49	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:49	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:49	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:49	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:49	WG872936
(S) 2-Fluorophenol	40.0			10.0-77.9		05/19/2016 19:49	WG872936
(S) Phenol-d5	32.2			5.00-70.1		05/19/2016 19:49	WG872936
(S) Nitrobenzene-d5	70.2			21.8-123		05/19/2016 19:49	WG872936
(S) 2-Fluorobiphenyl	81.9			29.5-131		05/19/2016 19:49	WG872936

TMW-WWL2D

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

	'	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	63.3			11.2-130		05/19/2016 19:49	WG872936	
(S) n-Ternhenvl-d14	94.9			29.3-137		05/19/2016 19:49	WG872936	



















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SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:12	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:12	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:12	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:12	WG872872
(S) Toluene-d8	104			90.0-115		05/18/2016 20:12	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/18/2016 20:12	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/18/2016 20:12	WG872872
(S) 4-Bromofluorobenzene	99.5			80.1-120		05/18/2016 20:12	WG872872



















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SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:34	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:34	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:34	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:34	WG872872
(S) Toluene-d8	108			90.0-115		05/18/2016 20:34	WG872872
(S) Dibromofluoromethane	99.3			79.0-121		05/18/2016 20:34	WG872872
(S) a,a,a-Trifluorotoluene	108			90.4-116		05/18/2016 20:34	WG872872
(S) 4-Bromofluorobenzene	105			80.1-120		05/18/2016 20:34	WG872872



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1660		7.95	100	10	05/23/2016 18:01	WG874228
Fluoride	18.3		0.261	1.00	1	05/23/2016 17:37	WG874228
Sulfate	20000		28.5	2500	50	05/24/2016 09:03	WG874228





Mercury by Method 7471A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Mercury	U		0.00280	0.0200	1	05/19/2016 09:44	WG873476





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Arsenic	2.87		0.650	2.00	1	05/20/2016 13:52	WG873554
Barium	95.9		0.170	0.500	1	05/20/2016 13:52	WG873554
Cadmium	0.222	<u>J</u>	0.0700	0.500	1	05/20/2016 13:52	WG873554
Chromium	5.89		0.140	1.00	1	05/20/2016 13:52	WG873554
Iron	5120		1.41	10.0	1	05/20/2016 13:52	WG873554
Lead	7.90		0.190	0.500	1	05/20/2016 13:52	WG873554
Manganese	390		0.120	1.00	1	05/20/2016 13:52	WG873554
Selenium	U		0.740	2.00	1	05/20/2016 13:52	WG873554
Silver	U		0.280	1.00	1	05/20/2016 13:52	WG873554





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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/20/2016 22:59	WG874253
(S) a,a,a-Trifluorotoluene(FID) 87.3			59.0-128		05/20/2016 22:59	WG874253

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/25/2016 02:00	WG874942
Toluene	U		0.00217	0.0250	5	05/25/2016 02:00	WG874942
Ethylbenzene	U		0.00148	0.00500	5	05/25/2016 02:00	WG874942
Total Xylenes	U		0.00349	0.0150	5	05/25/2016 02:00	WG874942
(S) Toluene-d8	106			88.7-115		05/25/2016 02:00	WG874942
(S) Dibromofluoromethane	102			76.3-123		05/25/2016 02:00	WG874942
(S) a,a,a-Trifluorotoluene	103			87.2-117		05/25/2016 02:00	WG874942
(S) 4-Bromofluorobenzene	103			69.7-129		05/25/2016 02:00	WG874942

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/20/2016 19:28	WG873587
C28-C40 Oil Range	4.12		0.274	4.00	1	05/20/2016 19:28	WG873587
(S) o-Terphenyl	87.5			50.0-150		05/20/2016 19:28	WG873587

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 14:58	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 14:58	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 14:58	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 14:58	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 14:58	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 14:58	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 14:58	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 14:58	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 14:58	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 14:58	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 14:58	WG873908
(S) 2-Fluorophenol	61.1			21.1-116		05/20/2016 14:58	WG873908
(S) Phenol-d5	55.3			26.3-121		05/20/2016 14:58	WG873908
(S) Nitrobenzene-d5	67.6			21.9-129		05/20/2016 14:58	WG873908
(S) 2-Fluorobiphenyl	62.2			34.9-129		05/20/2016 14:58	WG873908
(S) 2,4,6-Tribromophenol	46.7			21.6-142		05/20/2016 14:58	WG873908
(S) p-Terphenyl-d14	52.9			21.5-128		05/20/2016 14:58	WG873908

















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-03

Method Blank (MB)

(MB) R3139265-1	05/23/16 09:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Sulfate	U		0.0774	5.00







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CS) P3139265-2 05/23/16 09:23 • // CSD) P3139265-3 05/23/16 09:38

(LCS) R3139265-2 U5/23/	(LCS) R3139205-2 05/23/16 09:23 • (LCSD) R3139205-3 05/23/16 09:38											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
Chloride	40.0	38.9	38.9	97	97	80-120			0	15		
Fluoride	8.00	7.73	7.76	97	97	80-120			0	15		
Sulfate	40.0	38.5	38.6	96	97	80-120			0	15		









L835977-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835977-10 05/23/16 17:41 • (MS) R3139265-4 05/23/16 17:57 • (MSD) R3139265-5 05/23/16 18:13

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Fluoride	5.00	0.361	5.34	5.28	100	98	1	80-120			1	15
Sulfate	50.0	ND	50.8	51.0	99	99	1	80-120			0	15





Fluoride

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3139346-1 05/24/	16 08:33			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l









(OS) L836606-01 05/24/16 16:53 •	(DUP) R3139346-5 05/24/16 17:07
----------------------------------	---------------------------------

(00) 2000000 01 00/2 1/1	0 10.00 (201)	1101000100	00/2 1/10 1	, ,		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	ND	0.611	1	0		15
Fluoride	ND	0.0818	1	0		15











0.0099

0.100

(LCS) R3139346-2 05/24/	/16 08:47 • (LCS	D) R3139346-	3 05/24/16 10:2	27						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.0	39.2	97	98	90-110			0	20
Fluoride	8.00	7.82	7 84	98	98	90-110			0	20





L836505-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L836505-07 05/24/16 14:28 • (MS) R3139346-4 05/24/16 14:43

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	17.2	67.6	101	1	80-120	
Fluoride	5.00	0.122	5.04	98	1	80-120	

L836606-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(US) 1 836606-06	05/24/16 18:36	(MS) D31303/6-6	05/24/16 18:50 •	(MSD) R3139346-7	05/24/16 19:04
(US) L030000-00	03/24/10 10.30	0-04CECICA (CIVII)	03/24/10 10.30 •	(IVISD) KSISSS40-/	03/24/10 19.04

OS) L836606-06 05/24/16 18:36 • (MS) R3139346-6 05/24/16 18:50 • (MSD) R3139346-7 05/24/16 19:04												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	ND	50.1	51.6	100	103	1	80-120			3	15
Fluoride	5.00	ND	4.98	5.18	98	102	1	80-120			4	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3140117-1 05/26/16	6 09:06			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00







L837803-06 Original Sample (OS) • Duplicate (DUP)

(OS) L837803-06 05/26/16	6 15:51 • (DUP) F	R3140117-4 05/	/26/16 16:0	06		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Sulfate	35.7	35.6	1	0		15



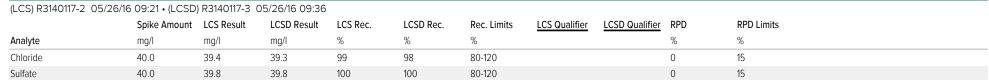
[†]Cn















ACCOUNT:

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-06

Method Blank (MB)

Chloride

Fluoride

Sulfate

(MB) R3139258-1 05/23/16	5 10:37		
	MB Result	MB Qualifier	MB MDL
Analyte	mg/kg		mg/kg

U

U











(OS) L836501-15 05/23/16 20:25 • (DUP) R3139258-4 05/23/16 20:49

	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	86.9	80.8	1	7		15
Fluoride	7.38	6.69	1	10		15
Sulfate	215	177	1	19	P1	15

MB RDL

mg/kg

10.0

1.00

50.0

0.795

0.261

0.57







⁸Al



(OS) L836501-21 05/24/16 00:48 • (DUP) R3139258-7 05/24/16 01:12

	Original Result (dry)	DUP Result (d	ry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	75.8	83.5	1	10		15
Fluoride	16.2	13.3	1	20	<u>J3</u>	15
Sulfate	257	235	1	9		15



⁹Sc

Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139258-2 05/23/16 11:01 • (LCSD) R3139258-3 05/23/16 11:25

(200) 110.00200 2 00/2	0,1010. (2002	,	00/20/10 11120							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	199	199	99	99	80-120			0	15
Fluoride	20.0	20.4	20.5	102	103	80-120			0	15
Sulfate	200	200	200	100	100	80-120			0	15

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Wet Chemistry by Method 9056A

L835353-06

L836501-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836501-16 05/23/16 22:00 • (MS) R3139258-5 05/23/16 22:24 • (MSD) R3139258-6 05/23/16 22:48

(00) 2000001 10 00/20/10	22.00 (1110) 10	0.002000000	720/10 22.21	(11102) 1101032	00 0 00/20/10	22.10						
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	538	78.6	643	629	105	102	1	80-120			2	15
Fluoride	53.8	5.67	49.6	49.1	82	81	1	80-120			1	15
Sulfato	E38	260	922	916	103	102	1	90 120			1	15





















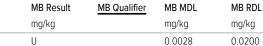
ONE LAB. NATIONWIDE.

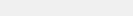
Method Blank (MB)

Mercury

Mercury by Method 7471A

(MB) R3138224-1 05/19/16 09:36 MB Result MB Qualifier MB MDL Analyte







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138224-2 05/19/16 09:39 • (LCSD) R3138224-3 05/19/16 09:41

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Mercury	0.300	0.260	0.274	87	91	80-120			5	20	









(OS) L835353-06 05/19/16 09:44 • (MS) R3138224-4 05/19/16 09:47 • (MSD) R3138224-5 05/19/16 09:54

, ,	Spike Amount	Original Result		MSD Result	MS Rec.	MSD Rec.	Dilutio	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
Mercury	0.300	U	0.282	0.276	94	92	1	75-125			2	20	









ONE LAB. NATIONWIDE.

Metals (ICP) by Method 6010B

L835353-01,02,03

Method Blank (MB)

(MB) R3137501-1 05/17/16	12:02			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	U		0.0141	0.100
Manganese	U		0.0012	0.0100







(LCS) R313/501-2 05/1//10	6 12:04 • (LCSD) R313/501-3 (05/1//16 12:0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Iron	10.0	9.70	9.78	97	98	80-120			1	20
Manganese	100	0 973	0.980	97	98	80-120			1	20















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Metals (ICP) by Method 6010B

L835353-06

Method Blank (MB)

Silver

(MB) R3138672-1 0	5/20/16 13:30			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.65	2.00
Barium	0.278	<u>J</u>	0.17	0.500
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Manganese	U		0.12	1.00
Selenium	U		0.74	2.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

0.28

1.00

(LCS) R31386/2-2	05/20/16 13:33 • (LC	CSD) R31386/2-3	05/20/16 13:35
------------------	----------------------	-----------------	----------------

U

(200)	00/20/10 10:00 (200)	5,	00/20/10 10.0	•							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Arsenic	100	99.2	97.4	99	97	80-120			2	20	
Barium	100	104	102	104	102	80-120			1	20	
Cadmium	100	103	101	103	101	80-120			2	20	
Chromium	100	99.2	97.9	99	98	80-120			1	20	
Iron	1000	974	963	97	96	80-120			1	20	
Lead	100	104	102	104	102	80-120			2	20	
Manganese	100	99.7	98.4	100	98	80-120			1	20	
Selenium	100	103	102	103	102	80-120			1	20	
Silver	100	98.4	97.0	98	97	80-120			1	20	

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

	Spike Amount (dry)	Original Result (dry)		MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	105	4.07	102	106	94	97	1	75-125			3	20
Barium	105	47.6	155	166	102	113	1	75-125			7	20
Cadmium	105	U	106	108	101	103	1	75-125			2	20
Chromium	105	7.15	105	111	93	99	1	75-125			6	20
Iron	1050	11300	10800	12600	0	118	1	75-125	\vee		16	20

















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Metals (ICP) by Method 6010B

L835353-06

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

· /	, ,			,								
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Lead	105	6.62	114	116	102	105	1	75-125			2	20
Manganese	105	293	362	353	65	57	1	75-125	<u>J6</u>	<u>J6</u>	2	20
Selenium	105	U	92.7	98.3	88	94	1	75-125			6	20
Silver	105	U	100	104	95	99	1	75-125			4	20





















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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-01,02,03

Method Blank (MB)

(MB) R3137306-3 05/16/16	6 22:25						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	U		0.0314	0.100			
(S) a,a,a-Trifluorotoluene(FIL	D) 100			62.0-128			







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137306-1 05/16/16 21:22 • (LCSD) R3137306-2 05/16/16 21:43											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	6.14	6.04	112	110	67.0-132			1.66	20	
(S) a,a,a-Trifluorotoluene(Fl.	D)			102	101	62.0-128					







L834446-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834446-01 05/16/16 23:50 • (MS) R3137306-4 05/16/16 22:46 • (MSD) R3137306-5 05/16/16 23:07													
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	ND	2.91	3.00	52.9	54.6	1	50.0-143			3.25	20	
(S) a.a.a-Trifluorotoluene(Fl	'DI				100	100		62.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-06

Method Blank (MB)

(MB) R3138993-3 05/20/16 19:11								
	MB Result	MB Qualifier	MB MDL	MB RDL				
Analyte	mg/kg		mg/kg	mg/kg				
TPH (GC/FID) Low Fraction	U		0.0217	0.100				
(S) a,a,a-Trifluorotoluene(FIL	D) 88.2			59.0-128				





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138993-1 05/20/16 18:01 • (LCSD) R3138993-2 05/20/16 18:24										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.12	4.92	93.0	89.4	63.5-137			3.96	20
(S) a a a-Trifluorotoluene(FII	וח			891	89.0	59 0-128				







7 GI

L835353-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835353-06 05/20/16 22:59 • (MS) R3138993-4 05/20/16 21:50 • (MSD) R3138993-5 05/20/16 22:13												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	U	17.6	19.8	63.9	71.9	5	28.5-138			11.7	23.6
(S) a,a,a-Trifluorotoluene(FID))				86.7	87.5		59.0-128				





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-01,02,03,04,05

Method Blank (MB)

(MB) R3138238-3 05/18/16	3 18:41			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			90.0-115
(S) Dibromofluoromethane	109			79.0-121
(S) a,a,a-Trifluorotoluene	103			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138238-1 05/18/1	6 16:49 • (LCSD)) R3138238-2	05/18/16 17:11								_
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0256	0.0267	102	107	73.0-122			4.33	20	
Ethylbenzene	0.0250	0.0251	0.0260	100	104	80.9-121			3.74	20	0
Toluene	0.0250	0.0235	0.0244	93.9	97.4	77.9-116			3.63	20	
Xylenes, Total	0.0750	0.0736	0.0765	98.2	102	79.2-122			3.82	20	L
(S) Toluene-d8				105	106	90.0-115					
(S) Dibromofluoromethane				110	103	79.0-121					
(S) a,a,a-Trifluorotoluene				103	106	90.4-116					
(S) 4-Bromofluorobenzene				101	106	80.1-120					

L835321-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835321-02 05/18/16 21:19 • (MS) R3138238-4 05/18/16 19:04 • (MSD) R3138238-5 05/18/16 19:27												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	ND	0.0233	0.0247	93.2	98.8	1	58.6-133			5.89	20
Ethylbenzene	0.0250	ND	0.0234	0.0253	93.5	101	1	62.7-136			7.89	20
Toluene	0.0250	ND	0.0215	0.0228	85.9	91.4	1	67.8-124			6.16	20
Xylenes, Total	0.0750	ND	0.0695	0.0740	92.6	98.7	1	65.6-133			6.31	20
(S) Toluene-d8					106	105		90.0-115				
(S) Dibromofluoromethane					108	109		79.0-121				
(S) a,a,a-Trifluorotoluene					104	104		90.4-116				
(S) 4-Bromofluorobenzene					104	104		80.1-120				





















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

Method Blank (MB)

(MB) R3139540-3 05/24/16 21:59										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/kg		mg/kg	mg/kg						
Benzene	U		0.000270	0.00100						
Ethylbenzene	U		0.000297	0.00100						
Toluene	U		0.000434	0.00500						
Xylenes, Total	U		0.000698	0.00300						
(S) Toluene-d8	106			88.7-115						
(S) Dibromofluoromethane	99.4			76.3-123						
(S) a,a,a-Trifluorotoluene	105			87.2-117						
(S) 4-Bromofluorobenzene	103			69.7-129						

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139540-1 05/24/	16 20:22 • (LCS	D) R3139540-2	2 05/24/16 20:	42							ľ
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0216	0.0216	86.5	86.4	72.6-120			0.0900	20	_
Ethylbenzene	0.0250	0.0236	0.0232	94.6	92.8	78.6-124			1.85	20	9
Toluene	0.0250	0.0224	0.0225	89.5	90.1	76.7-116			0.740	20	_
Xylenes, Total	0.0750	0.0711	0.0715	94.8	95.3	78.1-123			0.510	20	L
(S) Toluene-d8				108	108	88.7-115					
(S) Dibromofluoromethane				101	101	76.3-123					
(S) a,a,a-Trifluorotoluene				107	106	87.2-117					
(S) 4-Bromofluorobenzene				103	102	69.7-129					

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0285	29.5	137	134	81.9	79.6	4600	47.8-131			2.25	22.8
Ethylbenzene	0.0285	108	229	232	91.7	94.6	4600	44.8-135			1.67	26.9
Toluene	0.0285	222	339	347	89.5	95.7	4600	47.8-127			2.37	24.3
Xylenes, Total	0.0855	527	895	913	93.6	98.1	4600	42.7-135			1.94	26.6
(S) Toluene-d8					108	107		88.7-115				
(S) Dibromofluoromethane					102	99.1		76.3-123				
(S) a,a,a-Trifluorotoluene					106	107		87.2-117				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836637-05 05/26/16 11:45 • (MS) R3139988-1 05/26/16 12:04 • (MSD) R3139988-2 05/26/16 12:24

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					104	105		69.7-129				



















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-01,02,03

Method Blank (MB)

(MB) R3137334-1 05/17/	/16 03:42			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	105			50.0-150









(LCS) R3137334-2 05/17	(LCS) R3137334-2 05/17/16 03:59 • (LCSD) R3137334-3 05/17/16 04:16												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits			
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%			
C10-C28 Diesel Range	1.50	1.48	1.44	98.5	96.1	70.0-130			2.44	20			
(S) o-Terphenyl				104	97.9	50.0-150							















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-06

Method Blank (MB)

(MB) R3138554-1 05/20	8) R3138554-1 05/20/16 10:03										
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/kg		mg/kg	mg/kg							
C10-C28 Diesel Range	U		1.61	4.00							
C28-C40 Oil Range	U		0.274	4.00							
(S) o-Terphenyl	88.1			50.0-150							









(LCS) R3138554-2 05/2	0/16 10:17 • (LCSE	D) R3138554-3	05/20/16 10:3	1						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	47.4	48.5	78.9	80.9	50.0-100			2.44	20
(S) o-Terphenyl				88.9	91.0	50.0-150				











10	JC/ 1 83E3E3 UE	05/20/16 10:28 -	(MC) D3139554 4	05/20/16 10:42 - /	(MSD) R3138554-5	05/20/16 10:57
()3) L033333-00	03/20/10 19.20 •	(IVIS) KSIS6SS4-4	03/20/10 13.42 • ((IVISD) KS136334-3	03/20/10 19.37

(6.6) 2555555 55 55,25,16 16.25 (1.16) 1.6.5555 1. 55,25,16 16.25 (1.16)												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	U	43.1	44.1	71.8	73.6	1	50.0-100			2.39	20
(S) o-Terphenyl					67.2	65.3		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

Method Blank (MB)

(MB) R3138702-3 05/19/1	6 14:49				١
	MB Result	MB Qualifier	MB MDL	MB RDL	Ē
Analyte	mg/l		mg/l	mg/l	ľ
4-Chloro-3-methylphenol	U		0.000263	0.0100	L
2-Chlorophenol	U		0.000283	0.0100	3
2,4-Dichlorophenol	U		0.000284	0.0100	L
2,4-Dimethylphenol	U		0.000624	0.0100	Ţ.
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	
2,4-Dinitrophenol	U		0.00325	0.0100	L
2-Nitrophenol	U		0.000320	0.0100	1
4-Nitrophenol	U		0.00201	0.0100	L
Pentachlorophenol	U		0.000313	0.0100	6
Phenol	U		0.000334	0.0100	
2,4,6-Trichlorophenol	U		0.000297	0.0100	
(S) Nitrobenzene-d5	77.9			21.8-123	7
(S) 2-Fluorobiphenyl	84.2			29.5-131	L
(S) p-Terphenyl-d14	93.8			29.3-137	8
(S) Phenol-d5	38.1			5.00-70.1	
(S) 2-Fluorophenol	55.7			10.0-77.9	L
(S) 2,4,6-Tribromophenol	70.6			11.2-130	1

LCS) R3138702-1 05/19/16 14:02 • (LCSD) R3138702-2 05/19/16 14:25										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0439	0.0424	87.8	84.8	35.7-100			3.47	22.9
2-Chlorophenol	0.0500	0.0377	0.0354	75.3	70.8	26.2-91.5			6.19	26.5
2,4-Dichlorophenol	0.0500	0.0441	0.0428	88.1	85.7	31.4-103			2.83	24.9
2,4-Dimethylphenol	0.0500	0.0430	0.0431	86.1	86.2	31.9-107			0.150	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0375	0.0383	75.0	76.7	18.4-148			2.20	24.4
2,4-Dinitrophenol	0.0500	0.0258	0.0157	51.5	31.3	24.2-128		<u>J3</u>	48.8	20.5
2-Nitrophenol	0.0500	0.0447	0.0434	89.3	86.7	25.9-106			2.97	26.9
4-Nitrophenol	0.0500	0.0190	0.0153	38.0	30.6	10.0-52.7			21.7	40
Pentachlorophenol	0.0500	0.0392	0.0347	78.3	69.4	10.0-97.4			12.0	35.1
Phenol	0.0500	0.0200	0.0177	40.0	35.5	10.0-57.9			12.1	35
2,4,6-Trichlorophenol	0.0500	0.0452	0.0456	90.5	91.2	29.8-107			0.790	24.1
(S) Nitrobenzene-d5				84.3	87.2	21.8-123				
(S) 2-Fluorobiphenyl				86.0	90.9	29.5-131				

















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

(LCS) R3138702-1 05/19/1	16 14:02 • (LCSD) R3138702-2	05/19/16 14:25								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
(S) p-Terphenyl-d14				96.1	98.8	29.3-137					
(S) Phenol-d5				37.7	32.4	5.00-70.1					
(S) 2-Fluorophenol				52.3	43.9	10.0-77.9					
(S) 2,4,6-Tribromophenol				88.7	88.5	11.2-130					



















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-06

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	Γ
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	L
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	61.8			21.9-129	
(S) 2-Fluorobiphenyl	61.7			34.9-129	
(S) p-Terphenyl-d14	68.7			21.5-128	
(S) Phenol-d5	70.1			26.3-121	
(S) 2-Fluorophenol	64.2			21.1-116	
(S) 2,4,6-Tribromophenol	52.9			21.6-142	

(LCS) R3138667-1 05/20/16 10:08 • (LCSD) R3138667-2 05/20/16 10:32										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				

















(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

835353-06

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC) D2120667.1	0E/20/16 10:00	(LCSD) R3138667-2	OE /20 /16 10.22
1LC21 K3138007-1	U5/ZU/IB IU:U8 •	- ILCSDI R3138007-2	U5/ZU/IB IU:3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142









L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6













68.4

21.6-142

GLOSSARY OF TERMS

ONE LAB. NATIONWIDE.



SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
lowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















		Te.	Billing Informa	ation:	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\overline{}$	2		Anal	lysis / Cu	ontaine	er / Preser	ervative			-	Chain of Custody	Pageof
MEC Foster Wheeler - 85 N. Dairy Ashford ouston, TX 77079	- Houstor	n, TX	Accounts P 585 N. Dain Houston, T	Payable airy Ashford TX 77079												1	YOUR LAB O 12065 Lebanon Rd Mount Juliet, TN 37122	回磷酸国
eport to:		- 1	Email To: pa	amela.krueger@ame	necfw.com							NO3			BIK		Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859	
Project Description: Survey Stinger Sump In	WATER .	Line		City/State Collected:				31	res			H-340	toPres		b-HCl-		L# L835	353
Phone: 713-929-5674	Client Project # 6703160012.	and the second second		Lab Project # AMECFWHTX-S	SLURRY		res	DROOROLVI 40mlAmb-HCl-BT	4ozClr-NoPres		oPres	Skinner's List Mtls. 250mlHDPE-HNO3	Skinner's List Mtls. 2ozClr-NoPres		40mIAmb-HCI-BIK		1198	
Fax:	Site/Facility ID #			P.O. #			nb NoPr	mlAm	70 4ozt	DH.C	GRO,V8260 2ozClr-NoPres	Mtls. 2:	Mtls. 2	V8260 40mlAmb-HCl	Blank 40		Acctnum: AMEC	081
Collected by (signature):		ab MUST Be N			lesults Needed		ml Amb	VI 40	,5V8270	IAmb	60 20	List	List	OmlA	Trip Bl		Prelogin: P5525	McCord
Immediately	Same Day Next Day Two Day Three Da	ay	200% 100% 50%	2012	No X_Yes	No. of	8270 100ml	OOROL	DRORLA,S	GRO 40mlAmb HCI	10,782	inner's	inner's	3260 40	V8260-T		Shipped Via: Fee	dEX Ground
Packed on Ice N Y Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	DR	100000000000000000000000000000000000000	85	-	Ski	X Ski	87	N N		Rem./Contaminant	Sample # (lab only
1 -		SS	·			13			X		X	1	X			-		
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		SS	-	1:- 1:		10	-	X	~	X		х		Х				-0
TMW-WWH		GW	1	5/12/16		10	10000000	X	100	X		X		Х	-			0
TMW-WWLZ		GW	-	5/11/6	9:00	10	200000	X		X		X		X		L		0
TMW-WWLZD		GW	1	5/n/16	1600	10	-	100							X	L		C
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		GW					1		1								e174	
* Matrix: SS - Soil GW - Groundwater	r WW West to	(ater DW D	Vrinking Wat	ter OT - Other	1/2 - 2/2					pil .		T	emp			6	711013	2901,
* Matrix: SS - Soil GW - Groundwater Remarks:	usine wi	ILL CA	XL IN	ANALYS	5'1 0-	al.				pH Flow	April 10	Ot	ther			5	5-054	
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Relinquished by : (Signature)	Coff	5/h	116	Time:	Received by: (Sign	gnature	R	Table 1		Temp	np:			s Received	(Seal Intact: VY	YNN
Relinquished by : (Signature)		Date:		Time:	Received for lab	by: (Sig	gnature			Date	6.	16	Time:			pH Che	necked: NC	CF:

ESC Lab Sciences Non-Conformance Form

Login #: L835353	Client:	Client: AMECFWHTX	Date: 5/13/16	Evaluated by: Jeremy
Non-Conformance (check applicable items)	heck ap	olicable items)		
Sample Integrity		Chain of Custody Clarification	noi	
Parameter(s) past holding time		x Login Clarification Needed		If Broken Container:
Improper temperature		Chain of custody is incomplete	ej.	Insufficient packing material around container
Improper container type		Please specify Metals requested.	red.	Insufficient packing material inside cooler
Improper preservation		Please specify TCLP requested.	ď.	Improper handling by carrier (FedEx / UPS / Cour
Insufficient sample volume.	me.	Received additional samples not listed on coc.	not listed on coc.	Sample was frozen
Sample is biphasic.		Sample ids on containers do not match ids on coc	not match ids on	Container lid not intact
Vials received with head	Ispace.	Trip Blank not received.		If no Chain of Custody:
Broken container		Client did not "X" analysis.		Received by:
Broken container:		Chain of Custody is missing		Date/Time:
Sufficient sample remains				Temp./Cont. Rec./pH:
				Carrier:

Login Comments: Received a 125ml-NP for Anions for all TMW ID's not listed on COC.

Tracking#

Client informed by:	Call	Email	Voice Mail	Date:	Time:	
TSR Initials: CM	Client Cont	act:				
County of the Co						

Login Instructions:

Log 125mL-NP for CHLORIDE, FLUORIDE and SULFATE.

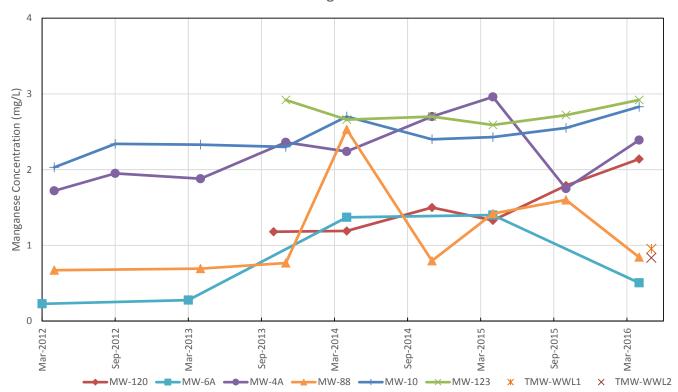
Also, change on all IDs: 8270 to 8270ACID; V8260 to V8260BTEX and only log metals FEICP and MNICP.

dissemination of this communication is strictly prohibited. If you have received this message in error, please contact the sender This E-mail and any attached files are confidential, and may be copyright protected. If you are not the addressee, any immediately and delete/destroy all information received.

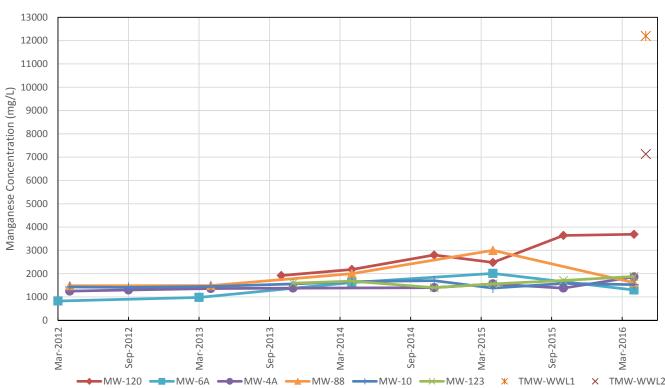


ATTACHMENT D

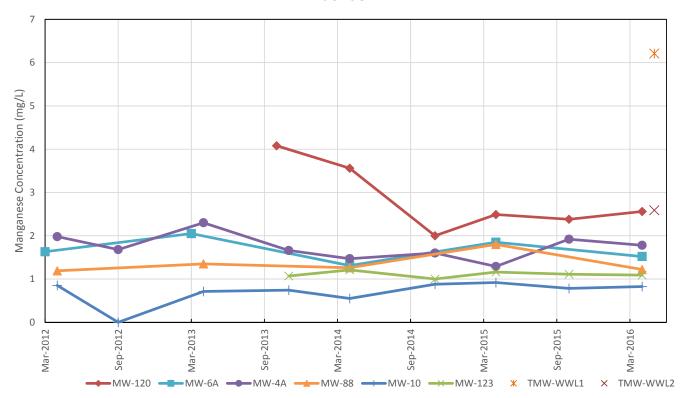
Manganese



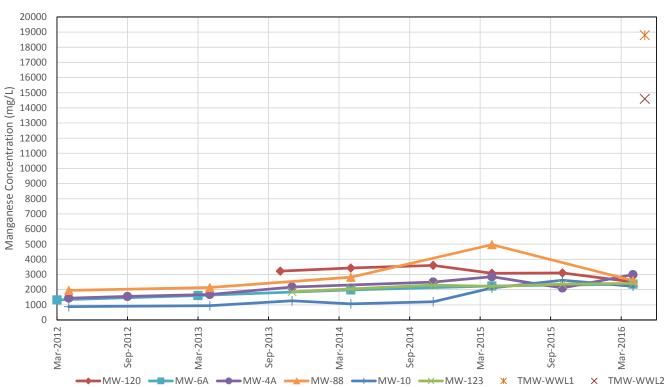




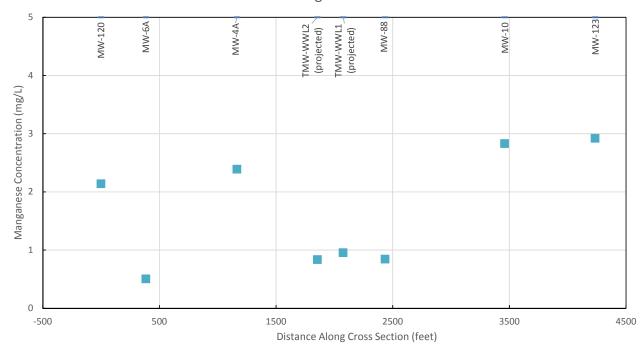
Fluoride



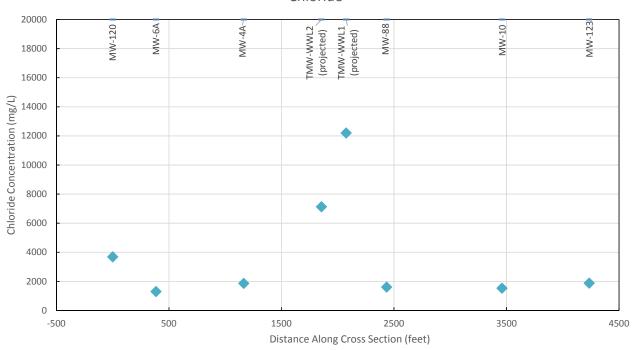




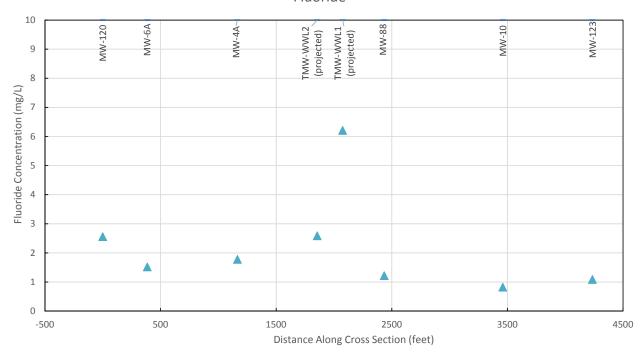
Manganese



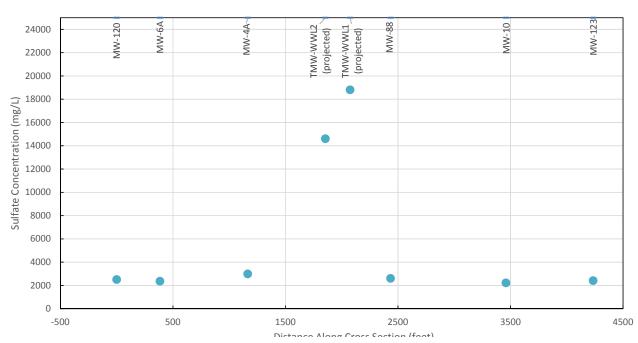




Fluoride



Sulfate



Tom Blaine, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 586987 File Nbr: RA 12403

May. 10, 2016

SCOTT DENTON
HOLLYFRONTIER NAVAJO REFINING
501 EAST MAIN STREET
ARTESIA, NM 88210

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 05/31/2017, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 05/31/2017.

Appropriate forms can be downloaded from the CSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

ouan Hernandez (575)622-6521

Enclosure

explore

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

sted End Date: 6/1/2016
sted End Date: 6/1/2016
sted End Date: 6/1/2016
sted End Date: 6/1/2016
check here if Agent
Zip Code:
☐ Home ☐ Cell 746-5487

	FOR OSE INTERNAL USE	Application for Permit, Form wr-07,	Rev 6/14/12	
# #: 50	File No.: 12403	Trn. No.:586987	Receipt No.:	
	Trans Description (optional):	POD 1,2		
الاستقالية اعتدادة	Sub-Basin:	PCW/LOG Due I	Date: 5-31-17	
	and a second of the same wife in the same			Dago 1 of 3

2. WELL(S) Describe the well(s) applicable to this application.

(Lat/Long - WGS84).		•	a PLSS location in addition to above.
NM State Plane (NAD83) NM West Zone NM East Zone NM Central Zone		ITM (NAD83) (Mete]Zone 12N]Zone 13N	Lat/Long (WGS84) (to the nearest 1/10 th of second)
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves , Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
TMW-WWLine1	104 20' 20.1" W	32 51' 0.1" N	T17S, R26E, S12, Q4 1, Q16 3
TMW-WWLine2	104 20' 20.3" W	32 51' 0.7" N	T17S, R26E, S12, Q4 1, Q16 3
NOTE: If more well location Additional well descriptions			WR-08 (Attachment 1 – POD Descriptions) If yes, how many
Other description relating well	l to co mmon landmark	s, streets, or other	
Well is on land owned by: Holl	lyFrontier Navajo Refin	ning, LLC	
Well Information: NOTE: If r	more than one (1) we	II needs to be des	cribed, provide attachment. Attached?
Approximate depth of well (fe			Outside diameter of well casing (inches): 2
Driller Name: Envirotech Drillir	ng Services LLC		Priller License Number: WD-1757
only), then plugged and	wells will be insta	alled and deve	oped, allowed to rest for 24 hours, sampled (once he temporary monitoring wells is to determine reak may have impacted the shallow groundwater

FOR OSE IN File No.:

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

Trn No.: 531987

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Exploratory: Pollution Control and/or Recovery: Construction Mine De-Watering: ☐ Include a ☐ Include a plan for pollution De-Watering: ☐ Include a plan for pollution Include a description of the description of control/recovery, that includes the control/recovery, that includes the following: any proposed following: proposed dewatering A description of the need for mine pump test, if A description of the need for the operation, dewatering. pollution control or recovery operation. ☐ The estimated duration of applicable. ☐ The estimated maximum period of time ☐ The estimated maximum period of the operation, for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the time for completion of the operation. The maximum amount of ☐ The annual diversion amount. water to be diverted, ☐ The annual consumptive use A description of the need aquifer(s). amount. for the dewatering operation. The maximum amount of water to be ☐ The maximum amount of water to be diverted per annum. diverted and injected for the duration of A description of how the ☐The maximum amount of water to be the operation. diverted water will be disposed diverted for the duration of the operation. ☐The quality of the water. ☐ The method and place of discharge. of. Monitoring: ☐ The method of measurement of Geo-Thermal: The method of measurement of water water produced and discharged. Include the Include a description of the diverted. ☐ The source of water to be injected. ☐The recharge of water to the aquifer. reason for the geothermal heat exchange monitoring ☐ The method of measurement of project, Description of the estimated area of well, and, water injected. hydrologic effect of the project. ☐ The amount of water to be ■ The ☐ The characteristics of the aquifer. The method and place of discharge. diverted and re-injected for the duration ☐ The method of determining the ☐An estimation of the effects on surface project, resulting annual consumptive use of water rights and underground water rights of the planned The time frame for water and depletion from any related constructing the geothermal from the mine dewatering project. monitoring. stream system. heat exchange project, and, A description of the methods employed to ☐ The duration of the project. ☐ Preliminary surveys, design Proof of any permit required from the estimate effects on surface water rights and New Mexico Environment Department. underground water rights. An access agreement if the ☐ Information on existing wells, rivers, data, and additional applicant is not the owner of the land on information shall be included to springs, and wetlands within the area of which the pollution plume control or provide all essential facts hydrologic effect. recovery well is to be located. relating to the request. **ACKNOWLEDGEMENT** I, We (name of applicant(s)), Scott Denton on behalf of HollyFrontier Navajo Refining LLC Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Mrs Robert Combs for Scott M. Denton **ACTION OF THE STATE ENGINEER** This application is: approved partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. Witness my hand and seal this day of May 20 16 , for the State Engineer, Tom Blaine, P.E. ___, State Engineer Signature Title: Juan Hernandez, Engr Specialist Supervisor Print 2016 HAYY -2 PM 41: 20 ENSIME OF BLEND Application for Permit, Form wr-07 FOR OSE INTERNAL USE

File No.:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 1A Depth of the well shall not exceed the thickness of the valley fill.
- 4 No water shall be appropriated and beneficially used under this permit.
- The well shall be plugged upon completion of the permitted use, and a plugging report shall be filed with the State Engineer within 10 days.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
- C Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.
- P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

- Q The State Engineer retains jurisdiction over this permit.
- LOG The Point of Diversion RA 12403 POD1 must be completed and the Well Log filed on or before 05/31/2017.
- LOG The Point of Diversion RA 12403 POD2 must be completed and the Well Log filed on or before 05/31/2017.

IT IS THE PERMITTEES RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

SHOULD THE PERMITTEE CHANGE THE PURPOSE OF USE TO OTHER THAN MONITORING PURPOSES, AN APPLICATION SHALL BE ACQUIRED FROM THE OFFICE OF THE STATE ENGINEER.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd: Date Rcvd. Corrected: Formal Application Rcvd: 05/02/2016 Pub. of Notice Ordered: Date Returned - Correction: Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 10 day of May A.D., 2016

Tom Blaine, P.E. , State Engineer

By:

Juan Bernandez

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

Locator Tool Report

General Information:

Application ID:29

Date: 05-10-2016

Time: 08:42:10

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE2

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.7 Seconds N

Longitude:

104 Degrees 20 Minutes 20.3 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,873
 E: 561,855

 NAD 1983(92) (Survey Feet)
 N: 11,925,413
 E: 1,843,353

 NAD 1927 (Meters)
 N: 3,634,670
 E: 561,905

 NAD 1927 (Survey Feet)
 N: 11,924,748
 E: 1,843,516

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,141
 E: 164,472

 NAD 1983(92) (Survey Feet)
 N: 673,034
 E: 539,606

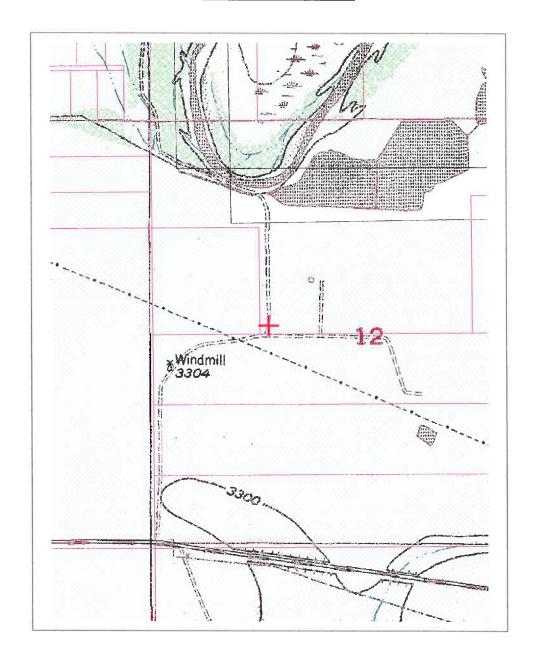
 NAD 1927 (Meters)
 N: 205,122
 E: 151,921

 NAD 1927 (Survey Feet)
 N: 672,971
 E: 498,427

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,873 E: 561,855

Northing/Easting: SPCS83(92) (Feet): N: 673,034 E: 539,606

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016

Locator Tool Report

General Information:

Application ID: 29

Date: 05-10-2016

Time: 08:40:32

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE1

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.1 Seconds N

Longitude:

104 Degrees 20 Minutes 20.1 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,855
 E: 561,860

 NAD 1983(92) (Survey Feet)
 N: 11,925,353
 E: 1,843,371

 NAD 1927 (Meters)
 N: 3,634,652
 E: 561,910

 NAD 1927 (Survey Feet)
 N: 11,924,687
 E: 1,843,534

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,123
 E: 164,477

 NAD 1983(92) (Survey Feet)
 N: 672,973
 E: 539,623

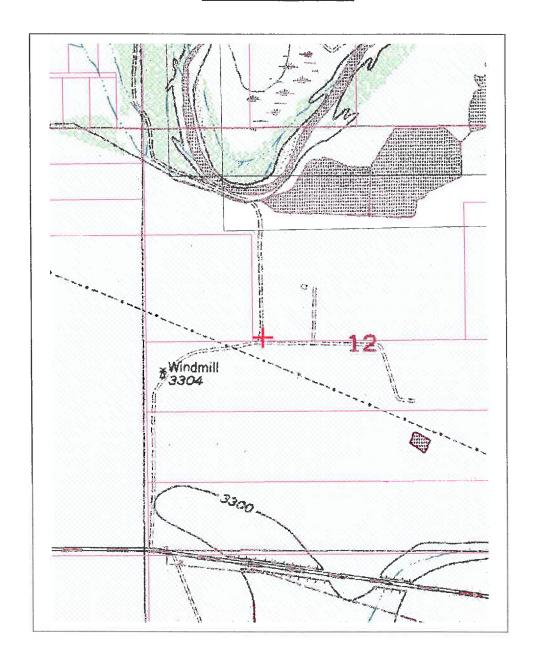
 NAD 1927 (Meters)
 N: 205,103
 E: 151,926

 NAD 1927 (Survey Feet)
 N: 672,910
 E: 498,444

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,855 E: 561,860

Northing/Easting: SPCS83(92) (Feet): N: 672,973 E: 539,623

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016



WELL PLUGGING PLAN OF OPERATIONS



NOTE:	A Well Plugging Plan of Operations to plugging.	shall be filed	with and accept	ed by the Offic	e of the State Engineer prior
I. FILI	NG FEE: There is no filing fee for this	s form.			
II. GE Existing	NERAL / WELL OWNERSHIP: g Office of the State Engineer POD N	Jumber (Well 1	Number) for we	Il to be plugged	:RA-12403
Name o	of well owner: Holly Frontier Navago	o Refining, Ll	LC		
Mailing	address: 501 East Main Street				
City: _	Artesia	State:	NM		Zip code: 88210
Phone r	Artesia number: 575-746-5487		E-mail: Scot	t.Denton@Ho	llyFrontier.com
	ELL DRILLER INFORMATION: riller contracted to provide plugging ser	vices: Enviro	tech Drilling S		
New M	exico Well Driller License No.: WD-1	757		Expiration D	ate: 1/31/2018
	Reason(s) for plugging well:	32	_deg,51 _deg,20	min,0.1 min,20.1	sec sec, NAD 83
	This plan is for two temporary will be plugged and abandon				
3)	Was well used for any type of monitor what hydrogeologic parameters were water, authorization from the New Me	monitored. I	f the well was	used to monito	r contaminated or poor quali
4)	Does the well tap brackish, saline, or	otherwise poor	r quality water?	Yes	If yes, provide additional deta
	including analytical results and/or labor				
	Temporary wells are located south of semiannual monitoring program. Da TDS values ranging from 5,000 to 1	ata from those			
5)		- 83	urface feet abov	ve land surface	(circle one)
6)	Depth of the well: 10 - 12 fee	et			Well Plugging Plan Version: August 11, 2015

7)	Inside diameter of innermost casing:inches.
8)	Casing material: PVC
9)	The well was constructed with: an open-hole production interval, state the open interval: a well screen or perforated pipe, state the screened interval(s): 2 to 10 (or 2 to 12)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? N/A
11)	Was the well built with surface casing? No No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
	if yes, prease describe.
12)	Has all pumping equipment and associated piping been removed from the well?If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DES	CRIPTION OF PLANNED WELL PLUGGING:
pipe, a c	this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie letailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional linformation, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:
	Lean cement grout will be placed in the boring from the bottom up using a tremie pipe.
2)	Will well head be cut-off below land surface after plugging? PVC casing will be removed
VI. PL	UGGING AND SEALING MATERIALS:
Note: T	he plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 1.6 - 2 gallons
4)	Type of Cement proposed: Portland cement
5)	Proposed cement grout mix: 5 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

2016 MAY -2 FM 4: 20

7)	Grout additives requested, and percent by dry weight relative to cement:
0)	
8)	Additional notes and calculations:
VII.	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):
VIII.	SIGNATURE:
	ott Denton, say that I have carefully read the foregoing Well Plugging Plan of
	tions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State
	eer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well ing Plan of Operations and attachments are true to the best of my knowledge and belief.
	Joshu R Robert Combs for Scott M. Danton 5/2/16
	Signature of Applicant Date
IX. A	CTION OF THE STATE ENGINEER:
This V	Well Plugging Plan of Operations is:
	Approved subject to the attached conditions
	Approved subject to the attached conditions. Not approved for the reasons provided on the attached letter.
	Witness my hand and official seal this
	Tom Blaine P.E., New Mexico State Engineer
	De la DA CENTA
	02:17 HJ Z- AVH 9107 Fox Andy Morley Dr. Mil T. Manager Well Plugging Plan Version: August 11, 2015 Page 3 of 5
	Dichof The Well Plugging Plan
	Version: August 11, 2015 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			0
Bottom of proposed interval of grout placement (ft bgl)			10-12
Theoretical volume of grout required per interval (gallons)			1.6 to 2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			5
Mixed on-site or batch- mixed and delivered?			mixed on-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

2016 MAY -2 FM 4: 20

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

			_	Log of Well No. TMW-WWL-1 GROUND SURFACE ELEVATION AND DATUM:			
ORING LOC	ATION:		GROUND	SURFACE ELEVA	HON AND L	ATOW:	
RILLING CO	NTRACTOR:	Envirotech Services	DATE STAI 5/10/16	RTED:	DATE FIN 5/10/16	ISHED:	
RILLING ME	THOD: Ha	ollow Stem Auger	TOTAL DEI	PTH (ft.):	SCREEN	INTERVAL (ft.):	
	000000000000000000000000000000000000000		16.0 DEPTH TO	WATER ATD:	10' CASING:		
RILLING EQ	UIPMENT:	Geoprobe 9520	12'		2'		
AMPLING M	ETHOD: A	Auger	William S				
AMMER WE	ight: N A	A DROP: NA	RESPONSI William S	IBLE PROFESSIO Smith	NAL:	REG. NO.	
	Blows/Sample Foot OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, str cementation, react. w/HCl, geo. inter. Surface Elevation:		Siliai	DET	CONSTRUCTION AILS AND/OR ING REMARKS	
- to -	0	SANDY CLAY (CL): reddish-brown, dry, low carb induration, low-medium plasticity, no odor, no sta			- Open	Casina	
-					2" DiametBentonite	er Casing	
		SANDY CLAY (CL): reddish-brown, low carbona induration, medium-high plasticity, no odor, no st	I		– 20/40 Gra	de Silica Sand	
5-8	0	SANDY CLAY (CL): light brown, low plasticity, no no staining	odor,				
		SANDY CLAY (CL):brown, low plasticity, gypsum crystals, no odor, no staining	1				
10-	0	SANDY CLAY (CL): light reddish-brown, low cart induration, low-medium plasticity, damp, containe some gypsum crystals, no odor, no staining			– Sch 40 0.0 Screen	010 Slot PVC	
	0	Gypsiferrous SANDY CLAY (CL): whitish-green, plasticity, moist, no odor, no staining	low				
15-		Total Depth = 15.5'					
-		Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15.5'		_			
20							

ROJE			J	er Navajo Wastewater Line Release Investigati	L	<u> </u>	lo. TMW-WWL-2
ORIN	G LO	CATION:			GROU	ND SURFACE ELEVA	TION AND DATUM:
RILLII	NG C	ONTRAC	TOR:	Envirotech Services	5/10/1		DATE FINISHED: 5/10/16
RILLII	NG M	ETHOD:	Ho	ollow Stem Auger	16.0	DEPTH (ft.):	SCREEN INTERVAL (ft.): 10'
RILLII	NG E	QUIPMEI	NT:	Geoprobe 9520	DEPTH 12'	TO WATER ATD:	CASING: 2'
AMPL	ING I	METHOD	: <i>F</i>	Auger	LOGGE Willia	ED BY: m Smith	
AMME	ER W	EIGHT:	N/	DROP: NA	RESPO	NSIBLE PROFESSIOM Smith	DNAL: REG. NO.
(feet)	Sample No.	Sample M Blows/ ST Foot	OVM	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, s cementation, react. w/HCl, geo. inter.	·		WELL CONSTRUCTION DETAILS AND/OR
5=	Sar	Sar	8	Surface Elevation:			DRILLING REMARKS
_	- 01 -		0	SILTY SAND (SM): light brown, damp, non-pla odor, no stain	stic, no		─ Open─ 2" Diameter Casing
_							Bentonite
_				SANDY CLAY (CL): brown, damp, medium pla contains some gypsum crystals, no odor, no sta	-		Zonto mo
_				SANDY CLAY (CL): light reddish-brown, damp medium to high plasticity, contains some gymsi			— 20/40 Grade Silica Sand
5- -	- 05		0	crystals, no odor, no stain,			
10-			0				— Sch 40 0.010 Slot PVC
- - - 15-	- 12 -		0	SANDY CLAY (CL): reddish-brown, moist, low plasticity, low-moderate carbonate induration be more gymsiferous with depth, no odor, organic, stain			Screen
-				TOTAL DEDTU- 16'			
				TOTAL DEPTH = 16'			
_				Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15'			
20							



ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835078

Samples Received: 05/12/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation
Site: HOLLEY FRONTIER NAVAJO

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, forh

Chris McCord

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the luboratory. Where applicable, sampling conducted by ESCIs performed per guidance provided in laboratory standard operating procedures 96/3002, 06/303, and 06/304.



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⁹Sc: Chain of Custody

45



TMW-WWL1-01 L835078-01 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:00	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:06	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:05	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 12:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 07:06	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 08:15	DWR
Wet Chemistry by Method 9056A	WG872631	20	05/16/16 17:26	05/17/16 11:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 01:04	СМ
TMW-WWL1-05 L835078-02 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:10	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
Mark WORLD Mark 19940	W00700F7		date/time	date/time	0.05
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:08	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:29	JF DMC
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 10:49	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:12	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5 50	05/19/16 00:02 05/16/16 17:26	05/19/16 08:37	DWR CM
Wet Chemistry by Method 9056A Wet Chemistry by Method 9056A	WG872631 WG873240	1	05/18/16 17:26	05/17/16 12:04 05/19/16 01:52	CM
Wet elicilisity by Method 3030A	W00/3240	ı	03/10/10 13.30	03/13/10 01.32	CIVI
TMW-WWL1-12 L835078-03 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:17	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:52	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:35	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:00	DWR
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 12:28	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:16	СМ
TMW-WWL2-01 L835078-04 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:20	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 17:15	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:50	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:58	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:22	DWR
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:29	CM
Wet Chemistry by Method 9056A	WG872631	10	05/16/16 17:26	05/17/16 12:52	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:40	CM
TMW-WWL2-05 L835078-05 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:30	Received date/time 05/12/16 09:00
	Batch	Dilution	Preparation	Analysis	Analyst
Method			date/time	date/time	
Method Metals (ICP) by Method 6010B	WG872357	1	date/time 05/14/16 08:15	date/time 05/14/16 14:23	BRJ

















SAMPLE SUMMARY

Collected by

ONE		

Collected date/time

Received date/time

TMW-WWL2-05 L835078-05 Solid			William R. Smith	05/10/16 16:30	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:14	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 10:21	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:29	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:53	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:16	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 03:04	CM
TMW-WWL2-12 L835078-06 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:50	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	

Wet elicinistry by Method 3030A	W0072031	30	03/10/10 17.20	03/1//10 13.10	CIVI
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 03:04	CM
TMW-WWL2-12 L835078-06 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:50	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:26	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 18:02	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:26	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:23	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:53	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 07:17	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 04:16	CM
			Collected by	Collected date/time	Received date/time

TMW-WWL2-12D L835078-07 Solid			William R. Smith	05/10/16 16:55	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:29	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 12:33	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:38	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:46	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 16:17	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 09:36	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 14:04	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 04:40	CM

TMW-WW6-EQ L835078-08 GW	William R. Smith	05/10/16 18:00	05/12/16 09:00		
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872401	1	05/16/16 10:43	05/16/16 15:27	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872427	1	05/12/16 21:03	05/15/16 18:23	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872369	1	05/12/16 20:58	05/15/16 10:41	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872916	1	05/17/16 19:24	05/17/16 19:24	LRL
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872248	1	05/13/16 18:16	05/13/16 18:16	LRL
Wet Chemistry by Method 9056A	WG873772	1	05/20/16 04:02	05/20/16 04:02	SAM



















Collected by

Collected date/time

Received date/time



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the





Ss















Chris McCord Technical Service Representative

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1730		15.9	200	20	05/17/2016 11:40	WG872631
Fluoride	5.61		0.261	1.00	1	05/19/2016 01:04	WG873240
Sulfate	7580		11.4	1000	20	05/17/2016 11:40	WG872631

Ср





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	12200		1.41	10.0	1	05/14/2016 14:06	WG872357
Manganese	388		0.120	1.00	1	05/14/2016 14:06	WG872357





Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 07:06	WG873092
(S) a,a,a-Trifluorotoluene(FIL	99.2			59.0-128		05/18/2016 07:06	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:15	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:15	WG872230
hylbenzene	U		0.00148	0.00500	5	05/19/2016 08:15	WG872230
otal Xylenes	U		0.00349	0.0150	5	05/19/2016 08:15	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:15	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 08:15	WG872230
(S) a,a,a-Trifluorotoluene	95.8			87.2-117		05/19/2016 08:15	WG872230
(S) 4-Bromofluorobenzene	96.7			69.7-129		05/19/2016 08:15	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	7.31		1.61	4.00	1	05/17/2016 12:02	WG872902
C28-C40 Oil Range	3.15	<u>J</u>	0.274	4.00	1	05/17/2016 12:02	WG872902
(S) o-Terphenyl	91.8			50.0-150		05/17/2016 12:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:05	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:05	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:05	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:05	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:05	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:05	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:05	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:05	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:05	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:05	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:05	WG872189
(S) 2-Fluorophenol	67.0			21.1-116		05/18/2016 16:05	WG872189
(S) Phenol-d5	68.0			26.3-121		05/18/2016 16:05	WG872189
(S) Nitrobenzene-d5	83.5			21.9-129		05/18/2016 16:05	WG872189
(S) 2-Fluorobiphenyl	74.9			34.9-129		05/18/2016 16:05	WG872189

TMW-WWL1-01

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	62.6			21.6-142		05/18/2016 16:05	WG872189	
(S) p-Terphenyl-d14	63.6			21.5-128		05/18/2016 16:05	WG872189	



















SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1070		39.8	500	50	05/17/2016 12:04	WG872631
Fluoride	16.1		0.261	1.00	1	05/19/2016 01:52	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:04	WG872631







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	7850		1.41	10.0	1	05/14/2016 14:08	WG872357
Manganese	162		0.120	1.00	1	05/14/2016 14:08	WG872357



⁵Sr

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:12	WG873092
(S) a,a,a-Trifluorotoluene(FID	98.8			59.0-128		05/18/2016 09:12	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:37	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:37	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 08:37	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 08:37	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:37	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 08:37	WG872230
(S) a,a,a-Trifluorotoluene	95.5			87.2-117		05/19/2016 08:37	WG872230
(S) 4-Bromofluorobenzene	99.6			69.7-129		05/19/2016 08:37	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 10:49	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 10:49	WG872902
(S) o-Terphenyl	98.1			50.0-150		05/17/2016 10:49	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:29	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:29	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:29	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:29	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:29	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:29	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:29	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:29	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:29	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:29	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:29	WG872189
(S) 2-Fluorophenol	57.1			21.1-116		05/18/2016 16:29	WG872189
(S) Phenol-d5	46.4			26.3-121		05/18/2016 16:29	WG872189
(S) Nitrobenzene-d5	64.5			21.9-129		05/18/2016 16:29	WG872189
(S) 2-Fluorobiphenyl	66.2			34.9-129		05/18/2016 16:29	WG872189

TMW-WWL1-05

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	39.8			21.6-142		05/18/2016 16:29	WG872189	
(S) p-Terphenvl-d14	39.6			21.5-128		05/18/2016 16:29	WG872189	



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1690		39.8	500	50	05/17/2016 12:28	WG872631
Fluoride	11.8		0.261	1.00	1	05/19/2016 02:16	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:28	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2710		1.41	10.0	1	05/14/2016 14:17	WG872357
Manganese	64.7		0.120	1.00	1	05/14/2016 14:17	WG872357



[°]Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:35	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 09:35	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:00	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:00	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:00	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:00	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:00	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 09:00	WG872230
(S) a,a,a-Trifluorotoluene	96.3			87.2-117		05/19/2016 09:00	WG872230
(S) 4-Bromofluorobenzene	98.8			69.7-129		05/19/2016 09:00	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:02	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:02	WG872902
(S) o-Terphenyl	95.4			50.0-150		05/17/2016 11:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:52	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:52	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:52	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:52	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:52	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:52	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:52	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:52	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:52	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:52	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:52	WG872189
(S) 2-Fluorophenol	64.9			21.1-116		05/18/2016 16:52	WG872189
(S) Phenol-d5	58.7			26.3-121		05/18/2016 16:52	WG872189
(S) Nitrobenzene-d5	64.9			21.9-129		05/18/2016 16:52	WG872189
(S) 2-Fluorobiphenyl	56.2			34.9-129		05/18/2016 16:52	WG872189

TMW-WWL1-12

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

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	<u>'</u>	*	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	51.6			21.6-142		05/18/2016 16:52	WG872189	
(S) p-Terphenyl-d14	46.8			21.5-128		05/18/2016 16:52	WG872189	



















SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	113		0.795	10.0	1	05/17/2016 06:29	WG872631
Fluoride	4.56		0.261	1.00	1	05/19/2016 02:40	WG873240
Sulfate	2590		5.70	500	10	05/17/2016 12:52	WG872631





Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	10500		1.41	10.0	1	05/14/2016 14:20	WG872357
Manganese	344		0.120	1.00	1	05/14/2016 14:20	WG872357



[°]Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.255	<u>J</u>	0.108	0.500	5	05/18/2016 09:58	WG873092
(S) a,a,a-Trifluorotoluene(FIL	0) 99.7			59.0-128		05/18/2016 09:58	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:22	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:22	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:22	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:22	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:22	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 09:22	WG872230
(S) a,a,a-Trifluorotoluene	97.8			87.2-117		05/19/2016 09:22	WG872230
(S) 4-Bromofluorobenzene	100			69.7-129		05/19/2016 09:22	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:50	WG872902
C28-C40 Oil Range	0.687	<u>J</u>	0.274	4.00	1	05/17/2016 11:50	WG872902
(S) o-Terphenyl	84.3			50.0-150		05/17/2016 11:50	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:15	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:15	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:15	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:15	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:15	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:15	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:15	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:15	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:15	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:15	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:15	WG872189
(S) 2-Fluorophenol	63.6			21.1-116		05/18/2016 17:15	WG872189
(S) Phenol-d5	67.5			26.3-121		05/18/2016 17:15	WG872189
(S) Nitrobenzene-d5	72.4			21.9-129		05/18/2016 17:15	WG872189
(S) 2-Fluorobiphenyl	77.4			34.9-129		05/18/2016 17:15	WG872189

TMW-WWL2-01

SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	71.5			21.6-142		05/18/2016 17:15	WG872189	
(S) p-Terphenvl-d14	67.0			21.5-128		05/18/2016 17:15	WG872189	



















SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 06:53	WG872631
Fluoride	15.8		0.261	1.00	1	05/19/2016 03:04	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 13:16	WG872631





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	5580		1.41	10.0	1	05/14/2016 14:23	WG872357
Manganese	70.6		0.120	1.00	1	05/14/2016 14:23	WG872357



СQс

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 10:21	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 10:21	WG873092







Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	<u> </u>
Benzene	U		0.00135	0.00500	5	05/19/2016 15:29	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 15:29	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:29	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:29	WG873800
(S) Toluene-d8	101			88.7-115		05/19/2016 15:29	WG873800
(S) Dibromofluoromethane	102			76.3-123		05/19/2016 15:29	WG873800
(S) a,a,a-Trifluorotoluene	101			87.2-117		05/19/2016 15:29	WG873800
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:29	WG873800

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:14	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:14	WG872902
(S) o-Terphenyl	96.4			50.0-150		05/17/2016 11:14	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:39	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:39	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:39	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:39	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:39	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:39	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:39	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:39	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:39	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:39	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:39	WG872189
(S) 2-Fluorophenol	59.4			21.1-116		05/18/2016 17:39	WG872189
(S) Phenol-d5	58.8			26.3-121		05/18/2016 17:39	WG872189
(S) Nitrobenzene-d5	64.1			21.9-129		05/18/2016 17:39	WG872189
(S) 2-Fluorobiphenyl	56.5			34.9-129		05/18/2016 17:39	WG872189

TMW-WWL2-05

SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

L835078

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	58.0			21.6-142		05/18/2016 17:39	WG872189	
(S) n-Ternhenvl-d14	66.9			21.5-128		05/18/2016 17:39	WG872189	



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 07:17	WG872631
Fluoride	8.01		0.261	1.00	1	05/19/2016 04:16	WG873240
Sulfate	17200		28.5	2500	50	05/17/2016 13:40	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2880		1.41	10.0	1	05/14/2016 14:26	WG872357
Manganese	80.3		0.120	1.00	1	05/14/2016 14:26	WG872357



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U	<u>J3 J6</u>	0.108	0.500	5	05/18/2016 20:23	WG873220
(S) a,a,a-Trifluorotoluene(FIL	99.8			59.0-128		05/18/2016 20:23	WG873220





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
Benzene	U		0.00135	0.00500	5	05/19/2016 15:53	WG873800	
Toluene	U		0.00217	0.0250	5	05/19/2016 15:53	WG873800	
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:53	WG873800	
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:53	WG873800	
(S) Toluene-d8	103			88.7-115		05/19/2016 15:53	WG873800	
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 15:53	WG873800	
(S) a,a,a-Trifluorotoluene	100			87.2-117		05/19/2016 15:53	WG873800	
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:53	WG873800	

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:26	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:26	WG872902
(S) o-Terphenyl	102			50.0-150		05/17/2016 11:26	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 18:02	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 18:02	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 18:02	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 18:02	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 18:02	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 18:02	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 18:02	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 18:02	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 18:02	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 18:02	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 18:02	WG872189
(S) 2-Fluorophenol	45.8			21.1-116		05/18/2016 18:02	WG872189
(S) Phenol-d5	45.5			26.3-121		05/18/2016 18:02	WG872189
(S) Nitrobenzene-d5	52.8			21.9-129		05/18/2016 18:02	WG872189
(S) 2-Fluorobiphenyl	48.0			34.9-129		05/18/2016 18:02	WG872189

TMW-WWL2-12

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

L835078

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	44.1			21.6-142		05/18/2016 18:02	WG872189	
(S) n-Ternhenvl-d14	42.5			21.5-128		05/18/2016 18:02	WG872189	



















SAMPLE RESULTS - 07

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

L835078

Wet Chemistry by Method 9056A

	, ,						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	899		0.795	10.0	1	05/17/2016 09:36	WG872631
Fluoride	11.2		0.261	1.00	1	05/19/2016 04:40	WG873240
Sulfate	18200		28.5	2500	50	05/17/2016 14:04	WG872631

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³Ss

Metals (ICP) by Method 6010B

Result <u>Qualifier</u> MDL RDL Dilution Analysis <u>Batch</u>	
Analyte mg/kg mg/kg mg/kg date / time	
Iron 3950 1.41 10.0 1 05/14/2016 14:29 <u>WG872357</u>	
Manganese 95.4 0.120 1.00 1 05/14/2016 14:29 <u>WG872357</u>	



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 20:46	WG873220
(S) a,a,a-Trifluorotoluene(FID)	99.5			59.0-128		05/18/2016 20:46	WG873220





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 16:17	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 16:17	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 16:17	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 16:17	WG873800
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 16:17	WG873800
(S) Dibromofluoromethane	98.9			76.3-123		05/19/2016 16:17	WG873800
(S) a,a,a-Trifluorotoluene	105			87.2-117		05/19/2016 16:17	WG873800
(S) 4-Bromofluorobenzene	99.8			69.7-129		05/19/2016 16:17	WG873800

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:38	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:38	WG872902
(S) o-Terphenyl	94.5			50.0-150		05/17/2016 11:38	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 12:33	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 12:33	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 12:33	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 12:33	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 12:33	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 12:33	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 12:33	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 12:33	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 12:33	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 12:33	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 12:33	WG873908
(S) 2-Fluorophenol	77.5			21.1-116		05/20/2016 12:33	WG873908
(S) Phenol-d5	72.1			26.3-121		05/20/2016 12:33	WG873908
(S) Nitrobenzene-d5	67.2			21.9-129		05/20/2016 12:33	WG873908
(S) 2-Fluorobiphenyl	<i>7</i> 5. <i>7</i>			34.9-129		05/20/2016 12:33	WG873908

TMW-WWL2-12D

SAMPLE RESULTS - 07

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	64.1			21.6-142		05/20/2016 12:33	WG873908	
(S) p-Terphenyl-d14	64.6			21.5-128		05/20/2016 12:33	WG873908	



















SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	0.244	<u>J</u>	0.0519	1.00	1	05/20/2016 04:02	WG873772
Fluoride	U		0.00990	0.100	1	05/20/2016 04:02	WG873772
Sulfate	0.269	<u>J</u>	0.0774	5.00	1	05/20/2016 04:02	WG873772







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.0241	<u>B J</u>	0.0141	0.100	1	05/16/2016 15:27	WG872401
Manganese	U		0.00120	0.0100	1	05/16/2016 15:27	WG872401



СQс

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 19:24	WG872916
(S) a,a,a-Trifluorotoluene(FID)	94.6			62.0-128		05/17/2016 19:24	WG872916





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Patch
		Qualifier		KDL	Dilution	•	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	0.000509	J	0.000331	0.00100	1	05/13/2016 18:16	WG872248
Toluene	U		0.000780	0.00500	1	05/13/2016 18:16	WG872248
Ethylbenzene	U		0.000384	0.00100	1	05/13/2016 18:16	WG872248
Total Xylenes	U		0.00106	0.00300	1	05/13/2016 18:16	WG872248
(S) Toluene-d8	105			90.0-115		05/13/2016 18:16	WG872248
(S) Dibromofluoromethane	106			79.0-121		05/13/2016 18:16	WG872248
(S) a,a,a-Trifluorotoluene	98.5			90.4-116		05/13/2016 18:16	WG872248
(S) 4-Bromofluorobenzene	102			80.1-120		05/13/2016 18:16	WG872248

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0358	<u>J</u>	0.0222	0.100	1	05/15/2016 10:41	WG872369
C28-C40 Oil Range	U		0.0118	0.100	1	05/15/2016 10:41	WG872369
(S) o-Terphenyl	109			50.0-150		05/15/2016 10:41	WG872369

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U	<u>J4</u>	0.000263	0.0100	1	05/15/2016 18:23	WG872427
2-Chlorophenol	U		0.000283	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/15/2016 18:23	WG872427
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dinitrophenol	U		0.00325	0.0100	1	05/15/2016 18:23	WG872427
2-Nitrophenol	U		0.000320	0.0100	1	05/15/2016 18:23	WG872427
4-Nitrophenol	U		0.00201	0.0100	1	05/15/2016 18:23	WG872427
Pentachlorophenol	U		0.000313	0.0100	1	05/15/2016 18:23	WG872427
Phenol	U	<u>J4</u>	0.000334	0.0100	1	05/15/2016 18:23	WG872427
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/15/2016 18:23	WG872427
(S) 2-Fluorophenol	71.8			10.0-77.9		05/15/2016 18:23	WG872427
(S) Phenol-d5	58.8			5.00-70.1		05/15/2016 18:23	WG872427
(S) Nitrobenzene-d5	82.5			21.8-123		05/15/2016 18:23	WG872427
(S) 2-Fluorobiphenyl	79.0			29.5-131		05/15/2016 18:23	WG872427

TMW-WW6-EQ

SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	51.3			11.2-130		05/15/2016 18:23	WG872427	
(S) p-Terphenyl-d14	91.0			29.3-137		05/15/2016 18:23	WG872427	



















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137464-1	05/16/16 20:07	
	MB Res	ult <u>MB Qualifier</u>

(1112) 110107 1011 00710710 2				
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	U		0.795	10.0
Sulfate	H		0.57	50.0







L835458-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835458-01 05/1	/16/16 22:07 • (DUP)	R3137464-4	05/16/16 22:30
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(03) 2033430-01 03/10/	10 22.07 (DOI)	1(3137 +0+-+	03/10/10 2	2.50		
	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	15.8	17.1	1	8		15
Sulfate	ND	2.85	1	0		15









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137464-2 05/16/16 20:31 • (LCSD) R3137464-3 05/16/16 20:55

' '	,									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	192	192	96	96	80-120			0	15
Sulfate	200	194	195	97	97	80-120			0	15





L834994-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834994-01 05/17/16 03:18 • (MS) R3137464-5 05/17/16 03:42 • (MSD) R3137464-6 05/17/16 04:06

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	559	13.1	595	564	104	99	1	80-120			5	15

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Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3138282-1	05/18/16 23:05

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Fluoride	U		0.261	1.00

Ср





L835078-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835078-01 05/19/16	01:04 • (DUP) F	R3138282-4 05	5/19/16 01:	28		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Eluarida	E 61	E E2	1	1		15







L835938-02 Original Sample (OS) • Duplicate (DUP)

(OS) L835938-02 05/19/16 09:16 • (DUP) R3138282-5 05/19/16 09:50

(,	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Fluoride	6.25	7.86	1	23	<u>J3</u>	15





[®]Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138282-2 05/18/16 23:28 • (LCSD) R3138282-3 05/18/16 23:52

(200) 10100202 2 00/1	0/10/20:20 (200)	D) 110100202	0 00/10/10 20:0	-						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Fluoride	20.0	19.9	20.0	100	100	80-120			0	15

L835938-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835938-03 05/19/16 10:14 • (MS) R3138282-6 05/19/16 11:26 • (MSD) R3138282-7 05/19/16 11:50

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Fluoride	50.0	5.27	36.6	33.9	63	57	1	80-120	<u>J6</u>	<u>J6</u>	7	15

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Wet Chemistry by Method 9056A

L835078-08

Method Blank (MB)

Sulfate

(MB) R3138709-1	05/19/16 20:49				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/l		mg/l	mg/l	
Chloride	U		0.0519	1.00	
Fluoride	U		0.0099	0.100	

0.0774

5.00











U

(OS) | 83/161/LOA | 05/20/16 | 02:49 • (DLIP) | P3138709-5 | 05/20/16 | 03:04

(03) 2034014-04 03/20/10	02.43 (001)	113130703-3 1	00/20/10	JJ.UT		03/20/10/04/20/10/02/43 (DOI)/10/30/03-3 03/20/10/03/04											
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits											
Analyte	mg/l	mg/l		%		%											
Chloride	1.51	1.52	1	0		15											
Fluoride	ND	0.0592	1	0		15											
Sulfate	18.1	18.1	1	0		15											









(LCS) R3138709-2 05/19/16 21:03 • (LCSD) R3138709-3 05/19/16 21:18

(200)	10710 21100 (2002	,	00,10,10 = 1.10							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.2	39.2	98	98	80-120			0	15
Fluoride	8.00	7.89	7.89	99	99	80-120			0	15
Sulfate	40.0	39.6	39.6	99	99	80-120			0	15





L834185-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L834185-02 05/20/16 00:54 • (MS) R3138709-4 05/20/16 01:09

(00) 200 1100 02 00/20/	(1.6) 1.65 62 66,26,16 66.6 1 (1.6) 1.6.65,66 1 66,26,16 6.65										
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier				
Analyte	mg/l	mg/l	mg/l	%		%					
Chloride	50.0	40.1	92.4	104	1	80-120					
Fluoride	5.00	0.558	5.88	106	1	80-120					
Sulfate	50.0	6.65	60.4	107	1	80-120					

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Wet Chemistry by Method 9056A

L834409-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834409-03 05/20/16 04:45 • (MS) R3138709-6 05/20/16 04:59 • (MSD) R3138709-7 05/20/16 05:14

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	31.0	80.0	81.0	98	100	1	80-120			1	15
Fluoride	5.00	ND	5.21	5.34	102	105	1	80-120			2	15
Sulfate	50.0	ND	53.0	53.9	101	103	1	80-120			2	15



















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Metals (ICP) by Method 6010B

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3136806-1 (05/14/16 13:43
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Analyta	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Iron	1.56	<u>J</u>	1.41	10.0
Manganese	П		0.12	1.00









(LCS) R3136806-2	05/14/16 13:46 •	(LCSD) B3136806-3	05/14/16 13:48
(LC3) N3130000-2	03/14/10 13.40	(LC3D) N3 130000-3	03/14/10 13.40

(ECS) NS130000 2 03/14/1	10 15.40 - (ECSE) 113130000 3	03/14/10 13.40	•						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Iron	1000	937	924	94	92	80-120			1	20
Manganese	100	93.2	92.0	93	92	80-120			1	20







L835281-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835281-01 05/14/16 13:51 • (MS) R3136806-6 05/14/16 14:00 • (MSD) R3136806-7 05/14/16 14:03

,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Iron	1090	20800	20900	23500	15	254	1	75-125	$\underline{\vee}$	V	12	20
Manganese	109	608	701	714	85	97	1	75-125			2	20







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Metals (ICP) by Method 6010B

L835078-08

Method Blank (MB)

(MB) R3137224-7 05/16/16	6 19:15			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	0.0473	<u>J</u>	0.0141	0.100
Manganese	U		0.0012	0.0100







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

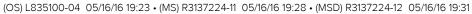
(LCS) R3137224-8 05/16	/16 19:17 • (LCSD)) R313/224-9	05/16/16 19:20								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Iron	10.0	10.2	10.3	102	103	80-120			1	20	
Manganese	1.00	0.997	1.00	100	100	80-120			1	20	







L835100-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)



(03) 2033100 04 0	3/10/10 13.23 - (1413) 10	3137224 11 03	10/10 15.20	(14130) 1(313722	+ 12 03/10/10	15.51						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Iron	10.0	0.0740	10.3	10.3	102	102	1	75-125			0	20
Manganese	100	0.00612	102	102	102	101	1	75-125			1	20







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-08

Method Blank (MB)

(MB) R3137716-5 05/17/16	12:58						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	0.0333	<u>J</u>	0.0314	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 94.7			62.0-128			



³Ss

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137716-3 05/17/16	5 11:43 • (LCSD) I	R3137716-4 0	5/17/16 12:06							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.24	5.58	95.3	101	67.0-132			6.28	20
(S) a,a,a-Trifluorotoluene(FIL	0)			104	104	62.0-128				







⁷ GI

L835661-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835661-01 05/17/16	(OS) L835661-01 05/17/16 17:33 • (MS) R3137716-8 05/17/16 16:27 • (MSD) R3137716-9 05/17/16 16:49											
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	ND	5.49	5.50	99.1	99.3	1	50.0-143			0.200	20
(S) a,a,a-Trifluorotoluene(FID)				103	104		62.0-128				







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-01,02,03,04,05

Method Blank (MB)

(MB) R3137718-3 05/18/16	01:00						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 99.8			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137718-1 05/17/16	5 23:52 • (LCSD)	R3137718-2	05/18/16 00:14							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	6.45	6.44	117	117	63.5-137			0.140	20
(S) a,a,a-Trifluorotoluene(Fi	ID)			99.0	99.6	59.0-128				





[©]Qc

⁷Gl



(OS) L835078-04 05/18/1	16 09:58 • (MS) F	R3137718-4 05	/18/16 01:46 •	(MSD) R3137718	3-5 05/18/16 (02:09							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	0.255	18.3	14.9	65.7	53.1	5	28.5-138			20.9	23.6	
(S) a.a.a-Trifluorotoluene(Fli	D)				96.5	97.4		59.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-06,07

Method Blank (MB)

(MB) R3138234-3 05/18/16	3 17:50						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(FIL) 100			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138234-1 05/18/1	6 16:42 • (LCSD) R3138234-2	05/18/16 17:04								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	5.59	6.61	102	120	63.5-137			16.8	20	
(S) a,a,a-Trifluorotoluene(Fl	D)			99.3	99.1	59.0-128					







⁷Gl

L835078-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-06 05/18/	16 20:23 • (MS)	R3138234-4 05	5/18/16 19:15 •	(MSD) R313823	84-5 05/18/16	19:38							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	U	4.61	9.33	16.8	33.9	5	28.5-138	<u>J6</u>	<u>J3</u>	67.8	23.6	
(S) a,a,a-Trifluorotoluene(Fl	D)				98.4	98.4		59.0-128					





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-01,02,03,04

Method Blank (MB)

(MB) R3138213-3 05/19/16 (01:28			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	105			88.7-115
(S) Dibromofluoromethane	101			76.3-123
(S) a,a,a-Trifluorotoluene	94.8			87.2-117
(S) 4-Bromofluorobenzene	100			69.7-129



(LCS) R3138213-1 05/18/16	3 23:58 • (LCSD) R3138213-2	05/19/16 00:21								— ⁷
,	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0232	0.0234	92.7	93.6	72.6-120			1.03	20	
Ethylbenzene	0.0250	0.0248	0.0244	99.2	97.6	78.6-124			1.62	20	
Toluene	0.0250	0.0243	0.0247	97.2	98.7	76.7-116			1.52	20	
Xylenes, Total	0.0750	0.0724	0.0729	96.5	97.1	78.1-123			0.620	20	
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				103	103	76.3-123					
(S) a,a,a-Trifluorotoluene				95.8	96.3	87.2-117					
(S) 4-Bromofluorobenzene				102	101	69.7-129					

L835057-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835057-12 05/19/16	03:21 • (MS) R3	3138213-4 05/1	9/16 02:13 • (M	SD) R3138213-5	5 05/19/16 02:	36						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0250	ND	0.0727	0.122	58.2	97.3	5	47.8-131		<u>J3</u>	50.4	22.8
Ethylbenzene	0.0250	ND	0.0847	0.121	67.8	97.1	5	44.8-135		<u>J3</u>	35.6	26.9
Toluene	0.0250	ND	0.0832	0.122	66.5	97.9	5	47.8-127		<u>J3</u>	38.1	24.3
Xylenes, Total	0.0750	ND	0.253	0.362	67.6	96.6	5	42.7-135		<u>J3</u>	35.4	26.6
(S) Toluene-d8					104	103		88.7-115				
(S) Dibromofluoromethane					102	104		76.3-123				
(S) a,a,a-Trifluorotoluene					95.0	94.8		87.2-117				
(S) 4-Bromofluorobenzene					98.2	99.3		69.7-129				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

Method Blank (MB)

(MB) R3138352-3 05/19/16	10:31			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	105			88.7-115
(S) Dibromofluoromethane	95.5			76.3-123
(S) a,a,a-Trifluorotoluene	106			87.2-117
(S) 4-Bromofluorobenzene	103			69.7-129

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138352-1 05/19/10	6 08:30 • (LCSE) R3138352-2	05/19/16 08:5	4							Ė
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	l
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Benzene	0.0250	0.0228	0.0223	91.1	89.3	72.6-120			2.05	20	·
Ethylbenzene	0.0250	0.0259	0.0253	103	101	78.6-124			2.09	20	Ιi
Toluene	0.0250	0.0229	0.0232	91.6	92.9	76.7-116			1.39	20	
Xylenes, Total	0.0750	0.0751	0.0738	100	98.4	78.1-123			1.75	20	Į l
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				99.3	96.4	76.3-123					
(S) a,a,a-Trifluorotoluene				105	107	87.2-117					
(S) 4-Bromofluorobenzene				102	103	69.7-129					

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835074-10 05/19/16 14:41 • (MS) R3138352-6 05/19/16 12:16 • (MSD) R3138352-7 05/19/16 12:40

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0336	ND	1.40	1.36	90.6	87.5	45	47.8-131			3.33	22.8
Ethylbenzene	0.0336	ND	1.38	1.33	87.5	84.4	45	44.8-135			3.38	26.9
Toluene	0.0336	ND	1.40	1.37	90.6	88.7	45	47.8-127			2.13	24.3
Xylenes, Total	0.101	1.60	5.48	5.40	85.5	83.9	45	42.7-135			1.35	26.6
(S) Toluene-d8					104	104		88.7-115				
(S) Dibromofluoromethane					101	98.8		76.3-123				
(S) a,a,a-Trifluorotoluene					102	104		87.2-117				















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					95.1	99.8		69.7-129				



















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-08

Method Blank (MB)

(MB) R3136703-3 05/13/16	13:23			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	105			90.0-115
(S) Dibromofluoromethane	105			79.0-121
(S) a,a,a-Trifluorotoluene	98.8			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136703-1 05/13/16	6 12:14 • (LCSD)	R3136703-2	05/13/16 12:31								. [
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0259	0.0255	103	102	73.0-122			1.27	20	
Ethylbenzene	0.0250	0.0260	0.0246	104	98.2	80.9-121			5.57	20	9
Toluene	0.0250	0.0264	0.0251	105	100	77.9-116			5.02	20	
Xylenes, Total	0.0750	0.0786	0.0747	105	99.6	79.2-122			5.11	20	L
(S) Toluene-d8				105	104	90.0-115					
(S) Dibromofluoromethane				102	106	79.0-121					
(S) a,a,a-Trifluorotoluene				99.7	99.5	90.4-116					
(S) 4-Bromofluorobenzene				97.8	98.1	80.1-120					

L835078-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-08 05/13/16	5 18:16 • (MS) R3	3136703-4 05/	13/16 18:33 • (M	ISD) R3136703-	5 05/13/16 18:	50						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	0.000509	0.0233	0.0247	91.1	96.9	1	58.6-133			6.06	20
Ethylbenzene	0.0250	U	0.0217	0.0232	86.9	92.7	1	62.7-136			6.45	20
Toluene	0.0250	U	0.0224	0.0240	89.4	95.8	1	67.8-124			6.96	20
Xylenes, Total	0.0750	U	0.0658	0.0704	87.8	93.9	1	65.6-133			6.70	20
(S) Toluene-d8					104	106		90.0-115				
(S) Dibromofluoromethane					106	108		79.0-121				
(S) a,a,a-Trifluorotoluene					97.8	102		90.4-116				
(S) 4-Bromofluorobenzene					98.4	98.0		80.1-120				

















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-08

Method Blank (MB)

(MB) R3139237-1 05/15	/16 09:51			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	112			50.0-150









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139237-2 05/15/	16 10:07 • (LCSD) R3139237-3	05/15/16 10:24							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
C10-C28 Diesel Range	1.50	1.53	1.54	102	102	70.0-130			0.680	20
(S) o-Terphenyl				110	117	50.0-150				













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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137450-1 05/17/16	10:13			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	103			50.0-150











(LCS) R3137450-2 05/17/16 10:25 • (LCSD) R3137450-3 05/17/16 10:37

(200) 1000 2 00/1//	10 10.20 (2002) 110107 100 0	00/1//10 10.0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	48.2	52.7	80.3	87.9	50.0-100			9.05	20
(S) o-Terphenyl				93.1	93.4	50.0-150				











(OS) L835078-01 05/17/16 12:02 • (MS) R3137450-4 05/17/16 12:15 • (MSD) R3137450-5 05/17/16 12:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	7.31	57.8	64.7	84.1	95.7	1	50.0-100			11.4	20
(S) o-Terphenyl					72.6	68.2		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Method Blank (MB)

(MB) R3138162-3 05/18/16	6 13:22				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	80.9			21.9-129	
(S) 2-Fluorobiphenyl	83.1			34.9-129	
(S) p-Terphenyl-d14	85.7			21.5-128	
(S) Phenol-d5	80.4			26.3-121	
(S) 2-Fluorophenol	74.3			21.1-116	
(S) 2,4,6-Tribromophenol	74.1			21.6-142	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

_CS) R3138162-1 05/18/16 12:35 • (LCSD) R3138162-2 05/18/16 12:58												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
4-Chloro-3-methylphenol	0.667	0.587	0.686	88.0	103	51.1-113			15.6	20		
2-Chlorophenol	0.667	0.469	0.525	70.3	78.7	40.8-103			11.3	20		
2,4-Dichlorophenol	0.667	0.551	0.617	82.6	92.5	46.2-109			11.3	20		
2,4-Dimethylphenol	0.667	0.557	0.647	83.6	97.1	42.2-110			15.0	20		
4,6-Dinitro-2-methylphenol	0.667	0.536	0.586	80.3	87.8	23.1-119			8.86	23.7		
2,4-Dinitrophenol	0.667	0.332	0.345	49.8	51.7	10.0-105			3.82	36.5		
2-Nitrophenol	0.667	0.532	0.620	79.7	93.0	44.2-113			15.3	20.9		
4-Nitrophenol	0.667	0.538	0.600	80.7	90.0	34.8-109			10.9	20		
Pentachlorophenol	0.667	0.550	0.574	82.5	86.1	16.2-102			4.25	22.9		
Phenol	0.667	0.497	0.599	74.6	89.8	41.5-106			18.5	20		
2,4,6-Trichlorophenol	0.667	0.565	0.620	84.7	93.0	44.4-108			9.39	20		
(S) Nitrobenzene-d5				86.7	99.9	21.9-129						
(S) 2-Fluorobiphenyl				83.6	94.3	34.9-129						



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16 12:35 • (LCSD) R3138162-2 05/18/16 12:58												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
(S) p-Terphenyl-d14				81.3	84.5	21.5-128						
(S) Phenol-d5				74.6	82.2	26.3-121						
(S) 2-Fluorophenol				71.3	82.1	21.1-116						
(S) 2.4.6-Tribromophenol				83.7	84.4	21.6-142						



L835035-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
4-Chloro-3-methylphenol	0.142	U	0.632	0.663	89.0	93.4	5	27.0-154			4.76	26.6	
2-Chlorophenol	0.142	U	0.524	0.563	73.8	79.2	5	33.2-121			7.06	29.3	
2,4-Dichlorophenol	0.142	U	0.634	0.639	89.2	90.0	5	34.8-134			0.890	27.3	
2,4-Dimethylphenol	0.142	U	0.638	0.651	89.9	91.7	5	12.3-149			2.00	32.3	
4,6-Dinitro-2-methylphenol	0.142	U	ND	ND	0.000	0.000	5	10.0-144	<u>J6</u>	<u>J6</u>	0.000	32.7	
2,4-Dinitrophenol	0.142	U	ND	ND	0.000	0.000	5	10.0-121	<u>J6</u>	<u>J6</u>	0.000	39.4	
2-Nitrophenol	0.142	U	0.636	0.652	89.5	91.8	5	29.5-144			2.53	29.9	
4-Nitrophenol	0.142	U	0.586	0.569	82.6	80.1	5	20.0-133			3.03	30.2	
Pentachlorophenol	0.142	U	0.655	0.671	92.3	94.5	5	10.0-139			2.43	28.3	
Phenol	0.142	U	0.565	0.644	79.5	90.7	5	25.1-130			13.1	29.6	
2,4,6-Trichlorophenol	0.142	U	0.633	0.675	89.1	95.1	5	33.8-133			6.52	28.1	
(S) Nitrobenzene-d5					86.3	94.0		21.9-129					
(S) 2-Fluorobiphenyl					83.0	81.1		34.9-129					
(S) p-Terphenyl-d14					82.2	60.4		21.5-128					
(S) Phenol-d5					80.2	86.0		26.3-121					
(S) 2-Fluorophenol					78.2	82.9		21.1-116					
(S) 2,4,6-Tribromophenol					80.1	84.2		21.6-142					











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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Method Blank (MB)

(MB) R3138667-3 05/20/1	B) R3138667-3 05/20/16 10:56									
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/kg		mg/kg	mg/kg						
4-Chloro-3-methylphenol	U		0.00477	0.333						
2-Chlorophenol	U		0.00831	0.333						
2,4-Dichlorophenol	U		0.00746	0.333						
2,4-Dimethylphenol	U		0.0471	0.333						
4,6-Dinitro-2-methylphenol	U		0.124	0.333						
2,4-Dinitrophenol	U		0.0980	0.333						
2-Nitrophenol	U		0.0130	0.333						
4-Nitrophenol	U		0.0525	0.333						
Pentachlorophenol	U		0.0480	0.333						
Phenol	U		0.00695	0.333						
2,4,6-Trichlorophenol	U		0.00779	0.333						
(S) Nitrobenzene-d5	61.8			21.9-129						
(S) 2-Fluorobiphenyl	61.7			34.9-129						
(S) p-Terphenyl-d14	68.7			21.5-128						
(S) Phenol-d5	70.1			26.3-121						
(S) 2-Fluorophenol	64.2			21.1-116						
(S) 2,4,6-Tribromophenol	52.9			21.6-142						

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138667-1 05/20/	'16 10:08 • (LCSE	D) R3138667-2	05/20/16 10:3	2						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(I CS) D3139667 1	0E/20/16 10·02	 (LCSD) R3138667-2 	0E/20/16 10·32
IECOI KOIGOUU/-I	U3/ZU/IU IU.U0	• ILCODI ROBODO/-Z	U3/ZU/IU IU.3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128				
(S) Phenol-d5				56.0	67.8	26.3-121				
(S) 2-Fluorophenol				59.1	73.1	21.1-116				
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142				







⁴Cn

L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6











(S) 2,4,6-Tribromophenol

68.4

21.6-142

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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Method Blank (MB)

(MB) R3136946-3 05/15/16	6 16:02					
	MB Result	MB Qualifier	MB MDL	MB RDL	- -	6
Analyte	mg/l		mg/l	mg/l		ĺ
4-Chloro-3-methylphenol	U		0.000263	0.0100		-
2-Chlorophenol	U		0.000283	0.0100		3
2,4-Dichlorophenol	U		0.000284	0.0100		L
2,4-Dimethylphenol	U		0.000624	0.0100		4
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100		ı
2,4-Dinitrophenol	U		0.00325	0.0100		-
2-Nitrophenol	U		0.000320	0.0100		5
4-Nitrophenol	U		0.00201	0.0100		L
Pentachlorophenol	U		0.000313	0.0100	1	6
Phenol	U		0.000334	0.0100		
2,4,6-Trichlorophenol	U		0.000297	0.0100		
(S) Nitrobenzene-d5	85.3			21.8-123		7
(S) 2-Fluorobiphenyl	<i>75.7</i>			29.5-131		L
(S) p-Terphenyl-d14	88.4			29.3-137		8
(S) Phenol-d5	53.1			5.00-70.1		ĺ
(S) 2-Fluorophenol	72.7			10.0-77.9		
(S) 2,4,6-Tribromophenol	44.8			11.2-130		ç

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	16 15:16 • (LCSD)	R3136946-2	05/15/16 15:39							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0516	0.0536	103	107	35.7-100	<u>J4</u>	<u>J4</u>	3.90	22.9
2-Chlorophenol	0.0500	0.0350	0.0353	70.1	70.6	26.2-91.5			0.760	26.5
2,4-Dichlorophenol	0.0500	0.0414	0.0421	82.8	84.1	31.4-103			1.56	24.9
2,4-Dimethylphenol	0.0500	0.0402	0.0453	80.3	90.6	31.9-107			12.0	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0450	0.0490	89.9	98.1	18.4-148			8.69	24.4
2,4-Dinitrophenol	0.0500	0.0286	0.0321	57.1	64.3	24.2-128			11.8	20.5
2-Nitrophenol	0.0500	0.0429	0.0419	85.7	83.9	25.9-106			2.18	26.9
4-Nitrophenol	0.0500	0.0259	0.0255	51.9	50.9	10.0-52.7			1.86	40
Pentachlorophenol	0.0500	0.0325	0.0346	65.0	69.1	10.0-97.4			6.22	35.1
Phenol	0.0500	0.0280	0.0295	55.9	59.1	10.0-57.9		<u>J4</u>	5.49	35
2,4,6-Trichlorophenol	0.0500	0.0418	0.0443	83.7	88.6	29.8-107			5.71	24.1
(S) Nitrobenzene-d5				93.0	96.0	21.8-123				
(S) 2-Fluorobiphenyl				80.1	80.5	29.5-131				

















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/16 15:16 • (LCSD) R3136946-2 05/15/16 15:39												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
(S) p-Terphenyl-d14				88.1	101	29.3-137						
(S) Phenol-d5				55.5	52.7	5.00-70.1						
(S) 2-Fluorophenol				66.2	67.0	10.0-77.9						
(S) 2,4,6-Tribromophenol				62.1	62.8	11.2-130						



















GLOSSARY OF TERMS





SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
В	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Ilinois	200008	Oregon	TN200002
ndiana	C-TN-01	Pennsylvania	68-02979
owa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















			Billing Information:				Analysis / Container / Preservative										Chain of Custody	Page of
AMEC Foster Wheeler - Houston, TX 585 N. Dairy Ashford Houston, TX 77079			Accounts Payable 585 N. Dairy Ashford Houston, TX 77079					o S		T	NoPres	ا03 ح ک				The second secon	LA-B S-C	SC
Report to: Pamela Krueger			Email To: pamela.krueger@amecfw.com														12065 Lebanon Rd Mount Juliet, TN 3712 Phone: 615-758-5858 Phone: 800-767-5859	100
Project Description: Wastewater Line Investigation			City/State ARTESEA, NM				5								es	100		Fax: 615-758-5859
Phone: 713-929-5674 Client Project # 6703160012.001				Lab Project # AMECFWHTX-WW LINE			NoPres	5mlHDPE-NoPres	SO4 4ozClr-NoPres	DROOROLVI 40mlAmb-HCI-BT	DRORLA, SV8270ACID 4 oz CIr-No Pres	FEICP, MNICP 250mlHDPE-HNO3	FEICP, MNICP 202Clr-NoPres	HCI	X 2ozClr-NoPres	HCI	K079	
Collected by (print):	Site/Facility ID#			eNAASO			nl Amb									40mlAmb-HCl	Acctnum: AME Template:T112	
Collected by (signature):				Email?	_No XYes No. of		8270ACID 100ml	FI, SO4 125r	FI, SO4 402C	JOROLVI 40	DRLA,SV827	CP, MINICP 2	CP, MNICP 2	GRO 40mlAmb HCI	GRO,V8260BTEX	V8260BTEX 40	Prelogin: P552 TSR: 526 - Chris PB: 5 . 4 . Shipped Via: Fe	McCord G KM
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	Ω,	C, F	DRC	DRC	FEIG	FEIG	GRC	GRC	V82	Rem./Contaminant	Sample # (lab on
TMW-WWL1-01		SS	1	5/10/16	15:00	4			X		X		X		X	_		-01
TMW-WULL-05		SS	5	5/10/16	15:10	4			X		X		X		X			-02
TMW-WWL1-12	10 To	SS	12	5/10/16	15:20	4			X		X		X		X			-03
TMW-WWLZ-01		SS	1	5/10/16	16:20	4			X		X		X		X	_	1 1 2 2 3	-04
TMWEWWLZ-05		SS	5	5/10/16		4			X		Х		X		X	_		-05
TMW-WWLZ-12D		SS	12	5/10/16		4			X		X		X		X	_		-14
TMW-WWL2-121)		SS	12	5/10/16	16:55	4			X		X		X		X			-57
n		_\$5		1		4	>		X		X		X		X			
TMW-WW6-EQ		₩.	_	5/10/10	18:00	11	X	X		Х		Х		Х		Х	100	-08
111	/	GW	1	1		122	×	X		X		X		×		X	- P	
Matrix: SS - Soil GW - Groundwater Remarks:	₩₩-WasteW	ater DW - D	rinking Wat	er OT - Other						pH _ Flow _	2	Tem			Но	67/	10132	8168
Relinquished by : (Signature) Date:			1/6	Time: Received by: (Signature)			Samples returned via: UPS						Condition: (lab use only)					
Relinquished by : (Signature) Date:				Time: R	eceived by: (Sign		K	- 177 - 1 - 178 - 179 - 1		Temp:		°C 80	9+	TB	3 00	COC Seal Intact:Y N NA		
Relinquished by : (Signature)	Date:		Time: Received for lab by: (Signal						Date: Time: pH 5-12-16 900						H Checked: NCF:			



ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835353

Samples Received: 05/13/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, fagh

Chris McCord

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the lutroratory. Where applicable, sampling conducted by ESC is performed per guidance provided in lutroratory standard operating procedures 56/300, 06/303, and 06/304.



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TMW-WWL2 L835353-02	8
TMW-WWL2D L835353-03	10
TRIP BLANK L835353-04	12
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⁹Sc: Chain of Custody

38

ONE	LAB.	NAT	TION	WID

TMW-WWL1 L835353-01 GW			Collected by	Collected date/time 05/12/16 08:30	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:15	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 15:12	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:33	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:32	05/17/16 00:32	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:20	05/19/16 00:20	DAH
Net Chemistry by Method 9056A	WG874711	1	05/24/16 13:02	05/24/16 13:02	CM
Wet Chemistry by Method 9056A	WG875355	500	05/26/16 11:11	05/26/16 11:11	CM
TMW-WWL2 L835353-02 GW			Collected by	Collected date/time 05/12/16 09:00	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:12	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:26	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:50	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:53	05/17/16 00:53	ACG
/olatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:43	05/19/16 00:43	DAH

SAMPLE SUMMARY



'Ss

Cn

Sr

СQс



CM

 CM

CM

Received date/time

05/13/16 09:00

TMW-WWL2D L835353-03 GW

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:18	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:49	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 05:07	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 01:15	05/17/16 01:15	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 01:05	05/19/16 01:05	DAH
Wet Chemistry by Method 9056A	WG874225	1	05/23/16 13:58	05/23/16 13:58	SAM
Wet Chemistry by Method 9056A	WG874225	500	05/23/16 12:55	05/23/16 12:55	SAM
			Collected by	Collected date/time	Received date/time
TRIP BLANK 1 835353-04 GW				05/12/16 00:00	05/13/16 09:00

WG874711

WG874711

WG875355

1

100

500

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected by

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected date/time 05/12/16 09:05

	Collected by	Collected date/time	Received date/time
RIP BLANK L835353-04 GW		05/12/16 00:00	05/13/16 09:00

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:12	05/18/16 20:12	DAH
			Collected by	Collected date/time	Received date/time
TRIP BLANK L835353-05 GW				05/12/16 00:00	05/13/16 09:00

TRIP DLAINE LOSSSSS-US GW					
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:34	05/18/16 20:34	DAH

Collected by

Collected date/time

Received date/time



WWL-SPC L835353-06 Solid	05/12/16 00:00	05/13/16 09:00			
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Mercury by Method 7471A	WG873476	1	05/18/16 17:22	05/19/16 09:44	NJB
Metals (ICP) by Method 6010B	WG873554	1	05/20/16 11:08	05/20/16 13:52	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 14:58	SNR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG873587	1	05/19/16 21:44	05/20/16 19:28	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG874253	5	05/20/16 17:57	05/20/16 22:59	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG874942	5	05/24/16 16:07	05/25/16 02:00	DWR
Wet Chemistry by Method 9056A	WG874228	1	05/23/16 09:00	05/23/16 17:37	CM
Wet Chemistry by Method 9056A	WG874228	10	05/23/16 09:00	05/23/16 18:01	CM
Wet Chemistry by Method 9056A	WG874228	50	05/23/16 09:00	05/24/16 09:03	CM





















All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

















Technical Service Representative

Analyte

Manganese

Iron

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

Metals (ICP) by Method 6010B

Result

mg/l

0.234

0.954

Qualifier

MDL

mg/l

0.0705

0.00600

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	12200		26.0	500	500	05/26/2016 11:11	WG875355
Fluoride	6.21		0.00990	0.100	1	05/24/2016 13:02	WG874711
Sulfate	18800		38.7	2500	500	05/26/2016 11:11	WG875355

Dilution

5

5

Analysis

date / time

05/17/2016 17:15

05/17/2016 17:15

Batch

WG872666

WG872666

RDL

mg/l

0.500

0.0500





Cn



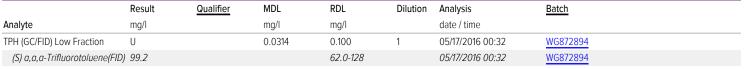












Volatile Organic Compounds (GC/MS) by Method 8260B

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:20	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:20	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:20	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:20	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:20	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/19/2016 00:20	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/19/2016 00:20	WG872872
(S) 4-Bromofluorobenzene	101			80.1-120		05/19/2016 00:20	WG872872

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0851	<u>J</u>	0.0222	0.100	1	05/17/2016 04:33	WG872740
C28-C40 Oil Range	0.0419	<u>J</u>	0.0118	0.100	1	05/17/2016 04:33	WG872740
(S) o-Terphenyl	95.3			50.0-150		05/17/2016 04:33	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 15:12	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 15:12	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 15:12	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 15:12	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 15:12	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 15:12	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 15:12	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 15:12	WG872936
(S) 2-Fluorophenol	43.8			10.0-77.9		05/19/2016 15:12	WG872936
(S) Phenol-d5	32.9			5.00-70.1		05/19/2016 15:12	WG872936
(S) Nitrobenzene-d5	76.8			21.8-123		05/19/2016 15:12	WG872936
(S) 2-Fluorobiphenyl	87.2			29.5-131		05/19/2016 15:12	WG872936

TMW-WWL1

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

L835353

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	71.9			11.2-130		05/19/2016 15:12	WG872936	
(S) n-Ternhenvl-d14	98.2			29.3-137		05/19/2016 15:12	WG872936	



















SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7130		5.19	100	100	05/24/2016 13:45	WG874711
Fluoride	2.59		0.00990	0.100	1	05/24/2016 13:31	WG874711
Sulfate	14600		38.7	2500	500	05/26/2016 11:25	WG875355







	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.169	<u>J</u>	0.0705	0.500	5	05/17/2016 17:12	WG872666
Manganese	0.836		0.00600	0.0500	5	05/17/2016 17:12	WG872666



Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 00:53	WG872894
(S) a,a,a-Trifluorotoluene(FIL	99.5			62.0-128		05/17/2016 00:53	WG872894



Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:43	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:43	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:43	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:43	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:43	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 00:43	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 00:43	WG872872
(S) 4-Bromofluorobenzene	114			80.1-120		05/19/2016 00:43	WG872872



ΆΙ

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.182		0.0222	0.100	1	05/17/2016 04:50	WG872740
C28-C40 Oil Range	0.175		0.0118	0.100	1	05/17/2016 04:50	WG872740
(S) o-Terphenyl	104			50.0-150		05/17/2016 04:50	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:26	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:26	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:26	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:26	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:26	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:26	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:26	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:26	WG872936
(S) 2-Fluorophenol	52.9			10.0-77.9		05/19/2016 19:26	WG872936
(S) Phenol-d5	38.1			5.00-70.1		05/19/2016 19:26	WG872936
(S) Nitrobenzene-d5	84.9			21.8-123		05/19/2016 19:26	WG872936
(S) 2-Fluorobiphenyl	88.9			29.5-131		05/19/2016 19:26	WG872936

TMW-WWL2

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

	<u>'</u>	•	, ,				
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
(S) 2,4,6-Tribromophenol	78.3			11.2-130		05/19/2016 19:26	WG872936
(S) p-Terphenyl-d14	99.5			29.3-137		05/19/2016 19:26	WG872936



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7100		26.0	500	500	05/23/2016 12:55	WG874225
Fluoride	3.10		0.00990	0.100	1	05/23/2016 13:58	WG874225
Sulfate	16800		38.7	2500	500	05/23/2016 12:55	WG874225







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.981		0.0705	0.500	5	05/17/2016 17:18	WG872666
Manganese	0.910		0.00600	0.0500	5	05/17/2016 17:18	WG872666



Sr ⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 01:15	WG872894
(S) a,a,a-Trifluorotoluene(FID)	98.8			62.0-128		05/17/2016 01:15	WG872894





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
		Qualifier			Dilution	,	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 01:05	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 01:05	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 01:05	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 01:05	WG872872
(S) Toluene-d8	103			90.0-115		05/19/2016 01:05	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 01:05	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 01:05	WG872872
(S) 4-Bromofluorobenzene	116			80.1-120		05/19/2016 01:05	WG872872

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0892	<u>J</u>	0.0222	0.100	1	05/17/2016 05:07	WG872740
C28-C40 Oil Range	0.0898	<u>J</u>	0.0118	0.100	1	05/17/2016 05:07	WG872740
(S) o-Terphenyl	97.7			50.0-150		05/17/2016 05:07	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:49	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:49	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:49	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:49	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:49	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:49	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:49	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:49	WG872936
(S) 2-Fluorophenol	40.0			10.0-77.9		05/19/2016 19:49	WG872936
(S) Phenol-d5	32.2			5.00-70.1		05/19/2016 19:49	WG872936
(S) Nitrobenzene-d5	70.2			21.8-123		05/19/2016 19:49	WG872936
(S) 2-Fluorobiphenyl	81.9			29.5-131		05/19/2016 19:49	WG872936

TMW-WWL2D

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

	'	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	63.3			11.2-130		05/19/2016 19:49	WG872936	
(S) n-Ternhenvl-d14	94.9			29.3-137		05/19/2016 19:49	WG872936	



















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SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:12	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:12	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:12	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:12	WG872872
(S) Toluene-d8	104			90.0-115		05/18/2016 20:12	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/18/2016 20:12	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/18/2016 20:12	WG872872
(S) 4-Bromofluorobenzene	99.5			80.1-120		05/18/2016 20:12	WG872872



















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SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:34	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:34	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:34	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:34	WG872872
(S) Toluene-d8	108			90.0-115		05/18/2016 20:34	WG872872
(S) Dibromofluoromethane	99.3			79.0-121		05/18/2016 20:34	WG872872
(S) a,a,a-Trifluorotoluene	108			90.4-116		05/18/2016 20:34	WG872872
(S) 4-Bromofluorobenzene	105			80.1-120		05/18/2016 20:34	WG872872



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1660		7.95	100	10	05/23/2016 18:01	WG874228
Fluoride	18.3		0.261	1.00	1	05/23/2016 17:37	WG874228
Sulfate	20000		28.5	2500	50	05/24/2016 09:03	WG874228





Mercury by Method 7471A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Mercury	U		0.00280	0.0200	1	05/19/2016 09:44	WG873476





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Arsenic	2.87		0.650	2.00	1	05/20/2016 13:52	WG873554
Barium	95.9		0.170	0.500	1	05/20/2016 13:52	WG873554
Cadmium	0.222	<u>J</u>	0.0700	0.500	1	05/20/2016 13:52	WG873554
Chromium	5.89		0.140	1.00	1	05/20/2016 13:52	WG873554
Iron	5120		1.41	10.0	1	05/20/2016 13:52	WG873554
Lead	7.90		0.190	0.500	1	05/20/2016 13:52	WG873554
Manganese	390		0.120	1.00	1	05/20/2016 13:52	WG873554
Selenium	U		0.740	2.00	1	05/20/2016 13:52	WG873554
Silver	U		0.280	1.00	1	05/20/2016 13:52	WG873554





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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/20/2016 22:59	WG874253
(S) a,a,a-Trifluorotoluene(FID) 87.3			59.0-128		05/20/2016 22:59	WG874253

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/25/2016 02:00	WG874942
Toluene	U		0.00217	0.0250	5	05/25/2016 02:00	WG874942
Ethylbenzene	U		0.00148	0.00500	5	05/25/2016 02:00	WG874942
Total Xylenes	U		0.00349	0.0150	5	05/25/2016 02:00	WG874942
(S) Toluene-d8	106			88.7-115		05/25/2016 02:00	WG874942
(S) Dibromofluoromethane	102			76.3-123		05/25/2016 02:00	WG874942
(S) a,a,a-Trifluorotoluene	103			87.2-117		05/25/2016 02:00	WG874942
(S) 4-Bromofluorobenzene	103			69.7-129		05/25/2016 02:00	WG874942

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/20/2016 19:28	WG873587
C28-C40 Oil Range	4.12		0.274	4.00	1	05/20/2016 19:28	WG873587
(S) o-Terphenyl	87.5			50.0-150		05/20/2016 19:28	WG873587

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 14:58	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 14:58	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 14:58	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 14:58	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 14:58	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 14:58	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 14:58	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 14:58	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 14:58	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 14:58	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 14:58	WG873908
(S) 2-Fluorophenol	61.1			21.1-116		05/20/2016 14:58	WG873908
(S) Phenol-d5	55.3			26.3-121		05/20/2016 14:58	WG873908
(S) Nitrobenzene-d5	67.6			21.9-129		05/20/2016 14:58	WG873908
(S) 2-Fluorobiphenyl	62.2			34.9-129		05/20/2016 14:58	WG873908
(S) 2,4,6-Tribromophenol	46.7			21.6-142		05/20/2016 14:58	WG873908
(S) p-Terphenyl-d14	52.9			21.5-128		05/20/2016 14:58	WG873908

















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-03

Method Blank (MB)

(MB) R3139265-1	05/23/16 09:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Sulfate	U		0.0774	5.00







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CS) P3139265-2 05/23/16 09:23 • // CSD) P3139265-3 05/23/16 09:38

(LCS) R3139265-2 U5/23/	16 09:23 • (LCS	D) R3139265-	3 05/23/16 09	.38						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	38.9	38.9	97	97	80-120			0	15
Fluoride	8.00	7.73	7.76	97	97	80-120			0	15
Sulfate	40.0	38.5	38.6	96	97	80-120			0	15









L835977-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835977-10 05/23/16 17:41 • (MS) R3139265-4 05/23/16 17:57 • (MSD) R3139265-5 05/23/16 18:13

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Fluoride	5.00	0.361	5.34	5.28	100	98	1	80-120			1	15
Sulfate	50.0	ND	50.8	51.0	99	99	1	80-120			0	15





Fluoride

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3139346-1 05/24/	16 08:33			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l









(OS) L836606-01 05/24/16 16:53 •	(DUP) R3139346-5 05/24/16 17:07
----------------------------------	---------------------------------

(00) 2000000 01 00/2 1/1	0 10.00 (201)	1101000100	00/2 1/10 1	, ,		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	ND	0.611	1	0		15
Fluoride	ND	0.0818	1	0		15











0.0099

0.100

(LCS) R3139346-2 05/24/	/16 08:47 • (LCS	D) R3139346-	3 05/24/16 10:2	27						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.0	39.2	97	98	90-110			0	20
Fluoride	8.00	7.82	7 84	98	98	90-110			0	20





L836505-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L836505-07 05/24/16 14:28 • (MS) R3139346-4 05/24/16 14:43

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	17.2	67.6	101	1	80-120	
Fluoride	5.00	0.122	5.04	98	1	80-120	

L836606-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(US) 1 836606-06	05/24/16 18:36	(MS) D31303/6-6	05/24/16 18:50 •	(MSD) R3139346-7	05/24/16 19:04
(US) L030000-00	03/24/10 10.30	0-04CECICA (CIVII)	03/24/10 10.30 •	(IVISD) KSISSS40-/	03/24/10 19.04

(OS) L836606-06 05/24/	76 18:36 • (MS) I	3139346-6 U	5/24/16 18:50	· (MSD) R31393	46-/ 05/24/16	19:04						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	ND	50.1	51.6	100	103	1	80-120			3	15
Fluoride	5.00	ND	4.98	5.18	98	102	1	80-120			4	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3140117-1 05/26/16	6 09:06			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00







L837803-06 Original Sample (OS) • Duplicate (DUP)

(OS) L837803-06 05/26/16	6 15:51 • (DUP) F	R3140117-4 05/	/26/16 16:0	06		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Sulfate	35.7	35.6	1	0		15



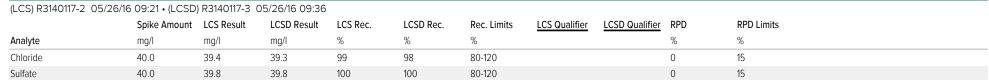
[†]Cn















ACCOUNT:

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-06

Method Blank (MB)

Chloride

Fluoride

Sulfate

(MB) R3139258-1 05/23/16	5 10:37		
	MB Result	MB Qualifier	MB MDL
Analyte	mg/kg		mg/kg

U

U











(OS) L836501-15 05/23/16 20:25 • (DUP) R3139258-4 05/23/16 20:49

	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	86.9	80.8	1	7		15
Fluoride	7.38	6.69	1	10		15
Sulfate	215	177	1	19	P1	15

MB RDL

mg/kg

10.0

1.00

50.0

0.795

0.261

0.57







⁸Al



(OS) L836501-21 05/24/16 00:48 • (DUP) R3139258-7 05/24/16 01:12

	Original Result (dry)	DUP Result (d	ry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	75.8	83.5	1	10		15
Fluoride	16.2	13.3	1	20	<u>J3</u>	15
Sulfate	257	235	1	9		15



⁹Sc

Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139258-2 05/23/16 11:01 • (LCSD) R3139258-3 05/23/16 11:25

(200) 110.00200 2 00/2	0,1010. (2002	,	00/20/10 11120							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	199	199	99	99	80-120			0	15
Fluoride	20.0	20.4	20.5	102	103	80-120			0	15
Sulfate	200	200	200	100	100	80-120			0	15

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Wet Chemistry by Method 9056A

L835353-06

L836501-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836501-16 05/23/16 22:00 • (MS) R3139258-5 05/23/16 22:24 • (MSD) R3139258-6 05/23/16 22:48

(00) 2000001 10 00/20/10	25) 2550501 10 35/25/10 22.00 (110) 10103250 3 35/25/10 22.21 (1105) 10103250 3 35/25/10 22.10													
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%		
Chloride	538	78.6	643	629	105	102	1	80-120			2	15		
Fluoride	53.8	5.67	49.6	49.1	82	81	1	80-120			1	15		
Sulfato	E38	260	922	916	103	102	1	90 120			1	15		





















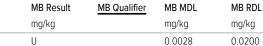
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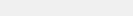
Method Blank (MB)

Mercury

Mercury by Method 7471A

(MB) R3138224-1 05/19/16 09:36 MB Result MB Qualifier MB MDL Analyte







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138224-2 05/19/16 09:39 • (LCSD) R3138224-3 05/19/16 09:41

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Mercury	0.300	0.260	0.274	87	91	80-120			5	20	









(OS) L835353-06 05/19/16 09:44 • (MS) R3138224-4 05/19/16 09:47 • (MSD) R3138224-5 05/19/16 09:54

, ,	Spike Amount	Original Result		MSD Result	MS Rec.	MSD Rec.	Dilutio	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
Mercury	0.300	U	0.282	0.276	94	92	1	75-125			2	20	









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Metals (ICP) by Method 6010B

L835353-01,02,03

Method Blank (MB)

(MB) R3137501-1 05/17/16	12:02			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	U		0.0141	0.100
Manganese	U		0.0012	0.0100







(LCS) R313/501-2 05/1//10	6 12:04 • (LCSD) R313/501-3 (05/1//16 12:0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Iron	10.0	9.70	9.78	97	98	80-120			1	20
Manganese	100	0 973	0.980	97	98	80-120			1	20















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Metals (ICP) by Method 6010B

L835353-06

Method Blank (MB)

Silver

(MB) R3138672-1 0	5/20/16 13:30			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.65	2.00
Barium	0.278	<u>J</u>	0.17	0.500
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Manganese	U		0.12	1.00
Selenium	U		0.74	2.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

0.28

1.00

(LCS) R31386/2-2	05/20/16 13:33 • (LC	CSD) R31386/2-3	05/20/16 13:35
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U

(200)	00/20/10 10:00 (200)	5,	00/20/10 10.0	•							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Arsenic	100	99.2	97.4	99	97	80-120			2	20	
Barium	100	104	102	104	102	80-120			1	20	
Cadmium	100	103	101	103	101	80-120			2	20	
Chromium	100	99.2	97.9	99	98	80-120			1	20	
Iron	1000	974	963	97	96	80-120			1	20	
Lead	100	104	102	104	102	80-120			2	20	
Manganese	100	99.7	98.4	100	98	80-120			1	20	
Selenium	100	103	102	103	102	80-120			1	20	
Silver	100	98.4	97.0	98	97	80-120			1	20	

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

	Spike Amount (dry)	Original Result (dry)		MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	105	4.07	102	106	94	97	1	75-125			3	20
Barium	105	47.6	155	166	102	113	1	75-125			7	20
Cadmium	105	U	106	108	101	103	1	75-125			2	20
Chromium	105	7.15	105	111	93	99	1	75-125			6	20
Iron	1050	11300	10800	12600	0	118	1	75-125	\vee		16	20

















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Metals (ICP) by Method 6010B

L835353-06

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

· /	, ,			,								
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Lead	105	6.62	114	116	102	105	1	75-125			2	20
Manganese	105	293	362	353	65	57	1	75-125	<u>J6</u>	<u>J6</u>	2	20
Selenium	105	U	92.7	98.3	88	94	1	75-125			6	20
Silver	105	U	100	104	95	99	1	75-125			4	20





















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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-01,02,03

Method Blank (MB)

(MB) R3137306-3 05/16/16	6 22:25						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	U		0.0314	0.100			
(S) a,a,a-Trifluorotoluene(FIL	D) 100			62.0-128			







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137306-1 05/16/1	6 21:22 • (LCSD) R3137306-2	05/16/16 21:43								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	6.14	6.04	112	110	67.0-132			1.66	20	
(S) a,a,a-Trifluorotoluene(Fl.	D)			102	101	62.0-128					







L834446-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834446-01 05/16/1	6 23:50 • (MS) R	3137306-4 05	/16/16 22:46	• (MSD) R313730	06-5 05/16/16	3 23:07							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	ND	2.91	3.00	52.9	54.6	1	50.0-143			3.25	20	
(S) a.a.a-Trifluorotoluene(Fl	'DI				100	100		62.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-06

Method Blank (MB)

(MB) R3138993-3 05/20/1	16 19:11			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FIL	D) 88.2			59.0-128





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138993-1 05/20/	16 18:01 • (LCSD) R3138993-2	05/20/16 18:24	1						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.12	4.92	93.0	89.4	63.5-137			3.96	20
(S) a a a-Trifluorotoluene(FII	וח			891	89.0	59 0-128				







7 GI

L835353-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835353-06 05/20/16 22:59 • (MS) R3138993-4 05/20/16 21:50 • (MSD) R3138993-5 05/20/16 22:13												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	U	17.6	19.8	63.9	71.9	5	28.5-138			11.7	23.6
(S) a,a,a-Trifluorotoluene(FID))				86.7	87.5		59.0-128				





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-01,02,03,04,05

Method Blank (MB)

(MB) R3138238-3 05/18/16	3 18:41			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			90.0-115
(S) Dibromofluoromethane	109			79.0-121
(S) a,a,a-Trifluorotoluene	103			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138238-1 05/18/1	6 16:49 • (LCSD)) R3138238-2	05/18/16 17:11								_
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0256	0.0267	102	107	73.0-122			4.33	20	
Ethylbenzene	0.0250	0.0251	0.0260	100	104	80.9-121			3.74	20	0
Toluene	0.0250	0.0235	0.0244	93.9	97.4	77.9-116			3.63	20	
Xylenes, Total	0.0750	0.0736	0.0765	98.2	102	79.2-122			3.82	20	L
(S) Toluene-d8				105	106	90.0-115					
(S) Dibromofluoromethane				110	103	79.0-121					
(S) a,a,a-Trifluorotoluene				103	106	90.4-116					
(S) 4-Bromofluorobenzene				101	106	80.1-120					

L835321-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835321-02 05/18/16	21:19 • (MS) R3	138238-4 05/1	8/16 19:04 • (M	SD) R3138238-	5 05/18/16 19:2	27						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	ND	0.0233	0.0247	93.2	98.8	1	58.6-133			5.89	20
Ethylbenzene	0.0250	ND	0.0234	0.0253	93.5	101	1	62.7-136			7.89	20
Toluene	0.0250	ND	0.0215	0.0228	85.9	91.4	1	67.8-124			6.16	20
Xylenes, Total	0.0750	ND	0.0695	0.0740	92.6	98.7	1	65.6-133			6.31	20
(S) Toluene-d8					106	105		90.0-115				
(S) Dibromofluoromethane					108	109		79.0-121				
(S) a,a,a-Trifluorotoluene					104	104		90.4-116				
(S) 4-Bromofluorobenzene					104	104		80.1-120				





















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

Method Blank (MB)

(MB) R3139540-3 05/24/16 21:59											
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/kg		mg/kg	mg/kg							
Benzene	U		0.000270	0.00100							
Ethylbenzene	U		0.000297	0.00100							
Toluene	U		0.000434	0.00500							
Xylenes, Total	U		0.000698	0.00300							
(S) Toluene-d8	106			88.7-115							
(S) Dibromofluoromethane	99.4			76.3-123							
(S) a,a,a-Trifluorotoluene	105			87.2-117							
(S) 4-Bromofluorobenzene	103			69.7-129							

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139540-1 05/24/	16 20:22 • (LCS	D) R3139540-2	2 05/24/16 20:	42							ľ
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0216	0.0216	86.5	86.4	72.6-120			0.0900	20	_
Ethylbenzene	0.0250	0.0236	0.0232	94.6	92.8	78.6-124			1.85	20	9
Toluene	0.0250	0.0224	0.0225	89.5	90.1	76.7-116			0.740	20	_
Xylenes, Total	0.0750	0.0711	0.0715	94.8	95.3	78.1-123			0.510	20	L
(S) Toluene-d8				108	108	88.7-115					
(S) Dibromofluoromethane				101	101	76.3-123					
(S) a,a,a-Trifluorotoluene				107	106	87.2-117					
(S) 4-Bromofluorobenzene				103	102	69.7-129					

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0285	29.5	137	134	81.9	79.6	4600	47.8-131			2.25	22.8
Ethylbenzene	0.0285	108	229	232	91.7	94.6	4600	44.8-135			1.67	26.9
Toluene	0.0285	222	339	347	89.5	95.7	4600	47.8-127			2.37	24.3
Xylenes, Total	0.0855	527	895	913	93.6	98.1	4600	42.7-135			1.94	26.6
(S) Toluene-d8					108	107		88.7-115				
(S) Dibromofluoromethane					102	99.1		76.3-123				
(S) a,a,a-Trifluorotoluene					106	107		87.2-117				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836637-05 05/26/16 11:45 • (MS) R3139988-1 05/26/16 12:04 • (MSD) R3139988-2 05/26/16 12:24

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					104	105		69.7-129				



















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-01,02,03

Method Blank (MB)

(MB) R3137334-1 05/17/	/16 03:42			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	105			50.0-150









(LCS) R3137334-2 05/17	7/16 03:59 • (LCSI	D) R3137334-3	05/17/16 04:16								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
C10-C28 Diesel Range	1.50	1.48	1.44	98.5	96.1	70.0-130			2.44	20	
(S) o-Terphenyl				104	97.9	50.0-150					















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-06

Method Blank (MB)

(MB) R3138554-1 05/20	0/16 10:03			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	88.1			50.0-150









(LCS) R3138554-2 05/2	(LCS) R3138554-2 05/20/16 10:17 • (LCSD) R3138554-3 05/20/16 10:31											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
C10-C28 Diesel Range	60.0	47.4	48.5	78.9	80.9	50.0-100			2.44	20		
(S) o-Terphenyl				88.9	91.0	50.0-150						











10	JC/ 1 83E3E3 UE	05/20/16 10:28 -	(MC) D3139554 4	05/20/16 10:42 - /	(MSD) R3138554-5	05/20/16 10:57
()3) L033333-00	03/20/10 19.20 •	(IVIS) KSIS6SS4-4	03/20/10 13.42 • ((IVISD) KS136334-3	03/20/10 19.37

(100) 1000000 10 100000 10 100000 10 100000 10 1												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	U	43.1	44.1	71.8	73.6	1	50.0-100			2.39	20
(S) o-Terphenyl					67.2	65.3		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

Method Blank (MB)

(MB) R3138702-3 05/19/1	6 14:49				1
	MB Result	MB Qualifier	MB MDL	MB RDL	ř
Analyte	mg/l		mg/l	mg/l	ľ
4-Chloro-3-methylphenol	U		0.000263	0.0100	L
2-Chlorophenol	U		0.000283	0.0100	
2,4-Dichlorophenol	U		0.000284	0.0100	L
2,4-Dimethylphenol	U		0.000624	0.0100	Ę
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	
2,4-Dinitrophenol	U		0.00325	0.0100	L
2-Nitrophenol	U		0.000320	0.0100	!
4-Nitrophenol	U		0.00201	0.0100	L
Pentachlorophenol	U		0.000313	0.0100	
Phenol	U		0.000334	0.0100	
2,4,6-Trichlorophenol	U		0.000297	0.0100	
(S) Nitrobenzene-d5	77.9			21.8-123	1
(S) 2-Fluorobiphenyl	84.2			29.5-131	L
(S) p-Terphenyl-d14	93.8			29.3-137	Ī
(S) Phenol-d5	38.1			5.00-70.1	
(S) 2-Fluorophenol	55.7			10.0-77.9	L
(S) 2,4,6-Tribromophenol	70.6			11.2-130	1

(LCS) R3138702-1 05/19/	16 14:02 • (LCSD) R3138702-2	05/19/16 14:25							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0439	0.0424	87.8	84.8	35.7-100			3.47	22.9
2-Chlorophenol	0.0500	0.0377	0.0354	75.3	70.8	26.2-91.5			6.19	26.5
2,4-Dichlorophenol	0.0500	0.0441	0.0428	88.1	85.7	31.4-103			2.83	24.9
2,4-Dimethylphenol	0.0500	0.0430	0.0431	86.1	86.2	31.9-107			0.150	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0375	0.0383	75.0	76.7	18.4-148			2.20	24.4
2,4-Dinitrophenol	0.0500	0.0258	0.0157	51.5	31.3	24.2-128		<u>J3</u>	48.8	20.5
2-Nitrophenol	0.0500	0.0447	0.0434	89.3	86.7	25.9-106			2.97	26.9
4-Nitrophenol	0.0500	0.0190	0.0153	38.0	30.6	10.0-52.7			21.7	40
Pentachlorophenol	0.0500	0.0392	0.0347	78.3	69.4	10.0-97.4			12.0	35.1
Phenol	0.0500	0.0200	0.0177	40.0	35.5	10.0-57.9			12.1	35
2,4,6-Trichlorophenol	0.0500	0.0452	0.0456	90.5	91.2	29.8-107			0.790	24.1
(S) Nitrobenzene-d5				84.3	87.2	21.8-123				
(S) 2-Fluorobiphenyl				86.0	90.9	29.5-131				

















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

(LCS) R3138702-1 05/19/1	16 14:02 • (LCSD) R3138702-2	05/19/16 14:25								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
(S) p-Terphenyl-d14				96.1	98.8	29.3-137					
(S) Phenol-d5				37.7	32.4	5.00-70.1					
(S) 2-Fluorophenol				52.3	43.9	10.0-77.9					
(S) 2,4,6-Tribromophenol				88.7	88.5	11.2-130					



















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-06

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	Γ
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	L
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	61.8			21.9-129	
(S) 2-Fluorobiphenyl	61.7			34.9-129	
(S) p-Terphenyl-d14	68.7			21.5-128	
(S) Phenol-d5	70.1			26.3-121	
(S) 2-Fluorophenol	64.2			21.1-116	
(S) 2,4,6-Tribromophenol	52.9			21.6-142	

(LCS) R3138667-1 05/20/	16 10:08 • (LCSE	D) R3138667-2	2 05/20/16 10:3	2						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				

















(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

835353-06

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC) D2120667.1	OE/20/16 10:00	(LCSD) R3138667-2	OE /20 /16 10.22
1LC21 K3138007-1	- U5/ZU/IB IU:U8 •	ILUSDI R3138007-2	U5/ZU/IB IU:3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142









L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6













68.4

21.6-142

GLOSSARY OF TERMS

ONE LAB. NATIONWIDE.



SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
lowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















		Te.	Billing Informa	ation:	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\overline{}$	2		Anal	lysis / Cu	ontaine	er / Preser	ervative			-	Chain of Custody	Pageof
MEC Foster Wheeler - 85 N. Dairy Ashford ouston, TX 77079	- Houstor	n, TX	Accounts Payable 585 N. Dairy Ashford Houston, TX 77079													1	YOUR LAB O 12065 Lebanon Rd Mount Juliet, TN 37122	回磷酸国
eport to:		- 1	Email To: pa	amela.krueger@ame	necfw.com							NO3			BIK		Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859	
Project Description: Survey Stinger Sump In	WATER .	Line		City/State Collected:				31	res			H-340	toPres		b-HCl-		L# L835	353
Phone: 713-929-5674	hone: 713-929-5674 6703160012.00			Lab Project # AMECFWHTX-S	SLURRY		res	DROOROLVI 40mlAmb-HCl-BT	4ozClr-NoPres		oPres	Skinner's List Mtls. 250mlHDPE-HNO3	Skinner's List Mtls. 2ozClr-NoPres		40mIAmb-HCI-BIK		1198	
Fax:	Site/Facility ID #			P.O. #			nb NoPr	mlAm	70 4ozt	DH.C	GRO,V8260 2ozClr-NoPres	Mtls. 2:	Mtls. 2	V8260 40mlAmb-HCl	Blank 40		Acctnum: AMEC	081
Collected by (signature):		ab MUST Be N			esults Needed		ml Amb	VI 40	,5V8270	IAmb	60 20	List	List	OmlA	Trip Bl		Prelogin: P5525	McCord
Immediately	Same Day Next Day Two Day Three Da	ay	200% 100% 50%	2012	No X_Yes	No. of	8270 100ml	OOROL	DRORLA,S	GRO 40mlAmb HCI	10,782	inner's	inner's	3260 40	V8260-T		Shipped Via: Fee	dEX Ground
Packed on Ice N Y Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	DR	100000000000000000000000000000000000000	85	-	Ski	X Ski	87	N N		Rem./Contaminant	Sample # (lab only
1 -		SS	·			13			X		X	1	X			-		
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TMW-WWH		GW	1 2 2	5/12/16		10	10000000	X	1	X		X		Х	-			0
TMW-WWLZ		GW	-	5/11/6	9:00	10	200000	X		X		X		X		L		0
TMW-WWLZD		GW	1	5/n/16	1600	10	-	100							X	L		C
TR.P Black		GW	-	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		1	1000000			100					X	1	7	(
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		GW					1		1								e174	
* Matrix: SS - Soil GW - Groundwater	r WW West to	(ater DW D	Vrinking Wat	ter OT - Other	1/2 - 2/2					pil .		T	emp			6	711013	2901,
* Matrix: SS - Soil GW - Groundwater Remarks:	usine wi	ILL CA	XL IN	ANALYS	5'1 0-	al.				pH Flow	April 10	Ot	ther			5	5-054	
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Relinquished by : (Signature)	Coff	5/h	116	Time:	Received by: (Sign	gnature	R	Tambar - Tambar		Temp	np:			s Received	(Seal Intact: VY	YNN
Relinquished by : (Signature)		Date:		Time:	Received for lab	by: (Sig	gnature			Date	6.	16	Time:			pH Che	necked: NC	CF:

ESC Lab Sciences Non-Conformance Form

Login #: L835353	Client: AMECFWHTX	Date: 5/13/16	Evaluated by: Jeremy	
			그리는 사람이 살아 있다면 하는 사람들이 얼마를 하셨다. 이 그리다면	Г

Non-Conformance (check applicable items)

Sample Integrity		Chain of Custody Clarification	
Parameter(s) past holding time	×	Login Clarification Needed	If Broken Container:
Improper temperature		Chain of custody is incomplete	Insufficient packing material around container
Improper container type		Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation		Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Cour
Insufficient sample volume.		Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.		Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.		Trip Blank not received.	If no Chain of Custody:
Broken container		Client did not "X" analysis.	Received by:
Broken container:		Chain of Custody is missing	Date/Time:
Sufficient sample remains			Temp./Cont. Rec./pH:
到一个人的			Carrier:
			Tracking#

Login Comments: Received a 125ml-NP for Anions for all TMW ID's not listed on COC.

Client informed by:	Call	Email	Voice Mail	Date:	Time:	
TSR Initials: CM	Client Con	tact:				No.

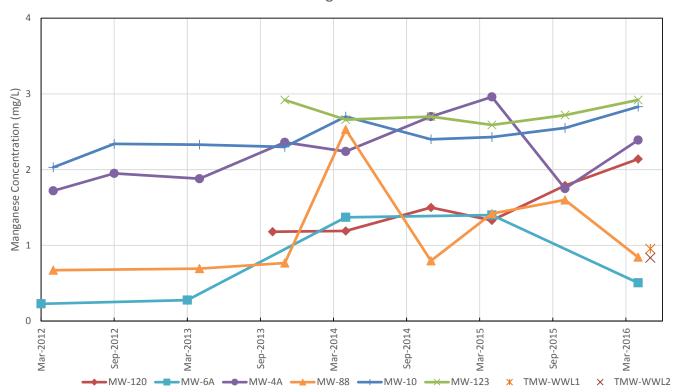
Login Instructions:

Log 125mL-NP for CHLORIDE, FLUORIDE and SULFATE.

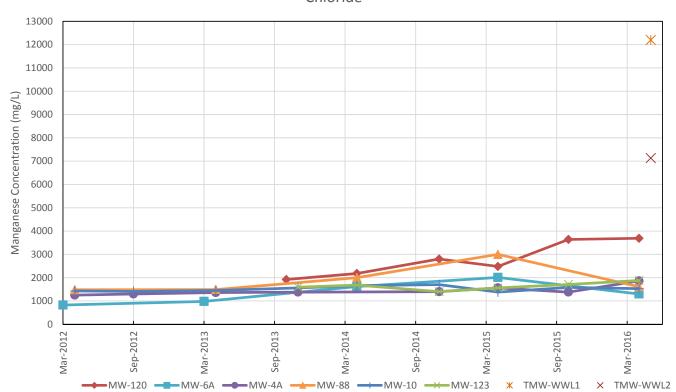
Also, change on all IDs: 8270 to 8270ACID; V8260 to V8260BTEX and only log metals FEICP and MNICP.

This E-mail and any attached files are confidential, and may be copyright protected. If you are not the addressee, any dissemination of this communication is strictly prohibited. If you have received this message in error, please contact the sender immediately and delete/destroy all information received.

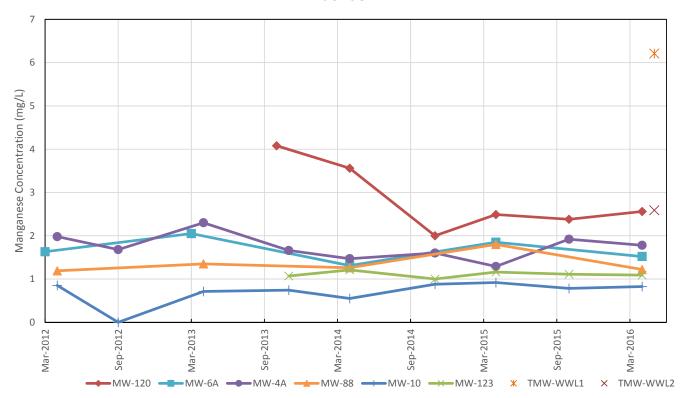
Manganese



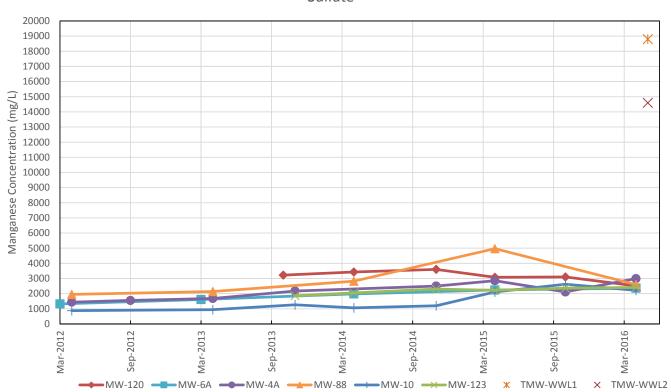




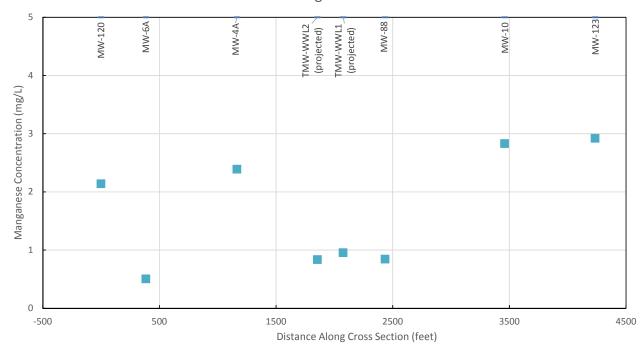
Fluoride



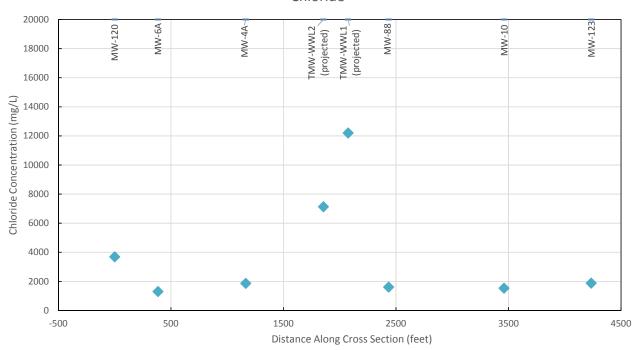




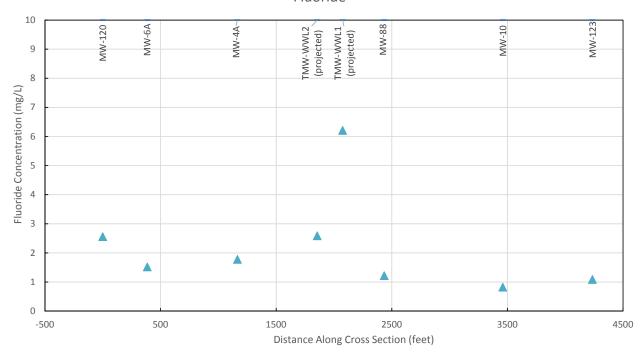
Manganese



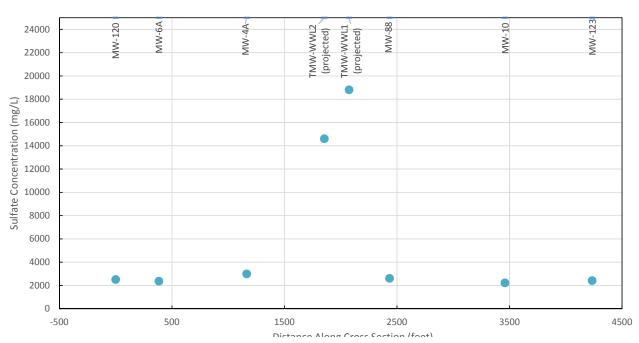




Fluoride



Sulfate





July 28, 2016

Mr, Carl Chavez
Oil Conservation Division-Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Investigation of the June 2015 Wastewater Pipeline Break near the Former Evaporation

Ponds Area

HollyFrontier Navajo Refining LLC - Artesia Refinery

GW-028

Dear Mr. Chavez:

Enclosed is a letter describing the investigation performed in response to the HollyFrontier Navajo Refining LLC (Navajo) Artesia Refinery June 2015 wastewater pipeline break near the former evaporation ponds. The investigation was performed according to the approved work plan for this investigation.

If you have any questions or comments regarding this request, please feel free to contact me at 575-746-5487 or Robert Combs at 575-746-5382.

Sincerely,

Scott M. Denton

Environmental Manager HollyFrontier Navajo Refining LLC

c: Robert Combs, Navajo

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II District III
1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Form C-141 Revised August 8, 2011

			Rele	ease I	Notific:	ation	and Co	orrective A	ction		
							OPERA	ГOR	1	Initia	al Report 🛛 Final Repor
Name of Co	mpany: N	avajo Refini	ng Comp	any, L.	L.C.		Contact: Robert Combs				
		St., Artesia,				7	Telephone No.: 575-746-5382				
Facility Nar	ne: Navajo	Refining C	ompany,	L.L.C.				e: Petroleum R			
Courfe - o Ossa	NI	. D.£	7	13	<i>t</i> . 10		· · · · · · · · · · · · · · · · · · ·				
L.L.C.	ner: Navaj 	o Refining C	ompany,	N	Mineral O	wner N	//A			API No	o. N/A
F	Y						OF RE				
Unit Letter	Section	Township	Range	Feet fi	rom the	North/	South Line	Feet from the	East/W	est Line	County
			Lat	itude_	32°51'0.3	32"N	Longitud	le_104°20'20.0	3''W		
						URE	OF REL				
		azardous treate						Release: > 25 bl			Recovered: 75 bbls
Artesia		l hole in pipel	ine approx	imately	3 miles ea	st of	04/12/15,	Iour of Occurrenc Unknown time		Date and 10:30 am	Hour of Discovery: 04/12/15
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required						If YES, To Whom? NM Oil Conservation Division Santa Fe– Left message to Carl Chavez NM Oil Conservation Division Artesia – Left message, return call by Randy Dade NMED Hazardous Waste Bureau – Left message					
			***************************************				National R	esponse Center –	Incident	t report #	
By Whom? I Was a Water		1 19					Date and Hour 04/12/15 ~13:15 - 13:30 If YES, Volume Impacting the Watercourse.				
was a water	course Read		Yes 🛚	No			None None	olume Impacting	the Water	rcourse.	
N/A		pacted, Descri						1			
Pipeline leak down and a v	was discov acuum truc	em and Remed ered during dak was dispatch vacuumed wat	aily visual ned to the	monitor	ring of the remove th	ne water	which had a	ccumulated with	ischarge i rain wate	pumps loc er in a low	cated at the refinery were shut lying depression in the pipeline
The release a vacuum truck installation at plugged after	rea is located and the pipe of sampling versions of the sampling versions.	peline was rep g of two soil b was complete.	ely 3 miles aired. Inv orings, cor The inves	s from the estigation of the estigation of the estigation of the estimation of the e	on of the son to tempor report is a	oil and grary mon	groundwater nitor wells ar . No further	in the vicinity of and collection grou action for soil or	the releas indwater groundw	se was per samples. vater was r	
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OIL CONSERVATION DIVISION							DIVISION				
Signature:	py	M_			***						
Printed Name	e: Rob	ert Combs	54.7 - t			1	Approved by Environmental Specialist:				
Title: Environ	nmental Spe	ecialist				/	Approval Dat	te:	E	xpiration	Date:
E-mail Addre	ess:					(Conditions of	f Approval:			Attached
Date: 7	/28/16		hone:	575-	746-5382						

^{*} Attach Additional Sheets If Necessary

July 27, 2016



Mr. Robert Combs HollyFrontier Navajo LLC 510 East Main Street Artesia, New Mexico 88210

Investigation of the June 2015 Wastewater Pipeline Break near the Former Evaporation Ponds Area HollyFrontier Navajo Refinery, Artesia, New Mexico Discharge Permit GW-028

Dear Robert:

This release response report describes investigation of the soil and shallow groundwater near a wastewater pipeline break that occurred near the former evaporation ponds located east of the HollyFrontier Navajo LLC (Navajo) Refinery in Artesia, New Mexico. This investigation was performed according to the revised work plan¹ submitted to the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) in October 2015.

Release History

The release occurred due to a break in the pipeline that conveys treated wastewater from the Refinery to injection wells located approximately 12 miles east of the Refinery. The break occurred approximately three miles east of the Refinery, and south of the Evaporation Ponds (Figure 1).

The wastewater that is conveyed through the pipeline is sampled quarterly and analyzed for waste characterization purposes. A copy of the first quarter 2015 wastewater analytical report was provided in Attachment 1 to the work plan. The sample was analyzed for total metals, anions, cations, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), corrosivity, reactivity, ignitability, specific conductance, specific gravity, total dissolved solids (TDS), and pH. In addition, the sample was analyzed for eight metals using the toxicity characteristic leaching procedure (TCLP). The analytical suite includes the majority of the constituents of concern (COCs) listed in the New Mexico Water Quality Control Commission (WQCC) standards found at New Mexico Administrative Code 20.6.2.3013 and additional analyses required for waste characterization purposes.

¹ Arcadis. Final Work Plan for the Soil and Groundwater Investigation at the Wastewater Pipeline Break near the Evaporation Ponds Area, Navajo Refining Company Artesia Refinery. October 14, 2015.

The analytical results indicate that the wastewater is not corrosive, not reactive, not ignitable, not toxic (no TCLP metals detected), and contains no VOCs above the WQCC standards. The following compounds were reported above the WQCC standards:

- Phenol was reported at 0.0081 mg/L, above the WQCC standard of 0.005mg/L
- ▶ Iron was reported at 3.7 mg/L, above the WQCC standard of 1.0 mg/L
- ▶ Manganese was reported at 0.25 mg/L, above the WQCC standard of 0.2 mg/L
- Chloride was reported at 300 mg/L, above the WQCC standard of 250 mg/L
- ► Fluoride was reported at 11 mg/L, above the WQCC standard of 1.6 mg/L
- Sulfate was reported at 2,100 mg/L, above the WQCC standard of 600 mg/L
- ▶ TDS was reported at 3,710 mg/L, above the WQCC standard of 1,000 mg/L

Based on the analytical results of the wastewater, OCD requested that soil and shallow groundwater samples be collected from the vicinity of the pipeline break to evaluate whether impacts had occurred as a result of the break. An initial work plan was submitted in June 2015 and a final work plan, incorporating requested revisions from OCD, was submitted in October 2015.

Scope of Work Performed

Sample Locations

Two soil borings were advanced at the locations specified in the work plan and were converted to temporary monitoring wells. Figure 2 shows the locations of the two borings/temporary wells. Location TMW-WWL2 was located northwest of the pipeline break, in the upgradient direction, while TMW-WWL1 was located as close as possible to the pipeline break location, within the spill area in the downgradient direction. The borings/temporary wells were located a minimum of 25 feet from the pipeline due to subsurface clearance policies.

Prior to initiating the investigation, well drilling permits were obtained from the Office of the State Engineer (OSE) and a plugging plan for the temporary wells was filed with the OSE. A copy of the permits and plugging plan is provided in Attachment A to this letter.

Soil Samples

Soil samples were collected continuously by advancing a sample collection tool lined with acetate sleeves using a convertible GeoprobeTM 9520 rig, followed by the use of a hollow-stem auger to enlarge the boring. The soil samples were screened using a photo-ionization detector (PID) and were visually inspected. Field observations were recorded on boring logs, which are provided in Attachment B to this letter.

Soil samples were collected at depths of 1, 5, and 12 feet below ground surface (ft bgs) in both borings. The soil samples were placed in containers provided by the analytical laboratory, labelled, and placed into a sample cooler. The samples were shipped by overnight courier to the laboratory under proper chain of custody to be analyzed for the following:

- ► Total Petroleum Hydrocarbons (TPH):
 - Gasoline Range Organics (GRO)
 - Diesel Range Organics (DRO)
 - Oil Range Organics (ORO)
- ▶ Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- Chloride
- ▶ Fluoride
- Sulfate
- ▶ Iron
- Manganese
- Phenol

One field duplicate sample was collected and one equipment blank was collected during the soil sampling effort. A copy of the laboratory report is provided, in electronic format, in Attachment C to this letter. Analytical results are discussed below.

Groundwater Samples

Shallow groundwater was encountered at a depth of 12 ft bgs in each boring. Each boring was advanced to a depth of approximately 16 ft bgs and a temporary well screen was installed from 15 ft bgs to 5 ft bgs. The well screen was schedule 40 polyvinyl chloride (PVC) with 0.010 inch slots. A solid PVC riser was installed from 5 ft bgs to slightly above the ground surface. Silica sand, grade 20/40, was installed in the annular space around the well screen, extending 2 feet above the well screen. A 2-foot thick bentonite seal was placed above the sand pack.

The temporary wells were developed by pumping, with the intention of purging the wells until the water quality parameters stabilized. During the initial development efforts on May 10, 2016, both wells pumped dry. The wells were developed by allowing the groundwater to recover overnight, then purging them dry two more times each on May 11, 2016. The wells were then allowed to settle overnight prior to sample collection on May 12, 2016. Table 1 provides a summary of the well development process.

Groundwater samples were collected from each well and placed into containers provided by the laboratory. A duplicate sample was collected from TMW-WWL2, located on the eastern (downgradient) side of the pipeline break. The normal and duplicate samples were analyzed for the same parameters as the soil samples. A copy of the laboratory report is provided, in electronic format, in Attachment C to this letter. Analytical results are discussed below.

Data Evaluation

Soil Screening Values

Table 2 provides a summary of the soil analytical results, along with screening levels used in the soil data evaluation. The three sources of screening levels included:

- OCD Spill Guidance document²
- ► New Mexico Environment Department (NMED) Soil Screening Levels (SSLs) for the soil leaching to groundwater pathway with a diffusion attenuation factor of 20 (DAF 20)³
- ▶ Background threshold values (BTVs) developed from background soil samples collected near the former evaporation ponds⁴

As discussed in the work plan, previous investigations of the former evaporation ponds performed under the guidance of the NMED Hazardous Waste Bureau (HWB) included collection and analysis of shallow soil samples for inorganic parameters from background areas not affected by historical operations associated with the Refinery, including operation of the evaporation ponds. These background soil samples were used to determine BTVs for inorganics that are known to be present naturally in the soils in this area. The background soil sample locations are shown in Figure 2 and are within similar soil types to those observed in the borings installed as part of this investigation. The Phase IV Corrective Action Investigation Report – Revised⁴ contained the results of the background soil investigation and statistical evaluation of those results, including calculation of upper tolerance limits (UTLs) to be used as BTVs for this area. Because these BTVs are from similar soil types located within 1,000 to 5,000 feet of the investigation area, it is appropriate to apply these BTVs as a screening level for this investigation. OCD had previously stated that the BTVs would not be accepted because they had not yet been approved; however, subsequent to that discussion, the NMED approved the report⁵. Therefore, the BTVs for inorganic compounds are shown in Table 2 along with the NMED SSLs.

Soil Analytical Results

TPH: The analytical results for TPH were either not detectable or were significantly below the OCD Spill Guidance screening value of 100 mg/kg.

BTEX: None of the soil samples contained BTEX above the method detection limits and all method detection limits were at least one order of magnitude below the SSLs.

Phenol: None of the soil samples contained phenol above the method detection limit and the method detection limit was four orders of magnitude below the SSL.

² New Mexico Oil Conservation Division. *Guidelines for Remediation of Leaks, Spills and Releases.* August 13, 1993.

³ New Mexico Environment Department. *Risk Assessment Guidance for Site Investigations and Remediation*. July 2015.

⁴ Arcadis. Evaporation Ponds Phase IV Corrective Action Investigation Report – Revised. May 2015.

⁵ New Mexico Environment Department. *Approval with Modifications: Evaporation Ponds Phase IV Corrective Action Investigation Report – Revised, May 2015.* October 6, 2015.

Iron: All of the soil samples contained iron at concentrations above the method detection limits. The samples collected from 1 ft bgs at both locations, and from 5 ft bgs from TMW-WWL1, contained iron at a concentration above the DAF 20 SSL, but below the BTV. The concentrations from the 1 and 5 ft bgs intervals were slightly higher from locations TMW-WWL1 than from location TMW-WWL2. Because the iron concentrations are below the BTV, this constituent is not considered to indicate the presence of impacts from the wastewater pipeline break.

Manganese: All of the soil samples contained manganese at concentrations above the method detection limits. All of the reported manganese concentrations were below both the DAF 20 SSL and the BTV for manganese. Therefore, there does not appear to have been any impact to the shallow soil.

Chloride: All of the soil samples contained chloride at concentrations above the method detection limits. All of the reported chloride concentrations were below the BTV for chloride and there is no DAF 20 SSL for chloride. Therefore, there does not appear to have been a significant impact to the shallow soil.

Fluoride: All of the soil samples contained fluoride at concentrations above the method detection limits. All of the reported fluoride concentrations were below both the DAF 20 SSL and the BTV for fluoride. Therefore, there does not appear to have been any impact to the shallow soil.

Sulfate: All of the soil samples contained sulfate at concentrations above the method detection limits. All of the reported sulfate concentrations were below the BTV for sulfate and there is no DAF 20 SSL for sulfate. Therefore, there does not appear to have been an impact to the shallow soil.

Groundwater Screening Values

Table 3 provides a summary of the groundwater analytical results, along with screening levels used in the groundwater data evaluation. The screening levels include the NMED TPH screening levels for TPH in groundwater³, the WQCC standards for groundwater with total dissolved solids (TDS) less than 10,000 milligrams per liter (mg/L).

Groundwater Analytical Results

TPH: The analytical results for TPH were either not detectable or were below the NMED TPH screening level of 0.2 mg/L.

BTEX: None of the groundwater samples contained BTEX above the method detection limits and all method detection limits were at least two orders of magnitude below the WQCC standards.

Phenol: None of the groundwater samples contained phenol above the method detection limit and the method detection limit was five orders of magnitude below the WQCC standard.

Iron: All of the groundwater samples contained iron at concentrations above the method detection limits; however, all of the concentrations were below the WQCC standard.

Manganese: All of the groundwater samples contained manganese at concentrations above the method detection limits and all of the concentrations were above the WQCC standard for manganese.

Chloride: All of the groundwater samples contained chloride at concentrations above the method detection limits. All of the reported chloride concentrations were above the WQCC standard. However, the chloride concentrations in the groundwater are three orders of magnitude higher than the chloride concentration in the wastewater sample. Thus, the wastewater could not have caused the elevated concentrations of chloride in the groundwater.

Fluoride: All of the groundwater samples contained fluoride at concentrations above the method detection limits. All of the reported fluoride concentrations were above the WQCC standard.

Sulfate: All of the groundwater samples contained sulfate at concentrations above the method detection limits. All of the reported sulfate concentrations were above the WQCC standard. However, the sulfate concentrations in the groundwater are an order of magnitude above the concentration of sulfate in the wastewater sample. Thus, the wastewater could not have caused the elevated concentrations of sulfate in the groundwater.

Comparison of Groundwater Analytical Results to Nearby Monitoring Wells

A comparison of the reported concentrations of manganese, chloride, fluoride and sulfate in the temporary wells to the reported concentrations in nearby permanent groundwater monitoring wells was performed to further evaluate the potential impacts from the wastewater pipeline break. The shallow groundwater flow direction in the vicinity of the former Evaporation Ponds and the wastewater pipeline break is to the south-southeast at a gradient of approximately 0.0012 feet per foot. The following monitoring wells were selected for comparison to the temporary wells:

- MW-120, located outside of the former Evaporation Ponds, near the termination of Three Mile Ditch, approximately 1600 feet north of the pipeline break
- ► MW-6A, located approximately 330 feet downgradient from MW-120, approximately 1430 feet north of the pipeline break
- ► MW-4A, located approximately 800 feet downgradient and slightly cross-gradient from MW-6A, approximately 1460 feet northeast of the pipeline break
- ► MW-88, located approximately 1270 feet downgradient of MW-6A, approximately 1250 feet east of the pipeline break
- ► MW-10, located approximately 1035 feet downgradient of MW-88, approximately 2100 east-southeast of the pipeline break
- ► MW-123, located approximately 780 feet south of MW-10, approximately 2560 feet southeast of the pipeline break

Trend charts were constructed using the reported concentrations of manganese, chloride, fluoride, and sulfate for each of these wells from the spring sampling event of 2012 through the spring sampling event of 2016. The trend charts are provided in Attachment D to this letter. As can be seen in the trend charts, the concentrations of these compounds fluctuate over time;

however, no obvious increasing trend in concentrations is observed in the well closest to the pipeline break area (MW-88) or in the downgradient direction (MW-10 and MW-123) following the June 2015 release.

In addition to the trend charts, a plot of the concentration reported from the April 2016 sampling for the wells listed above was constructed as a function of distance along a line connecting the wells from northwest to southeast. The locations of the temporary wells were projected onto the line between MW-4A and MW-88 and the concentrations reported from the May 2016 samples from the temporary wells were added to the plots. A concentration versus distance plot was constructed for manganese, chloride, fluoride, and sulfate and are included in Attachment D to this letter.

The comparisons of the temporary well sample results to the nearby monitoring well data (plots of concentration versus distance and trend plots over time) demonstrate that the manganese concentrations from the temporary wells are similar to the manganese concentrations in the general area. The concentrations of chloride, fluoride, and sulfate in the temporary wells appear to be elevated in one or both of the temporary wells when compared to the concentrations in the general area. Based on the concentrations of the chloride and sulfate in the wastewater sample, the wastewater is not the source of the elevated inorganic compounds in this area.

Conclusions and Recommendations

The investigation results indicate that no significant impact to soil has occurred. Although the reported concentrations of iron in the shallow soil samples are above the DAF 20 SSL, the concentrations are below the BTV for shallow soil in this area. The concentrations of chloride and sulfate in the shallow soil at location TMW-WWL1 are higher than those observed at location TMW-WWL2, but are below the BTV for shallow soil in this area. Therefore, no further action is recommended for soils.

The investigation results indicate that no impact from organic COCs has been observed in shallow groundwater; however, chloride, fluoride, and sulfate concentrations appear to be elevated in the temporary wells samples when compared to nearby downgradient monitoring wells. Based on the concentrations of the chloride and sulfate in the wastewater sample, the wastewater is not the source of the elevated inorganic compounds in this area. Because the wastewater is not a likely source for the elevated concentrations observed in the shallow groundwater, it is recommended that monitoring of the existing downgradient permanent monitoring wells continue according to the facility-wide monitoring program.

If you have any questions or comments, please feel free to contact me at 713-929-5674 or 713-249-8548.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Pamela R. Krueger Senior Associate

c: David R. Hoffman, PE, Amec Foster Wheeler

Figures:

- 1 Site Location Map
- 2 Boring/Temporary Well Location Map

Tables:

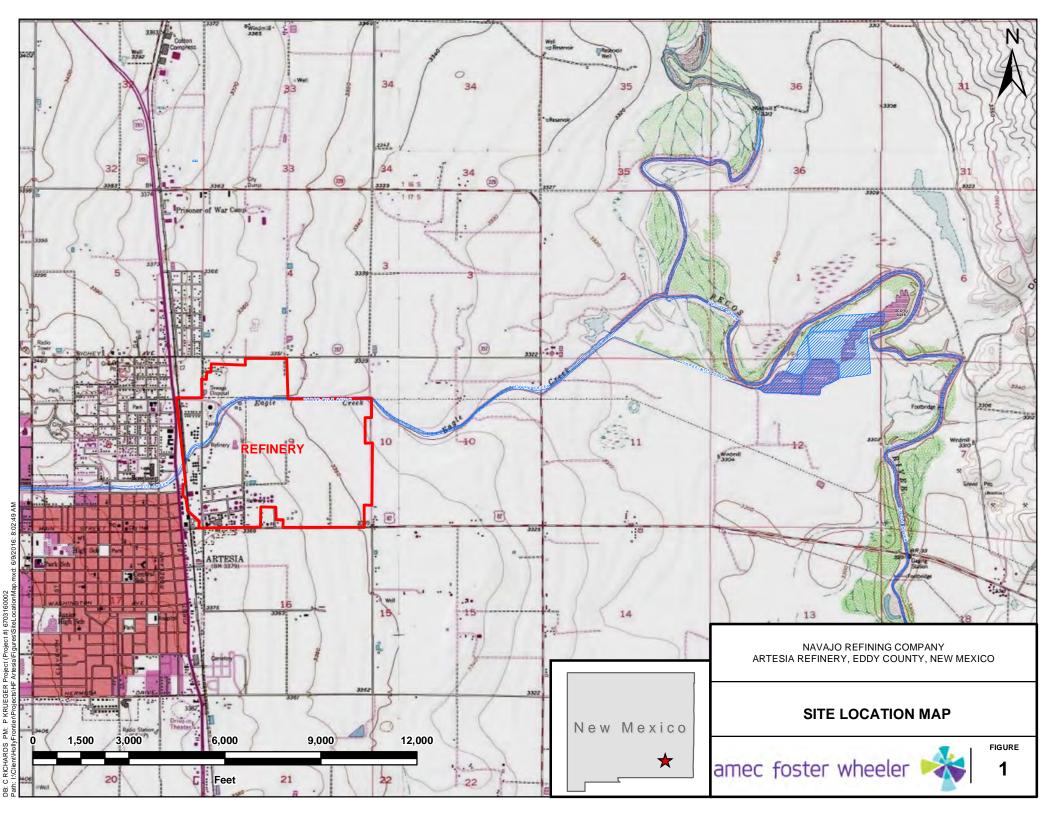
- 1 Temporary Well Development Purge Parameters
- 2 Soil Analytical Results from the Wastewater Pipeline Investigation
- 3 Groundwater Analytical Results from the Wastewater Pipeline Investigation

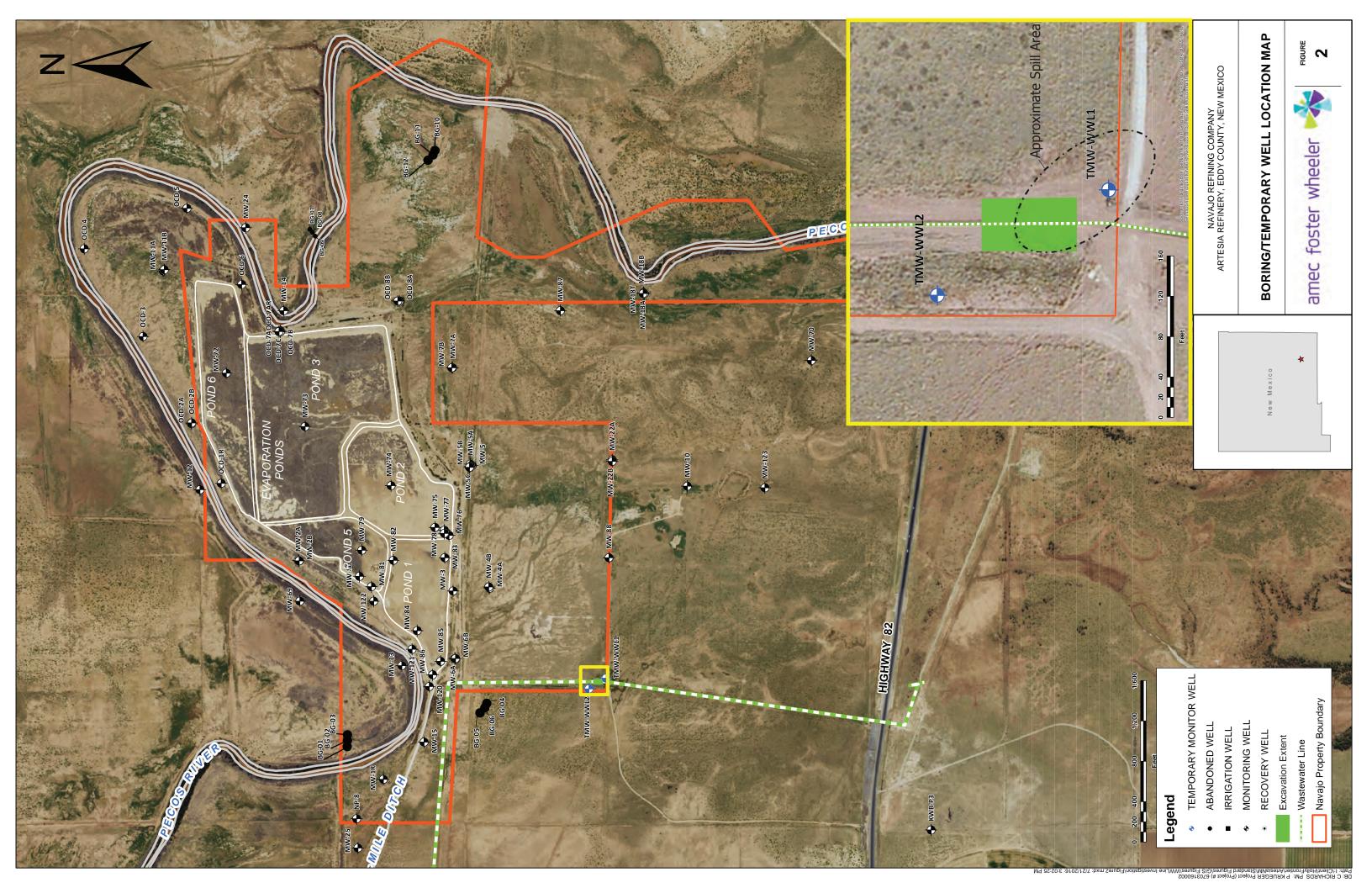
Attachments:

- A Well Installation Permits and Plugging Plan
- B Boring and Temporary Well Completion Logs
- C Laboratory Reports (electronic format)
- D Trend Plots of Inorganic in Nearby Monitoring Wells



FIGURES







TABLES

Table 1 - Temporary Well Development Purge Parameters

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

Location	TOC (ft msl)	Date	Time	Depth to Water (feet)	GW Elevation (ft msl)	Volume Purged (gallons)	Temperature (°C)	pH (SU)	Comments
TMW-WWL1	3284.25	5/10/2016	5:10 PM	6.95	3277.30	10			Purged dry
		5/11/2016	1:10 PM	6.98	3277.27	[18.8	7.19	Slightly
			1:12 PM				18.3	7.15	cloudy, no
			1:14 PM				18.2	7.20	odor, fines
			1:15 PM	9.60	3274.65	5	18.1	7.17	Dry, rising
			5:25 PM	6.98	3277.27		18.8	7.23	Slow
			5:27 PM				18.0	7.21	recovery
			5:29 PM	9.00	3275.25	5	17.9	7.20	\square
		5/12/2016	8:30 AM	7.02	3277.23				Sampled
TMW-WWL2	3284.36	5/10/2016	5:10 PM	7.00	3277.36	10			Purged dry
		5/11/2016	1:00 PM	7.12	3277.24	[19.1	7.15	Cloudy,
			1:01 PM				17.9	7.20	fines
			1:03 PM				17.6	7.21	
			1:05 PM	7.85	3276.51	5	17.5	7.17	
			5:14 PM	7.12	3277.24		18.0	7.25	Slow
			5:16 PM				17.9	7.17	recovery
			5:19 PM	7.50	3276.86	5	17.9	7.16	
		5/12/2016	9:00 AM	7.16	3277.20				Sampled

Definitions

°C = degrees Celsius ft msl = feet mean sea level GW = groundwater SU = standard units

Table 2 - Soil Analytical Results from the Wastewater Line Investigation

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

				Location:		TMW-WWL1			TMW-	-WWL2	
				Depth (ft bgs):	1	5	12	1	5	12	12 (Duplicate)
				Date:	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016	05/10/2016
			Screening Levels								
Analyte	Units	OCD Spill Guidance	NMED DAF 20 SSL	Former EP BTV							
GRO	mg/kg	100			< 0.108	< 0.108	< 0.108	0.255 J	< 0.108	< 0.108 J3 J6	< 0.108
DRO	mg/kg	100			7.31	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
ORO	mg/kg	100			3.15 J	< 0.274	< 0.274	0.687 J	< 0.274	< 0.274	< 0.274
Benzene	mg/kg	10	0.038		< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135	< 0.00135
Ethylbenzene	mg/kg		0.262		< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148
Toluene	mg/kg		12.1		< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00217	< 0.00148
Total Xylenes	mg/kg		2.98		< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349	< 0.00349
Phenol	mg/kg		52.3		< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695	< 0.00695
Iron	mg/kg		6,960	17,344	12,200	7,850	2,710	10,500	5,580	2,880	3,950
Manganese	mg/kg		2,630	488	388	162	65	344	71	80	95
Chloride	mg/kg			5,264	1,730	1,070	1,690	113	712	712	899
Fluoride	mg/kg		3,560	17.9	5.61	16.1	11.8	4.56	15.8	8.01	11.2
Sulfate	mg/kg			21,620	7,580	18,300	18,300	2,590	18,300	17,200	18,200

Notes and Definitions:

< X = Result reported as not detectable with a method detection limit equal to X

Values shown in bold font with blue shading indicate that the result was above the lower of the DAF 20 SSL or BTV, but less than the higher of the DAF 20 SSL or BTV.

Values shown in bold italics font with lavendar shading indicate that the result was above both the DAF 20 SSL and the BTV. No results met this screening criteria.

BTV = Background Threshold Value

DAF 20 = Soil leaching to groundwater pathway with dilution attenuation factor of 20

DRO = Diesel Range Organics

EP = Evaporation Ponds

GRO = Gasoline Range Organics

J = Estimated result reported at a concentration above the method detection limit but below the reporting limit.

J3 = Associated laboratory batch quality control sample was outsied the established control range for precision.

J6 = Sample matrix interfered with the ability to make an accurate determination of concentration; spike value is low.

mg/kg = milligrams per kilogram

NMED = New Mexico Environment Department

OCD = Oil Conservation Division

ORO = Motor Oil Range Organics

SSL = Soil Screening Level

Table 3 - Groundwater Analytical Results from the Wastewater Line Investigation

HollyFrontier Navajo Refining LLC - Artesia, New Mexico

				Wastewater	TMW-WWL1	TMW-	-WWL2
				2/23/2105	5/12/2016	5/12/2016	5/12/2016 (Duplicate)
Analyte	Units	NMED TPH	WQCC				
GRO	mg/L				< 0.0314	< 0.0314	< 0.0314
DRO	mg/L	0.2			0.0851 J	0.182	0.0892 J
ORO	mg/L	0.2			0.0419 J	0.175	0.0898 J
Benzene	mg/L		0.01	< 0.0005	< 0.000331	< 0.000331	< 0.000331
Ethylbenzene	mg/L		0.75	< 0.0005	< 0.000384	< 0.000384	< 0.000384
Toluene	mg/L		0.75	< 0.0005	< 0.000780	< 0.000780	< 0.000780
Total Xylenes	mg/L		0.62	0.0041	< 0.00106	< 0.00106	< 0.00106
Phenol	mg/L		0.005	0.0081	< 0.000297	< 0.000297	< 0.000297
Iron	mg/L		1.0	3.7	0.234 J	0.169 J	0.981
Manganese	mg/L		0.2	0.25	0.954	0.836	0.910
Chloride	mg/L		250	300	12,200	7,130	7,100
Fluoride	mg/L		1.6	11	6.21	2.59	3.10
Sulfate	mg/L		600	2,100	18,800	14,600	16,800

Notes and Definitions:

< X = Result reported as not detectable with a method detection limit equal to X

Values shown in bold font with blue shading indicate that the result was above the lower of the WQCC or BTV, but less than the higher of the WQCC or BTV. Values shown in bold italics font with lavendar shading indicate that the result was above both the WQCC and the BTV.

DRO = Diesel Range Organics

GRO = Gasoline Range Organics

J = Estimated result reported at a concentration above the method detection limit but below the reporting limit.

mg/L = milligrams per liter

NMED = New Mexico Environment Department

ORO = Motor Oil Range Organics

TPH = Total Petroleum Hydrocarbons

WQCC = Water Quality Control Comission



ATTACHMENTS



ATTACHMENT A

Tom Blaine, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 586987 File Nbr: RA 12403

May. 10, 2016

SCOTT DENTON
HOLLYFRONTIER NAVAJO REFINING
501 EAST MAIN STREET
ARTESIA, NM 88210

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 05/31/2017, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 05/31/2017.

Appropriate forms can be downloaded from the CSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

duan Hernandez (575)622-6521

Enclosure

explore

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

	For fees, see State Engineer web	site: http://www.ose.state.nm.u	<u>\$/</u>			
Purpose:	☐ Pollution Control And / Or Recovery	☐ Geo-Thermal				
☐ Exploratory	☐ Construction Site De-Watering	Other (Describe):				
Monitoring	☐ Mineral De-Watering					
A separate permit will be	required to apply water to beneficial use.					
Temporary Request -	Requested Start Date: 5/1/2016	Requested	End Date: 6/1/2016			
Plugging Plan of Operation	ons Submitted? Yes No					
1. APPLICANT(S)						
Name: HollyFront	ier Navajo Refining LLC	Name:				
Contact or Agent: Scott Denton	check here if Agent	Contact or Agent:	check here if Agent 🗌			
Mailing Address: 501	East Main Street	Mailing Address:				
^{City:} Artesia		City:				
State: NM	Zip Code: 88210	State:	Zip Code:			
Phone: Phone (Work): 575-74	■ Home □ Cell 6-5487	Phone: Phone (Work): 575-746	☐ Home ☐ Cell 6-5487			
E-mail (optional): Scott	t.Denton@HollyFrontier.com	E-mail (optional):				

	FOR OSE INTERNAL USE	Application for Permit, Form wr-07,	Rev 6/14/12	
# #: 50	File No.: 12403	Trn. No.:586987	Receipt No.:	
	Trans Description (optional):	POD 1,2		
الاستقالية اعتدادة	Sub-Basin:	PCW/LOG Due I	Date: 5-31-17	
	and a second of the same wife in the same			Dago 1 of 3

2. WELL(S) Describe the well(s) applicable to this application.

(Lat/Long - WGS84).			State Plane (NAD 83), UTM (NAD 83), <u>or</u> Latitude/Longitude e a PLSS location in addition to above.
☐ NM State Plane (NAD83) ☐ NM West Zone ☐ NM East Zone ☐ NM Central Zone		TM (NAD83) (Met Zone 12N Zone 13N	ers) Lat/Long (WGS84) (to the nearest 1/10 th of second)
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
TMW-WWLine1	104 20' 20.1" W	32 51' 0.1" N	T17S, R26E, S12, Q4 1, Q16 3
TMW-WWLine2	104 20' 20.3" W	32 51' 0.7" N	T17S, R26E, S12, Q4 1, Q16 3
NOTE: If more well location Additional well descriptions			m WR-08 (Attachment 1 – POD Descriptions) If yes, how many
Other description relating well Temporary wells to be installed			r: er line south of former evaporation ponds, north of US Highway 82.
Well is on land owned by: Holl	lyFrontier Navajo Refin	ing, LLC	
Well Information: NOTE: If r	nore than one (1) we	Il needs to be de	scribed, provide attachment. Attached? Yes No
Approximate depth of well (fe-			Outside diameter of well casing (inches): 2
Driller Name: Envirotech Drillin	ng Services LLC		Driller License Number: WD-1757
3. ADDITIONAL STATEMENTS	OR EXPLANATION	s	
only), then plugged and	l abandoned. Th	ne purpose of	eloped, allowed to rest for 24 hours, sampled (once the temporary monitoring wells is to determine break may have impacted the shallow groundwater

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

Trn No.: 536987

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Exploratory: Pollution Control and/or Recovery: Construction Mine De-Watering: ☐ Include a ☐ Include a plan for pollution De-Watering: ☐ Include a plan for pollution Include a description of the description of control/recovery, that includes the control/recovery, that includes the following: any proposed following: proposed dewatering A description of the need for mine pump test, if A description of the need for the operation, dewatering. pollution control or recovery operation. ☐ The estimated duration of applicable. ☐ The estimated maximum period of time ☐ The estimated maximum period of the operation, for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the time for completion of the operation. The maximum amount of ☐ The annual diversion amount. water to be diverted, ☐ The annual consumptive use A description of the need aquifer(s). amount. for the dewatering operation. The maximum amount of water to be ☐ The maximum amount of water to be diverted per annum. diverted and injected for the duration of A description of how the ☐The maximum amount of water to be the operation. diverted water will be disposed diverted for the duration of the operation. ☐The quality of the water. ☐ The method and place of discharge. of. Monitoring: ☐ The method of measurement of Geo-Thermal: The method of measurement of water water produced and discharged. Include the Include a description of the diverted. ☐ The source of water to be injected. ☐The recharge of water to the aquifer. reason for the geothermal heat exchange monitoring ☐ The method of measurement of project, Description of the estimated area of well, and, water injected. hydrologic effect of the project. ☐ The amount of water to be ■ The ☐ The characteristics of the aquifer. The method and place of discharge. diverted and re-injected for the duration ☐ The method of determining the ☐An estimation of the effects on surface project, resulting annual consumptive use of water rights and underground water rights of the planned The time frame for water and depletion from any related constructing the geothermal from the mine dewatering project. monitoring. stream system. heat exchange project, and, A description of the methods employed to ☐ The duration of the project. ☐ Preliminary surveys, design Proof of any permit required from the estimate effects on surface water rights and New Mexico Environment Department. underground water rights. An access agreement if the ☐ Information on existing wells, rivers, data, and additional applicant is not the owner of the land on information shall be included to springs, and wetlands within the area of which the pollution plume control or provide all essential facts hydrologic effect. recovery well is to be located. relating to the request. **ACKNOWLEDGEMENT** I, We (name of applicant(s)), Scott Denton on behalf of HollyFrontier Navajo Refining LLC Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Mrs Robert Combs for Scott M. Denton **ACTION OF THE STATE ENGINEER** This application is: approved partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. Witness my hand and seal this day of May 20 16 , for the State Engineer, Tom Blaine, P.E. ___, State Engineer Signature Title: Juan Hernandez, Engr Specialist Supervisor Print 2016 HAYY -2 PM 41: 20 ENSIME OF BLEND Application for Permit, Form wr-07 FOR OSE INTERNAL USE

File No.:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 1A Depth of the well shall not exceed the thickness of the valley fill.
- 4 No water shall be appropriated and beneficially used under this permit.
- The well shall be plugged upon completion of the permitted use, and a plugging report shall be filed with the State Engineer within 10 days.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
- O Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.
- P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

- Q The State Engineer retains jurisdiction over this permit.
- LOG The Point of Diversion RA 12403 POD1 must be completed and the Well Log filed on or before 05/31/2017.
- LOG The Point of Diversion RA 12403 POD2 must be completed and the Well Log filed on or before 05/31/2017.

IT IS THE PERMITTEES RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

SHOULD THE PERMITTEE CHANGE THE PURPOSE OF USE TO OTHER THAN MONITORING PURPOSES, AN APPLICATION SHALL BE ACQUIRED FROM THE OFFICE OF THE STATE ENGINEER.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd: Date Rcvd. Corrected: Formal Application Rcvd: 05/02/2016 Pub. of Notice Ordered: Date Returned - Correction: Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 10 day of May A.D., 2016

Tom Blaine, P.E. , State Engineer

By:
Juan Remandez

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

Locator Tool Report

General Information:

Application ID:29

Date: 05-10-2016

Time: 08:42:10

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE2

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.7 Seconds N

Longitude:

104 Degrees 20 Minutes 20.3 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,873
 E: 561,855

 NAD 1983(92) (Survey Feet)
 N: 11,925,413
 E: 1,843,353

 NAD 1927 (Meters)
 N: 3,634,670
 E: 561,905

 NAD 1927 (Survey Feet)
 N: 11,924,748
 E: 1,843,516

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,141
 E: 164,472

 NAD 1983(92) (Survey Feet)
 N: 673,034
 E: 539,606

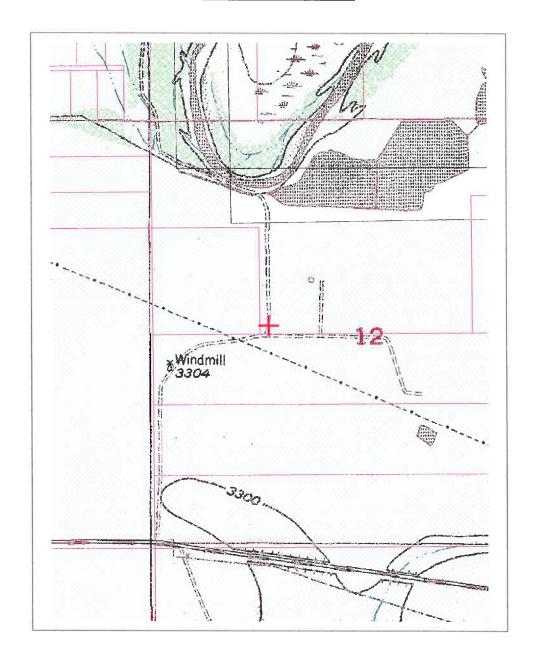
 NAD 1927 (Meters)
 N: 205,122
 E: 151,921

 NAD 1927 (Survey Feet)
 N: 672,971
 E: 498,427

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,873 E: 561,855

Northing/Easting: SPCS83(92) (Feet): N: 673,034 E: 539,606

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016

Locator Tool Report

General Information:

Application ID: 29

Date: 05-10-2016

Time: 08:40:32

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE1

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.1 Seconds N

Longitude:

104 Degrees 20 Minutes 20.1 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,855
 E: 561,860

 NAD 1983(92) (Survey Feet)
 N: 11,925,353
 E: 1,843,371

 NAD 1927 (Meters)
 N: 3,634,652
 E: 561,910

 NAD 1927 (Survey Feet)
 N: 11,924,687
 E: 1,843,534

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,123
 E: 164,477

 NAD 1983(92) (Survey Feet)
 N: 672,973
 E: 539,623

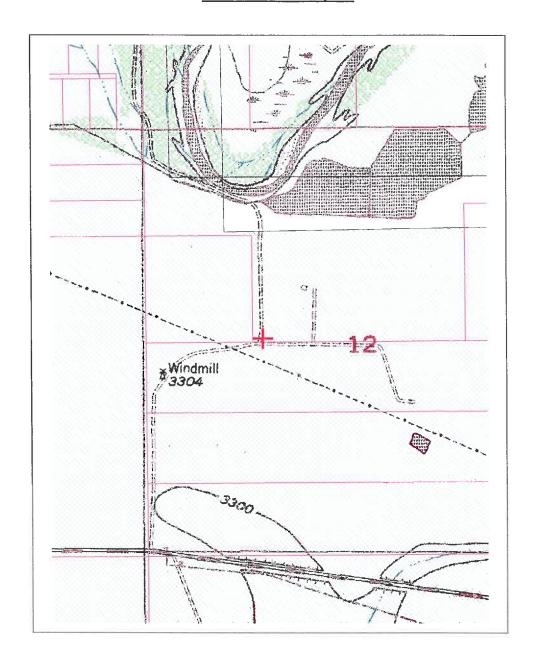
 NAD 1927 (Meters)
 N: 205,103
 E: 151,926

 NAD 1927 (Survey Feet)
 N: 672,910
 E: 498,444

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,855 E: 561,860

Northing/Easting: SPCS83(92) (Feet): N: 672,973 E: 539,623

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016



WELL PLUGGING PLAN OF OPERATIONS



		_						
NOTE	: A Well Plugging Plan o to plugging.	f Operations sh	all be filed wi	ith and	accepted by the	Office of the	State Engineer	prior
I. FIL	NG FEE: There is no fili	ng fee for this fo	orm.					
II. GE	NERAL / WELL OWNE	RSHIP:				- A		
Existing	g Office of the State Eng	ineer POD Nun	nber (Well Ni	umber) i	for well to be pla	ugged: KA	1-12403	
Name o	of well owner: HollyFro	ntier Navajo F	Refining, LL0	3	_			
Mailing	g address: 501 East Ma	ain Street						
City: _	Artesia number: <u>575-746-5487</u>		State:	NM			Zip code: 882	10
Phone 1	number: 575-746-5487			E-mail:	Scott.Denton@	@HollyFron	tier.com	
Well D	ELL DRILLER INFORMATION OF THE PROPERTY OF THE	plugging servic	es: Envirote	ech Dril	ing Services L	LC		
New M	lexico Well Driller License	No.: WD-175	57		Expirat	ion Date: 1/	31/2018	
	ELL INFORMATION: A copy of the existing Wel GPS Well Location:		•		ould be attached t	•	c , NAD 83	
2)	Reason(s) for plugging v	vell:						
	This plan is for two will be plugged and		_					ınd
3)	Was well used for any ty what hydrogeologic par water, authorization from	ameters were m	ionitored. If	the wel	was used to m	onitor conta	minated or poor	o detai quality
4)	Does the well tap brack	ish, saline, or of	herwise poor o	quality v	vater? Yes	If yes, p	orovide additional	l de tail
	including analytical resul							
	Temporary wells are lo semiannual monitoring TDS values ranging fro	program. Data	from those w					
5)	Static water level:	5 - 7 feet b	pelow land sur	face/ fe	et above land sur	face (circle	one)	
6)	Depth of the well: 1	0 - 12 feet	50	市制	2016 MAY -2			

DATE ALLANDING STALLS

7)	Inside diameter of innermost casing:inches.
8)	Casing material: PVC
9)	The well was constructed with: an open-hole production interval, state the open interval: a well screen or perforated pipe, state the screened interval(s): 2 to 10 (or 2 to 12)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? N/A
11)	Was the well built with surface casing? No No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
	if yes, prease describe.
12)	Has all pumping equipment and associated piping been removed from the well?If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DES	CRIPTION OF PLANNED WELL PLUGGING:
pipe, a c	this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie letailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional linformation, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:
	Lean cement grout will be placed in the boring from the bottom up using a tremie pipe.
2)	Will well head be cut-off below land surface after plugging? PVC casing will be removed
VI. PL	UGGING AND SEALING MATERIALS:
Note: T	he plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 1.6 - 2 gallons
4)	Type of Cement proposed: Portland cement
5)	Proposed cement grout mix: 5 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

2016 MAY -2 FM 4: 20

7)	Grout additives requested, and percent by dry weight relative to cement:
0)	
8)	Additional notes and calculations:
VII.	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):
VIII.	SIGNATURE:
	ott Denton, say that I have carefully read the foregoing Well Plugging Plan of
	tions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State
	eer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well ing Plan of Operations and attachments are true to the best of my knowledge and belief.
	Joshu R Robert Combs for Scott M. Danton 5/2/16
	Signature of Applicant Date
IX. A	CTION OF THE STATE ENGINEER:
This V	Well Plugging Plan of Operations is:
	Approved subject to the attached conditions
	Approved subject to the attached conditions. Not approved for the reasons provided on the attached letter.
	Witness my hand and official seal this
	Tom Blaine P.E., New Mexico State Engineer
	De la DA CENTA
	02:17 HJ Z- AVH 9107 Fox Andy Morley Dr. Mil T. Manager Well Plugging Plan Version: August 11, 2015 Page 3 of 5
	Dichof The Well Plugging Plan
	Version: August 11, 2015 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			0
Bottom of proposed interval of grout placement (ft bgl)			10-12
Theoretical volume of grout required per interval (gallons)			1.6 to 2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			5
Mixed on-site or batch- mixed and delivered?			mixed on-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

2016 MAY -2 FM 4: 20

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			



ATTACHMENT B

			Log of Well No. TMW-WWL-1 GROUND SURFACE ELEVATION AND DATUM:			
ORING LOC	ATION:		GROUND	SURFAGE ELEVA	HON AND L	ATOW:
RILLING CO	NTRACTOR:	Envirotech Services	DATE STAI 5/10/16	RTED:	DATE FIN 5/10/16	ISHED:
RILLING ME	THOD: Ha	ollow Stem Auger	TOTAL DEI	PTH (ft.):	SCREEN	INTERVAL (ft.):
	000000000000000000000000000000000000000		16.0 DEPTH TO	WATER ATD:	10' CASING:	
RILLING EQ	UIPMENT:	Geoprobe 9520	12'		2'	
AMPLING M	ETHOD: A	Auger	William S			
AMMER WE	ight: N A	A DROP: NA	RESPONSI William S	IBLE PROFESSIO Smith	NAL:	REG. NO.
	Blows/Sample Foot OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, str cementation, react. w/HCl, geo. inter. Surface Elevation:		Siliai	DET	CONSTRUCTION AILS AND/OR ING REMARKS
- to -	0	SANDY CLAY (CL): reddish-brown, dry, low carb induration, low-medium plasticity, no odor, no sta			- Open	Casina
-					2" DiametBentonite	er Casing
		SANDY CLAY (CL): reddish-brown, low carbona induration, medium-high plasticity, no odor, no st	I		– 20/40 Gra	de Silica Sand
5-8	0	SANDY CLAY (CL): light brown, low plasticity, no no staining	odor,			
		SANDY CLAY (CL):brown, low plasticity, gypsum crystals, no odor, no staining	1			
10-	0	SANDY CLAY (CL): light reddish-brown, low cart induration, low-medium plasticity, damp, containe some gypsum crystals, no odor, no staining			– Sch 40 0.0 Screen	010 Slot PVC
	0	Gypsiferrous SANDY CLAY (CL): whitish-green, plasticity, moist, no odor, no staining	low			
15-		Total Depth = 15.5'				
-		Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15.5'		_		
20						

ROJE			J	er Navajo Wastewater Line Release Investigati	L	<u> </u>	lo. TMW-WWL-2
ORIN	G LO	CATION:			GROU	ND SURFACE ELEVA	TION AND DATUM:
RILLII	NG C	ONTRAC	TOR:	Envirotech Services	5/10/1		DATE FINISHED: 5/10/16
RILLII	NG M	ETHOD:	Ho	ollow Stem Auger	16.0	DEPTH (ft.):	SCREEN INTERVAL (ft.): 10'
RILLII	NG E	QUIPMEI	NT:	Geoprobe 9520	DEPTH 12'	TO WATER ATD:	CASING: 2'
AMPL	ING I	METHOD	: <i>F</i>	Auger	LOGGE Willia	ED BY: m Smith	
AMME	ER W	EIGHT:	N/	DROP: NA	RESPO	NSIBLE PROFESSIOM Smith	DNAL: REG. NO.
(feet)	Sample No.	Sample M Blows/ ST Foot	OVM	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, s cementation, react. w/HCl, geo. inter.	·		WELL CONSTRUCTION DETAILS AND/OR
5=	Sar	Sar	8	Surface Elevation:			DRILLING REMARKS
_	- 01 -		0	SILTY SAND (SM): light brown, damp, non-pla odor, no stain	stic, no		─ Open─ 2" Diameter Casing
_							Bentonite
_				SANDY CLAY (CL): brown, damp, medium pla contains some gypsum crystals, no odor, no sta	-		Zonto mo
_				SANDY CLAY (CL): light reddish-brown, damp medium to high plasticity, contains some gymsi			— 20/40 Grade Silica Sand
5-	- 05		0	crystals, no odor, no stain,			
10-			0				— Sch 40 0.010 Slot PVC
- - - 15-	- 12 -		0	SANDY CLAY (CL): reddish-brown, moist, low plasticity, low-moderate carbonate induration be more gymsiferous with depth, no odor, organic, stain			Screen
-				TOTAL DEDTU- 16'			
				TOTAL DEPTH = 16'			
_				Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15'			
20							



ATTACHMENT C



ANALYTICAL REPORT May 24, 2016



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835078

Samples Received: 05/12/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation HOLLEY FRONTIER NAVAJO Site:

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, forh

Chris McCord

Technical Service Representative Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



¹ Cp: Cover Page	1
² Tc: Table of Contents	2
³ Ss: Sample Summary	3
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⁵ Sr: Sample Results	6
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TMW-WWL1-05 L835078-02	8
TMW-WWL1-12 L835078-03	10
TMW-WWL2-01 L835078-04	12
TMW-WWL2-05 L835078-05	14
TMW-WWL2-12 L835078-06	16
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⁷ Gl: Glossary of Terms	43
⁸ Al: Accreditations & Locations	44



















⁹Sc: Chain of Custody

45



TMW-WWL1-01 L835078-01 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:00	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:06	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:05	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 12:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 07:06	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 08:15	DWR
Wet Chemistry by Method 9056A	WG872631	20	05/16/16 17:26	05/17/16 11:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 01:04	СМ
TMW-WWL1-05 L835078-02 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:10	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
Mark WORLD Mark 19940	W00700F7		date/time	date/time	0.05
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:08	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:29	JF DMC
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 10:49	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:12	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5 50	05/19/16 00:02 05/16/16 17:26	05/19/16 08:37	DWR CM
Wet Chemistry by Method 9056A Wet Chemistry by Method 9056A	WG872631 WG873240	1	05/18/16 17:26	05/17/16 12:04 05/19/16 01:52	CM
Wet elicilisity by method 5050A	W0073240	ı	03/10/10 13.30	03/13/10 01.32	CIVI
TMW-WWL1-12 L835078-03 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:17	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:52	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:35	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:00	DWR
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 12:28	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:16	СМ
TMW-WWL2-01 L835078-04 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:20	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 17:15	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:50	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:58	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:22	DWR
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:29	CM
Wet Chemistry by Method 9056A	WG872631	10	05/16/16 17:26	05/17/16 12:52	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:40	CM
TMW-WWL2-05 L835078-05 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:30	Received date/time 05/12/16 09:00
	Batch	Dilution	Preparation	Analysis	Analyst
Method			date/time	date/time	
Method Metals (ICP) by Method 6010B	WG872357	1	date/time 05/14/16 08:15	date/time 05/14/16 14:23	BRJ

















Collected	by
William D	Conside



Received date/time





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TMW-WWL2-05 L835078-05 Solid			William R. Smith	05/10/16 16:30	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:14	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 10:21	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:29	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:53	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:16	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 03:04	CM
TMW-WWL2-12 L835078-06 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:50	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	•
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:26	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 18:02	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:26	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:23	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:53	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 07:17	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 04:16	CM
TMW-WWL2-12D L835078-07 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:55	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:29	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 12:33	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:38	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:46	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 16:17	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 09:36	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 14:04	CM

SAMPLE SUMMARY

TMW-WW6-EQ	L835078-08	GW

Wet Chemistry by Method 9056A

TMW-WW6-EQ L835078-08 GW	William R. Smith	05/10/16 18:00	05/12/16 09:00		
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872401	1	05/16/16 10:43	05/16/16 15:27	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872427	1	05/12/16 21:03	05/15/16 18:23	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872369	1	05/12/16 20:58	05/15/16 10:41	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872916	1	05/17/16 19:24	05/17/16 19:24	LRL
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872248	1	05/13/16 18:16	05/13/16 18:16	LRL
Wet Chemistry by Method 9056A	WG873772	1	05/20/16 04:02	05/20/16 04:02	SAM

WG873240

05/18/16 15:50

Collected by

05/19/16 04:40

Collected date/time

 CM

Received date/time



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the





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Chris McCord Technical Service Representative

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1730		15.9	200	20	05/17/2016 11:40	WG872631
Fluoride	5.61		0.261	1.00	1	05/19/2016 01:04	WG873240
Sulfate	7580		11.4	1000	20	05/17/2016 11:40	WG872631

Ср





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	12200		1.41	10.0	1	05/14/2016 14:06	WG872357
Manganese	388		0.120	1.00	1	05/14/2016 14:06	WG872357





Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 07:06	WG873092
(S) a,a,a-Trifluorotoluene(FIL	99.2			59.0-128		05/18/2016 07:06	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:15	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:15	WG872230
hylbenzene	U		0.00148	0.00500	5	05/19/2016 08:15	WG872230
otal Xylenes	U		0.00349	0.0150	5	05/19/2016 08:15	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:15	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 08:15	WG872230
(S) a,a,a-Trifluorotoluene	95.8			87.2-117		05/19/2016 08:15	WG872230
(S) 4-Bromofluorobenzene	96.7			69.7-129		05/19/2016 08:15	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	7.31		1.61	4.00	1	05/17/2016 12:02	WG872902
C28-C40 Oil Range	3.15	<u>J</u>	0.274	4.00	1	05/17/2016 12:02	WG872902
(S) o-Terphenyl	91.8			50.0-150		05/17/2016 12:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:05	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:05	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:05	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:05	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:05	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:05	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:05	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:05	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:05	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:05	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:05	WG872189
(S) 2-Fluorophenol	67.0			21.1-116		05/18/2016 16:05	WG872189
(S) Phenol-d5	68.0			26.3-121		05/18/2016 16:05	WG872189
(S) Nitrobenzene-d5	83.5			21.9-129		05/18/2016 16:05	WG872189
(S) 2-Fluorobiphenyl	74.9			34.9-129		05/18/2016 16:05	WG872189

TMW-WWL1-01

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	62.6			21.6-142		05/18/2016 16:05	WG872189	
(S) p-Terphenyl-d14	63.6			21.5-128		05/18/2016 16:05	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1070		39.8	500	50	05/17/2016 12:04	WG872631
Fluoride	16.1		0.261	1.00	1	05/19/2016 01:52	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:04	WG872631







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	7850		1.41	10.0	1	05/14/2016 14:08	WG872357
Manganese	162		0.120	1.00	1	05/14/2016 14:08	WG872357



⁵Sr

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:12	WG873092
(S) a,a,a-Trifluorotoluene(FID	98.8			59.0-128		05/18/2016 09:12	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:37	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:37	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 08:37	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 08:37	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:37	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 08:37	WG872230
(S) a,a,a-Trifluorotoluene	95.5			87.2-117		05/19/2016 08:37	WG872230
(S) 4-Bromofluorobenzene	99.6			69.7-129		05/19/2016 08:37	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 10:49	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 10:49	WG872902
(S) o-Terphenyl	98.1			50.0-150		05/17/2016 10:49	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:29	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:29	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:29	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:29	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:29	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:29	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:29	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:29	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:29	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:29	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:29	WG872189
(S) 2-Fluorophenol	57.1			21.1-116		05/18/2016 16:29	WG872189
(S) Phenol-d5	46.4			26.3-121		05/18/2016 16:29	WG872189
(S) Nitrobenzene-d5	64.5			21.9-129		05/18/2016 16:29	WG872189
(S) 2-Fluorobiphenyl	66.2			34.9-129		05/18/2016 16:29	WG872189

TMW-WWL1-05

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	39.8			21.6-142		05/18/2016 16:29	WG872189	
(S) p-Terphenvl-d14	39.6			21.5-128		05/18/2016 16:29	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1690		39.8	500	50	05/17/2016 12:28	WG872631
Fluoride	11.8		0.261	1.00	1	05/19/2016 02:16	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:28	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2710		1.41	10.0	1	05/14/2016 14:17	WG872357
Manganese	64.7		0.120	1.00	1	05/14/2016 14:17	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:35	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 09:35	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:00	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:00	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:00	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:00	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:00	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 09:00	WG872230
(S) a,a,a-Trifluorotoluene	96.3			87.2-117		05/19/2016 09:00	WG872230
(S) 4-Bromofluorobenzene	98.8			69.7-129		05/19/2016 09:00	WG872230

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Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:02	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:02	WG872902
(S) o-Terphenyl	95.4			50.0-150		05/17/2016 11:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:52	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:52	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:52	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:52	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:52	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:52	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:52	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:52	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:52	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:52	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:52	WG872189
(S) 2-Fluorophenol	64.9			21.1-116		05/18/2016 16:52	WG872189
(S) Phenol-d5	58.7			26.3-121		05/18/2016 16:52	WG872189
(S) Nitrobenzene-d5	64.9			21.9-129		05/18/2016 16:52	WG872189
(S) 2-Fluorobiphenyl	56.2			34.9-129		05/18/2016 16:52	WG872189

TMW-WWL1-12

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

L835078

		•	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	51.6			21.6-142		05/18/2016 16:52	WG872189	
(S) p-Terphenyl-d14	46.8			21.5-128		05/18/2016 16:52	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	113		0.795	10.0	1	05/17/2016 06:29	WG872631
Fluoride	4.56		0.261	1.00	1	05/19/2016 02:40	WG873240
Sulfate	2590		5.70	500	10	05/17/2016 12:52	WG872631





Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	10500		1.41	10.0	1	05/14/2016 14:20	WG872357
Manganese	344		0.120	1.00	1	05/14/2016 14:20	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.255	<u>J</u>	0.108	0.500	5	05/18/2016 09:58	WG873092
(S) a,a,a-Trifluorotoluene(FIL	0) 99.7			59.0-128		05/18/2016 09:58	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:22	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:22	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:22	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:22	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:22	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 09:22	WG872230
(S) a,a,a-Trifluorotoluene	97.8			87.2-117		05/19/2016 09:22	WG872230
(S) 4-Bromofluorobenzene	100			69.7-129		05/19/2016 09:22	WG872230

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Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:50	WG872902
C28-C40 Oil Range	0.687	<u>J</u>	0.274	4.00	1	05/17/2016 11:50	WG872902
(S) o-Terphenyl	84.3			50.0-150		05/17/2016 11:50	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:15	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:15	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:15	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:15	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:15	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:15	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:15	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:15	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:15	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:15	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:15	WG872189
(S) 2-Fluorophenol	63.6			21.1-116		05/18/2016 17:15	WG872189
(S) Phenol-d5	67.5			26.3-121		05/18/2016 17:15	WG872189
(S) Nitrobenzene-d5	72.4			21.9-129		05/18/2016 17:15	WG872189
(S) 2-Fluorobiphenyl	77.4			34.9-129		05/18/2016 17:15	WG872189

TMW-WWL2-01

SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	71.5			21.6-142		05/18/2016 17:15	WG872189	
(S) p-Terphenvl-d14	67.0			21.5-128		05/18/2016 17:15	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 06:53	WG872631
Fluoride	15.8		0.261	1.00	1	05/19/2016 03:04	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 13:16	WG872631





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	5580		1.41	10.0	1	05/14/2016 14:23	WG872357
Manganese	70.6		0.120	1.00	1	05/14/2016 14:23	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 10:21	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 10:21	WG873092







Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	<u> </u>
Benzene	U		0.00135	0.00500	5	05/19/2016 15:29	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 15:29	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:29	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:29	WG873800
(S) Toluene-d8	101			88.7-115		05/19/2016 15:29	WG873800
(S) Dibromofluoromethane	102			76.3-123		05/19/2016 15:29	WG873800
(S) a,a,a-Trifluorotoluene	101			87.2-117		05/19/2016 15:29	WG873800
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:29	WG873800

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Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:14	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:14	WG872902
(S) o-Terphenyl	96.4			50.0-150		05/17/2016 11:14	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:39	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:39	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:39	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:39	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:39	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:39	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:39	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:39	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:39	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:39	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:39	WG872189
(S) 2-Fluorophenol	59.4			21.1-116		05/18/2016 17:39	WG872189
(S) Phenol-d5	58.8			26.3-121		05/18/2016 17:39	WG872189
(S) Nitrobenzene-d5	64.1			21.9-129		05/18/2016 17:39	WG872189
(S) 2-Fluorobiphenyl	56.5			34.9-129		05/18/2016 17:39	WG872189

TMW-WWL2-05

SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	58.0			21.6-142		05/18/2016 17:39	WG872189	
(S) n-Ternhenvl-d14	66.9			21.5-128		05/18/2016 17:39	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

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Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 07:17	WG872631
Fluoride	8.01		0.261	1.00	1	05/19/2016 04:16	WG873240
Sulfate	17200		28.5	2500	50	05/17/2016 13:40	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2880		1.41	10.0	1	05/14/2016 14:26	WG872357
Manganese	80.3		0.120	1.00	1	05/14/2016 14:26	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U	<u>J3 J6</u>	0.108	0.500	5	05/18/2016 20:23	WG873220
(S) a,a,a-Trifluorotoluene(FIL	99.8			59.0-128		05/18/2016 20:23	WG873220





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
Benzene	U		0.00135	0.00500	5	05/19/2016 15:53	WG873800	
Toluene	U		0.00217	0.0250	5	05/19/2016 15:53	WG873800	
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:53	WG873800	
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:53	WG873800	
(S) Toluene-d8	103			<i>88.7-115</i>		05/19/2016 15:53	WG873800	
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 15:53	WG873800	
(S) a,a,a-Trifluorotoluene	100			87.2-117		05/19/2016 15:53	WG873800	
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:53	WG873800	

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:26	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:26	WG872902
(S) o-Terphenyl	102			50.0-150		05/17/2016 11:26	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 18:02	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 18:02	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 18:02	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 18:02	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 18:02	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 18:02	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 18:02	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 18:02	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 18:02	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 18:02	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 18:02	WG872189
(S) 2-Fluorophenol	45.8			21.1-116		05/18/2016 18:02	WG872189
(S) Phenol-d5	45.5			26.3-121		05/18/2016 18:02	WG872189
(S) Nitrobenzene-d5	52.8			21.9-129		05/18/2016 18:02	WG872189
(S) 2-Fluorobiphenyl	48.0			34.9-129		05/18/2016 18:02	WG872189

TMW-WWL2-12

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	44.1			21.6-142		05/18/2016 18:02	WG872189	
(S) n-Ternhenvl-d14	42.5			21.5-128		05/18/2016 18:02	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

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Wet Chemistry by Method 9056A

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	899		0.795	10.0	1	05/17/2016 09:36	WG872631
Fluoride	11.2		0.261	1.00	1	05/19/2016 04:40	WG873240
Sulfate	18200		28.5	2500	50	05/17/2016 14:04	WG872631

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Metals (ICP) by Method 6010B

Result <u>Qualifier</u> MDL RDL Dilution Analysis <u>Batch</u>	
Analyte mg/kg mg/kg mg/kg date / time	
Iron 3950 1.41 10.0 1 05/14/2016 14:29 <u>WG872357</u>	
Manganese 95.4 0.120 1.00 1 05/14/2016 14:29 <u>WG872357</u>	



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 20:46	WG873220
(S) a,a,a-Trifluorotoluene(FID)	99.5			59.0-128		05/18/2016 20:46	WG873220





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Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 16:17	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 16:17	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 16:17	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 16:17	WG873800
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 16:17	WG873800
(S) Dibromofluoromethane	98.9			76.3-123		05/19/2016 16:17	WG873800
(S) a,a,a-Trifluorotoluene	105			87.2-117		05/19/2016 16:17	WG873800
(S) 4-Bromofluorobenzene	99.8			69.7-129		05/19/2016 16:17	WG873800

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:38	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:38	WG872902
(S) o-Terphenyl	94.5			50.0-150		05/17/2016 11:38	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 12:33	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 12:33	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 12:33	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 12:33	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 12:33	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 12:33	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 12:33	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 12:33	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 12:33	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 12:33	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 12:33	WG873908
(S) 2-Fluorophenol	77.5			21.1-116		05/20/2016 12:33	WG873908
(S) Phenol-d5	72.1			26.3-121		05/20/2016 12:33	WG873908
(S) Nitrobenzene-d5	67.2			21.9-129		05/20/2016 12:33	WG873908
(S) 2-Fluorobiphenyl	<i>7</i> 5. <i>7</i>			34.9-129		05/20/2016 12:33	WG873908

TMW-WWL2-12D

SAMPLE RESULTS - 07

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Collected date/time: 05/10/16 16:55

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	64.1			21.6-142		05/20/2016 12:33	WG873908	
(S) p-Terphenyl-d14	64.6			21.5-128		05/20/2016 12:33	WG873908	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	0.244	<u>J</u>	0.0519	1.00	1	05/20/2016 04:02	WG873772
Fluoride	U		0.00990	0.100	1	05/20/2016 04:02	WG873772
Sulfate	0.269	<u>J</u>	0.0774	5.00	1	05/20/2016 04:02	WG873772







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.0241	<u>B J</u>	0.0141	0.100	1	05/16/2016 15:27	WG872401
Manganese	U		0.00120	0.0100	1	05/16/2016 15:27	WG872401



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 19:24	WG872916
(S) a,a,a-Trifluorotoluene(FID)	94.6			62.0-128		05/17/2016 19:24	WG872916





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Patch
		Qualifier		KDL	Dilution	•	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	0.000509	J	0.000331	0.00100	1	05/13/2016 18:16	WG872248
Toluene	U		0.000780	0.00500	1	05/13/2016 18:16	WG872248
Ethylbenzene	U		0.000384	0.00100	1	05/13/2016 18:16	WG872248
Total Xylenes	U		0.00106	0.00300	1	05/13/2016 18:16	WG872248
(S) Toluene-d8	105			90.0-115		05/13/2016 18:16	WG872248
(S) Dibromofluoromethane	106			79.0-121		05/13/2016 18:16	WG872248
(S) a,a,a-Trifluorotoluene	98.5			90.4-116		05/13/2016 18:16	WG872248
(S) 4-Bromofluorobenzene	102			80.1-120		05/13/2016 18:16	WG872248

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0358	<u>J</u>	0.0222	0.100	1	05/15/2016 10:41	WG872369
C28-C40 Oil Range	U		0.0118	0.100	1	05/15/2016 10:41	WG872369
(S) o-Terphenyl	109			50.0-150		05/15/2016 10:41	WG872369

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U	<u>J4</u>	0.000263	0.0100	1	05/15/2016 18:23	WG872427
2-Chlorophenol	U		0.000283	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/15/2016 18:23	WG872427
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dinitrophenol	U		0.00325	0.0100	1	05/15/2016 18:23	WG872427
2-Nitrophenol	U		0.000320	0.0100	1	05/15/2016 18:23	WG872427
4-Nitrophenol	U		0.00201	0.0100	1	05/15/2016 18:23	WG872427
Pentachlorophenol	U		0.000313	0.0100	1	05/15/2016 18:23	WG872427
Phenol	U	<u>J4</u>	0.000334	0.0100	1	05/15/2016 18:23	WG872427
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/15/2016 18:23	WG872427
(S) 2-Fluorophenol	71.8			10.0-77.9		05/15/2016 18:23	WG872427
(S) Phenol-d5	58.8			5.00-70.1		05/15/2016 18:23	WG872427
(S) Nitrobenzene-d5	82.5			21.8-123		05/15/2016 18:23	WG872427
(S) 2-Fluorobiphenyl	79.0			29.5-131		05/15/2016 18:23	WG872427

TMW-WW6-EQ

SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	51.3			11.2-130		05/15/2016 18:23	WG872427	
(S) p-Terphenyl-d14	91.0			29.3-137		05/15/2016 18:23	WG872427	



















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137464-1	05/16/16 20:07	
	MB Res	ult <u>MB Qualifier</u>

(1112) 110107 1011 00710710 2				
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	U		0.795	10.0
Sulfate	H		0.57	50.0







L835458-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835458-01 05/1	/16/16 22:07 • (DUP)	R3137464-4	05/16/16 22:30
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(03) 2033430-01 03/10/	(03) 2033430-01 03/10/10 22:07 (050) / (0513/404-4 05/10/10 22:30								
	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits			
Analyte	mg/kg	mg/kg		%		%			
Chloride	15.8	17.1	1	8		15			
Sulfate	ND	2.85	1	0		15			









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137464-2 05/16/16 20:31 • (LCSD) R3137464-3 05/16/16 20:55

' '	, ,									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	192	192	96	96	80-120			0	15
Sulfate	200	194	195	97	97	80-120			0	15





L834994-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834994-01 05/17/16 03:18 • (MS) R3137464-5 05/17/16 03:42 • (MSD) R3137464-6 05/17/16 04:06

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	559	13.1	595	564	104	99	1	80-120			5	15

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Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3138282-1	05/18/16 23:05

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Fluoride	U		0.261	1.00

Ср





L835078-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835078-01 05/19/16	01:04 • (DUP) F	R3138282-4 05	5/19/16 01:	28		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Eluarida	E 61	E E2	1	1		15







L835938-02 Original Sample (OS) • Duplicate (DUP)

(OS) L835938-02 05/19/16 09:16 • (DUP) R3138282-5 05/19/16 09:50

(,	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Fluoride	6.25	7.86	1	23	<u>J3</u>	15





[®]Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138282-2 05/18/16 23:28 • (LCSD) R3138282-3 05/18/16 23:52

(200) 10100202 2 00/1	0/10/20:20 (200)	D) 110100202	0 00/10/10 20:0	-						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Fluoride	20.0	19.9	20.0	100	100	80-120			0	15

L835938-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835938-03 05/19/16 10:14 • (MS) R3138282-6 05/19/16 11:26 • (MSD) R3138282-7 05/19/16 11:50

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Fluoride	50.0	5.27	36.6	33.9	63	57	1	80-120	<u>J6</u>	<u>J6</u>	7	15

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Wet Chemistry by Method 9056A

L835078-08

Method Blank (MB)

Sulfate

(MB) R3138709-1	05/19/16 20:49				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/l		mg/l	mg/l	
Chloride	U		0.0519	1.00	
Fluoride	U		0.0099	0.100	

0.0774

5.00











U

(OS) | 83/161/LOA | 05/20/16 | 02:49 • (DLIP) | P3138709-5 | 05/20/16 | 03:04

(03) 2034014-04 03/20/10	02.43 (001)	113130703-3 1	00/20/10	JJ.UT		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	1.51	1.52	1	0		15
Fluoride	ND	0.0592	1	0		15
Sulfate	18.1	18.1	1	0		15









(LCS) R3138709-2 05/19/16 21:03 • (LCSD) R3138709-3 05/19/16 21:18

(200)	10710 21100 (2002	,	00,10,10 = 1.10							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.2	39.2	98	98	80-120			0	15
Fluoride	8.00	7.89	7.89	99	99	80-120			0	15
Sulfate	40.0	39.6	39.6	99	99	80-120			0	15





L834185-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L834185-02 05/20/16 00:54 • (MS) R3138709-4 05/20/16 01:09

(00) 200 1100 02 00/20/			0,20,100.00				
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	40.1	92.4	104	1	80-120	
Fluoride	5.00	0.558	5.88	106	1	80-120	
Sulfate	50.0	6.65	60.4	107	1	80-120	

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Wet Chemistry by Method 9056A

L834409-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834409-03 05/20/16 04:45 • (MS) R3138709-6 05/20/16 04:59 • (MSD) R3138709-7 05/20/16 05:14

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	31.0	80.0	81.0	98	100	1	80-120			1	15
Fluoride	5.00	ND	5.21	5.34	102	105	1	80-120			2	15
Sulfate	50.0	ND	53.0	53.9	101	103	1	80-120			2	15



















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Metals (ICP) by Method 6010B

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3136806-1 (05/14/16 13:43
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Analyta	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Iron	1.56	<u>J</u>	1.41	10.0
Manganese	П		0.12	1.00









(LCS) R3136806-2	05/14/16 13:46 •	(LCSD) B3136806-3	05/14/16 13:48
(LC3) N3130000-Z	03/14/10 13.40	(LC3D) N3 130000-3	03/14/10 13.40

(ECS) NS130000 2 03/14/1	10 15.40 - (ECSE) 113130000 3	03/14/10 13.40	•						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Iron	1000	937	924	94	92	80-120			1	20
Manganese	100	93.2	92.0	93	92	80-120			1	20







L835281-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835281-01 05/14/16 13:51 • (MS) R3136806-6 05/14/16 14:00 • (MSD) R3136806-7 05/14/16 14:03

,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Iron	1090	20800	20900	23500	15	254	1	75-125	$\underline{\vee}$	V	12	20
Manganese	109	608	701	714	85	97	1	75-125			2	20







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Metals (ICP) by Method 6010B

L835078-08

Method Blank (MB)

(MB) R3137224-7 05/16/16	(MB) R3137224-7 05/16/16 19:15										
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/l		mg/l	mg/l							
Iron	0.0473	<u>J</u>	0.0141	0.100							
Manganese	U		0.0012	0.0100							







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

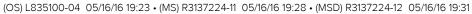
(LCS) R3137224-8 05/16	/16 19:17 • (LCSD)) R313/224-9	05/16/16 19:20								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Iron	10.0	10.2	10.3	102	103	80-120			1	20	
Manganese	1.00	0.997	1.00	100	100	80-120			1	20	







L835100-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)



(03) 2033100 04 03/10/10 13.23 - (M3) (N3) (N3) (N3) (M3) (M3) (M3) (M3)												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Iron	10.0	0.0740	10.3	10.3	102	102	1	75-125			0	20
Manganese	100	0.00612	102	102	102	101	1	75-125			1	20







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-08

Method Blank (MB)

(MB) R3137716-5 05/17/16	12:58						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	0.0333	<u>J</u>	0.0314	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 94.7			62.0-128			



³Ss

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137716-3 05/17/16	LCS) R3137716-3 05/17/16 11:43 • (LCSD) R3137716-4 05/17/16 12:06											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
TPH (GC/FID) Low Fraction	5.50	5.24	5.58	95.3	101	67.0-132			6.28	20		
(S) a,a,a-Trifluorotoluene(FIL	0)			104	104	62.0-128						







⁷ GI

L835661-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835661-01 05/17/16 17:33 • (MS) R3137716-8 05/17/16 16:27 • (MSD) R3137716-9 05/17/16 16:49												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	ND	5.49	5.50	99.1	99.3	1	50.0-143			0.200	20
(S) a,a,a-Trifluorotoluene(FID)				103	104		62.0-128				







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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-01,02,03,04,05

Method Blank (MB)

(MB) R3137718-3 05/18/16	01:00					
	MB Result	MB Qualifier	MB MDL	MB RDL		
Analyte	mg/kg		mg/kg	mg/kg		
TPH (GC/FID) Low Fraction	U		0.0217	0.100		
(S) a,a,a-Trifluorotoluene(FID) 99.8			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137718-1 05/17/16 23:52 • (LCSD) R3137718-2 05/18/16 00:14										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	6.45	6.44	117	117	63.5-137			0.140	20
(S) a.a.a-Trifluorotoluene(FID)				99.0	99.6	59.0-128				





[©]Qc

⁷Gl



(OS) L835078-04 05/18/1	16 09:58 • (MS) F	R3137718-4 05	/18/16 01:46 •	(MSD) R3137718	3-5 05/18/16 (02:09							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	0.255	18.3	14.9	65.7	53.1	5	28.5-138			20.9	23.6	
(S) a.a.a-Trifluorotoluene(FID)					96.5	97.4		59.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-06,07

Method Blank (MB)

(MB) R3138234-3 05/18/16	3 17:50						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(FIL) 100			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138234-1 05/18/1	6 16:42 • (LCSD) R3138234-2	05/18/16 17:04								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	5.59	6.61	102	120	63.5-137			16.8	20	
(S) a,a,a-Trifluorotoluene(Fl	D)			99.3	99.1	59.0-128					







⁷Gl

L835078-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-06 05/18/	16 20:23 • (MS)	R3138234-4 05	5/18/16 19:15 •	(MSD) R313823	84-5 05/18/16	19:38							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	U	4.61	9.33	16.8	33.9	5	28.5-138	<u>J6</u>	<u>J3</u>	67.8	23.6	
(S) a,a,a-Trifluorotoluene(Fl	D)				98.4	98.4		59.0-128					





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-01,02,03,04

Method Blank (MB)

(MB) R3138213-3 05/19/16 (01:28			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	105			88.7-115
(S) Dibromofluoromethane	101			76.3-123
(S) a,a,a-Trifluorotoluene	94.8			87.2-117
(S) 4-Bromofluorobenzene	100			69.7-129



(LCS) R3138213-1 05/18/16	3 23:58 • (LCSD) R3138213-2	05/19/16 00:21								— ⁷
,	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0232	0.0234	92.7	93.6	72.6-120			1.03	20	
Ethylbenzene	0.0250	0.0248	0.0244	99.2	97.6	78.6-124			1.62	20	
Toluene	0.0250	0.0243	0.0247	97.2	98.7	76.7-116			1.52	20	
Xylenes, Total	0.0750	0.0724	0.0729	96.5	97.1	78.1-123			0.620	20	
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				103	103	76.3-123					
(S) a,a,a-Trifluorotoluene				95.8	96.3	87.2-117					
(S) 4-Bromofluorobenzene				102	101	69.7-129					

L835057-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835057-12 05/19/16	03:21 • (MS) R3	3138213-4 05/1	9/16 02:13 • (M	SD) R3138213-5	5 05/19/16 02:	36						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0250	ND	0.0727	0.122	58.2	97.3	5	47.8-131		<u>J3</u>	50.4	22.8
Ethylbenzene	0.0250	ND	0.0847	0.121	67.8	97.1	5	44.8-135		<u>J3</u>	35.6	26.9
Toluene	0.0250	ND	0.0832	0.122	66.5	97.9	5	47.8-127		<u>J3</u>	38.1	24.3
Xylenes, Total	0.0750	ND	0.253	0.362	67.6	96.6	5	42.7-135		<u>J3</u>	35.4	26.6
(S) Toluene-d8					104	103		88.7-115				
(S) Dibromofluoromethane					102	104		76.3-123				
(S) a,a,a-Trifluorotoluene					95.0	94.8		87.2-117				
(S) 4-Bromofluorobenzene					98.2	99.3		69.7-129				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

Method Blank (MB)

(MB) R3138352-3 05/19/16	10:31			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	105			88.7-115
(S) Dibromofluoromethane	95.5			76.3-123
(S) a,a,a-Trifluorotoluene	106			87.2-117
(S) 4-Bromofluorobenzene	103			69.7-129

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138352-1 05/19/10	6 08:30 • (LCSE) R3138352-2	05/19/16 08:5	4							Ė
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	l
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Benzene	0.0250	0.0228	0.0223	91.1	89.3	72.6-120			2.05	20	
Ethylbenzene	0.0250	0.0259	0.0253	103	101	78.6-124			2.09	20	Ιi
Toluene	0.0250	0.0229	0.0232	91.6	92.9	76.7-116			1.39	20	
Xylenes, Total	0.0750	0.0751	0.0738	100	98.4	78.1-123			1.75	20	Į l
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				99.3	96.4	76.3-123					
(S) a,a,a-Trifluorotoluene				105	107	87.2-117					
(S) 4-Bromofluorobenzene				102	103	69.7-129					

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835074-10 05/19/16 14:41 • (MS) R3138352-6 05/19/16 12:16 • (MSD) R3138352-7 05/19/16 12:40

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0336	ND	1.40	1.36	90.6	87.5	45	47.8-131			3.33	22.8
Ethylbenzene	0.0336	ND	1.38	1.33	87.5	84.4	45	44.8-135			3.38	26.9
Toluene	0.0336	ND	1.40	1.37	90.6	88.7	45	47.8-127			2.13	24.3
Xylenes, Total	0.101	1.60	5.48	5.40	85.5	83.9	45	42.7-135			1.35	26.6
(S) Toluene-d8					104	104		88.7-115				
(S) Dibromofluoromethane					101	98.8		76.3-123				
(S) a,a,a-Trifluorotoluene					102	104		87.2-117				















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					95.1	99.8		69.7-129				



















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-08

Method Blank (MB)

(MB) R3136703-3 05/13/16	13:23			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	105			90.0-115
(S) Dibromofluoromethane	105			79.0-121
(S) a,a,a-Trifluorotoluene	98.8			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136703-1 05/13/16	6 12:14 • (LCSD)	R3136703-2	05/13/16 12:31								. [
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0259	0.0255	103	102	73.0-122			1.27	20	
Ethylbenzene	0.0250	0.0260	0.0246	104	98.2	80.9-121			5.57	20	9
Toluene	0.0250	0.0264	0.0251	105	100	77.9-116			5.02	20	
Xylenes, Total	0.0750	0.0786	0.0747	105	99.6	79.2-122			5.11	20	L
(S) Toluene-d8				105	104	90.0-115					
(S) Dibromofluoromethane				102	106	79.0-121					
(S) a,a,a-Trifluorotoluene				99.7	99.5	90.4-116					
(S) 4-Bromofluorobenzene				97.8	98.1	80.1-120					

L835078-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-08 05/13/16 18:16 • (MS) R3136703-4 05/13/16 18:33 • (MSD) R3136703-5 05/13/16 18:50												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	0.000509	0.0233	0.0247	91.1	96.9	1	58.6-133			6.06	20
Ethylbenzene	0.0250	U	0.0217	0.0232	86.9	92.7	1	62.7-136			6.45	20
Toluene	0.0250	U	0.0224	0.0240	89.4	95.8	1	67.8-124			6.96	20
Xylenes, Total	0.0750	U	0.0658	0.0704	87.8	93.9	1	65.6-133			6.70	20
(S) Toluene-d8					104	106		90.0-115				
(S) Dibromofluoromethane					106	108		79.0-121				
(S) a,a,a-Trifluorotoluene					97.8	102		90.4-116				
(S) 4-Bromofluorobenzene					98.4	98.0		80.1-120				

















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-08

Method Blank (MB)

(MB) R3139237-1 05/15	(MB) R3139237-1 05/15/16 09:51								
	MB Result	MB Qualifier	MB MDL	MB RDL					
Analyte	mg/l		mg/l	mg/l					
C10-C28 Diesel Range	U		0.0222	0.100					
C28-C40 Oil Range	U		0.0118	0.100					
(S) o-Terphenyl	112			50.0-150					









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139237-2 05/15/	16 10:07 • (LCSD) R3139237-3	05/15/16 10:24							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
C10-C28 Diesel Range	1.50	1.53	1.54	102	102	70.0-130			0.680	20
(S) o-Terphenyl				110	117	50.0-150				













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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137450-1 05/17/16 10:13											
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/kg		mg/kg	mg/kg							
C10-C28 Diesel Range	U		1.61	4.00							
C28-C40 Oil Range	U		0.274	4.00							
(S) o-Terphenyl	103			50.0-150							











(LCS) R3137450-2 05/17/16 10:25 • (LCSD) R3137450-3 05/17/16 10:37

(200) 1000 2 00/1//	10 10.20 (2002) 110107 100 0	00/1//10 10.0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	48.2	52.7	80.3	87.9	50.0-100			9.05	20
(S) o-Terphenyl				93.1	93.4	50.0-150				











(OS) L835078-01 05/17/16 12:02 • (MS) R3137450-4 05/17/16 12:15 • (MSD) R3137450-5 05/17/16 12:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	7.31	57.8	64.7	84.1	95.7	1	50.0-100			11.4	20
(S) o-Terphenyl					72.6	68.2		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Method Blank (MB)

(MB) R3138162-3 05/18/16	6 13:22				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	80.9			21.9-129	
(S) 2-Fluorobiphenyl	83.1			34.9-129	
(S) p-Terphenyl-d14	85.7			21.5-128	
(S) Phenol-d5	80.4			26.3-121	
(S) 2-Fluorophenol	74.3			21.1-116	
(S) 2,4,6-Tribromophenol	74.1			21.6-142	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16 12:35 • (LCSD) R3138162-2 05/18/16 12:58											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
4-Chloro-3-methylphenol	0.667	0.587	0.686	88.0	103	51.1-113			15.6	20	
2-Chlorophenol	0.667	0.469	0.525	70.3	78.7	40.8-103			11.3	20	
2,4-Dichlorophenol	0.667	0.551	0.617	82.6	92.5	46.2-109			11.3	20	
2,4-Dimethylphenol	0.667	0.557	0.647	83.6	97.1	42.2-110			15.0	20	
4,6-Dinitro-2-methylphenol	0.667	0.536	0.586	80.3	87.8	23.1-119			8.86	23.7	
2,4-Dinitrophenol	0.667	0.332	0.345	49.8	51.7	10.0-105			3.82	36.5	
2-Nitrophenol	0.667	0.532	0.620	79.7	93.0	44.2-113			15.3	20.9	
4-Nitrophenol	0.667	0.538	0.600	80.7	90.0	34.8-109			10.9	20	
Pentachlorophenol	0.667	0.550	0.574	82.5	86.1	16.2-102			4.25	22.9	
Phenol	0.667	0.497	0.599	74.6	89.8	41.5-106			18.5	20	
2,4,6-Trichlorophenol	0.667	0.565	0.620	84.7	93.0	44.4-108			9.39	20	
(S) Nitrobenzene-d5				86.7	99.9	21.9-129					
(S) 2-Fluorobiphenyl				83.6	94.3	34.9-129					

(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY

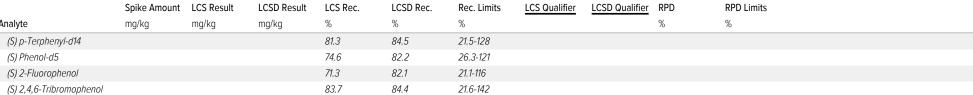
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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16	12:35 • (LCSD)	R3138162-2 0	5/18/16 12:58							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RP
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%



L835035-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) I 835035-10 05/19/16 12:00 • (MS) R3138313-1 05/19/16 12:24 • (MSD) R3138313-2 05/19/16 12:47

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.142	U	0.632	0.663	89.0	93.4	5	27.0-154			4.76	26.6
2-Chlorophenol	0.142	U	0.524	0.563	73.8	79.2	5	33.2-121			7.06	29.3
2,4-Dichlorophenol	0.142	U	0.634	0.639	89.2	90.0	5	34.8-134			0.890	27.3
2,4-Dimethylphenol	0.142	U	0.638	0.651	89.9	91.7	5	12.3-149			2.00	32.3
4,6-Dinitro-2-methylphenol	0.142	U	ND	ND	0.000	0.000	5	10.0-144	<u>J6</u>	<u>J6</u>	0.000	32.7
2,4-Dinitrophenol	0.142	U	ND	ND	0.000	0.000	5	10.0-121	<u>J6</u>	<u>J6</u>	0.000	39.4
2-Nitrophenol	0.142	U	0.636	0.652	89.5	91.8	5	29.5-144			2.53	29.9
4-Nitrophenol	0.142	U	0.586	0.569	82.6	80.1	5	20.0-133			3.03	30.2
Pentachlorophenol	0.142	U	0.655	0.671	92.3	94.5	5	10.0-139			2.43	28.3
Phenol	0.142	U	0.565	0.644	79.5	90.7	5	25.1-130			13.1	29.6
2,4,6-Trichlorophenol	0.142	U	0.633	0.675	89.1	95.1	5	33.8-133			6.52	28.1
(S) Nitrobenzene-d5					86.3	94.0		21.9-129				
(S) 2-Fluorobiphenyl					83.0	81.1		34.9-129				
(S) p-Terphenyl-d14					82.2	60.4		21.5-128				
(S) Phenol-d5					80.2	86.0		26.3-121				
(S) 2-Fluorophenol					78.2	82.9		21.1-116				

84.2

















80.1

21.6-142

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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	61.8			21.9-129
(S) 2-Fluorobiphenyl	61.7			34.9-129
(S) p-Terphenyl-d14	68.7			21.5-128
(S) Phenol-d5	70.1			26.3-121
(S) 2-Fluorophenol	64.2			21.1-116
(S) 2,4,6-Tribromophenol	52.9			21.6-142

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138667-1 05/20/	LCS) R3138667-1 05/20/16 10:08 • (LCSD) R3138667-2 05/20/16 10:32												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits			
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%			
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20			
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20			
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20			
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20			
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7			
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5			
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9			
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20			
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9			
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20			
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20			
(S) Nitrobenzene-d5				59.1	63.6	21.9-129							
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129							

(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

1835078-07

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC\ D2120667.1	0E/20/16 10:00	(LCSD) R3138667-2	OE/20/16 10:22
ILC31 K3130007-1	05/20/10 10.00 •	1LC3D1 K3130007-Z	05/20/10 10.32

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142







⁴Cn

L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6

68.4

21.6-142

ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Method Blank (MB)

(MB) R3136946-3 05/15/16	6 16:02					
	MB Result	MB Qualifier	MB MDL	MB RDL	- -	6
Analyte	mg/l		mg/l	mg/l		ĺ
4-Chloro-3-methylphenol	U		0.000263	0.0100		-
2-Chlorophenol	U		0.000283	0.0100		3
2,4-Dichlorophenol	U		0.000284	0.0100		L
2,4-Dimethylphenol	U		0.000624	0.0100		4
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100		ı
2,4-Dinitrophenol	U		0.00325	0.0100		-
2-Nitrophenol	U		0.000320	0.0100		5
4-Nitrophenol	U		0.00201	0.0100		L
Pentachlorophenol	U		0.000313	0.0100	1	6
Phenol	U		0.000334	0.0100		
2,4,6-Trichlorophenol	U		0.000297	0.0100		
(S) Nitrobenzene-d5	85.3			21.8-123		7
(S) 2-Fluorobiphenyl	<i>75.7</i>			29.5-131		L
(S) p-Terphenyl-d14	88.4			29.3-137		8
(S) Phenol-d5	53.1			5.00-70.1		ĺ
(S) 2-Fluorophenol	72.7			10.0-77.9		
(S) 2,4,6-Tribromophenol	44.8			11.2-130		ç

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	16 15:16 • (LCSD)	R3136946-2	05/15/16 15:39							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0516	0.0536	103	107	35.7-100	<u>J4</u>	<u>J4</u>	3.90	22.9
2-Chlorophenol	0.0500	0.0350	0.0353	70.1	70.6	26.2-91.5			0.760	26.5
2,4-Dichlorophenol	0.0500	0.0414	0.0421	82.8	84.1	31.4-103			1.56	24.9
2,4-Dimethylphenol	0.0500	0.0402	0.0453	80.3	90.6	31.9-107			12.0	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0450	0.0490	89.9	98.1	18.4-148			8.69	24.4
2,4-Dinitrophenol	0.0500	0.0286	0.0321	57.1	64.3	24.2-128			11.8	20.5
2-Nitrophenol	0.0500	0.0429	0.0419	85.7	83.9	25.9-106			2.18	26.9
4-Nitrophenol	0.0500	0.0259	0.0255	51.9	50.9	10.0-52.7			1.86	40
Pentachlorophenol	0.0500	0.0325	0.0346	65.0	69.1	10.0-97.4			6.22	35.1
Phenol	0.0500	0.0280	0.0295	55.9	59.1	10.0-57.9		<u>J4</u>	5.49	35
2,4,6-Trichlorophenol	0.0500	0.0418	0.0443	83.7	88.6	29.8-107			5.71	24.1
(S) Nitrobenzene-d5				93.0	96.0	21.8-123				
(S) 2-Fluorobiphenyl				80.1	80.5	29.5-131				

















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	6 15:16 • (LCSD)	R3136946-2	05/15/16 15:39								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
(S) p-Terphenyl-d14				88.1	101	29.3-137					
(S) Phenol-d5				55.5	52.7	5.00-70.1					
(S) 2-Fluorophenol				66.2	67.0	10.0-77.9					
(S) 2,4,6-Tribromophenol				62.1	62.8	11.2-130					



















GLOSSARY OF TERMS





SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
В	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
llinois	200008	Oregon	TN200002
ndiana	C-TN-01	Pennsylvania	68-02979
owa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky 1	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
ouisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















			Billing Info	rmation:			100	1	A	nalysis /	Contain	ner / Pre	servativ	ve .	4.5		Chain of Custody	Page of
AMEC Foster Wheeler 585 N. Dairy Ashford Houston, TX 77079	- Housto	on, TX	585 N. D	s Payable Pairy Ashford 1, TX 77079												and the same of th	LA-B S-C	SC
teport to: Pamela Krueger			Email To: p	oamela.krueger@a	mecfw.com						es	V					12065 Lebanon Rd Mount Juliet, TN 3712 Phone: 615-758-5858 Phone: 800-767-5859	100
Project Description: Wastewater Line Inv	estigation			City/State A & Collected:	TESTAIN	VM.	5	S		_	NoPr	103			res	100	Fax: 615-758-5859	
Phone: 713-929-5674 Client Project # 6703160012.001			Lab Project # AMECFWH		(-WW LINE		NoPres	5mlHDPE-NoPres	res	9-HCI-B	4ozClr-	DPE-HN	VoPres		2ozCir-NoPres	HCI	₩ C8 3s	the production of the same of
lected by (print): I am R Site/Facility ID # Holas Front		Routin					nl Amb	nlHDP	Ir-NoP	mlAm	OACID	50mlH	ozClr-N	HCI		40mlAmb-HCl	Acctnum: AME Template:T112	
Rush? (Lab MUST B Same Day Next Day Two Day Three Day		Day ay				No.	8270ACID 100ml	FI, SO4 125r	Fl, SO4 4ozClr-NoPres	DROOROLVI 40mlAmb-HCl-BT	DRORLA, SV8270ACID 4ozClr-NoPres	FEICP, MNICP 250mlHDPE-HNO3	FEICP, MNICP 202Clr-NoPres	GRO 40mlAmb HCl	GRO,V8260BTEX	V8260BTEX 401	Prelogin: P552 TSR: 526 - Chris PB: 5 . 4 . Shipped Via: Fe	McCord G KM
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	Ω,	C, F	DRC	DRC	FEIG	FEIG	GRC	GRC	V82	Rem./Contaminant	Sample # (lab on
TMW-WWL1-01		SS	1	5/10/16	15:00	4			X		X		X		X	_		-01
TMW-WULL-05		SS	5	5/10/16	15:10	4			X		X		X		X			-02
TMW-WWL1-12	100	SS	12	5/10/16	15:20	4			X		X		X		X			-03
TMW-WWLZ-01		SS	1	5/10/16	16:20	4			X		X		X		X	_	1 1 2 2 3	-04
TMW-WWLZ-05		SS	5	5/10/16		4			X		Х		X		X	_		-05
TMW-WWLZ-12D		SS	12	5/10/16		4			X		X		X		X	_		-14
TMW-WWL2-121)		SS	12	5/10/16	16:55	4			X	_	X		X		X			-57
n		_\$5		1		4	>		X		×		X		X			
TMW-WW6-EQ		Ø ₩	_	5/10/10	18:00	11	X	X		Х		Х		Х		X	100	-08
111	/	GW	1	1		111	×	X		X		X		X		X	- P	
Matrix: SS - Soil GW - Groundwater Remarks:	WW - WasteW	ater DW - D	rinking Wate	er OT - Other						pH _ Flow _	2	Tem			Но	47/	10132	8168
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ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835353

Samples Received: 05/13/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, fagh

Chris McCord

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the lutroratory. Where applicable, sampling conducted by ESC is performed per guidance provided in lutroratory standard operating procedures 56/300, 06/303, and 06/304.



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⁹Sc: Chain of Custody

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ONE	LAB.	NAT	TION	WID

TMW-WWL1 L835353-01 GW			Collected by	Collected date/time 05/12/16 08:30	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:15	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 15:12	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:33	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:32	05/17/16 00:32	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:20	05/19/16 00:20	DAH
Net Chemistry by Method 9056A	WG874711	1	05/24/16 13:02	05/24/16 13:02	CM
Wet Chemistry by Method 9056A	WG875355	500	05/26/16 11:11	05/26/16 11:11	CM
TMW-WWL2 L835353-02 GW			Collected by	Collected date/time 05/12/16 09:00	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:12	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:26	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:50	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:53	05/17/16 00:53	ACG
/olatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:43	05/19/16 00:43	DAH

SAMPLE SUMMARY



'Ss

Cn

Sr

СQс



CM

 CM

CM

Received date/time

05/13/16 09:00

TMW-WWL2D L835353-03 GW

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Method	Batch	Dilution	Preparation	Analysis	Analyst	
			date/time	date/time		
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:18	ST	
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:49	JF	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 05:07	JNS	
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 01:15	05/17/16 01:15	ACG	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 01:05	05/19/16 01:05	DAH	
Wet Chemistry by Method 9056A	WG874225	1	05/23/16 13:58	05/23/16 13:58	SAM	
Wet Chemistry by Method 9056A	WG874225	500	05/23/16 12:55	05/23/16 12:55	SAM	
			Collected by	Collected date/time	Received date/time	
TRIP BLANK 1 835353-04 GW				05/12/16 00:00	05/13/16 09:00	

WG874711

WG874711

WG875355

1

100

500

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected by

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected date/time 05/12/16 09:05

	Collected by	Collected date/time	Received date/time
RIP BLANK L835353-04 GW		05/12/16 00:00	05/13/16 09:00

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:12	05/18/16 20:12	DAH
			Collected by	Collected date/time	Received date/time
TRIP BLANK L835353-05 GW				05/12/16 00:00	05/13/16 09:00

TRIP DLAINE LOSSSSS-US GW					
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:34	05/18/16 20:34	DAH

Collected by

Collected date/time

Received date/time



WWL-SPC L835353-06 Solid				05/12/16 00:00	05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Mercury by Method 7471A	WG873476	1	05/18/16 17:22	05/19/16 09:44	NJB
Metals (ICP) by Method 6010B	WG873554	1	05/20/16 11:08	05/20/16 13:52	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 14:58	SNR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG873587	1	05/19/16 21:44	05/20/16 19:28	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG874253	5	05/20/16 17:57	05/20/16 22:59	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG874942	5	05/24/16 16:07	05/25/16 02:00	DWR
Wet Chemistry by Method 9056A	WG874228	1	05/23/16 09:00	05/23/16 17:37	CM
Wet Chemistry by Method 9056A	WG874228	10	05/23/16 09:00	05/23/16 18:01	CM
Wet Chemistry by Method 9056A	WG874228	50	05/23/16 09:00	05/24/16 09:03	CM





















All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

















Technical Service Representative

Analyte

Manganese

Iron

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

Metals (ICP) by Method 6010B

Result

mg/l

0.234

0.954

Qualifier

MDL

mg/l

0.0705

0.00600

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	12200		26.0	500	500	05/26/2016 11:11	WG875355
Fluoride	6.21		0.00990	0.100	1	05/24/2016 13:02	WG874711
Sulfate	18800		38.7	2500	500	05/26/2016 11:11	WG875355

Dilution

5

5

Analysis

date / time

05/17/2016 17:15

05/17/2016 17:15

Batch

WG872666

WG872666

RDL

mg/l

0.500

0.0500





Cn



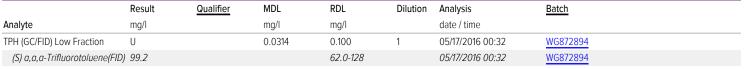












Volatile Organic Compounds (GC/MS) by Method 8260B

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:20	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:20	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:20	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:20	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:20	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/19/2016 00:20	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/19/2016 00:20	WG872872
(S) 4-Bromofluorobenzene	101			80.1-120		05/19/2016 00:20	WG872872

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0851	<u>J</u>	0.0222	0.100	1	05/17/2016 04:33	WG872740
C28-C40 Oil Range	0.0419	<u>J</u>	0.0118	0.100	1	05/17/2016 04:33	WG872740
(S) o-Terphenyl	95.3			50.0-150		05/17/2016 04:33	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 15:12	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 15:12	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 15:12	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 15:12	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 15:12	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 15:12	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 15:12	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 15:12	WG872936
(S) 2-Fluorophenol	43.8			10.0-77.9		05/19/2016 15:12	WG872936
(S) Phenol-d5	32.9			5.00-70.1		05/19/2016 15:12	WG872936
(S) Nitrobenzene-d5	76.8			21.8-123		05/19/2016 15:12	WG872936
(S) 2-Fluorobiphenyl	87.2			29.5-131		05/19/2016 15:12	WG872936

TMW-WWL1

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

L835353

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	71.9			11.2-130		05/19/2016 15:12	WG872936	
(S) n-Ternhenvl-d14	98.2			29.3-137		05/19/2016 15:12	WG872936	



















SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7130		5.19	100	100	05/24/2016 13:45	WG874711
Fluoride	2.59		0.00990	0.100	1	05/24/2016 13:31	WG874711
Sulfate	14600		38.7	2500	500	05/26/2016 11:25	WG875355







	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.169	<u>J</u>	0.0705	0.500	5	05/17/2016 17:12	WG872666
Manganese	0.836		0.00600	0.0500	5	05/17/2016 17:12	WG872666



Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 00:53	WG872894
(S) a,a,a-Trifluorotoluene(FIL	99.5			62.0-128		05/17/2016 00:53	WG872894



Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:43	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:43	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:43	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:43	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:43	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 00:43	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 00:43	WG872872
(S) 4-Bromofluorobenzene	114			80.1-120		05/19/2016 00:43	WG872872



ΆΙ

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.182		0.0222	0.100	1	05/17/2016 04:50	WG872740
C28-C40 Oil Range	0.175		0.0118	0.100	1	05/17/2016 04:50	WG872740
(S) o-Terphenyl	104			50.0-150		05/17/2016 04:50	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:26	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:26	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:26	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:26	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:26	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:26	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:26	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:26	WG872936
(S) 2-Fluorophenol	52.9			10.0-77.9		05/19/2016 19:26	WG872936
(S) Phenol-d5	38.1			5.00-70.1		05/19/2016 19:26	WG872936
(S) Nitrobenzene-d5	84.9			21.8-123		05/19/2016 19:26	WG872936
(S) 2-Fluorobiphenyl	88.9			29.5-131		05/19/2016 19:26	WG872936

TMW-WWL2

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

	<u>'</u>	•	, ,				
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
(S) 2,4,6-Tribromophenol	78.3			11.2-130		05/19/2016 19:26	WG872936
(S) p-Terphenyl-d14	99.5			29.3-137		05/19/2016 19:26	WG872936



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7100		26.0	500	500	05/23/2016 12:55	WG874225
Fluoride	3.10		0.00990	0.100	1	05/23/2016 13:58	WG874225
Sulfate	16800		38.7	2500	500	05/23/2016 12:55	WG874225







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.981		0.0705	0.500	5	05/17/2016 17:18	WG872666
Manganese	0.910		0.00600	0.0500	5	05/17/2016 17:18	WG872666



Sr ⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 01:15	WG872894
(S) a,a,a-Trifluorotoluene(FID)	98.8			62.0-128		05/17/2016 01:15	WG872894





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
		Qualifier			Dilution	,	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 01:05	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 01:05	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 01:05	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 01:05	WG872872
(S) Toluene-d8	103			90.0-115		05/19/2016 01:05	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 01:05	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 01:05	WG872872
(S) 4-Bromofluorobenzene	116			80.1-120		05/19/2016 01:05	WG872872

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0892	<u>J</u>	0.0222	0.100	1	05/17/2016 05:07	WG872740
C28-C40 Oil Range	0.0898	<u>J</u>	0.0118	0.100	1	05/17/2016 05:07	WG872740
(S) o-Terphenyl	97.7			50.0-150		05/17/2016 05:07	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:49	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:49	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:49	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:49	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:49	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:49	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:49	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:49	WG872936
(S) 2-Fluorophenol	40.0			10.0-77.9		05/19/2016 19:49	WG872936
(S) Phenol-d5	32.2			5.00-70.1		05/19/2016 19:49	WG872936
(S) Nitrobenzene-d5	70.2			21.8-123		05/19/2016 19:49	WG872936
(S) 2-Fluorobiphenyl	81.9			29.5-131		05/19/2016 19:49	WG872936

TMW-WWL2D

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	63.3			11.2-130		05/19/2016 19:49	WG872936	
(S) n-Ternhenvl-d14	94.9			29.3-137		05/19/2016 19:49	WG872936	



















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SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:12	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:12	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:12	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:12	WG872872
(S) Toluene-d8	104			90.0-115		05/18/2016 20:12	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/18/2016 20:12	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/18/2016 20:12	WG872872
(S) 4-Bromofluorobenzene	99.5			80.1-120		05/18/2016 20:12	WG872872



















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SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:34	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:34	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:34	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:34	WG872872
(S) Toluene-d8	108			90.0-115		05/18/2016 20:34	WG872872
(S) Dibromofluoromethane	99.3			79.0-121		05/18/2016 20:34	WG872872
(S) a,a,a-Trifluorotoluene	108			90.4-116		05/18/2016 20:34	WG872872
(S) 4-Bromofluorobenzene	105			80.1-120		05/18/2016 20:34	WG872872



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1660		7.95	100	10	05/23/2016 18:01	WG874228
Fluoride	18.3		0.261	1.00	1	05/23/2016 17:37	WG874228
Sulfate	20000		28.5	2500	50	05/24/2016 09:03	WG874228





Mercury by Method 7471A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Mercury	U		0.00280	0.0200	1	05/19/2016 09:44	WG873476





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Arsenic	2.87		0.650	2.00	1	05/20/2016 13:52	WG873554
Barium	95.9		0.170	0.500	1	05/20/2016 13:52	WG873554
Cadmium	0.222	<u>J</u>	0.0700	0.500	1	05/20/2016 13:52	WG873554
Chromium	5.89		0.140	1.00	1	05/20/2016 13:52	WG873554
Iron	5120		1.41	10.0	1	05/20/2016 13:52	WG873554
Lead	7.90		0.190	0.500	1	05/20/2016 13:52	WG873554
Manganese	390		0.120	1.00	1	05/20/2016 13:52	WG873554
Selenium	U		0.740	2.00	1	05/20/2016 13:52	WG873554
Silver	U		0.280	1.00	1	05/20/2016 13:52	WG873554





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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/20/2016 22:59	WG874253
(S) a,a,a-Trifluorotoluene(FID) 87.3			59.0-128		05/20/2016 22:59	WG874253

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/25/2016 02:00	WG874942
Toluene	U		0.00217	0.0250	5	05/25/2016 02:00	WG874942
Ethylbenzene	U		0.00148	0.00500	5	05/25/2016 02:00	WG874942
Total Xylenes	U		0.00349	0.0150	5	05/25/2016 02:00	WG874942
(S) Toluene-d8	106			88.7-115		05/25/2016 02:00	WG874942
(S) Dibromofluoromethane	102			76.3-123		05/25/2016 02:00	WG874942
(S) a,a,a-Trifluorotoluene	103			87.2-117		05/25/2016 02:00	WG874942
(S) 4-Bromofluorobenzene	103			69.7-129		05/25/2016 02:00	WG874942

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/20/2016 19:28	WG873587
C28-C40 Oil Range	4.12		0.274	4.00	1	05/20/2016 19:28	WG873587
(S) o-Terphenyl	87.5			50.0-150		05/20/2016 19:28	WG873587

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 14:58	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 14:58	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 14:58	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 14:58	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 14:58	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 14:58	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 14:58	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 14:58	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 14:58	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 14:58	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 14:58	WG873908
(S) 2-Fluorophenol	61.1			21.1-116		05/20/2016 14:58	WG873908
(S) Phenol-d5	55.3			26.3-121		05/20/2016 14:58	WG873908
(S) Nitrobenzene-d5	67.6			21.9-129		05/20/2016 14:58	WG873908
(S) 2-Fluorobiphenyl	62.2			34.9-129		05/20/2016 14:58	WG873908
(S) 2,4,6-Tribromophenol	46.7			21.6-142		05/20/2016 14:58	WG873908
(S) p-Terphenyl-d14	52.9			21.5-128		05/20/2016 14:58	WG873908

















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835353-03

Method Blank (MB)

(MB) R3139265-1	05/23/16 09:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Sulfate	U		0.0774	5.00







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CS) P3139265-2 05/23/16 09:23 • // CSD) P3139265-3 05/23/16 09:38

(LCS) R3139265-2 U5/23/	(LCS) R3139205-2 05/23/16 09.23 • (LCSD) R3139205-3 05/23/16 09.38											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
Chloride	40.0	38.9	38.9	97	97	80-120			0	15		
Fluoride	8.00	7.73	7.76	97	97	80-120			0	15		
Sulfate	40.0	38.5	38.6	96	97	80-120			0	15		









L835977-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835977-10 05/23/16 17:41 • (MS) R3139265-4 05/23/16 17:57 • (MSD) R3139265-5 05/23/16 18:13

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Fluoride	5.00	0.361	5.34	5.28	100	98	1	80-120			1	15
Sulfate	50.0	ND	50.8	51.0	99	99	1	80-120			0	15





Fluoride

QUALITY CONTROL SUMMARY

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Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3139346-1 05/24/	16 08:33			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l









(OS) L836606-01 05/24/16 16:53 •	· (DUP) R3139346-5 05/24/16 17:07
----------------------------------	-----------------------------------

(00) 2000000 01 00/2 1/1	0 10.00 (201)	1101000100	00/2 1/10 1	, ,		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	ND	0.611	1	0		15
Fluoride	ND	0.0818	1	0		15











0.0099

0.100

(LCS) R3139346-2 05/24/	/16 08:47 • (LCS	D) R3139346-	3 05/24/16 10:2	27						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.0	39.2	97	98	90-110			0	20
Fluoride	8.00	7.82	7 84	98	98	90-110			0	20





L836505-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L836505-07 05/24/16 14:28 • (MS) R3139346-4 05/24/16 14:43

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	17.2	67.6	101	1	80-120	
Fluoride	5.00	0.122	5.04	98	1	80-120	

L836606-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(US) 1 836606-06	05/24/16 18:36	(MS) D31303/6-6	05/24/16 18:50 •	(MSD) R3139346-7	05/24/16 19:04
(US) L030000-00	03/24/10 10.30	0-04CECICA (CIVII)	03/24/10 10.30 •	(IVISD) KSISSS40-/	03/24/10 19.04

OS) L836606-06 05/24/16 18:36 • (MS) R3139346-6 05/24/16 18:50 • (MSD) R3139346-7 05/24/16 19:04												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	ND	50.1	51.6	100	103	1	80-120			3	15
Fluoride	5.00	ND	4.98	5.18	98	102	1	80-120			4	15

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Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3140117-1 05/26/16 09:06								
	MB Result	MB Qualifier	MB MDL	MB RDL				
Analyte	mg/l		mg/l	mg/l				
Chloride	U		0.0519	1.00				
Sulfate	U		0.0774	5.00				







L837803-06 Original Sample (OS) • Duplicate (DUP)

	(OS) L837803-06 05/26/16 15:51 • (DUP) R3140117-4 05/26/16 16:06											
Original Result DUP Result Dilution DUP RPD <u>DUP Qualifier</u> DUP RPD Limits												
	Analyte	mg/l	mg/l		%		%					
	Sulfate	35.7	35.6	1	0		15					



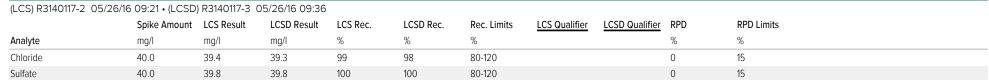
[†]Cn















ACCOUNT:

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Wet Chemistry by Method 9056A

L835353-06

Method Blank (MB)

Chloride

Fluoride

Sulfate

(MB) R3139258-1 05/23/16	B) R3139258-1 05/23/16 10:37								
	MB Result	MB Qualifier	MB MDL						
Analyte	mg/kg		mg/kg						

U

U











(OS) L836501-15 05/23/16 20:25 • (DUP) R3139258-4 05/23/16 20:49

	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	86.9	80.8	1	7		15
Fluoride	7.38	6.69	1	10		15
Sulfate	215	177	1	19	P1	15

MB RDL

mg/kg

10.0

1.00

50.0

0.795

0.261

0.57







⁸Al



(OS) L836501-21 05/24/16 00:48 • (DUP) R3139258-7 05/24/16 01:12

	Original Result (dry)	DUP Result (dry) Dilution DUP RPD			DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	75.8	83.5	1	10		15
Fluoride	16.2	13.3	1	20	<u>J3</u>	15
Sulfate	257	235	1	9		15



⁹Sc

Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139258-2 05/23/16 11:01 • (LCSD) R3139258-3 05/23/16 11:25

(200) ((0.002002 00)20	3, 10 11.01 (2002	,	00/20/10 11120							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	199	199	99	99	80-120			0	15
Fluoride	20.0	20.4	20.5	102	103	80-120			0	15
Sulfate	200	200	200	100	100	80-120			0	15

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Wet Chemistry by Method 9056A

L835353-06

L836501-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836501-16 05/23/16 22:00 • (MS) R3139258-5 05/23/16 22:24 • (MSD) R3139258-6 05/23/16 22:48

(00) 2000001 10 00/20/10	(00) 2000001 10 00/20/10 22:00 (110) No100200 0 00/20/10 22:21 (1100) No100200 0 00/20/10 22:10											
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	538	78.6	643	629	105	102	1	80-120			2	15
Fluoride	53.8	5.67	49.6	49.1	82	81	1	80-120			1	15
Sulfato	E38	260	922	916	103	102	1	90 120			1	15





















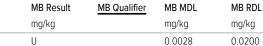
ONE LAB. NATIONWIDE.

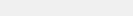
Method Blank (MB)

Mercury

Mercury by Method 7471A

(MB) R3138224-1 05/19/16 09:36 MB Result MB Qualifier MB MDL Analyte







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138224-2 05/19/16 09:39 • (LCSD) R3138224-3 05/19/16 09:41

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Mercury	0.300	0.260	0.274	87	91	80-120			5	20	









(OS) L835353-06 05/19/16 09:44 • (MS) R3138224-4 05/19/16 09:47 • (MSD) R3138224-5 05/19/16 09:54

, ,	Spike Amount	Original Result		MSD Result	MS Rec.	MSD Rec.	Dilutio	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
Mercury	0.300	U	0.282	0.276	94	92	1	75-125			2	20	









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Metals (ICP) by Method 6010B

L835353-01,02,03

Method Blank (MB)

(MB) R3137501-1 05/17/16	12:02			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	U		0.0141	0.100
Manganese	U		0.0012	0.0100







(LCS) R3137501-2 05/17	/16 12:04 • (LCSD) R3137501-3	05/17/16 12:07							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Iron	10.0	9.70	9.78	97	98	80-120			1	20
Manganese	1.00	0.973	0.980	97	98	80-120			1	20















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Metals (ICP) by Method 6010B

Method Blank (MB)

Silver

(MB) R3138672-1 05/20/1	6 13:30			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.65	2.00
Barium	0.278	<u>J</u>	0.17	0.500
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Manganese	U		0.12	1.00
Selenium	U		0.74	2.00



0.28

1.00

	(LC	S) R3138672-2	05/20/16 13:33 •	(LCSD	R3138672-3	05/20/16 13:35
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U

(LCS) NS 150072 2	03/20/10 13.33 • (ECSE	•									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier I	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%		•	%	%	
Arsenic	100	99.2	97.4	99	97	80-120		2	2	20	
Barium	100	104	102	104	102	80-120		1	l	20	
Cadmium	100	103	101	103	101	80-120			2	20	
Chromium	100	99.2	97.9	99	98	80-120		1	l	20	
Iron	1000	974	963	97	96	80-120		1	l	20	
Lead	100	104	102	104	102	80-120			2	20	
Manganese	100	99.7	98.4	100	98	80-120		1		20	
Selenium	100	103	102	103	102	80-120		1		20	
Silver	100	98.4	97.0	98	97	80-120		•		20	

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	105	4.07	102	106	94	97	1	75-125			3	20
Barium	105	47.6	155	166	102	113	1	75-125			7	20
Cadmium	105	U	106	108	101	103	1	75-125			2	20
Chromium	105	7.15	105	111	93	99	1	75-125			6	20
Iron	1050	11300	10800	12600	0	118	1	75-125	\vee		16	20



















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Metals (ICP) by Method 6010B

L835353-06

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

(00) 2000000 00 00/20/	0 .0.00 (0) .	(0.000) = 0 0	3/20/10 10:10	(2 / 00/20/10							
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Lead	105	6.62	114	116	102	105	1	75-125			2	20
Manganese	105	293	362	353	65	57	1	75-125	<u>J6</u>	<u>J6</u>	2	20
Selenium	105	U	92.7	98.3	88	94	1	75-125			6	20
Silver	105	П	100	104	95	99	1	75-125			4	20





















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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-01,02,03

Method Blank (MB)

(MB) R3137306-3 05/16/16	6 22:25						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	U		0.0314	0.100			
(S) a,a,a-Trifluorotoluene(FIL	D) 100			62.0-128			







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137306-1 05/16/1	6 21:22 • (LCSD) R3137306-2	05/16/16 21:43								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	6.14	6.04	112	110	67.0-132			1.66	20	
(S) a,a,a-Trifluorotoluene(Fl.	D)			102	101	62.0-128					







L834446-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834446-01 05/16/1	(OS) L834446-01 05/16/16 23:50 • (MS) R3137306-4 05/16/16 22:46 • (MSD) R3137306-5 05/16/16 23:07												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	ND	2.91	3.00	52.9	54.6	1	50.0-143			3.25	20	
(S) a.a.a-Trifluorotoluene(Fl	'DI				100	100		62.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-06

Method Blank (MB)

(MB) R3138993-3 05/20/1	16 19:11			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FIL	D) 88.2			59.0-128





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138993-1 05/20/	16 18:01 • (LCSD) R3138993-2	05/20/16 18:24	1						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.12	4.92	93.0	89.4	63.5-137			3.96	20
(S) a a a-Trifluorotoluene(FII	וח			891	89.0	59 0-128				







7 GI

L835353-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835353-06 05/20/1	6 22:59 • (MS)	R3138993-4 0	5/20/16 21:50	 (MSD) R31389 	993-5 05/20/16	5 22:13						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	U	17.6	19.8	63.9	71.9	5	28.5-138			11.7	23.6
(S) a,a,a-Trifluorotoluene(FID))				86.7	87.5		59.0-128				





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-01,02,03,04,05

Method Blank (MB)

(MB) R3138238-3 05/18/16	3 18:41			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			90.0-115
(S) Dibromofluoromethane	109			79.0-121
(S) a,a,a-Trifluorotoluene	103			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138238-1 05/18/1	6 16:49 • (LCSD)) R3138238-2	05/18/16 17:11								_
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0256	0.0267	102	107	73.0-122			4.33	20	
Ethylbenzene	0.0250	0.0251	0.0260	100	104	80.9-121			3.74	20	0
Toluene	0.0250	0.0235	0.0244	93.9	97.4	77.9-116			3.63	20	
Xylenes, Total	0.0750	0.0736	0.0765	98.2	102	79.2-122			3.82	20	L
(S) Toluene-d8				105	106	90.0-115					
(S) Dibromofluoromethane				110	103	79.0-121					
(S) a,a,a-Trifluorotoluene				103	106	90.4-116					
(S) 4-Bromofluorobenzene				101	106	80.1-120					

L835321-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835321-02 05/18/16	21:19 • (MS) R3	138238-4 05/1	8/16 19:04 • (M	SD) R3138238-	5 05/18/16 19:2	27						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	ND	0.0233	0.0247	93.2	98.8	1	58.6-133			5.89	20
Ethylbenzene	0.0250	ND	0.0234	0.0253	93.5	101	1	62.7-136			7.89	20
Toluene	0.0250	ND	0.0215	0.0228	85.9	91.4	1	67.8-124			6.16	20
Xylenes, Total	0.0750	ND	0.0695	0.0740	92.6	98.7	1	65.6-133			6.31	20
(S) Toluene-d8					106	105		90.0-115				
(S) Dibromofluoromethane					108	109		79.0-121				
(S) a,a,a-Trifluorotoluene					104	104		90.4-116				
(S) 4-Bromofluorobenzene					104	104		80.1-120				





















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

Method Blank (MB)

(MB) R3139540-3 05/24/16	3 21:59			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	106			88.7-115
(S) Dibromofluoromethane	99.4			76.3-123
(S) a,a,a-Trifluorotoluene	105			87.2-117
(S) 4-Bromofluorobenzene	103			69.7-129

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139540-1 05/24/	16 20:22 • (LCS	D) R3139540-2	2 05/24/16 20:	42							ľ
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0216	0.0216	86.5	86.4	72.6-120			0.0900	20	_
Ethylbenzene	0.0250	0.0236	0.0232	94.6	92.8	78.6-124			1.85	20	9
Toluene	0.0250	0.0224	0.0225	89.5	90.1	76.7-116			0.740	20	_
Xylenes, Total	0.0750	0.0711	0.0715	94.8	95.3	78.1-123			0.510	20	L
(S) Toluene-d8				108	108	88.7-115					
(S) Dibromofluoromethane				101	101	76.3-123					
(S) a,a,a-Trifluorotoluene				107	106	87.2-117					
(S) 4-Bromofluorobenzene				103	102	69.7-129					

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0285	29.5	137	134	81.9	79.6	4600	47.8-131			2.25	22.8
Ethylbenzene	0.0285	108	229	232	91.7	94.6	4600	44.8-135			1.67	26.9
Toluene	0.0285	222	339	347	89.5	95.7	4600	47.8-127			2.37	24.3
Xylenes, Total	0.0855	527	895	913	93.6	98.1	4600	42.7-135			1.94	26.6
(S) Toluene-d8					108	107		88.7-115				
(S) Dibromofluoromethane					102	99.1		76.3-123				
(S) a,a,a-Trifluorotoluene					106	107		87.2-117				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836637-05 05/26/16 11:45 • (MS) R3139988-1 05/26/16 12:04 • (MSD) R3139988-2 05/26/16 12:24

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					104	105		69.7-129				



















ONE LAB. NATIONWIDE.

Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-01,02,03

Method Blank (MB)

(MB) R3137334-1 05/17/	/16 03:42			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	105			50.0-150









(LCS) R3137334-2 05/17	7/16 03:59 • (LCSI	D) R3137334-3	05/17/16 04:16								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
C10-C28 Diesel Range	1.50	1.48	1.44	98.5	96.1	70.0-130			2.44	20	
(S) o-Terphenyl				104	97.9	50.0-150					















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-06

Method Blank (MB)

(MB) R3138554-1 05/20	(MB) R3138554-1 05/20/16 10:03										
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/kg		mg/kg	mg/kg							
C10-C28 Diesel Range	U		1.61	4.00							
C28-C40 Oil Range	U		0.274	4.00							
(S) o-Terphenyl	88.1			50.0-150							







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138554-2 05/20/	16 10:17 • (LCSE) R3138554-3	05/20/16 10:3	1						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	47.4	48.5	78.9	80.9	50.0-100			2.44	20
(S) o-Terphenyl				88.9	91.0	50.0-150				









(OS) 1.935353 O6 O5/20/46 10:28 . (MS) P2138554 4 O5/20/46 10:42 . (MSD) P2138554 5 O5/20/46 10:57





(US) LOSSSS-00 US/20/10 13.20 • (WIS) KSISOSS4-4 US/20/10 13.42 • (WIS) KSISOSS4-3 US/20/10 13.57													
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
C10-C28 Diesel Range	60.0	U	43.1	44.1	71.8	73.6	1	50.0-100			2.39	20	
(S) o-Terphenyl					67.2	65.3		50.0-150					

ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

Method Blank (MB)

(MB) R3138702-3 05/19/1	6 14:49				
	MB Result	MB Qualifier	MB MDL	MB RDL	ř
Analyte	mg/l		mg/l	mg/l	ľ
4-Chloro-3-methylphenol	U		0.000263	0.0100	L
2-Chlorophenol	U		0.000283	0.0100	
2,4-Dichlorophenol	U		0.000284	0.0100	L
2,4-Dimethylphenol	U		0.000624	0.0100	Ę
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	
2,4-Dinitrophenol	U		0.00325	0.0100	L
2-Nitrophenol	U		0.000320	0.0100	!
4-Nitrophenol	U		0.00201	0.0100	L
Pentachlorophenol	U		0.000313	0.0100	
Phenol	U		0.000334	0.0100	
2,4,6-Trichlorophenol	U		0.000297	0.0100	
(S) Nitrobenzene-d5	77.9			21.8-123	1
(S) 2-Fluorobiphenyl	84.2			29.5-131	L
(S) p-Terphenyl-d14	93.8			29.3-137	Ī
(S) Phenol-d5	38.1			5.00-70.1	
(S) 2-Fluorophenol	55.7			10.0-77.9	L
(S) 2,4,6-Tribromophenol	70.6			11.2-130	1

(LCS) R3138702-1 05/19/16 14:02 • (LCSD) R3138702-2 05/19/16 14:25											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
4-Chloro-3-methylphenol	0.0500	0.0439	0.0424	87.8	84.8	35.7-100			3.47	22.9	
2-Chlorophenol	0.0500	0.0377	0.0354	75.3	70.8	26.2-91.5			6.19	26.5	
2,4-Dichlorophenol	0.0500	0.0441	0.0428	88.1	85.7	31.4-103			2.83	24.9	
2,4-Dimethylphenol	0.0500	0.0430	0.0431	86.1	86.2	31.9-107			0.150	25.7	
4,6-Dinitro-2-methylphenol	0.0500	0.0375	0.0383	75.0	76.7	18.4-148			2.20	24.4	
2,4-Dinitrophenol	0.0500	0.0258	0.0157	51.5	31.3	24.2-128		<u>J3</u>	48.8	20.5	
2-Nitrophenol	0.0500	0.0447	0.0434	89.3	86.7	25.9-106			2.97	26.9	
4-Nitrophenol	0.0500	0.0190	0.0153	38.0	30.6	10.0-52.7			21.7	40	
Pentachlorophenol	0.0500	0.0392	0.0347	78.3	69.4	10.0-97.4			12.0	35.1	
Phenol	0.0500	0.0200	0.0177	40.0	35.5	10.0-57.9			12.1	35	
2,4,6-Trichlorophenol	0.0500	0.0452	0.0456	90.5	91.2	29.8-107			0.790	24.1	
(S) Nitrobenzene-d5				84.3	87.2	21.8-123					
(S) 2-Fluorobiphenyl				86.0	90.9	29.5-131					

















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

(LCS) R3138702-1 05/19/16 14:02 • (LCSD) R3138702-2 05/19/16 14:25												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
(S) p-Terphenyl-d14				96.1	98.8	29.3-137						
(S) Phenol-d5				37.7	32.4	5.00-70.1						
(S) 2-Fluorophenol				52.3	43.9	10.0-77.9						
(S) 2,4,6-Tribromophenol				88.7	88.5	11.2-130						



















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-06

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	Γ
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	L
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	61.8			21.9-129	
(S) 2-Fluorobiphenyl	61.7			34.9-129	
(S) p-Terphenyl-d14	68.7			21.5-128	
(S) Phenol-d5	70.1			26.3-121	
(S) 2-Fluorophenol	64.2			21.1-116	
(S) 2,4,6-Tribromophenol	52.9			21.6-142	

(LCS) R3138667-1 05/20/16 10:08 • (LCSD) R3138667-2 05/20/16 10:32											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20	
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20	
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20	
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20	
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7	
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5	
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9	
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20	
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9	
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20	
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20	
(S) Nitrobenzene-d5				59.1	63.6	21.9-129					
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129					

















(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

835353-06

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC) D2120667.1	OE/20/16 10:00	(LCSD) R3138667-2	OE /20 /16 10.22
1LC21 K3138007-1	- U5/ZU/IB IU:U8 •	ILUSDI R3138007-2	U5/ZU/IB IU:3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142









L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6













68.4

21.6-142

GLOSSARY OF TERMS

ONE LAB. NATIONWIDE.



SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
lowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















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Project Description: Survey Stinger Sump In	WATER .	Line		City/State Collected:				31	res			H-340	toPres		b-HCl-		L# L835	353
Phone: 713-929-5674	Client Project # 6703160012.	and the second second		Lab Project # AMECFWHTX-S	SLURRY		res	DROOROLVI 40mlAmb-HCl-BT	4ozClr-NoPres		oPres	Skinner's List Mtls. 250mlHDPE-HNO3	Skinner's List Mtls. 2ozClr-NoPres		40mIAmb-HCI-BIK		1198	
Fax:	Site/Facility ID #			P.O. #			nb NoPr	mlAm	70 4ozt	DH.C	GRO,V8260 2ozClr-NoPres	Mtls. 2:	Mtls. 2	V8260 40mlAmb-HCl	Blank 40		Acctnum: AMEC	081
Collected by (signature):		ab MUST Be N			lesults Needed		ml Amb	VI 40	,5V8270	IAmb	60 20	List	List	OmlA	Trip Bl		Prelogin: P5525	McCord
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Packed on Ice N Y Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	DR	100000000000000000000000000000000000000	85	-	Ski	X Ski	87	N N		Rem./Contaminant	Sample # (lab only
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Relinquished by : (Signature)		Date:		Time:	Received for lab	by: (Sig	gnature			Date	6.	16	Time:			pH Che	necked: NC	CF:

ESC Lab Sciences Non-Conformance Form

Login #: L835353	Client: AMECFWHTX	Date: 5/13/16	Evaluated by: Jeremy	

Non-Conformance (check applicable items)

Sample Integrity		Chain of Custody Clarification	
Parameter(s) past holding time	×	Login Clarification Needed	If Broken Container:
Improper temperature		Chain of custody is incomplete	Insufficient packing material around container
Improper container type		Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation		Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Cour
Insufficient sample volume.		Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.		Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.		Trip Blank not received.	If no Chain of Custody:
Broken container		Client did not "X" analysis.	Received by:
Broken container:		Chain of Custody is missing	Date/Time:
Sufficient sample remains			Temp./Cont. Rec./pH:
E. S.			Carrier:
			Tracking#

Login Comments: Received a 125ml-NP for Anions for all TMW ID's not listed on COC.

Client informed by:	Call	Email	Voice Mail	Date:	Time:	
TSR Initials: CM	Client Cont	tact:		- 22		Albert

Login Instructions:

Log 125mL-NP for CHLORIDE, FLUORIDE and SULFATE.

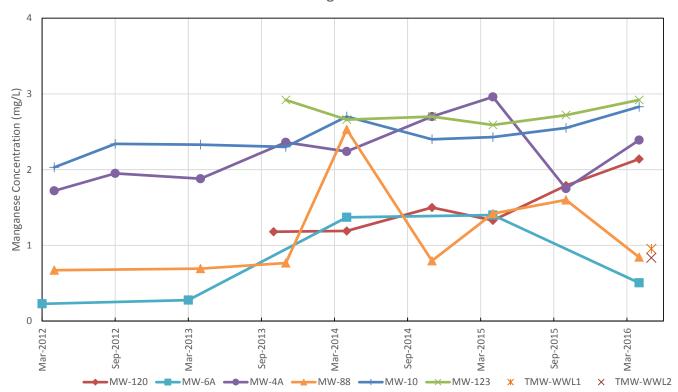
Also, change on all IDs: 8270 to 8270ACID; V8260 to V8260BTEX and only log metals FEICP and MNICP.

This E-mail and any attached files are confidential, and may be copyright protected. If you are not the addressee, any dissemination of this communication is strictly prohibited. If you have received this message in error, please contact the sender immediately and delete/destroy all information received.

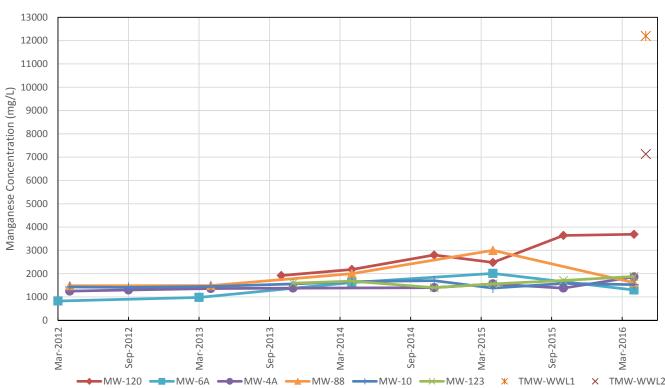


ATTACHMENT D

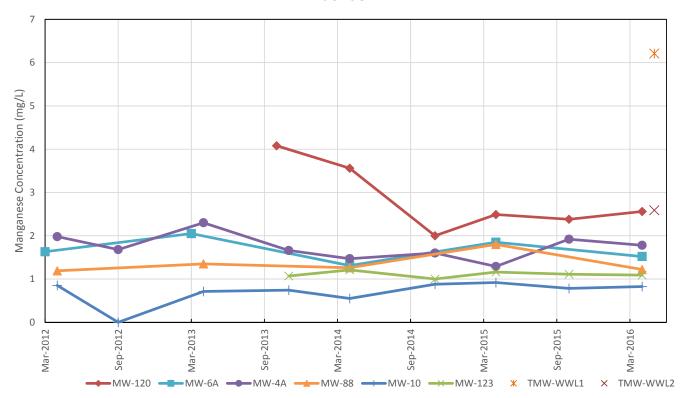
Manganese



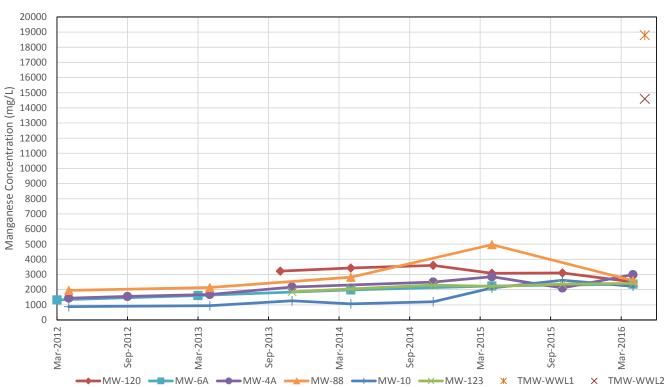




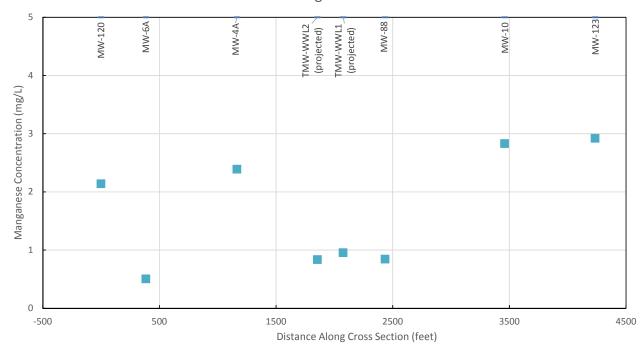
Fluoride



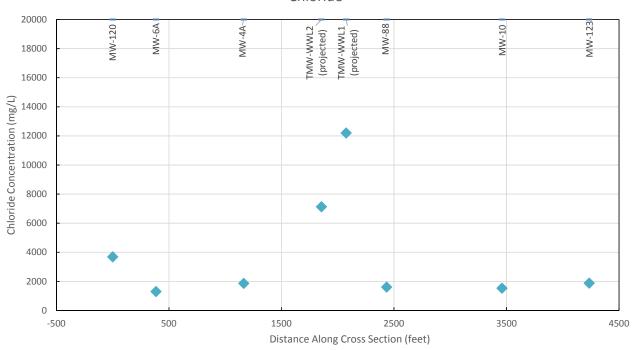




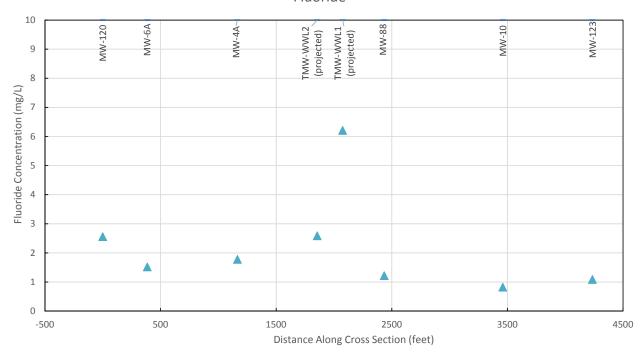
Manganese



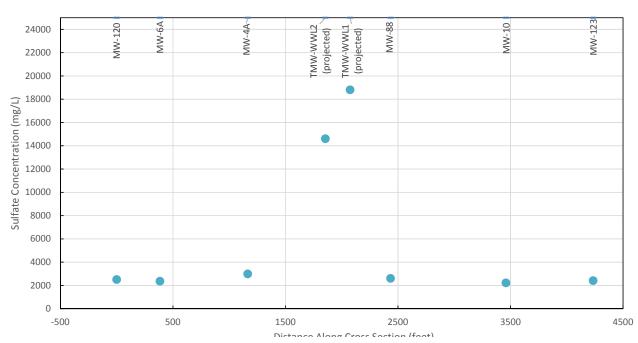




Fluoride



Sulfate



Tom Blaine, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 586987 File Nbr: RA 12403

May. 10, 2016

SCOTT DENTON
HOLLYFRONTIER NAVAJO REFINING
501 EAST MAIN STREET
ARTESIA, NM 88210

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 05/31/2017, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 05/31/2017.

Appropriate forms can be downloaded from the CSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

ouan Hernandez (575)622-6521

Enclosure

explore

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

sted End Date: 6/1/2016
sted End Date: 6/1/2016
sted End Date: 6/1/2016
sted End Date: 6/1/2016
check here if Agent
Zip Code:
☐ Home ☐ Cell 746-5487

	FOR OSE INTERNAL USE	Application for Permit, Form wr-07,	Rev 6/14/12	
# #: 50	File No.: 12403	Trn. No.:586987	Receipt No.:	
	Trans Description (optional):	POD 1,2		
الاستقالية اعتدادة	Sub-Basin:	PCW/LOG Due I	Date: 5-31-17	
	and a second of the same wife in the same			Dago 1 of 3

2. WELL(S) Describe the well(s) applicable to this application.

(Lat/Long - WGS84).		•	a PLSS location in addition to above.				
NM State Plane (NAD83) NM West Zone NM East Zone NM Central Zone	(Feet)	Ext/Long (WGS84) (to the nearest 1/10 th of second)					
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves , Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name				
TMW-WWLine1	104 20' 20.1" W	32 51' 0.1" N	T17S, R26E, S12, Q4 1, Q16 3				
TMW-WWLine2	104 20' 20.3" W	32 51' 0.7" N	T17S, R26E, S12, Q4 1, Q16 3				
NOTE: If more well location Additional well descriptions			WR-08 (Attachment 1 – POD Descriptions) If yes, how many				
Other description relating well	l to co mmon landmark	s, streets, or other					
Well is on land owned by: Holl	lyFrontier Navajo Refin	ning, LLC					
Well Information: NOTE: If r	more than one (1) we	II needs to be des	cribed, provide attachment. Attached?				
Approximate depth of well (fe			Outside diameter of well casing (inches): 2				
Driller Name: Envirotech Drillir	ng Services LLC]	Driller License Number: WD-1757				
Temporary monitoring wells will be installed and developed, allowed to rest for 24 hours, sampled (once only), then plugged and abandoned. The purpose of the temporary monitoring wells is to determine whether wastewater released from an identified line break may have impacted the shallow groundwater beneath the pipeline.							

FOR OSE IN File No.:

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

Trn No.: 536987

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Exploratory: Pollution Control and/or Recovery: Construction Mine De-Watering: ☐ Include a ☐ Include a plan for pollution De-Watering: ☐ Include a plan for pollution Include a description of the description of control/recovery, that includes the control/recovery, that includes the following: any proposed following: proposed dewatering A description of the need for mine pump test, if A description of the need for the operation, dewatering. pollution control or recovery operation. ☐ The estimated duration of applicable. ☐ The estimated maximum period of time ☐ The estimated maximum period of the operation, for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the time for completion of the operation. The maximum amount of ☐ The annual diversion amount. water to be diverted, ☐ The annual consumptive use A description of the need aquifer(s). amount. for the dewatering operation. The maximum amount of water to be ☐ The maximum amount of water to be diverted per annum. diverted and injected for the duration of A description of how the ☐The maximum amount of water to be the operation. diverted water will be disposed diverted for the duration of the operation. ☐The quality of the water. ☐ The method and place of discharge. of. Monitoring: ☐ The method of measurement of Geo-Thermal: The method of measurement of water water produced and discharged. Include the Include a description of the diverted. ☐ The source of water to be injected. ☐The recharge of water to the aquifer. reason for the geothermal heat exchange monitoring ☐ The method of measurement of project, Description of the estimated area of well, and, water injected. hydrologic effect of the project. ☐ The amount of water to be ■ The ☐ The characteristics of the aquifer. The method and place of discharge. diverted and re-injected for the duration ☐ The method of determining the ☐An estimation of the effects on surface project, resulting annual consumptive use of water rights and underground water rights of the planned The time frame for water and depletion from any related constructing the geothermal from the mine dewatering project. monitoring. stream system. heat exchange project, and, A description of the methods employed to ☐ The duration of the project. ☐ Preliminary surveys, design Proof of any permit required from the estimate effects on surface water rights and New Mexico Environment Department. underground water rights. An access agreement if the ☐ Information on existing wells, rivers, data, and additional applicant is not the owner of the land on information shall be included to springs, and wetlands within the area of which the pollution plume control or provide all essential facts hydrologic effect. recovery well is to be located. relating to the request. **ACKNOWLEDGEMENT** I, We (name of applicant(s)), Scott Denton on behalf of HollyFrontier Navajo Refining LLC Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Mrs Robert Combs for Scott M. Denton **ACTION OF THE STATE ENGINEER** This application is: approved partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. Witness my hand and seal this day of May 20 16 , for the State Engineer, Tom Blaine, P.E. ___, State Engineer Signature Title: Juan Hernandez, Engr Specialist Supervisor Print 2016 HAYY -2 PM 41: 20 ENSIME OF BLEND Application for Permit, Form wr-07 FOR OSE INTERNAL USE

File No.:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 1A Depth of the well shall not exceed the thickness of the valley fill.
- 4 No water shall be appropriated and beneficially used under this permit.
- The well shall be plugged upon completion of the permitted use, and a plugging report shall be filed with the State Engineer within 10 days.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
- C Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.
- P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

- Q The State Engineer retains jurisdiction over this permit.
- LOG The Point of Diversion RA 12403 POD1 must be completed and the Well Log filed on or before 05/31/2017.
- LOG The Point of Diversion RA 12403 POD2 must be completed and the Well Log filed on or before 05/31/2017.

IT IS THE PERMITTEES RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

SHOULD THE PERMITTEE CHANGE THE PURPOSE OF USE TO OTHER THAN MONITORING PURPOSES, AN APPLICATION SHALL BE ACQUIRED FROM THE OFFICE OF THE STATE ENGINEER.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd: Date Rcvd. Corrected: Formal Application Rcvd: 05/02/2016 Pub. of Notice Ordered: Date Returned - Correction: Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 10 day of May A.D., 2016

Tom Blaine, P.E. , State Engineer

By:

Juan Bernandez

Trn Desc: RA 12403 POD1,2 File Number: RA 12403

Trn Number: 586987

Locator Tool Report

General Information:

Application ID:29

Date: 05-10-2016

Time: 08:42:10

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE2

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.7 Seconds N

Longitude:

104 Degrees 20 Minutes 20.3 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,873
 E: 561,855

 NAD 1983(92) (Survey Feet)
 N: 11,925,413
 E: 1,843,353

 NAD 1927 (Meters)
 N: 3,634,670
 E: 561,905

 NAD 1927 (Survey Feet)
 N: 11,924,748
 E: 1,843,516

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,141
 E: 164,472

 NAD 1983(92) (Survey Feet)
 N: 673,034
 E: 539,606

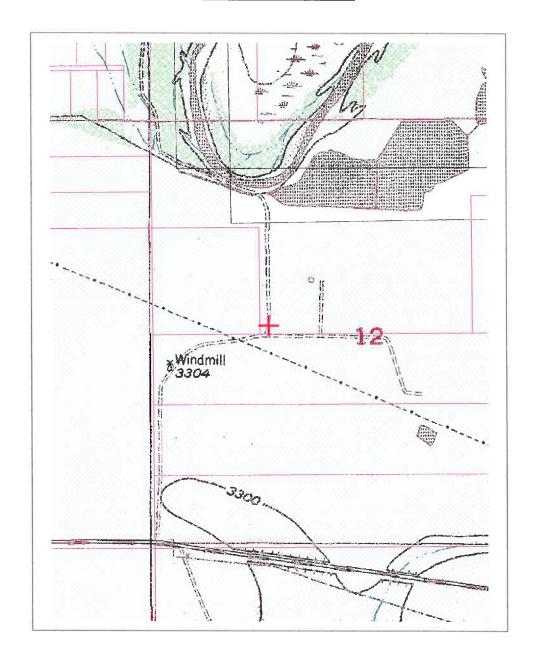
 NAD 1927 (Meters)
 N: 205,122
 E: 151,921

 NAD 1927 (Survey Feet)
 N: 672,971
 E: 498,427

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,873 E: 561,855

Northing/Easting: SPCS83(92) (Feet): N: 673,034 E: 539,606

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016

Locator Tool Report

General Information:

Application ID: 29

Date: 05-10-2016

Time: 08:40:32

WR File Number: RA

Purpose: POINT OF DIVERSION

Applicant First Name: HOLLY FRONTIER NAVAJO REFING LC

Applicant Last Name: TMW-WWLINE1

GW Basin: ROSWELL ARTESIAN

County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SW 1/4 of SE 1/4 of NW 1/4 of Section 12, Township 17S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude:

32 Degrees 51 Minutes 0.1 Seconds N

Longitude:

104 Degrees 20 Minutes 20.1 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,634,855
 E: 561,860

 NAD 1983(92) (Survey Feet)
 N: 11,925,353
 E: 1,843,371

 NAD 1927 (Meters)
 N: 3,634,652
 E: 561,910

 NAD 1927 (Survey Feet)
 N: 11,924,687
 E: 1,843,534

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 205,123
 E: 164,477

 NAD 1983(92) (Survey Feet)
 N: 672,973
 E: 539,623

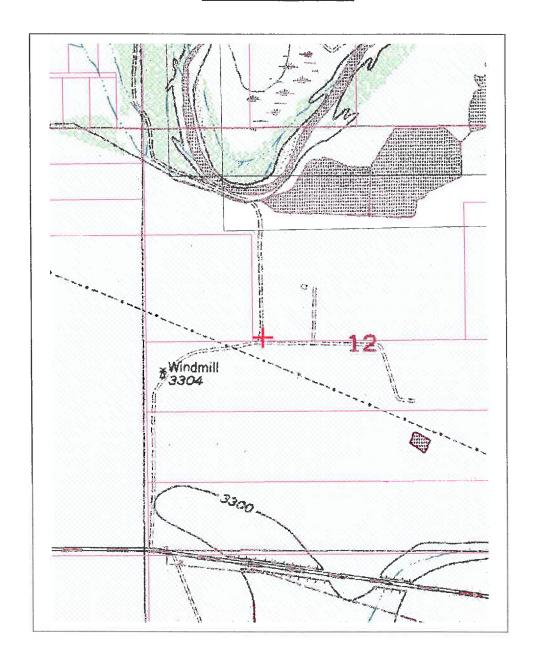
 NAD 1927 (Meters)
 N: 205,103
 E: 151,926

 NAD 1927 (Survey Feet)
 N: 672,910
 E: 498,444

Page 1 of 2 Print Date: 05/10/2016

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: RA Scale: 1:14,368

Northing/Easting: UTM83(92) (Meter): N: 3,634,855 E: 561,860

Northing/Easting: SPCS83(92) (Feet): N: 672,973 E: 539,623

GW Basin: Roswell Artesian

Page 2 of 2 Print Date: 05/10/2016



WELL PLUGGING PLAN OF OPERATIONS



NOTE:	A Well Plugging Plan of Operations to plugging.	shall be filed	with and accept	ed by the Offic	e of the State Engineer prior
I. FILI	NG FEE: There is no filing fee for this	s form.			
II. GE Existing	NERAL / WELL OWNERSHIP: g Office of the State Engineer POD N	Jumber (Well 1	Number) for we	Il to be plugged	:RA-12403
Name o	of well owner: Holly Frontier Navago	o Refining, Ll	LC		
Mailing	address: 501 East Main Street				
City: _	Artesia	State:	NM		Zip code: 88210
Phone r	Artesia number: 575-746-5487		E-mail: Scot	t.Denton@Ho	llyFrontier.com
	ELL DRILLER INFORMATION: riller contracted to provide plugging ser	vices: Enviro	tech Drilling S		
New M	exico Well Driller License No.: WD-1	757		Expiration D	ate: 1/31/2018
	Reason(s) for plugging well:	32 104	_deg,51 _deg,20	min,0.1 min,20.1	sec sec, NAD 83
	This plan is for two temporary will be plugged and abandon				
3)	Was well used for any type of monitor what hydrogeologic parameters were water, authorization from the New Me	monitored. I	f the well was	used to monito	r contaminated or poor quali
4)	Does the well tap brackish, saline, or	otherwise poor	r quality water?	Yes	If yes, provide additional deta
	including analytical results and/or labor				
	Temporary wells are located south of semiannual monitoring program. Da TDS values ranging from 5,000 to 1	ata from those			
5)		- 83	urface feet abov	ve land surface	(circle one)
6)	Depth of the well: 10 - 12 fee	et			Well Plugging Plan Version: August 11, 2015

7)	Inside diameter of innermost casing:inches.
8)	Casing material: PVC
9)	The well was constructed with: an open-hole production interval, state the open interval: a well screen or perforated pipe, state the screened interval(s): 2 to 10 (or 2 to 12)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? N/A
11)	Was the well built with surface casing? No No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:
	11 yes, prease describe.
12)	Has all pumping equipment and associated piping been removed from the well?If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DES	CRIPTION OF PLANNED WELL PLUGGING:
pipe, a c	this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie letailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional linformation, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well:
	Lean cement grout will be placed in the boring from the bottom up using a tremie pipe.
2)	Will well head be cut-off below land surface after plugging? PVC casing will be removed
VI. PL	UGGING AND SEALING MATERIALS:
Note: T	he plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: 1.6 - 2 gallons
4)	Type of Cement proposed: Portland cement
5)	Proposed cement grout mix: 5 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be:batch-mixed and delivered to the site mixed on site

2016 MAY -2 FM 4: 20

7)	Grout additives requested, and percent by dry weight relative to cement:
0)	
8)	Additional notes and calculations:
VII.	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):
VIII.	SIGNATURE:
	ott Denton, say that I have carefully read the foregoing Well Plugging Plan of
	tions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State
	eer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well ing Plan of Operations and attachments are true to the best of my knowledge and belief.
	Joshu R Robert Combs for Scott M. Danton 5/2/16
	Signature of Applicant Date
IX. A	CTION OF THE STATE ENGINEER:
This V	Well Plugging Plan of Operations is:
	Approved subject to the attached conditions
	Approved subject to the attached conditions. Not approved for the reasons provided on the attached letter.
	Witness my hand and official seal this
	Tom Blaine P.E., New Mexico State Engineer
	De la DA CENTA
	02:17 HJ Z- AVH 9107 Fox Andy Morley Dr. Mil T. Manager Well Plugging Plan Version: August 11, 2015 Page 3 of 5
	Dichof The Well Plugging Plan
	Version: August 11, 2015 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			0
Bottom of proposed interval of grout placement (ft bgl)			10-12
Theoretical volume of grout required per interval (gallons)			1.6 to 2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			5
Mixed on-site or batch- mixed and delivered?			mixed on-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

2016 MAY -2 FM 4: 20

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

			Log of Well No. TMW-WWL-1 GROUND SURFACE ELEVATION AND DATUM:			
ORING LOC	ATION:		GROUND	SURFAGE ELEVA	HON AND L	ATOW:
RILLING CO	NTRACTOR:	Envirotech Services	DATE STAI 5/10/16	RTED:	DATE FIN 5/10/16	ISHED:
RILLING ME	THOD: Ha	ollow Stem Auger	TOTAL DEI	PTH (ft.):	SCREEN	INTERVAL (ft.):
	000000000000000000000000000000000000000		16.0 DEPTH TO	WATER ATD:	10' CASING:	
RILLING EQ	UIPMENT:	Geoprobe 9520	12'		2'	
AMPLING M	ETHOD: A	Auger	William S			
AMMER WE	ight: N A	A DROP: NA	RESPONSI William S	IBLE PROFESSIO Smith	NAL:	REG. NO.
	Blows/Sample Foot OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, str cementation, react. w/HCl, geo. inter. Surface Elevation:		Siliai	DET	CONSTRUCTION AILS AND/OR ING REMARKS
- to -	0	SANDY CLAY (CL): reddish-brown, dry, low carb induration, low-medium plasticity, no odor, no sta			- Open	Casina
-					2" DiametBentonite	er Casing
		SANDY CLAY (CL): reddish-brown, low carbona induration, medium-high plasticity, no odor, no st	I		– 20/40 Gra	de Silica Sand
5-8	0	SANDY CLAY (CL): light brown, low plasticity, no no staining	odor,			
		SANDY CLAY (CL):brown, low plasticity, gypsum crystals, no odor, no staining	1			
10-	0	SANDY CLAY (CL): light reddish-brown, low cart induration, low-medium plasticity, damp, containe some gypsum crystals, no odor, no staining			– Sch 40 0.0 Screen	010 Slot PVC
	0	Gypsiferrous SANDY CLAY (CL): whitish-green, plasticity, moist, no odor, no staining	low			
15-		Total Depth = 15.5'				
-		Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15.5'		_		
20						

ROJE			J	er Navajo Wastewater Line Release Investigati	L	<u> </u>	lo. TMW-WWL-2
ORIN	G LO	CATION:			GROU	ND SURFACE ELEVA	TION AND DATUM:
RILLII	NG C	ONTRAC	TOR:	Envirotech Services	5/10/1		DATE FINISHED: 5/10/16
RILLII	NG M	ETHOD:	Ho	ollow Stem Auger	16.0	DEPTH (ft.):	SCREEN INTERVAL (ft.): 10'
RILLII	NG E	QUIPMEI	NT:	Geoprobe 9520	DEPTH 12'	TO WATER ATD:	CASING: 2'
AMPL	ING I	METHOD	: <i>F</i>	Auger	LOGGE Willia	ED BY: m Smith	
AMME	ER W	EIGHT:	N/	DROP: NA	RESPO	NSIBLE PROFESSIOM Smith	DNAL: REG. NO.
(feet)	Sample No.	Sample M Blows/ ST Foot	OVM	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, s cementation, react. w/HCl, geo. inter.	·		WELL CONSTRUCTION DETAILS AND/OR
5=	Sar	Sar	S &	Surface Elevation:			DRILLING REMARKS
_	- 01 -		0	SILTY SAND (SM): light brown, damp, non-pla odor, no stain	stic, no		─ Open─ 2" Diameter Casing
_							Bentonite
_				SANDY CLAY (CL): brown, damp, medium pla contains some gypsum crystals, no odor, no sta	-		Zonto mo
_				SANDY CLAY (CL): light reddish-brown, damp medium to high plasticity, contains some gymsi			— 20/40 Grade Silica Sand
5-	- 05		0	crystals, no odor, no stain,			
10-			0				— Sch 40 0.010 Slot PVC
- - - 15-	- 12 -		0	SANDY CLAY (CL): reddish-brown, moist, low plasticity, low-moderate carbonate induration be more gymsiferous with depth, no odor, organic, stain			Screen
-				TOTAL DEDTU- 16'			
				TOTAL DEPTH = 16'			
_				Sampler Stopped at 16' Auger Stopped at 15' TMW-WWL-1 Set to 15'			
20							



ANALYTICAL REPORT May 24, 2016



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835078

Samples Received: 05/12/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation HOLLEY FRONTIER NAVAJO Site:

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, forh

Chris McCord

Technical Service Representative Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



¹ Cp: Cover Page	1
² Tc: Table of Contents	2
³ Ss: Sample Summary	3
⁴Cn: Case Narrative	5
⁵ Sr: Sample Results	6
TMW-WWL1-01 L835078-01	6
TMW-WWL1-05 L835078-02	8
TMW-WWL1-12 L835078-03	10
TMW-WWL2-01 L835078-04	12
TMW-WWL2-05 L835078-05	14
TMW-WWL2-12 L835078-06	16
TMW-WWL2-12D L835078-07	18
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⁷ Gl: Glossary of Terms	43
⁸ Al: Accreditations & Locations	44



















⁹Sc: Chain of Custody

45



TMW-WWL1-01 L835078-01 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:00	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:06	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:05	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 12:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 07:06	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 08:15	DWR
Wet Chemistry by Method 9056A	WG872631	20	05/16/16 17:26	05/17/16 11:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 01:04	СМ
TMW-WWL1-05 L835078-02 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:10	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
Mark WORLD Mark 19940	W00700F7		date/time	date/time	0.05
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:08	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:29	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 10:49	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:12	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5 50	05/19/16 00:02 05/16/16 17:26	05/19/16 08:37	DWR CM
Wet Chemistry by Method 9056A Wet Chemistry by Method 9056A	WG872631 WG873240	1	05/18/16 17:26	05/17/16 12:04 05/19/16 01:52	CM
Wet elicilisity by Method 3030A	W0073240	ı	03/10/10 13.30	03/13/10 01.32	CIVI
TMW-WWL1-12 L835078-03 Solid			Collected by William R. Smith	Collected date/time 05/10/16 15:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:17	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 16:52	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:02	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:35	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:00	DWR
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 12:28	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:16	СМ
TMW-WWL2-01 L835078-04 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:20	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:20	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 17:15	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:50	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 09:58	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872230	5	05/19/16 00:02	05/19/16 09:22	DWR
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:29	CM
Wet Chemistry by Method 9056A	WG872631	10	05/16/16 17:26	05/17/16 12:52	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 02:40	CM
TMW-WWL2-05 L835078-05 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:30	Received date/time 05/12/16 09:00
	Batch	Dilution	Preparation	Analysis	Analyst
Method			date/time	date/time	
Method Metals (ICP) by Method 6010B	WG872357	1	date/time 05/14/16 08:15	date/time 05/14/16 14:23	BRJ

















Collected	by
William D	Conside



Received date/time





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TMW-WWL2-05 L835078-05 Solid			William R. Smith	05/10/16 16:30	05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:14	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873092	5	05/17/16 17:13	05/18/16 10:21	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:29	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 06:53	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:16	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 03:04	CM
TMW-WWL2-12 L835078-06 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:50	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	•
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:26	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872189	1	05/17/16 19:33	05/18/16 18:02	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:26	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:23	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 15:53	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 07:17	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 13:40	CM
Wet Chemistry by Method 9056A	WG873240	1	05/18/16 15:50	05/19/16 04:16	CM
TMW-WWL2-12D L835078-07 Solid			Collected by William R. Smith	Collected date/time 05/10/16 16:55	Received date/time 05/12/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872357	1	05/14/16 08:15	05/14/16 14:29	CCE
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 12:33	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872902	1	05/16/16 23:00	05/17/16 11:38	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG873220	5	05/18/16 18:29	05/18/16 20:46	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG873800	5	05/19/16 11:42	05/19/16 16:17	BMB
Wet Chemistry by Method 9056A	WG872631	1	05/16/16 17:26	05/17/16 09:36	CM
Wet Chemistry by Method 9056A	WG872631	50	05/16/16 17:26	05/17/16 14:04	CM

SAMPLE SUMMARY

TMW-WW6-EQ	L835078-08	GW

Wet Chemistry by Method 9056A

TMW-WW6-EQ L835078-08 GW	William R. Smith	05/10/16 18:00	05/12/16 09:00		
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872401	1	05/16/16 10:43	05/16/16 15:27	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872427	1	05/12/16 21:03	05/15/16 18:23	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872369	1	05/12/16 20:58	05/15/16 10:41	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872916	1	05/17/16 19:24	05/17/16 19:24	LRL
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872248	1	05/13/16 18:16	05/13/16 18:16	LRL
Wet Chemistry by Method 9056A	WG873772	1	05/20/16 04:02	05/20/16 04:02	SAM

WG873240

05/18/16 15:50

Collected by

05/19/16 04:40

Collected date/time

 CM

Received date/time



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the





Ss















Chris McCord Technical Service Representative

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1730		15.9	200	20	05/17/2016 11:40	WG872631
Fluoride	5.61		0.261	1.00	1	05/19/2016 01:04	WG873240
Sulfate	7580		11.4	1000	20	05/17/2016 11:40	WG872631

Ср





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	12200		1.41	10.0	1	05/14/2016 14:06	WG872357
Manganese	388		0.120	1.00	1	05/14/2016 14:06	WG872357





Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 07:06	WG873092
(S) a,a,a-Trifluorotoluene(FIL	99.2			59.0-128		05/18/2016 07:06	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:15	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:15	WG872230
hylbenzene	U		0.00148	0.00500	5	05/19/2016 08:15	WG872230
otal Xylenes	U		0.00349	0.0150	5	05/19/2016 08:15	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:15	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 08:15	WG872230
(S) a,a,a-Trifluorotoluene	95.8			87.2-117		05/19/2016 08:15	WG872230
(S) 4-Bromofluorobenzene	96.7			69.7-129		05/19/2016 08:15	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	7.31		1.61	4.00	1	05/17/2016 12:02	WG872902
C28-C40 Oil Range	3.15	<u>J</u>	0.274	4.00	1	05/17/2016 12:02	WG872902
(S) o-Terphenyl	91.8			50.0-150		05/17/2016 12:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:05	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:05	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:05	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:05	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:05	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:05	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:05	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:05	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:05	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:05	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:05	WG872189
(S) 2-Fluorophenol	67.0			21.1-116		05/18/2016 16:05	WG872189
(S) Phenol-d5	68.0			26.3-121		05/18/2016 16:05	WG872189
(S) Nitrobenzene-d5	83.5			21.9-129		05/18/2016 16:05	WG872189
(S) 2-Fluorobiphenyl	74.9			34.9-129		05/18/2016 16:05	WG872189

TMW-WWL1-01

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	62.6			21.6-142		05/18/2016 16:05	WG872189	
(S) p-Terphenyl-d14	63.6			21.5-128		05/18/2016 16:05	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1070		39.8	500	50	05/17/2016 12:04	WG872631
Fluoride	16.1		0.261	1.00	1	05/19/2016 01:52	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:04	WG872631







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	7850		1.41	10.0	1	05/14/2016 14:08	WG872357
Manganese	162		0.120	1.00	1	05/14/2016 14:08	WG872357



⁵Sr

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:12	WG873092
(S) a,a,a-Trifluorotoluene(FID	98.8			59.0-128		05/18/2016 09:12	WG873092





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 08:37	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 08:37	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 08:37	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 08:37	WG872230
(S) Toluene-d8	105			88.7-115		05/19/2016 08:37	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 08:37	WG872230
(S) a,a,a-Trifluorotoluene	95.5			87.2-117		05/19/2016 08:37	WG872230
(S) 4-Bromofluorobenzene	99.6			69.7-129		05/19/2016 08:37	WG872230

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 10:49	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 10:49	WG872902
(S) o-Terphenyl	98.1			50.0-150		05/17/2016 10:49	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:29	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:29	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:29	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:29	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:29	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:29	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:29	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:29	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:29	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:29	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:29	WG872189
(S) 2-Fluorophenol	57.1			21.1-116		05/18/2016 16:29	WG872189
(S) Phenol-d5	46.4			26.3-121		05/18/2016 16:29	WG872189
(S) Nitrobenzene-d5	64.5			21.9-129		05/18/2016 16:29	WG872189
(S) 2-Fluorobiphenyl	66.2			34.9-129		05/18/2016 16:29	WG872189

TMW-WWL1-05

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:10

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	39.8			21.6-142		05/18/2016 16:29	WG872189	
(S) p-Terphenvl-d14	39.6			21.5-128		05/18/2016 16:29	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1690		39.8	500	50	05/17/2016 12:28	WG872631
Fluoride	11.8		0.261	1.00	1	05/19/2016 02:16	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 12:28	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2710		1.41	10.0	1	05/14/2016 14:17	WG872357
Manganese	64.7		0.120	1.00	1	05/14/2016 14:17	WG872357



[°]Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 09:35	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 09:35	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:00	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:00	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:00	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:00	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:00	WG872230
(S) Dibromofluoromethane	104			76.3-123		05/19/2016 09:00	WG872230
(S) a,a,a-Trifluorotoluene	96.3			87.2-117		05/19/2016 09:00	WG872230
(S) 4-Bromofluorobenzene	98.8			69.7-129		05/19/2016 09:00	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:02	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:02	WG872902
(S) o-Terphenyl	95.4			50.0-150		05/17/2016 11:02	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 16:52	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 16:52	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 16:52	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 16:52	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 16:52	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 16:52	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 16:52	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 16:52	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 16:52	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 16:52	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 16:52	WG872189
(S) 2-Fluorophenol	64.9			21.1-116		05/18/2016 16:52	WG872189
(S) Phenol-d5	58.7			26.3-121		05/18/2016 16:52	WG872189
(S) Nitrobenzene-d5	64.9			21.9-129		05/18/2016 16:52	WG872189
(S) 2-Fluorobiphenyl	56.2			34.9-129		05/18/2016 16:52	WG872189

TMW-WWL1-12

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 15:20

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	51.6			21.6-142		05/18/2016 16:52	WG872189	
(S) p-Terphenyl-d14	46.8			21.5-128		05/18/2016 16:52	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	113		0.795	10.0	1	05/17/2016 06:29	WG872631
Fluoride	4.56		0.261	1.00	1	05/19/2016 02:40	WG873240
Sulfate	2590		5.70	500	10	05/17/2016 12:52	WG872631





Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	10500		1.41	10.0	1	05/14/2016 14:20	WG872357
Manganese	344		0.120	1.00	1	05/14/2016 14:20	WG872357



[°]Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.255	<u>J</u>	0.108	0.500	5	05/18/2016 09:58	WG873092
(S) a,a,a-Trifluorotoluene(FIL	0) 99.7			59.0-128		05/18/2016 09:58	WG873092





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 09:22	WG872230
Toluene	U		0.00217	0.0250	5	05/19/2016 09:22	WG872230
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 09:22	WG872230
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 09:22	WG872230
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 09:22	WG872230
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 09:22	WG872230
(S) a,a,a-Trifluorotoluene	97.8			87.2-117		05/19/2016 09:22	WG872230
(S) 4-Bromofluorobenzene	100			69.7-129		05/19/2016 09:22	WG872230

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:50	WG872902
C28-C40 Oil Range	0.687	<u>J</u>	0.274	4.00	1	05/17/2016 11:50	WG872902
(S) o-Terphenyl	84.3			50.0-150		05/17/2016 11:50	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:15	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:15	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:15	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:15	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:15	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:15	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:15	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:15	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:15	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:15	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:15	WG872189
(S) 2-Fluorophenol	63.6			21.1-116		05/18/2016 17:15	WG872189
(S) Phenol-d5	67.5			26.3-121		05/18/2016 17:15	WG872189
(S) Nitrobenzene-d5	72.4			21.9-129		05/18/2016 17:15	WG872189
(S) 2-Fluorobiphenyl	77.4			34.9-129		05/18/2016 17:15	WG872189

TMW-WWL2-01

SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:20

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	71.5			21.6-142		05/18/2016 17:15	WG872189	
(S) p-Terphenvl-d14	67.0			21.5-128		05/18/2016 17:15	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 06:53	WG872631
Fluoride	15.8		0.261	1.00	1	05/19/2016 03:04	WG873240
Sulfate	18300		28.5	2500	50	05/17/2016 13:16	WG872631





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	5580		1.41	10.0	1	05/14/2016 14:23	WG872357
Manganese	70.6		0.120	1.00	1	05/14/2016 14:23	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 10:21	WG873092
(S) a,a,a-Trifluorotoluene(FID)	99.0			59.0-128		05/18/2016 10:21	WG873092







Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	<u> </u>
Benzene	U		0.00135	0.00500	5	05/19/2016 15:29	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 15:29	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:29	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:29	WG873800
(S) Toluene-d8	101			88.7-115		05/19/2016 15:29	WG873800
(S) Dibromofluoromethane	102			76.3-123		05/19/2016 15:29	WG873800
(S) a,a,a-Trifluorotoluene	101			87.2-117		05/19/2016 15:29	WG873800
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:29	WG873800

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Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:14	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:14	WG872902
(S) o-Terphenyl	96.4			50.0-150		05/17/2016 11:14	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 17:39	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 17:39	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 17:39	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 17:39	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 17:39	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 17:39	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 17:39	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 17:39	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 17:39	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 17:39	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 17:39	WG872189
(S) 2-Fluorophenol	59.4			21.1-116		05/18/2016 17:39	WG872189
(S) Phenol-d5	58.8			26.3-121		05/18/2016 17:39	WG872189
(S) Nitrobenzene-d5	64.1			21.9-129		05/18/2016 17:39	WG872189
(S) 2-Fluorobiphenyl	56.5			34.9-129		05/18/2016 17:39	WG872189

TMW-WWL2-05

SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:30

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	58.0			21.6-142		05/18/2016 17:39	WG872189	
(S) n-Ternhenvl-d14	66.9			21.5-128		05/18/2016 17:39	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

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Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	712		0.795	10.0	1	05/17/2016 07:17	WG872631
Fluoride	8.01		0.261	1.00	1	05/19/2016 04:16	WG873240
Sulfate	17200		28.5	2500	50	05/17/2016 13:40	WG872631







Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Iron	2880		1.41	10.0	1	05/14/2016 14:26	WG872357
Manganese	80.3		0.120	1.00	1	05/14/2016 14:26	WG872357



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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U	J3 J6	0.108	0.500	5	05/18/2016 20:23	WG873220
(S) a,a,a-Trifluorotoluene(FIL	99.8			59.0-128		05/18/2016 20:23	WG873220





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
Benzene	U		0.00135	0.00500	5	05/19/2016 15:53	WG873800	
Toluene	U		0.00217	0.0250	5	05/19/2016 15:53	WG873800	
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 15:53	WG873800	
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 15:53	WG873800	
(S) Toluene-d8	103			<i>88.7-115</i>		05/19/2016 15:53	WG873800	
(S) Dibromofluoromethane	103			76.3-123		05/19/2016 15:53	WG873800	
(S) a,a,a-Trifluorotoluene	100			87.2-117		05/19/2016 15:53	WG873800	
(S) 4-Bromofluorobenzene	101			69.7-129		05/19/2016 15:53	WG873800	

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:26	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:26	WG872902
(S) o-Terphenyl	102			50.0-150		05/17/2016 11:26	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/18/2016 18:02	WG872189
2-Chlorophenol	U		0.00831	0.333	1	05/18/2016 18:02	WG872189
2,4-Dichlorophenol	U		0.00746	0.333	1	05/18/2016 18:02	WG872189
2,4-Dimethylphenol	U		0.0471	0.333	1	05/18/2016 18:02	WG872189
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/18/2016 18:02	WG872189
2,4-Dinitrophenol	U		0.0980	0.333	1	05/18/2016 18:02	WG872189
2-Nitrophenol	U		0.0130	0.333	1	05/18/2016 18:02	WG872189
4-Nitrophenol	U		0.0525	0.333	1	05/18/2016 18:02	WG872189
Pentachlorophenol	U		0.0480	0.333	1	05/18/2016 18:02	WG872189
Phenol	U		0.00695	0.333	1	05/18/2016 18:02	WG872189
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/18/2016 18:02	WG872189
(S) 2-Fluorophenol	45.8			21.1-116		05/18/2016 18:02	WG872189
(S) Phenol-d5	45.5			26.3-121		05/18/2016 18:02	WG872189
(S) Nitrobenzene-d5	52.8			21.9-129		05/18/2016 18:02	WG872189
(S) 2-Fluorobiphenyl	48.0			34.9-129		05/18/2016 18:02	WG872189

TMW-WWL2-12

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:50

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	44.1			21.6-142		05/18/2016 18:02	WG872189	
(S) n-Ternhenvl-d14	42.5			21.5-128		05/18/2016 18:02	WG872189	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

L835078

Wet Chemistry by Method 9056A

	, ,						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	899		0.795	10.0	1	05/17/2016 09:36	WG872631
Fluoride	11.2		0.261	1.00	1	05/19/2016 04:40	WG873240
Sulfate	18200		28.5	2500	50	05/17/2016 14:04	WG872631

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Metals (ICP) by Method 6010B

Result <u>Qualifier</u> MDL RDL Dilution Analysis <u>Batch</u>	
Analyte mg/kg mg/kg mg/kg date / time	
Iron 3950 1.41 10.0 1 05/14/2016 14:29 <u>WG872357</u>	
Manganese 95.4 0.120 1.00 1 05/14/2016 14:29 <u>WG872357</u>	



⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/18/2016 20:46	WG873220
(S) a,a,a-Trifluorotoluene(FID)	99.5			59.0-128		05/18/2016 20:46	WG873220





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Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/19/2016 16:17	WG873800
Toluene	U		0.00217	0.0250	5	05/19/2016 16:17	WG873800
Ethylbenzene	U		0.00148	0.00500	5	05/19/2016 16:17	WG873800
Total Xylenes	U		0.00349	0.0150	5	05/19/2016 16:17	WG873800
(S) Toluene-d8	106			<i>88.7-115</i>		05/19/2016 16:17	WG873800
(S) Dibromofluoromethane	98.9			76.3-123		05/19/2016 16:17	WG873800
(S) a,a,a-Trifluorotoluene	105			87.2-117		05/19/2016 16:17	WG873800
(S) 4-Bromofluorobenzene	99.8			69.7-129		05/19/2016 16:17	WG873800

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/17/2016 11:38	WG872902
C28-C40 Oil Range	U		0.274	4.00	1	05/17/2016 11:38	WG872902
(S) o-Terphenyl	94.5			50.0-150		05/17/2016 11:38	WG872902

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 12:33	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 12:33	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 12:33	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 12:33	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 12:33	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 12:33	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 12:33	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 12:33	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 12:33	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 12:33	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 12:33	WG873908
(S) 2-Fluorophenol	77.5			21.1-116		05/20/2016 12:33	WG873908
(S) Phenol-d5	72.1			26.3-121		05/20/2016 12:33	WG873908
(S) Nitrobenzene-d5	67.2			21.9-129		05/20/2016 12:33	WG873908
(S) 2-Fluorobiphenyl	<i>7</i> 5. <i>7</i>			34.9-129		05/20/2016 12:33	WG873908

TMW-WWL2-12D

SAMPLE RESULTS - 07

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 16:55

L835078

	'	\	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/kg		mg/kg	mg/kg		date / time		
(S) 2,4,6-Tribromophenol	64.1			21.6-142		05/20/2016 12:33	WG873908	
(S) p-Terphenyl-d14	64.6			21.5-128		05/20/2016 12:33	WG873908	



















ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	0.244	<u>J</u>	0.0519	1.00	1	05/20/2016 04:02	WG873772
Fluoride	U		0.00990	0.100	1	05/20/2016 04:02	WG873772
Sulfate	0.269	<u>J</u>	0.0774	5.00	1	05/20/2016 04:02	WG873772







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.0241	<u>B J</u>	0.0141	0.100	1	05/16/2016 15:27	WG872401
Manganese	U		0.00120	0.0100	1	05/16/2016 15:27	WG872401



СQс

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 19:24	WG872916
(S) a,a,a-Trifluorotoluene(FID)	94.6			62.0-128		05/17/2016 19:24	WG872916





Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Patch
		Qualifier		KDL	Dilution	•	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	0.000509	J	0.000331	0.00100	1	05/13/2016 18:16	WG872248
Toluene	U		0.000780	0.00500	1	05/13/2016 18:16	WG872248
Ethylbenzene	U		0.000384	0.00100	1	05/13/2016 18:16	WG872248
Total Xylenes	U		0.00106	0.00300	1	05/13/2016 18:16	WG872248
(S) Toluene-d8	105			90.0-115		05/13/2016 18:16	WG872248
(S) Dibromofluoromethane	106			79.0-121		05/13/2016 18:16	WG872248
(S) a,a,a-Trifluorotoluene	98.5			90.4-116		05/13/2016 18:16	WG872248
(S) 4-Bromofluorobenzene	102			80.1-120		05/13/2016 18:16	WG872248

Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0358	<u>J</u>	0.0222	0.100	1	05/15/2016 10:41	WG872369
C28-C40 Oil Range	U		0.0118	0.100	1	05/15/2016 10:41	WG872369
(S) o-Terphenyl	109			50.0-150		05/15/2016 10:41	WG872369

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U	<u>J4</u>	0.000263	0.0100	1	05/15/2016 18:23	WG872427
2-Chlorophenol	U		0.000283	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/15/2016 18:23	WG872427
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/15/2016 18:23	WG872427
2,4-Dinitrophenol	U		0.00325	0.0100	1	05/15/2016 18:23	WG872427
2-Nitrophenol	U		0.000320	0.0100	1	05/15/2016 18:23	WG872427
4-Nitrophenol	U		0.00201	0.0100	1	05/15/2016 18:23	WG872427
Pentachlorophenol	U		0.000313	0.0100	1	05/15/2016 18:23	WG872427
Phenol	U	<u>J4</u>	0.000334	0.0100	1	05/15/2016 18:23	WG872427
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/15/2016 18:23	WG872427
(S) 2-Fluorophenol	71.8			10.0-77.9		05/15/2016 18:23	WG872427
(S) Phenol-d5	58.8			5.00-70.1		05/15/2016 18:23	WG872427
(S) Nitrobenzene-d5	82.5			21.8-123		05/15/2016 18:23	WG872427
(S) 2-Fluorobiphenyl	79.0			29.5-131		05/15/2016 18:23	WG872427

TMW-WW6-EQ

SAMPLE RESULTS - 08

ONE LAB. NATIONWIDE.

Collected date/time: 05/10/16 18:00

L835078

		•						
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	51.3			11.2-130		05/15/2016 18:23	WG872427	
(S) p-Terphenyl-d14	91.0			29.3-137		05/15/2016 18:23	WG872427	



















ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137464-1	05/16/16 20:07	
	MB Res	ult <u>MB Qualifier</u>

(1112) 110107 1011 00710710 2				
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	U		0.795	10.0
Sulfate	H		0.57	50.0







L835458-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835458-01 05/1	/16/16 22:07 • (DUP)	R3137464-4	05/16/16 22:30
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(03) 2033430-01 03/10/	(03) 2033430-01 03/10/10 22:07 (050) / (0513/404-4 05/10/10 22:30								
	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits			
Analyte	mg/kg	mg/kg		%		%			
Chloride	15.8	17.1	1	8		15			
Sulfate	ND	2.85	1	0		15			









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137464-2 05/16/16 20:31 • (LCSD) R3137464-3 05/16/16 20:55

' '	,									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	192	192	96	96	80-120			0	15
Sulfate	200	194	195	97	97	80-120			0	15





L834994-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834994-01 05/17/16 03:18 • (MS) R3137464-5 05/17/16 03:42 • (MSD) R3137464-6 05/17/16 04:06

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	559	13.1	595	564	104	99	1	80-120			5	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3138282-1	05/18/16 23:05

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Fluoride	U		0.261	1.00

Ср





L835078-01 Original Sample (OS) • Duplicate (DUP)

(OS) L835078-01 05/19/16	01:04 • (DUP) F	R3138282-4 05	5/19/16 01:	28		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Eluarida	E 61	E E2	1	1		15







L835938-02 Original Sample (OS) • Duplicate (DUP)

(OS) L835938-02 05/19/16 09:16 • (DUP) R3138282-5 05/19/16 09:50

(,	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Fluoride	6.25	7.86	1	23	<u>J3</u>	15





Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138282-2 05/18/16 23:28 • (LCSD) R3138282-3 05/18/16 23:52

(200) 10100202 2 00/1	0/10/20:20 (200)	D) 110100202	0 00/10/10 20:0	-						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Fluoride	20.0	19.9	20.0	100	100	80-120			0	15

L835938-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835938-03 05/19/16 10:14 • (MS) R3138282-6 05/19/16 11:26 • (MSD) R3138282-7 05/19/16 11:50

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Fluoride	50.0	5.27	36.6	33.9	63	57	1	80-120	<u>J6</u>	<u>J6</u>	7	15

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L835078-08

Method Blank (MB)

Sulfate

(MB) R3138709-1	05/19/16 20:49				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/l		mg/l	mg/l	
Chloride	U		0.0519	1.00	
Fluoride	U		0.0099	0.100	

0.0774

5.00











U

(OS) | 83/161/LOA | 05/20/16 | 02:49 • (DLIP) | P3138709-5 | 05/20/16 | 03:04

(03) 2034014-04 03/20/10	02.43 (001)	113130703-3 1	00/20/10	JJ.UT		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	1.51	1.52	1	0		15
Fluoride	ND	0.0592	1	0		15
Sulfate	18.1	18.1	1	0		15









(LCS) R3138709-2 05/19/16 21:03 • (LCSD) R3138709-3 05/19/16 21:18

(200)	10710 21100 (2002	,	00,10,10 = 1.10							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Chloride	40.0	39.2	39.2	98	98	80-120			0	15
Fluoride	8.00	7.89	7.89	99	99	80-120			0	15
Sulfate	40.0	39.6	39.6	99	99	80-120			0	15





L834185-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L834185-02 05/20/16 00:54 • (MS) R3138709-4 05/20/16 01:09

(00) 200 1100 02 00/20/			0,20,100.00				
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	40.1	92.4	104	1	80-120	
Fluoride	5.00	0.558	5.88	106	1	80-120	
Sulfate	50.0	6.65	60.4	107	1	80-120	

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 9056A

L834409-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834409-03 05/20/16 04:45 • (MS) R3138709-6 05/20/16 04:59 • (MSD) R3138709-7 05/20/16 05:14

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	31.0	80.0	81.0	98	100	1	80-120			1	15
Fluoride	5.00	ND	5.21	5.34	102	105	1	80-120			2	15
Sulfate	50.0	ND	53.0	53.9	101	103	1	80-120			2	15



















ONE LAB. NATIONWIDE.

Metals (ICP) by Method 6010B

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3136806-1 (05/14/16 13:43
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Analyta	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Iron	1.56	<u>J</u>	1.41	10.0
Manganese	П		0.12	1.00









(LCS) R3136806-2	05/14/16 13:46 •	(LCSD) B3136806-3	05/14/16 13:48
(LC3) N3130000-Z	03/14/10 13.40	(LC3D) N3 130000-3	03/14/10 13.40

(ECS) NS130000 2 03/14/1	10 15.40 - (ECSE) 113130000 3	03/14/10 13.40	•						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Iron	1000	937	924	94	92	80-120			1	20
Manganese	100	93.2	92.0	93	92	80-120			1	20







L835281-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835281-01 05/14/16 13:51 • (MS) R3136806-6 05/14/16 14:00 • (MSD) R3136806-7 05/14/16 14:03

,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Iron	1090	20800	20900	23500	15	254	1	75-125	$\underline{\vee}$	V	12	20
Manganese	109	608	701	714	85	97	1	75-125			2	20







ONE LAB. NATIONWIDE.

Metals (ICP) by Method 6010B

L835078-08

Method Blank (MB)

(MB) R3137224-7 05/16/16	(MB) R3137224-7 05/16/16 19:15										
	MB Result	MB Qualifier	MB MDL	MB RDL							
Analyte	mg/l		mg/l	mg/l							
Iron	0.0473	<u>J</u>	0.0141	0.100							
Manganese	U		0.0012	0.0100							







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

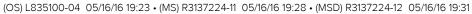
(LCS) R3137224-8 05/16	/16 19:17 • (LCSD)) R313/224-9	05/16/16 19:20								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Iron	10.0	10.2	10.3	102	103	80-120			1	20	
Manganese	1.00	0.997	1.00	100	100	80-120			1	20	







L835100-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)



(03) 2033100 04 03/10/10 13.23 - (M3) (N3) (N3) (N3) (M3) (M3) (M3) (M3)												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Iron	10.0	0.0740	10.3	10.3	102	102	1	75-125			0	20
Manganese	100	0.00612	102	102	102	101	1	75-125			1	20







ONE LAB. NATIONWIDE.

Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-08

Method Blank (MB)

(MB) R3137716-5 05/17/16	12:58						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	0.0333	<u>J</u>	0.0314	0.100			
(S) a,a,a-Trifluorotoluene(Fl	D) 94.7			62.0-128			



³Ss

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137716-3 05/17/16	LCS) R3137716-3 05/17/16 11:43 • (LCSD) R3137716-4 05/17/16 12:06											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
TPH (GC/FID) Low Fraction	5.50	5.24	5.58	95.3	101	67.0-132			6.28	20		
(S) a,a,a-Trifluorotoluene(FIL	0)			104	104	62.0-128						







⁷ GI

L835661-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835661-01 05/17/16 17:33 • (MS) R3137716-8 05/17/16 16:27 • (MSD) R3137716-9 05/17/16 16:49												
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	ND	5.49	5.50	99.1	99.3	1	50.0-143			0.200	20
(S) a,a,a-Trifluorotoluene(FID)				103	104		62.0-128				







ONE LAB. NATIONWIDE.

Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-01,02,03,04,05

Method Blank (MB)

(MB) R3137718-3 05/18/16	01:00					
	MB Result	MB Qualifier	MB MDL	MB RDL		
Analyte	mg/kg		mg/kg	mg/kg		
TPH (GC/FID) Low Fraction	U		0.0217	0.100		
(S) a,a,a-Trifluorotoluene(FI	D) 99.8			59.0-128		





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137718-1 05/17/16	5 23:52 • (LCSD)	R3137718-2	05/18/16 00:14							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	6.45	6.44	117	117	63.5-137			0.140	20
(S) a.a.a-Trifluorotoluene(Fi	ID)			99.0	99.6	59.0-128				





[©]Qc

⁷Gl



(OS) L835078-04 05/18/1	16 09:58 • (MS) F	R3137718-4 05	/18/16 01:46 •	(MSD) R3137718	3-5 05/18/16 (02:09							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	0.255	18.3	14.9	65.7	53.1	5	28.5-138			20.9	23.6	
(S) a.a.a-Trifluorotoluene(Fli	D)				96.5	97.4		59.0-128					





ONE LAB. NATIONWIDE.

Volatile Organic Compounds (GC) by Method 8015D/GRO

L835078-06,07

Method Blank (MB)

(MB) R3138234-3 05/18/16	3 17:50						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/kg		mg/kg	mg/kg			
TPH (GC/FID) Low Fraction	U		0.0217	0.100			
(S) a,a,a-Trifluorotoluene(FIL) 100			59.0-128			





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138234-1 05/18/16 16:42 • (LCSD) R3138234-2 05/18/16 17:04											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	5.59	6.61	102	120	63.5-137			16.8	20	
(S) a,a,a-Trifluorotoluene(Fl	'D)			99.3	99.1	59.0-128					







⁷Gl

L835078-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-06 05/18/16 20:23 • (MS) R3138234-4 05/18/16 19:15 • (MSD) R3138234-5 05/18/16 19:38													
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	U	4.61	9.33	16.8	33.9	5	28.5-138	<u>J6</u>	<u>J3</u>	67.8	23.6	
(S) a,a,a-Trifluorotoluene(Fl	D)				98.4	98.4		59.0-128					





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-01,02,03,04

Method Blank (MB)

(MB) R3138213-3 05/19/16 (B) R3138213-3 05/19/16 01:28									
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/kg		mg/kg	mg/kg						
Benzene	U		0.000270	0.00100						
Ethylbenzene	U		0.000297	0.00100						
Toluene	U		0.000434	0.00500						
Xylenes, Total	U		0.000698	0.00300						
(S) Toluene-d8	105			88.7-115						
(S) Dibromofluoromethane	101			76.3-123						
(S) a,a,a-Trifluorotoluene	94.8			87.2-117						
(S) 4-Bromofluorobenzene	100			69.7-129						



(LCS) R3138213-1 05/18/16	3 23:58 • (LCSD) R3138213-2	05/19/16 00:21								— ⁷
,	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0232	0.0234	92.7	93.6	72.6-120			1.03	20	
Ethylbenzene	0.0250	0.0248	0.0244	99.2	97.6	78.6-124			1.62	20	
Toluene	0.0250	0.0243	0.0247	97.2	98.7	76.7-116			1.52	20	_ "
Xylenes, Total	0.0750	0.0724	0.0729	96.5	97.1	78.1-123			0.620	20	L
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				103	103	76.3-123					
(S) a,a,a-Trifluorotoluene				95.8	96.3	87.2-117					
(S) 4-Bromofluorobenzene				102	101	69.7-129					

L835057-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835057-12 05/19/16	03:21 • (MS) R3	3138213-4 05/1	9/16 02:13 • (M	SD) R3138213-5	5 05/19/16 02:3	36						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0250	ND	0.0727	0.122	58.2	97.3	5	47.8-131		<u>J3</u>	50.4	22.8
Ethylbenzene	0.0250	ND	0.0847	0.121	67.8	97.1	5	44.8-135		<u>J3</u>	35.6	26.9
Toluene	0.0250	ND	0.0832	0.122	66.5	97.9	5	47.8-127		<u>J3</u>	38.1	24.3
Xylenes, Total	0.0750	ND	0.253	0.362	67.6	96.6	5	42.7-135		<u>J3</u>	35.4	26.6
(S) Toluene-d8					104	103		88.7-115				
(S) Dibromofluoromethane					102	104		76.3-123				
(S) a,a,a-Trifluorotoluene					95.0	94.8		87.2-117				
(S) 4-Bromofluorobenzene					98.2	99.3		69.7-129				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

Method Blank (MB)

(MB) R3138352-3 05/19/16	10:31			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	105			88.7-115
(S) Dibromofluoromethane	95.5			76.3-123
(S) a,a,a-Trifluorotoluene	106			87.2-117
(S) 4-Bromofluorobenzene	103			69.7-129

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138352-1 05/19/10	6 08:30 • (LCSE) R3138352-2	05/19/16 08:5	4							Ė
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	l
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Benzene	0.0250	0.0228	0.0223	91.1	89.3	72.6-120			2.05	20	·
Ethylbenzene	0.0250	0.0259	0.0253	103	101	78.6-124			2.09	20	Ιi
Toluene	0.0250	0.0229	0.0232	91.6	92.9	76.7-116			1.39	20	
Xylenes, Total	0.0750	0.0751	0.0738	100	98.4	78.1-123			1.75	20	Į l
(S) Toluene-d8				105	106	88.7-115					
(S) Dibromofluoromethane				99.3	96.4	76.3-123					
(S) a,a,a-Trifluorotoluene				105	107	87.2-117					
(S) 4-Bromofluorobenzene				102	103	69.7-129					

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835074-10 05/19/16 14:41 • (MS) R3138352-6 05/19/16 12:16 • (MSD) R3138352-7 05/19/16 12:40

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0336	ND	1.40	1.36	90.6	87.5	45	47.8-131			3.33	22.8
Ethylbenzene	0.0336	ND	1.38	1.33	87.5	84.4	45	44.8-135			3.38	26.9
Toluene	0.0336	ND	1.40	1.37	90.6	88.7	45	47.8-127			2.13	24.3
Xylenes, Total	0.101	1.60	5.48	5.40	85.5	83.9	45	42.7-135			1.35	26.6
(S) Toluene-d8					104	104		88.7-115				
(S) Dibromofluoromethane					101	98.8		76.3-123				
(S) a,a,a-Trifluorotoluene					102	104		87.2-117				















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-05,06,07

L835074-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

, ,	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					95.1	99.8		69.7-129				



















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835078-08

Method Blank (MB)

(MB) R3136703-3 05/13/16	13:23			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	105			90.0-115
(S) Dibromofluoromethane	105			79.0-121
(S) a,a,a-Trifluorotoluene	98.8			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136703-1 05/13/16	6 12:14 • (LCSD)	R3136703-2	05/13/16 12:31								. [
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0259	0.0255	103	102	73.0-122			1.27	20	
Ethylbenzene	0.0250	0.0260	0.0246	104	98.2	80.9-121			5.57	20	9
Toluene	0.0250	0.0264	0.0251	105	100	77.9-116			5.02	20	
Xylenes, Total	0.0750	0.0786	0.0747	105	99.6	79.2-122			5.11	20	L
(S) Toluene-d8				105	104	90.0-115					
(S) Dibromofluoromethane				102	106	79.0-121					
(S) a,a,a-Trifluorotoluene				99.7	99.5	90.4-116					
(S) 4-Bromofluorobenzene				97.8	98.1	80.1-120					

L835078-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835078-08 05/13/16	5 18:16 • (MS) R3	3136703-4 05/	13/16 18:33 • (M	ISD) R3136703-	5 05/13/16 18:	50						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	0.000509	0.0233	0.0247	91.1	96.9	1	58.6-133			6.06	20
Ethylbenzene	0.0250	U	0.0217	0.0232	86.9	92.7	1	62.7-136			6.45	20
Toluene	0.0250	U	0.0224	0.0240	89.4	95.8	1	67.8-124			6.96	20
Xylenes, Total	0.0750	U	0.0658	0.0704	87.8	93.9	1	65.6-133			6.70	20
(S) Toluene-d8					104	106		90.0-115				
(S) Dibromofluoromethane					106	108		79.0-121				
(S) a,a,a-Trifluorotoluene					97.8	102		90.4-116				
(S) 4-Bromofluorobenzene					98.4	98.0		80.1-120				

















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-08

Method Blank (MB)

(MB) R3139237-1 05/15	/16 09:51			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	112			50.0-150









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139237-2 05/15/	16 10:07 • (LCSD) R3139237-3	05/15/16 10:24							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
C10-C28 Diesel Range	1.50	1.53	1.54	102	102	70.0-130			0.680	20
(S) o-Terphenyl				110	117	50.0-150				













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Semi-Volatile Organic Compounds (GC) by Method 8015

L835078-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3137450-1 05/17/16	10:13			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	103			50.0-150











(LCS) R3137450-2 05/17/16 10:25 • (LCSD) R3137450-3 05/17/16 10:37

(200) 1000 2 00/1//	10 10.20 (2002) 110107 100 0	00/1//10 10.0/							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
C10-C28 Diesel Range	60.0	48.2	52.7	80.3	87.9	50.0-100			9.05	20
(S) o-Terphenyl				93.1	93.4	50.0-150				











(OS) L835078-01 05/17/16 12:02 • (MS) R3137450-4 05/17/16 12:15 • (MSD) R3137450-5 05/17/16 12:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	60.0	7.31	57.8	64.7	84.1	95.7	1	50.0-100			11.4	20
(S) o-Terphenyl					72.6	68.2		50.0-150				





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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Method Blank (MB)

(MB) R3138162-3 05/18/16	6 13:22				
	MB Result	MB Qualifier	MB MDL	MB RDL	
Analyte	mg/kg		mg/kg	mg/kg	
4-Chloro-3-methylphenol	U		0.00477	0.333	
2-Chlorophenol	U		0.00831	0.333	
2,4-Dichlorophenol	U		0.00746	0.333	
2,4-Dimethylphenol	U		0.0471	0.333	
4,6-Dinitro-2-methylphenol	U		0.124	0.333	
2,4-Dinitrophenol	U		0.0980	0.333	
2-Nitrophenol	U		0.0130	0.333	
4-Nitrophenol	U		0.0525	0.333	
Pentachlorophenol	U		0.0480	0.333	
Phenol	U		0.00695	0.333	
2,4,6-Trichlorophenol	U		0.00779	0.333	
(S) Nitrobenzene-d5	80.9			21.9-129	
(S) 2-Fluorobiphenyl	83.1			34.9-129	
(S) p-Terphenyl-d14	85.7			21.5-128	
(S) Phenol-d5	80.4			26.3-121	
(S) 2-Fluorophenol	74.3			21.1-116	
(S) 2,4,6-Tribromophenol	74.1			21.6-142	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16 12:35 • (LCSD) R3138162-2 05/18/16 12:58												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
4-Chloro-3-methylphenol	0.667	0.587	0.686	88.0	103	51.1-113			15.6	20		
2-Chlorophenol	0.667	0.469	0.525	70.3	78.7	40.8-103			11.3	20		
2,4-Dichlorophenol	0.667	0.551	0.617	82.6	92.5	46.2-109			11.3	20		
2,4-Dimethylphenol	0.667	0.557	0.647	83.6	97.1	42.2-110			15.0	20		
4,6-Dinitro-2-methylphenol	0.667	0.536	0.586	80.3	87.8	23.1-119			8.86	23.7		
2,4-Dinitrophenol	0.667	0.332	0.345	49.8	51.7	10.0-105			3.82	36.5		
2-Nitrophenol	0.667	0.532	0.620	79.7	93.0	44.2-113			15.3	20.9		
4-Nitrophenol	0.667	0.538	0.600	80.7	90.0	34.8-109			10.9	20		
Pentachlorophenol	0.667	0.550	0.574	82.5	86.1	16.2-102			4.25	22.9		
Phenol	0.667	0.497	0.599	74.6	89.8	41.5-106			18.5	20		
2,4,6-Trichlorophenol	0.667	0.565	0.620	84.7	93.0	44.4-108			9.39	20		
(S) Nitrobenzene-d5				86.7	99.9	21.9-129						
(S) 2-Fluorobiphenyl				83.6	94.3	34.9-129						

(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY

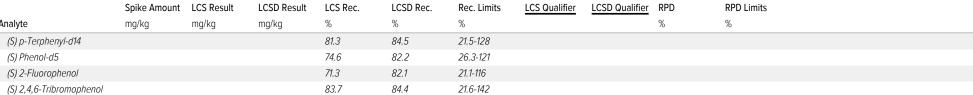
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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-01,02,03,04,05,06

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138162-1 05/18/16	12:35 • (LCSD)	R3138162-2 0	5/18/16 12:58							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RP
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%



L835035-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) I 835035-10 05/19/16 12:00 • (MS) R3138313-1 05/19/16 12:24 • (MSD) R3138313-2 05/19/16 12:47

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.142	U	0.632	0.663	89.0	93.4	5	27.0-154			4.76	26.6
2-Chlorophenol	0.142	U	0.524	0.563	73.8	79.2	5	33.2-121			7.06	29.3
2,4-Dichlorophenol	0.142	U	0.634	0.639	89.2	90.0	5	34.8-134			0.890	27.3
2,4-Dimethylphenol	0.142	U	0.638	0.651	89.9	91.7	5	12.3-149			2.00	32.3
4,6-Dinitro-2-methylphenol	0.142	U	ND	ND	0.000	0.000	5	10.0-144	<u>J6</u>	<u>J6</u>	0.000	32.7
2,4-Dinitrophenol	0.142	U	ND	ND	0.000	0.000	5	10.0-121	<u>J6</u>	<u>J6</u>	0.000	39.4
2-Nitrophenol	0.142	U	0.636	0.652	89.5	91.8	5	29.5-144			2.53	29.9
4-Nitrophenol	0.142	U	0.586	0.569	82.6	80.1	5	20.0-133			3.03	30.2
Pentachlorophenol	0.142	U	0.655	0.671	92.3	94.5	5	10.0-139			2.43	28.3
Phenol	0.142	U	0.565	0.644	79.5	90.7	5	25.1-130			13.1	29.6
2,4,6-Trichlorophenol	0.142	U	0.633	0.675	89.1	95.1	5	33.8-133			6.52	28.1
(S) Nitrobenzene-d5					86.3	94.0		21.9-129				
(S) 2-Fluorobiphenyl					83.0	81.1		34.9-129				
(S) p-Terphenyl-d14					82.2	60.4		21.5-128				
(S) Phenol-d5					80.2	86.0		26.3-121				
(S) 2-Fluorophenol					78.2	82.9		21.1-116				

84.2

















80.1

21.6-142

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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-07

Method Blank (MB)

(MB) R3138667-3 05/20/1	6 10:56			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	61.8			21.9-129
(S) 2-Fluorobiphenyl	61.7			34.9-129
(S) p-Terphenyl-d14	68.7			21.5-128
(S) Phenol-d5	70.1			26.3-121
(S) 2-Fluorophenol	64.2			21.1-116
(S) 2,4,6-Tribromophenol	52.9			21.6-142

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138667-1 05/20/	16 10:08 • (LCSE	D) R3138667-2	05/20/16 10:3	2						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				

(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

1835078-07

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC\ D2120667.1	0E/20/16 10:00	(LCSD) R3138667-2	OE/20/16 10:22
ILC31 K3130007-1	05/20/10 10.00 •	1LC3D1 K3130007-Z	05/20/10 10.32

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142







⁴Cn

L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6

68.4

21.6-142

ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Method Blank (MB)

(MB) R3136946-3 05/15/16	6 16:02					
	MB Result	MB Qualifier	MB MDL	MB RDL	- -	6
Analyte	mg/l		mg/l	mg/l		ĺ
4-Chloro-3-methylphenol	U		0.000263	0.0100		-
2-Chlorophenol	U		0.000283	0.0100		3
2,4-Dichlorophenol	U		0.000284	0.0100		L
2,4-Dimethylphenol	U		0.000624	0.0100		4
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100		ı
2,4-Dinitrophenol	U		0.00325	0.0100		-
2-Nitrophenol	U		0.000320	0.0100		5
4-Nitrophenol	U		0.00201	0.0100		L
Pentachlorophenol	U		0.000313	0.0100	1	6
Phenol	U		0.000334	0.0100		
2,4,6-Trichlorophenol	U		0.000297	0.0100		
(S) Nitrobenzene-d5	85.3			21.8-123		7
(S) 2-Fluorobiphenyl	<i>75.7</i>			29.5-131		L
(S) p-Terphenyl-d14	88.4			29.3-137		8
(S) Phenol-d5	53.1			5.00-70.1		ĺ
(S) 2-Fluorophenol	72.7			10.0-77.9		
(S) 2,4,6-Tribromophenol	44.8			11.2-130		ç

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/1	16 15:16 • (LCSD)	R3136946-2	05/15/16 15:39							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0516	0.0536	103	107	35.7-100	<u>J4</u>	<u>J4</u>	3.90	22.9
2-Chlorophenol	0.0500	0.0350	0.0353	70.1	70.6	26.2-91.5			0.760	26.5
2,4-Dichlorophenol	0.0500	0.0414	0.0421	82.8	84.1	31.4-103			1.56	24.9
2,4-Dimethylphenol	0.0500	0.0402	0.0453	80.3	90.6	31.9-107			12.0	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0450	0.0490	89.9	98.1	18.4-148			8.69	24.4
2,4-Dinitrophenol	0.0500	0.0286	0.0321	57.1	64.3	24.2-128			11.8	20.5
2-Nitrophenol	0.0500	0.0429	0.0419	85.7	83.9	25.9-106			2.18	26.9
4-Nitrophenol	0.0500	0.0259	0.0255	51.9	50.9	10.0-52.7			1.86	40
Pentachlorophenol	0.0500	0.0325	0.0346	65.0	69.1	10.0-97.4			6.22	35.1
Phenol	0.0500	0.0280	0.0295	55.9	59.1	10.0-57.9		<u>J4</u>	5.49	35
2,4,6-Trichlorophenol	0.0500	0.0418	0.0443	83.7	88.6	29.8-107			5.71	24.1
(S) Nitrobenzene-d5				93.0	96.0	21.8-123				
(S) 2-Fluorobiphenyl				80.1	80.5	29.5-131				

















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835078-08

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3136946-1 05/15/16 15:16 • (LCSD) R3136946-2 05/15/16 15:39												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%		
(S) p-Terphenyl-d14				88.1	101	29.3-137						
(S) Phenol-d5				55.5	52.7	5.00-70.1						
(S) 2-Fluorophenol				66.2	67.0	10.0-77.9						
(S) 2,4,6-Tribromophenol				62.1	62.8	11.2-130						



















GLOSSARY OF TERMS





SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
В	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
llinois	200008	Oregon	TN200002
ndiana	C-TN-01	Pennsylvania	68-02979
owa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
ouisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















			Billing Info	rmation:			100	1	A	nalysis /	Contain	ner / Pre	servativ	ve .	4.5		Chain of Custody	Page of
AMEC Foster Wheeler - Houston, TX 585 N. Dairy Ashford Houston, TX 77079		585 N. D	Accounts Payable 585 N. Dairy Ashford Houston, TX 77079													and the same of th	LA-B S-C	SC
eport to: Pamela Krueger			Email To: p	oamela.krueger@a	mecfw.com						es	V					12065 Lebanon Rd Mount Juliet, TN 3712 Phone: 615-758-5858 Phone: 800-767-5859	100
Project Description: Wastewater Line Inv	estigation			City/State A & Collected:	TESTAIN	VM.	5	S		_	NoPr	103			res	100	Fax: 615-758-5859	
Phone: 713-929-5674	Client Project 670316001			Lab Project # AMECFWHT)	(-WW LINE		NoPres	5mlHDPE-NoPres	res	9-HCI-B	4ozClr-	DPE-HN	VoPres		2ozCir-NoPres	HCI	₩ C8 3s	the production of the same of
Collected by (print):		Routin					nl Amb	nlHDP	Ir-NoP	mlAm	OACID	50mlH	ozClr-N	HCI		40mlAmb-HCl	Acctnum: AME Template:T112	
Collected by (signature):	4 90 100	ıy		Email?	No X_Yes	No.	8270ACID 100ml	FI, SO4 125r	Fl, SO4 4ozClr-NoPres	DROOROLVI 40mlAmb-HCI-BT	DRORLA, SV8270ACID 4ozClr-NoPres	FEICP, MNICP 250mlHDPE-HNO3	FEICP, MNICP 202Clr-NoPres	GRO 40mlAmb HCI	GRO,V8260BTEX	V8260BTEX 401	Prelogin: P552 TSR: 526 - Chris PB: 5 . 4 . Shipped Via: Fe	McCord G KM
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	Ω,	C, F	DRC	DRC	FEIG	FEIG	GRC	GRC	V82	Rem./Contaminant	Sample # (lab on
TMW-WWL1-01		SS	1	5/10/16	15:00	4			X		X		X		X	_		-01
TMW-WULL-05		SS	5	5/10/16	15:10	4			X		X		X		X			-02
TMW-WWL1-12	100	SS	12	5/10/16	15:20	4			X		X		X		X			-03
TMW-WWLZ-01		SS	1	5/10/16	16:20	4			X		X		X		X	_	1 1 2 2 3	-04
TMW-WWLZ-05		SS	5	5/10/16		4			X		Х		X		X	_		-05
TMW-WWLZ-12D		SS	12	5/10/16		4			X		X		X		X	_		-14
TMW-WWL2-121)		SS	12	5/10/16	16:55	4			X	_	X		X		X			-57
n		_\$5		1		4	>		X		×		X		X			
TMW-WW6-EQ		Ø ₩	_	5/10/10	18:00	11	X	X		Х		Х		Х		X	100	-08
111	/	GW	1	1		111	×	X		X		X		X		X	- P	
Matrix: SS - Soil GW - Groundwater Remarks:	WW - WasteW	ater DW - D	rinking Wate	er OT - Other						pH _ Flow _	2	Tem			Но	47/	10132	8168
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ANALYTICAL REPORT



AMEC Foster Wheeler - Houston, TX

Sample Delivery Group: L835353

Samples Received: 05/13/2016

Project Number: 6703160012.001

Description: Wastewater Line Investigation

Report To: Pamela Krueger

585 N. Dairy Ashford

Houston, TX 77079

Entire Report Reviewed By: Chu, fagh

Chris McCord

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the lutroratory. Where applicable, sampling conducted by ESC is performed per guidance provided in lutroratory standard operating procedures 56/300, 06/303, and 06/304.



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⁹Sc: Chain of Custody

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ONE	LAB.	NAT	TION	WID

TMW-WWL1 L835353-01 GW			Collected by	Collected date/time 05/12/16 08:30	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:15	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 15:12	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:33	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:32	05/17/16 00:32	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:20	05/19/16 00:20	DAH
Net Chemistry by Method 9056A	WG874711	1	05/24/16 13:02	05/24/16 13:02	CM
Wet Chemistry by Method 9056A	WG875355	500	05/26/16 11:11	05/26/16 11:11	CM
TMW-WWL2 L835353-02 GW			Collected by	Collected date/time 05/12/16 09:00	Received date/time 05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:12	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:26	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 04:50	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 00:53	05/17/16 00:53	ACG
/olatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 00:43	05/19/16 00:43	DAH

SAMPLE SUMMARY



'Ss

Cn

Sr

СQс



CM

 CM

CM

Received date/time

05/13/16 09:00

TMW-WWL2D L835353-03 GW

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Wet Chemistry by Method 9056A

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Metals (ICP) by Method 6010B	WG872666	5	05/17/16 09:52	05/17/16 17:18	ST
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG872936	1	05/18/16 11:41	05/19/16 19:49	JF
Semi-Volatile Organic Compounds (GC) by Method 8015	WG872740	1	05/15/16 18:28	05/17/16 05:07	JNS
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG872894	1	05/17/16 01:15	05/17/16 01:15	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/19/16 01:05	05/19/16 01:05	DAH
Wet Chemistry by Method 9056A	WG874225	1	05/23/16 13:58	05/23/16 13:58	SAM
Wet Chemistry by Method 9056A	WG874225	500	05/23/16 12:55	05/23/16 12:55	SAM
			Collected by	Collected date/time	Received date/time
TRIP BLANK 1 835353-04 GW				05/12/16 00:00	05/13/16 09:00

WG874711

WG874711

WG875355

1

100

500

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected by

05/24/16 13:31

05/24/16 13:45

05/26/16 11:25

Collected date/time 05/12/16 09:05

	Collected by	Collected date/time	Received date/time
RIP BLANK L835353-04 GW		05/12/16 00:00	05/13/16 09:00

Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:12	05/18/16 20:12	DAH
			Collected by	Collected date/time	Received date/time
TRIP BLANK L835353-05 GW				05/12/16 00:00	05/13/16 09:00

TRIP DLAINE LOSSSSS-US GW					
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Volatile Organic Compounds (GC/MS) by Method 8260B	WG872872	1	05/18/16 20:34	05/18/16 20:34	DAH

Collected by

Collected date/time

Received date/time



WWL-SPC L835353-06 Solid				05/12/16 00:00	05/13/16 09:00
Method	Batch	Dilution	Preparation	Analysis	Analyst
			date/time	date/time	
Mercury by Method 7471A	WG873476	1	05/18/16 17:22	05/19/16 09:44	NJB
Metals (ICP) by Method 6010B	WG873554	1	05/20/16 11:08	05/20/16 13:52	BRJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG873908	1	05/19/16 22:56	05/20/16 14:58	SNR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG873587	1	05/19/16 21:44	05/20/16 19:28	DMG
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG874253	5	05/20/16 17:57	05/20/16 22:59	JAH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG874942	5	05/24/16 16:07	05/25/16 02:00	DWR
Wet Chemistry by Method 9056A	WG874228	1	05/23/16 09:00	05/23/16 17:37	CM
Wet Chemistry by Method 9056A	WG874228	10	05/23/16 09:00	05/23/16 18:01	CM
Wet Chemistry by Method 9056A	WG874228	50	05/23/16 09:00	05/24/16 09:03	CM





















All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

















Technical Service Representative

Analyte

Manganese

Iron

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

Metals (ICP) by Method 6010B

Result

mg/l

0.234

0.954

Qualifier

MDL

mg/l

0.0705

0.00600

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	12200		26.0	500	500	05/26/2016 11:11	WG875355
Fluoride	6.21		0.00990	0.100	1	05/24/2016 13:02	WG874711
Sulfate	18800		38.7	2500	500	05/26/2016 11:11	WG875355

Dilution

5

5

Analysis

date / time

05/17/2016 17:15

05/17/2016 17:15

Batch

WG872666

WG872666

RDL

mg/l

0.500

0.0500





Cn



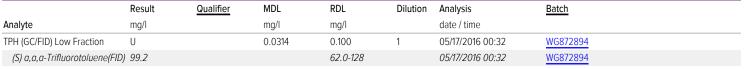












Volatile Organic Compounds (GC/MS) by Method 8260B

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:20	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:20	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:20	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:20	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:20	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/19/2016 00:20	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/19/2016 00:20	WG872872
(S) 4-Bromofluorobenzene	101			80.1-120		05/19/2016 00:20	WG872872

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0851	<u>J</u>	0.0222	0.100	1	05/17/2016 04:33	WG872740
C28-C40 Oil Range	0.0419	<u>J</u>	0.0118	0.100	1	05/17/2016 04:33	WG872740
(S) o-Terphenyl	95.3			50.0-150		05/17/2016 04:33	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 15:12	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 15:12	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 15:12	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 15:12	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 15:12	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 15:12	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 15:12	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 15:12	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 15:12	WG872936
(S) 2-Fluorophenol	43.8			10.0-77.9		05/19/2016 15:12	WG872936
(S) Phenol-d5	32.9			5.00-70.1		05/19/2016 15:12	WG872936
(S) Nitrobenzene-d5	76.8			21.8-123		05/19/2016 15:12	WG872936
(S) 2-Fluorobiphenyl	87.2			29.5-131		05/19/2016 15:12	WG872936

TMW-WWL1

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 08:30

L835353

	<u>'</u>	`	, ,					
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	71.9			11.2-130		05/19/2016 15:12	WG872936	
(S) n-Ternhenvl-d14	98.2			29.3-137		05/19/2016 15:12	WG872936	



















SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7130		5.19	100	100	05/24/2016 13:45	WG874711
Fluoride	2.59		0.00990	0.100	1	05/24/2016 13:31	WG874711
Sulfate	14600		38.7	2500	500	05/26/2016 11:25	WG875355







	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.169	<u>J</u>	0.0705	0.500	5	05/17/2016 17:12	WG872666
Manganese	0.836		0.00600	0.0500	5	05/17/2016 17:12	WG872666



Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 00:53	WG872894
(S) a,a,a-Trifluorotoluene(FIL	99.5			62.0-128		05/17/2016 00:53	WG872894



Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 00:43	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 00:43	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 00:43	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 00:43	WG872872
(S) Toluene-d8	104			90.0-115		05/19/2016 00:43	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 00:43	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 00:43	WG872872
(S) 4-Bromofluorobenzene	114			80.1-120		05/19/2016 00:43	WG872872



ΆΙ

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.182		0.0222	0.100	1	05/17/2016 04:50	WG872740
C28-C40 Oil Range	0.175		0.0118	0.100	1	05/17/2016 04:50	WG872740
(S) o-Terphenyl	104			50.0-150		05/17/2016 04:50	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:26	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:26	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:26	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:26	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:26	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:26	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:26	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:26	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:26	WG872936
(S) 2-Fluorophenol	52.9			10.0-77.9		05/19/2016 19:26	WG872936
(S) Phenol-d5	38.1			5.00-70.1		05/19/2016 19:26	WG872936
(S) Nitrobenzene-d5	84.9			21.8-123		05/19/2016 19:26	WG872936
(S) 2-Fluorobiphenyl	88.9			29.5-131		05/19/2016 19:26	WG872936

TMW-WWL2

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:00

L835353

	<u>'</u>	•	, ,				
	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
(S) 2,4,6-Tribromophenol	78.3			11.2-130		05/19/2016 19:26	WG872936
(S) p-Terphenyl-d14	99.5			29.3-137		05/19/2016 19:26	WG872936



















SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	7100		26.0	500	500	05/23/2016 12:55	WG874225
Fluoride	3.10		0.00990	0.100	1	05/23/2016 13:58	WG874225
Sulfate	16800		38.7	2500	500	05/23/2016 12:55	WG874225







Metals (ICP) by Method 6010B

	Result	<u>Qualifier</u>	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Iron	0.981		0.0705	0.500	5	05/17/2016 17:18	WG872666
Manganese	0.910		0.00600	0.0500	5	05/17/2016 17:18	WG872666



Sr ⁶Qc

Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
TPH (GC/FID) Low Fraction	U		0.0314	0.100	1	05/17/2016 01:15	WG872894
(S) a,a,a-Trifluorotoluene(FID)	98.8			62.0-128		05/17/2016 01:15	WG872894





⁸Al

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
		Qualifier			Dilution	,	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/19/2016 01:05	WG872872
Toluene	U		0.000780	0.00500	1	05/19/2016 01:05	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/19/2016 01:05	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/19/2016 01:05	WG872872
(S) Toluene-d8	103			90.0-115		05/19/2016 01:05	WG872872
(S) Dibromofluoromethane	110			79.0-121		05/19/2016 01:05	WG872872
(S) a,a,a-Trifluorotoluene	103			90.4-116		05/19/2016 01:05	WG872872
(S) 4-Bromofluorobenzene	116			80.1-120		05/19/2016 01:05	WG872872

⁹Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
C10-C28 Diesel Range	0.0892	<u>J</u>	0.0222	0.100	1	05/17/2016 05:07	WG872740
C28-C40 Oil Range	0.0898	<u>J</u>	0.0118	0.100	1	05/17/2016 05:07	WG872740
(S) o-Terphenyl	97.7			50.0-150		05/17/2016 05:07	WG872740

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
4-Chloro-3-methylphenol	U		0.000263	0.0100	1	05/19/2016 19:49	WG872936
2-Chlorophenol	U		0.000283	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dichlorophenol	U		0.000284	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dimethylphenol	U		0.000624	0.0100	1	05/19/2016 19:49	WG872936
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100	1	05/19/2016 19:49	WG872936
2,4-Dinitrophenol	U	<u>J3</u>	0.00325	0.0100	1	05/19/2016 19:49	WG872936
2-Nitrophenol	U		0.000320	0.0100	1	05/19/2016 19:49	WG872936
4-Nitrophenol	U		0.00201	0.0100	1	05/19/2016 19:49	WG872936
Pentachlorophenol	U		0.000313	0.0100	1	05/19/2016 19:49	WG872936
Phenol	U		0.000334	0.0100	1	05/19/2016 19:49	WG872936
2,4,6-Trichlorophenol	U		0.000297	0.0100	1	05/19/2016 19:49	WG872936
(S) 2-Fluorophenol	40.0			10.0-77.9		05/19/2016 19:49	WG872936
(S) Phenol-d5	32.2			5.00-70.1		05/19/2016 19:49	WG872936
(S) Nitrobenzene-d5	70.2			21.8-123		05/19/2016 19:49	WG872936
(S) 2-Fluorobiphenyl	81.9			29.5-131		05/19/2016 19:49	WG872936

TMW-WWL2D

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 09:05

L835353

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
(S) 2,4,6-Tribromophenol	63.3			11.2-130		05/19/2016 19:49	WG872936	
(S) n-Ternhenvl-d14	94.9			29.3-137		05/19/2016 19:49	WG872936	



















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SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:12	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:12	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:12	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:12	WG872872
(S) Toluene-d8	104			90.0-115		05/18/2016 20:12	WG872872
(S) Dibromofluoromethane	109			79.0-121		05/18/2016 20:12	WG872872
(S) a,a,a-Trifluorotoluene	104			90.4-116		05/18/2016 20:12	WG872872
(S) 4-Bromofluorobenzene	99.5			80.1-120		05/18/2016 20:12	WG872872



















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SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.000331	0.00100	1	05/18/2016 20:34	WG872872
Toluene	U		0.000780	0.00500	1	05/18/2016 20:34	WG872872
Ethylbenzene	U		0.000384	0.00100	1	05/18/2016 20:34	WG872872
Total Xylenes	U		0.00106	0.00300	1	05/18/2016 20:34	WG872872
(S) Toluene-d8	108			90.0-115		05/18/2016 20:34	WG872872
(S) Dibromofluoromethane	99.3			79.0-121		05/18/2016 20:34	WG872872
(S) a,a,a-Trifluorotoluene	108			90.4-116		05/18/2016 20:34	WG872872
(S) 4-Bromofluorobenzene	105			80.1-120		05/18/2016 20:34	WG872872



















SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

Wet Chemistry by Method 9056A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Chloride	1660		7.95	100	10	05/23/2016 18:01	WG874228
Fluoride	18.3		0.261	1.00	1	05/23/2016 17:37	WG874228
Sulfate	20000		28.5	2500	50	05/24/2016 09:03	WG874228





Mercury by Method 7471A

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Mercury	U		0.00280	0.0200	1	05/19/2016 09:44	WG873476





Metals (ICP) by Method 6010B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Arsenic	2.87		0.650	2.00	1	05/20/2016 13:52	WG873554
Barium	95.9		0.170	0.500	1	05/20/2016 13:52	WG873554
Cadmium	0.222	<u>J</u>	0.0700	0.500	1	05/20/2016 13:52	WG873554
Chromium	5.89		0.140	1.00	1	05/20/2016 13:52	WG873554
Iron	5120		1.41	10.0	1	05/20/2016 13:52	WG873554
Lead	7.90		0.190	0.500	1	05/20/2016 13:52	WG873554
Manganese	390		0.120	1.00	1	05/20/2016 13:52	WG873554
Selenium	U		0.740	2.00	1	05/20/2016 13:52	WG873554
Silver	U		0.280	1.00	1	05/20/2016 13:52	WG873554





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Volatile Organic Compounds (GC) by Method 8015D/GRO

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
TPH (GC/FID) Low Fraction	U		0.108	0.500	5	05/20/2016 22:59	WG874253
(S) a,a,a-Trifluorotoluene(FID) 87.3			59.0-128		05/20/2016 22:59	WG874253

Volatile Organic Compounds (GC/MS) by Method 8260B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
Benzene	U		0.00135	0.00500	5	05/25/2016 02:00	WG874942
Toluene	U		0.00217	0.0250	5	05/25/2016 02:00	WG874942
Ethylbenzene	U		0.00148	0.00500	5	05/25/2016 02:00	WG874942
Total Xylenes	U		0.00349	0.0150	5	05/25/2016 02:00	WG874942
(S) Toluene-d8	106			88.7-115		05/25/2016 02:00	WG874942
(S) Dibromofluoromethane	102			76.3-123		05/25/2016 02:00	WG874942
(S) a,a,a-Trifluorotoluene	103			87.2-117		05/25/2016 02:00	WG874942
(S) 4-Bromofluorobenzene	103			69.7-129		05/25/2016 02:00	WG874942

Semi-Volatile Organic Compounds (GC) by Method 8015

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
C10-C28 Diesel Range	U		1.61	4.00	1	05/20/2016 19:28	WG873587
C28-C40 Oil Range	4.12		0.274	4.00	1	05/20/2016 19:28	WG873587
(S) o-Terphenyl	87.5			50.0-150		05/20/2016 19:28	WG873587

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/12/16 00:00

L835353

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/kg		mg/kg	mg/kg		date / time	
4-Chloro-3-methylphenol	U		0.00477	0.333	1	05/20/2016 14:58	WG873908
2-Chlorophenol	U	<u>J3</u>	0.00831	0.333	1	05/20/2016 14:58	WG873908
2,4-Dichlorophenol	U		0.00746	0.333	1	05/20/2016 14:58	WG873908
2,4-Dimethylphenol	U		0.0471	0.333	1	05/20/2016 14:58	WG873908
4,6-Dinitro-2-methylphenol	U		0.124	0.333	1	05/20/2016 14:58	WG873908
2,4-Dinitrophenol	U		0.0980	0.333	1	05/20/2016 14:58	WG873908
2-Nitrophenol	U		0.0130	0.333	1	05/20/2016 14:58	WG873908
4-Nitrophenol	U		0.0525	0.333	1	05/20/2016 14:58	WG873908
Pentachlorophenol	U		0.0480	0.333	1	05/20/2016 14:58	WG873908
Phenol	U		0.00695	0.333	1	05/20/2016 14:58	WG873908
2,4,6-Trichlorophenol	U		0.00779	0.333	1	05/20/2016 14:58	WG873908
(S) 2-Fluorophenol	61.1			21.1-116		05/20/2016 14:58	WG873908
(S) Phenol-d5	55.3			26.3-121		05/20/2016 14:58	WG873908
(S) Nitrobenzene-d5	67.6			21.9-129		05/20/2016 14:58	WG873908
(S) 2-Fluorobiphenyl	62.2			34.9-129		05/20/2016 14:58	WG873908
(S) 2,4,6-Tribromophenol	46.7			21.6-142		05/20/2016 14:58	WG873908
(S) p-Terphenyl-d14	52.9			21.5-128		05/20/2016 14:58	WG873908

















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Wet Chemistry by Method 9056A

L835353-03

Method Blank (MB)

(MB) R3139265-1	05/23/16 09:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Sulfate	U		0.0774	5.00







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CS) P3139265-2 05/23/16 09:23 • // CSD) P3139265-3 05/23/16 09:38

(LCS) R3139265-2 U5/23/	(LCS) R3139205-2 U5/23/10 U9:23 • (LCSD) R3139205-3 U5/23/10 U9:38										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Chloride	40.0	38.9	38.9	97	97	80-120			0	15	
Fluoride	8.00	7.73	7.76	97	97	80-120			0	15	
Sulfate	40.0	38.5	38.6	96	97	80-120			0	15	









L835977-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835977-10 05/23/16 17:41 • (MS) R3139265-4 05/23/16 17:57 • (MSD) R3139265-5 05/23/16 18:13

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Fluoride	5.00	0.361	5.34	5.28	100	98	1	80-120			1	15
Sulfate	50.0	ND	50.8	51.0	99	99	1	80-120			0	15





Fluoride

QUALITY CONTROL SUMMARY

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Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3139346-1 05/24/16 08:33									
	MB Result	MB Qualifier	MB MDL	MB RDL					
Analyte	mg/l		mg/l	mg/l					









(OS) L836606-01 05/24/16 16:53 •	(DUP) R3139346-5 05/24/16 17:07
----------------------------------	---------------------------------

(00) 2000000 01 00/2 1/1	0 10.00 (201)	1101000100	00/2 1/10 1	, ,		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	ND	0.611	1	0		15
Fluoride	ND	0.0818	1	0		15











0.0099

0.100

(LCS) R3139346-2 05/24/	CS) R3139346-2 05/24/16 08:47 • (LCSD) R3139346-3 05/24/16 10:27										
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Chloride	40.0	39.0	39.2	97	98	90-110			0	20	
Fluoride	8.00	7.82	7 84	98	98	90-110			0	20	





L836505-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L836505-07 05/24/16 14:28 • (MS) R3139346-4 05/24/16 14:43

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	17.2	67.6	101	1	80-120	
Fluoride	5.00	0.122	5.04	98	1	80-120	

L836606-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(US) 1 836606-06	05/24/16 18:36	(MS) D31303/6-6	05/24/16 18:50 •	(MSD) R3139346-7	05/24/16 19:04
(US) L030000-00	03/24/10 10.30	0-04CECICA (CIVII)	03/24/10 10.30 •	(IVISD) KSISSS40-/	03/24/10 19.04

(OS) L836606-06 05/24/	76 18:36 • (MS) I	3139346-6 0	5/24/16 18:50	· (MSD) R31393	46-/ 05/24/16	19:04						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	ND	50.1	51.6	100	103	1	80-120			3	15
Fluoride	5.00	ND	4.98	5.18	98	102	1	80-120			4	15

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Wet Chemistry by Method 9056A

L835353-01,02

Method Blank (MB)

(MB) R3140117-1 05/26/16	6 09:06			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00







L837803-06 Original Sample (OS) • Duplicate (DUP)

(OS) L837803-06 05/26/16	6 15:51 • (DUP) F	R3140117-4 05/	/26/16 16:0	06		
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Sulfate	35.7	35.6	1	0		15



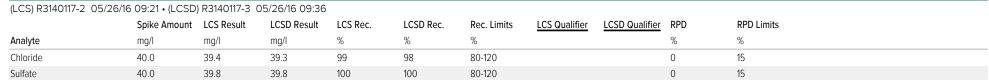
[†]Cn















ACCOUNT:

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Wet Chemistry by Method 9056A

L835353-06

Method Blank (MB)

Chloride

Fluoride

Sulfate

(MB) R3139258-1 05/23/16	5 10:37		
	MB Result	MB Qualifier	MB MDL
Analyte	mg/kg		mg/kg

U

U











(OS) L836501-15 05/23/16 20:25 • (DUP) R3139258-4 05/23/16 20:49

	Original Result (dry)	DUP Result (dry) Dilution	DUP RPD	DUP Qualifier	Qualifier DUP RPD Limits		
Analyte	mg/kg	mg/kg		%		%		
Chloride	86.9	80.8	1	7		15		
Fluoride	7.38	6.69	1	10		15		
Sulfate	215	177	1	19	P1	15		

MB RDL

mg/kg

10.0

1.00

50.0

0.795

0.261

0.57







⁸Al



(OS) L836501-21 05/24/16 00:48 • (DUP) R3139258-7 05/24/16 01:12

	Original Result (dry)	DUP Result (d	ry) Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	75.8	83.5	1	10		15
Fluoride	16.2	13.3	1	20	<u>J3</u>	15
Sulfate	257	235	1	9		15



⁹Sc

Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139258-2 05/23/16 11:01 • (LCSD) R3139258-3 05/23/16 11:25

(200) 110.00200 2 00/2	0,1010. (2002	,	00/20/10 11120							
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chloride	200	199	199	99	99	80-120			0	15
Fluoride	20.0	20.4	20.5	102	103	80-120			0	15
Sulfate	200	200	200	100	100	80-120			0	15

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Wet Chemistry by Method 9056A

L835353-06

L836501-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836501-16 05/23/16 22:00 • (MS) R3139258-5 05/23/16 22:24 • (MSD) R3139258-6 05/23/16 22:48

(00) 200000110 00/20/10 22:00 (MO) No100200 0 00/20/10 22:10 (MOD) No100200 0 00/20/10 22:10												
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	538	78.6	643	629	105	102	1	80-120			2	15
Fluoride	53.8	5.67	49.6	49.1	82	81	1	80-120			1	15
Sulfato	E38	260	922	916	103	102	1	90 120			1	15





















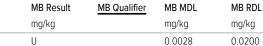
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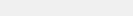
Method Blank (MB)

Mercury

Mercury by Method 7471A

(MB) R3138224-1 05/19/16 09:36 MB Result MB Qualifier MB MDL Analyte







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138224-2 05/19/16 09:39 • (LCSD) R3138224-3 05/19/16 09:41

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	
Mercury	0.300	0.260	0.274	87	91	80-120			5	20	









(OS) L835353-06 05/19/16 09:44 • (MS) R3138224-4 05/19/16 09:47 • (MSD) R3138224-5 05/19/16 09:54

, ,	Spike Amount	Original Result		MSD Result	MS Rec.	MSD Rec.	Dilutio	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
Mercury	0.300	U	0.282	0.276	94	92	1	75-125			2	20	









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Metals (ICP) by Method 6010B

L835353-01,02,03

Method Blank (MB)

(MB) R3137501-1 05/17/16	12:02			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Iron	U		0.0141	0.100
Manganese	U		0.0012	0.0100







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R313/501-2 05/1//16	5 12:04 • (LCSD)) R313/501-3 (05/1//16 12:0/								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
Iron	10.0	9.70	9.78	97	98	80-120			1	20	
Manganese	100	0 973	0.980	97	98	80-120			1	20	













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Metals (ICP) by Method 6010B

Method Blank (MB)

Silver

(MB) R3138672-1 05/20/1	6 13:30			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.65	2.00
Barium	0.278	<u>J</u>	0.17	0.500
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Manganese	U		0.12	1.00
Selenium	U		0.74	2.00



0.28

1.00

	(LC	S) R3138672-2	05/20/16 13:33 •	(LCSD	R3138672-3	05/20/16 13:35
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U

(LCS) NS130072 2	03/20/10 13.33 • (ECSE	•									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier I	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	%	%	%		•	%	%	
Arsenic	100	99.2	97.4	99	97	80-120		2	2	20	
Barium	100	104	102	104	102	80-120		1	l	20	
Cadmium	100	103	101	103	101	80-120			2	20	
Chromium	100	99.2	97.9	99	98	80-120		1	l	20	
Iron	1000	974	963	97	96	80-120		1	l	20	
Lead	100	104	102	104	102	80-120			2	20	
Manganese	100	99.7	98.4	100	98	80-120		1		20	
Selenium	100	103	102	103	102	80-120		1		20	
Silver	100	98.4	97.0	98	97	80-120		•		20	

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	105	4.07	102	106	94	97	1	75-125			3	20
Barium	105	47.6	155	166	102	113	1	75-125			7	20
Cadmium	105	U	106	108	101	103	1	75-125			2	20
Chromium	105	7.15	105	111	93	99	1	75-125			6	20
Iron	1050	11300	10800	12600	0	118	1	75-125	\vee		16	20



















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Metals (ICP) by Method 6010B

L835353-06

L836003-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836003-08 05/20/16 13:38 • (MS) R3138672-6 05/20/16 13:46 • (MSD) R3138672-7 05/20/16 13:48

(00) 2000000 00 00/20/	0 .0.00 (0) .	(0.000) = 0 0	3/20/10 10:10	(2 / 00/20/10							
	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Lead	105	6.62	114	116	102	105	1	75-125			2	20
Manganese	105	293	362	353	65	57	1	75-125	<u>J6</u>	<u>J6</u>	2	20
Selenium	105	U	92.7	98.3	88	94	1	75-125			6	20
Silver	105	П	100	104	95	99	1	75-125			4	20





















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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-01,02,03

Method Blank (MB)

(MB) R3137306-3 05/16/16	6 22:25						
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	mg/l		mg/l	mg/l			
TPH (GC/FID) Low Fraction	U		0.0314	0.100			
(S) a,a,a-Trifluorotoluene(FIL	D) 100			62.0-128			







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137306-1 05/16/1	6 21:22 • (LCSD) R3137306-2	05/16/16 21:43								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
TPH (GC/FID) Low Fraction	5.50	6.14	6.04	112	110	67.0-132			1.66	20	
(S) a,a,a-Trifluorotoluene(Fl.	D)			102	101	62.0-128					







L834446-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L834446-01 05/16/1	6 23:50 • (MS) R	3137306-4 05	/16/16 22:46	• (MSD) R313730	06-5 05/16/16	3 23:07							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%	
TPH (GC/FID) Low Fraction	5.50	ND	2.91	3.00	52.9	54.6	1	50.0-143			3.25	20	
(S) a.a.a-Trifluorotoluene(Fl	'DI				100	100		62.0-128					





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Volatile Organic Compounds (GC) by Method 8015D/GRO

L835353-06

Method Blank (MB)

(MB) R3138993-3 05/20/1	16 19:11			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FIL	D) 88.2			59.0-128





Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138993-1 05/20/	16 18:01 • (LCSD) R3138993-2	05/20/16 18:24	1						
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TPH (GC/FID) Low Fraction	5.50	5.12	4.92	93.0	89.4	63.5-137			3.96	20
(S) a a a-Trifluorotoluene(FII	וח			891	89.0	59 0-128				







7 GI

L835353-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835353-06 05/20/1	6 22:59 • (MS)	R3138993-4 0	5/20/16 21:50	 (MSD) R31389 	993-5 05/20/16	5 22:13						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	U	17.6	19.8	63.9	71.9	5	28.5-138			11.7	23.6
(S) a,a,a-Trifluorotoluene(FID))				86.7	87.5		59.0-128				





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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-01,02,03,04,05

Method Blank (MB)

(MB) R3138238-3 05/18/16	3 18:41			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			90.0-115
(S) Dibromofluoromethane	109			79.0-121
(S) a,a,a-Trifluorotoluene	103			90.4-116
(S) 4-Bromofluorobenzene	101			80.1-120

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138238-1 05/18/1	6 16:49 • (LCSD)) R3138238-2	05/18/16 17:11								_
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	8
Benzene	0.0250	0.0256	0.0267	102	107	73.0-122			4.33	20	
Ethylbenzene	0.0250	0.0251	0.0260	100	104	80.9-121			3.74	20	0
Toluene	0.0250	0.0235	0.0244	93.9	97.4	77.9-116			3.63	20	
Xylenes, Total	0.0750	0.0736	0.0765	98.2	102	79.2-122			3.82	20	L
(S) Toluene-d8				105	106	90.0-115					
(S) Dibromofluoromethane				110	103	79.0-121					
(S) a,a,a-Trifluorotoluene				103	106	90.4-116					
(S) 4-Bromofluorobenzene				101	106	80.1-120					

L835321-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835321-02 05/18/16	21:19 • (MS) R3	138238-4 05/1	8/16 19:04 • (M	SD) R3138238-	5 05/18/16 19:2	27						
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	ND	0.0233	0.0247	93.2	98.8	1	58.6-133			5.89	20
Ethylbenzene	0.0250	ND	0.0234	0.0253	93.5	101	1	62.7-136			7.89	20
Toluene	0.0250	ND	0.0215	0.0228	85.9	91.4	1	67.8-124			6.16	20
Xylenes, Total	0.0750	ND	0.0695	0.0740	92.6	98.7	1	65.6-133			6.31	20
(S) Toluene-d8					106	105		90.0-115				
(S) Dibromofluoromethane					108	109		79.0-121				
(S) a,a,a-Trifluorotoluene					104	104		90.4-116				
(S) 4-Bromofluorobenzene					104	104		80.1-120				





















ONE LAB. NATIONWIDE.

Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

Method Blank (MB)

(MB) R3139540-3 05/24/16	3 21:59			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Benzene	U		0.000270	0.00100
Ethylbenzene	U		0.000297	0.00100
Toluene	U		0.000434	0.00500
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	106			88.7-115
(S) Dibromofluoromethane	99.4			76.3-123
(S) a,a,a-Trifluorotoluene	105			87.2-117
(S) 4-Bromofluorobenzene	103			69.7-129

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3139540-1 05/24/	16 20:22 • (LCS	D) R3139540-2	2 05/24/16 20:	42							ľ
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	L
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%	8
Benzene	0.0250	0.0216	0.0216	86.5	86.4	72.6-120			0.0900	20	_
Ethylbenzene	0.0250	0.0236	0.0232	94.6	92.8	78.6-124			1.85	20	9
Toluene	0.0250	0.0224	0.0225	89.5	90.1	76.7-116			0.740	20	_
Xylenes, Total	0.0750	0.0711	0.0715	94.8	95.3	78.1-123			0.510	20	L
(S) Toluene-d8				108	108	88.7-115					
(S) Dibromofluoromethane				101	101	76.3-123					
(S) a,a,a-Trifluorotoluene				107	106	87.2-117					
(S) 4-Bromofluorobenzene				103	102	69.7-129					

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	0.0285	29.5	137	134	81.9	79.6	4600	47.8-131			2.25	22.8
Ethylbenzene	0.0285	108	229	232	91.7	94.6	4600	44.8-135			1.67	26.9
Toluene	0.0285	222	339	347	89.5	95.7	4600	47.8-127			2.37	24.3
Xylenes, Total	0.0855	527	895	913	93.6	98.1	4600	42.7-135			1.94	26.6
(S) Toluene-d8					108	107		88.7-115				
(S) Dibromofluoromethane					102	99.1		76.3-123				
(S) a,a,a-Trifluorotoluene					106	107		87.2-117				

















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Volatile Organic Compounds (GC/MS) by Method 8260B

L835353-06

L836637-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L836637-05 05/26/16 11:45 • (MS) R3139988-1 05/26/16 12:04 • (MSD) R3139988-2 05/26/16 12:24

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) 4-Bromofluorobenzene					104	105		69.7-129				



















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-01,02,03

Method Blank (MB)

(MB) R3137334-1 05/17/	/16 03:42			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
C10-C28 Diesel Range	U		0.0222	0.100
C28-C40 Oil Range	U		0.0118	0.100
(S) o-Terphenyl	105			50.0-150









Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3137334-2 05/17	7/16 03:59 • (LCSI	D) R3137334-3	05/17/16 04:16								
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%	
C10-C28 Diesel Range	1.50	1.48	1.44	98.5	96.1	70.0-130			2.44	20	
(S) o-Terphenyl				104	97.9	50.0-150					















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Semi-Volatile Organic Compounds (GC) by Method 8015

L835353-06

Method Blank (MB)

(MB) R3138554-1 05/20)/16 10:03			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	88.1			50.0-150







Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138554-2 05/20/16 10:17 • (LCSD) R3138554-3 05/20/16 10:31												
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits		
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%		
C10-C28 Diesel Range	60.0	47.4	48.5	78.9	80.9	50.0-100			2.44	20		
(S) o-Terphenyl				88.9	91.0	50.0-150						









(OS) 1.935353 O6 O5/20/46 10:28 . (MS) P2138554 4 O5/20/46 10:42 . (MSD) P2138554 5 O5/20/46 10:57





(O3) L033333-00 O3/2	0/10 19.20 • (IVIS)	K3136334-4 U	3/20/10 19.42	• (IVISO) KS1365	03/4-3 03/20/	10 19.57							
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%	
C10-C28 Diesel Range	60.0	U	43.1	44.1	71.8	73.6	1	50.0-100			2.39	20	
(S) o-Terphenyl					67.2	65.3		50.0-150					

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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

Method Blank (MB)

(MB) R3138702-3 05/19/1	MB) R3138702-3 05/19/16 14:49								
	MB Result	MB Qualifier	MB MDL	MB RDL		ř			
Analyte	mg/l		mg/l	mg/l		ľ			
4-Chloro-3-methylphenol	U		0.000263	0.0100		L			
2-Chlorophenol	U		0.000283	0.0100					
2,4-Dichlorophenol	U		0.000284	0.0100		L			
2,4-Dimethylphenol	U		0.000624	0.0100		Ę			
4,6-Dinitro-2-methylphenol	U		0.00262	0.0100					
2,4-Dinitrophenol	U		0.00325	0.0100		L			
2-Nitrophenol	U		0.000320	0.0100		!			
4-Nitrophenol	U		0.00201	0.0100		L			
Pentachlorophenol	U		0.000313	0.0100					
Phenol	U		0.000334	0.0100					
2,4,6-Trichlorophenol	U		0.000297	0.0100					
(S) Nitrobenzene-d5	77.9			21.8-123		1			
(S) 2-Fluorobiphenyl	84.2			29.5-131		L			
(S) p-Terphenyl-d14	93.8			29.3-137		Ī			
(S) Phenol-d5	38.1			5.00-70.1					
(S) 2-Fluorophenol	55.7			10.0-77.9		L			
(S) 2,4,6-Tribromophenol	70.6			11.2-130		1			

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138702-1 05/19/	LCS) R3138702-1 05/19/16 14:02 • (LCSD) R3138702-2 05/19/16 14:25									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
4-Chloro-3-methylphenol	0.0500	0.0439	0.0424	87.8	84.8	35.7-100			3.47	22.9
2-Chlorophenol	0.0500	0.0377	0.0354	75.3	70.8	26.2-91.5			6.19	26.5
2,4-Dichlorophenol	0.0500	0.0441	0.0428	88.1	85.7	31.4-103			2.83	24.9
2,4-Dimethylphenol	0.0500	0.0430	0.0431	86.1	86.2	31.9-107			0.150	25.7
4,6-Dinitro-2-methylphenol	0.0500	0.0375	0.0383	75.0	76.7	18.4-148			2.20	24.4
2,4-Dinitrophenol	0.0500	0.0258	0.0157	51.5	31.3	24.2-128		<u>J3</u>	48.8	20.5
2-Nitrophenol	0.0500	0.0447	0.0434	89.3	86.7	25.9-106			2.97	26.9
4-Nitrophenol	0.0500	0.0190	0.0153	38.0	30.6	10.0-52.7			21.7	40
Pentachlorophenol	0.0500	0.0392	0.0347	78.3	69.4	10.0-97.4			12.0	35.1
Phenol	0.0500	0.0200	0.0177	40.0	35.5	10.0-57.9			12.1	35
2,4,6-Trichlorophenol	0.0500	0.0452	0.0456	90.5	91.2	29.8-107			0.790	24.1
(S) Nitrobenzene-d5				84.3	87.2	21.8-123				
(S) 2-Fluorobiphenyl				86.0	90.9	29.5-131				

















ONE LAB. NATIONWIDE.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-01,02,03

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138702-1 05/19/1	(LCS) R3138702-1 05/19/16 14:02 • (LCSD) R3138702-2 05/19/16 14:25									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
(S) p-Terphenyl-d14				96.1	98.8	29.3-137				
(S) Phenol-d5				37.7	32.4	5.00-70.1				
(S) 2-Fluorophenol				52.3	43.9	10.0-77.9				
(S) 2,4,6-Tribromophenol				88.7	88.5	11.2-130				



















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Semi Volatile Organic Compounds (GC/MS) by Method 8270C

L835353-06

Method Blank (MB)

(MB) R3138667-3 05/20/1	(MB) R3138667-3 05/20/16 10:56								
	MB Result	MB Qualifier	MB MDL	MB RDL					
Analyte	mg/kg		mg/kg	mg/kg					
4-Chloro-3-methylphenol	U		0.00477	0.333					
2-Chlorophenol	U		0.00831	0.333					
2,4-Dichlorophenol	U		0.00746	0.333					
2,4-Dimethylphenol	U		0.0471	0.333	Γ				
4,6-Dinitro-2-methylphenol	U		0.124	0.333					
2,4-Dinitrophenol	U		0.0980	0.333	L				
2-Nitrophenol	U		0.0130	0.333					
4-Nitrophenol	U		0.0525	0.333					
Pentachlorophenol	U		0.0480	0.333					
Phenol	U		0.00695	0.333					
2,4,6-Trichlorophenol	U		0.00779	0.333					
(S) Nitrobenzene-d5	61.8			21.9-129					
(S) 2-Fluorobiphenyl	61.7			34.9-129					
(S) p-Terphenyl-d14	68.7			21.5-128					
(S) Phenol-d5	70.1			26.3-121					
(S) 2-Fluorophenol	64.2			21.1-116					
(S) 2,4,6-Tribromophenol	52.9			21.6-142					

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3138667-1 05/20/	LCS) R3138667-1 05/20/16 10:08 • (LCSD) R3138667-2 05/20/16 10:32									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
4-Chloro-3-methylphenol	0.667	0.451	0.496	67.7	74.4	51.1-113			9.51	20
2-Chlorophenol	0.667	0.345	0.432	51.7	64.8	40.8-103		<u>J3</u>	22.6	20
2,4-Dichlorophenol	0.667	0.452	0.451	67.8	67.5	46.2-109			0.350	20
2,4-Dimethylphenol	0.667	0.420	0.451	62.9	67.6	42.2-110			7.12	20
4,6-Dinitro-2-methylphenol	0.667	0.457	0.470	68.5	70.5	23.1-119			2.97	23.7
2,4-Dinitrophenol	0.667	0.430	0.404	64.5	60.6	10.0-105			6.29	36.5
2-Nitrophenol	0.667	0.421	0.463	63.1	69.4	44.2-113			9.50	20.9
4-Nitrophenol	0.667	0.393	0.365	58.9	54.7	34.8-109			7.41	20
Pentachlorophenol	0.667	0.517	0.487	77.5	73.0	16.2-102			5.87	22.9
Phenol	0.667	0.367	0.442	55.0	66.3	41.5-106			18.6	20
2,4,6-Trichlorophenol	0.667	0.512	0.479	76.8	71.8	44.4-108			6.68	20
(S) Nitrobenzene-d5				59.1	63.6	21.9-129				
(S) 2-Fluorobiphenyl				69.2	60.8	34.9-129				

















(S) 2,4,6-Tribromophenol

QUALITY CONTROL SUMMARY



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

835353-06

LCS Qualifier

LCSD Qualifier RPD

%

RPD Limits

%

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

// CC) D2120667.1	OE/20/16 10:00	(LCSD) R3138667-2	OE /20 /16 10.22
1LC21 K3138007-1	- U5/ZU/IB IU:U8 •	ILUSDI R3138007-2	U5/ZU/IB IU:3Z

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%
(S) p-Terphenyl-d14				65.8	64.2	21.5-128
(S) Phenol-d5				56.0	67.8	26.3-121
(S) 2-Fluorophenol				59.1	73.1	21.1-116
(S) 2,4,6-Tribromophenol				57.7	55.4	21.6-142









L835349-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L835349-02 05/20/16 13:46 • (MS) R3138667-4 05/20/16 14:10 • (MSD) R3138667-5 05/20/16 14:34

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
4-Chloro-3-methylphenol	0.767	U	0.592	0.713	77.2	93.1	1	27.0-154			18.6	26.6
2-Chlorophenol	0.767	U	0.450	0.513	58.8	67.0	1	33.2-121			13.1	29.3
2,4-Dichlorophenol	0.767	U	0.536	0.619	70.0	80.7	1	34.8-134			14.3	27.3
2,4-Dimethylphenol	0.767	U	0.502	0.634	65.4	82.8	1	12.3-149			23.4	32.3
4,6-Dinitro-2-methylphenol	0.767	U	0.558	0.641	72.8	83.6	1	10.0-144			13.8	32.7
2,4-Dinitrophenol	0.767	U	0.495	0.577	64.6	75.2	1	10.0-121			15.2	39.4
2-Nitrophenol	0.767	U	0.523	0.563	68.3	73.4	1	29.5-144			7.26	29.9
4-Nitrophenol	0.767	U	0.493	0.569	64.3	74.2	1	20.0-133			14.3	30.2
Pentachlorophenol	0.767	U	0.648	0.726	84.5	94.7	1	10.0-139			11.4	28.3
Phenol	0.767	U	0.581	0.646	75.8	84.3	1	25.1-130			10.6	29.6
2,4,6-Trichlorophenol	0.767	U	0.602	0.649	78.5	84.6	1	33.8-133			7.56	28.1
(S) Nitrobenzene-d5					67.5	80.4		21.9-129				
(S) 2-Fluorobiphenyl					59.8	65.2		34.9-129				
(S) p-Terphenyl-d14					47.5	54.0		21.5-128				
(S) Phenol-d5					63.4	68.3		26.3-121				
(S) 2-Fluorophenol					66.7	73.0		21.1-116				

64.6













68.4

21.6-142

GLOSSARY OF TERMS

ONE LAB. NATIONWIDE.



SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.





















ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.*** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
lowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee 14	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



















Billing Inform			lling Informa	ation:	7 1 1 1 1 1	$\overline{}$			Anal	lysis / Co	ontaine	r / Prese	ervative				Chain of Custody	Pageof
AMEC Foster Wheeler - Houston, TX		Accounts Payable 585 N. Dairy Ashford Houston, TX 77079														YOUR LAB O	. 回题里	
eport to:		- 1	Email To: pa	amela.krueger@amecfw.com								NO3			BIK		Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859	
Pamela Krueger Project Description: States Stinger Sump In	WATER .	Line		City/State Collected:				31	res			DPE-H	toPres		P-HCI-		L# L835	353
Phone: 713-929-5674	Client Project # 6703160012.	A CONTRACTOR OF THE PARTY OF TH		Lab Project # AMECFWHTX-	Lab Project # AMECFWHTX-SLURRY		res	DROOROLVI 40mlAmb-HCl-BT	4ozClr-NoPres		oPres	Skinner's List Mtls. 250mlHDPE-HNO3	Skinner's List Mtls. 2ozClr-NoPres		40mIAmb-HCI-BIK		1198	
Fax:	Site/Facility ID #			P.O. #	1		nb NoPr	mlAm	70 4oz(DH.	GRO,V8260 2ozClr-NoPres	VItls. 2	Mtls. 2	V8260 40mIAmb-HCI	Blank 40		Acctnum: AMEC	2081
Collected by (signature):		ab MUST Be N			esults Needed		ml Amb	LVI 40	,5V8270	IAmb	60 20	List	List	OmlA	Trip Bl		Prelogin: P5525	McCord
Immediately	Same Day		100%	2000 1000	No X_Yes	No. of	8270 100ml	OOROI	DRORLA,S	GRO 40mlAmb HCI	0,782	inner's	inner's	3260 40	V8260-T		Shipped Via: Fee	edEX Ground
Packed on Ice N Y Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	827	DR	100000000000000000000000000000000000000	GR.	-	Ski	X Ski	8%	8/		Rem./Contaminant	Sample # (lab only
1		SS	·			13			X		X	-	X		-	-		
		ss	1			3	-	1	X		X		X					
		SS	-	1:-1:	610	10	-	Х	~	X		Х		Х				-0
TMW-WWH		GW	1 2 2	5/12/16	8:30	10	10000000	X	1	X		X		Х	-		1	0
TMW-WWLZ		GW	-	5/11/6	9:00	10	200000	X		X		X		X				0
TMW-WWLZD		GW	1	5/n/16	1600	10	-	100							X	L		0
TR.P Black		GW	-	- 12 · · · · · · · · · · · · · · · · · ·		1	1000000			200.00					X		7	(
TPIP Blow		GW				1	1000000	100				21			X			
		GW			1				1	130								
* Matrix: SS - Soil GW - Groundwater	r WW West III	(ater DW D	Vrinking Wat	ter OT - Other						pile.		T	emp			6	711013	29011
* Matrix: SS - Soil GW - Groundwater Remarks:	usur w.	ILL CA	XL IN	ANALY!	5')	al				pH Flow	100000	Ot	Other		-	5	5-054	
Relinquished by : (Signature)	Sh	Date:	1		Received by: (Sign		100			200		turned via	ourier			Condition	tion: (It	ab use only)
Relinquished by : (Signature)	White .	5/12 Date:	116		Received by: (Sig	gnature	1			Temp	7		3	Receiver	(Seal Intact: V	YNN
Relinquished by : (Signature)		Date:		Time:	Received for lab	by: (Sil	gnature			Date	ρ.	16	Time:			pH Che	ecked:	ICF:

ESC Lab Sciences Non-Conformance Form

Login #: L835353 Client: AMECFWHTX Date: 5/13/16 Evaluated by: Jeremy					
	Login #: L835353	Client: AMECFWHTX	Date: 5/13/16	Evaluated by: Jeremy	

Non-Conformance (check applicable items)

Sample Integrity		Chain of Custody Clarification	
Parameter(s) past holding time	×	Login Clarification Needed	If Broken Container:
Improper temperature		Chain of custody is incomplete	Insufficient packing material around container
Improper container type		Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation		Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Cour
Insufficient sample volume.		Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.		Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.		Trip Blank not received.	If no Chain of Custody:
Broken container		Client did not "X" analysis.	Received by:
Broken container:		Chain of Custody is missing	Date/Time:
Sufficient sample remains			Temp./Cont. Rec./pH:
E. S. S. S. S.			Carrier:
			Tracking#

Login Comments: Received a 125ml-NP for Anions for all TMW ID's not listed on COC.

Client informed by:	Call	Email	Voice Mail	Date:	Time:	
TSR Initials: CM	Client Cont	tact:		-322		73.55

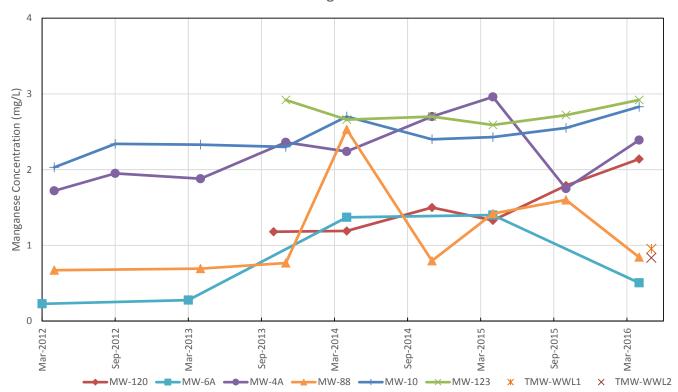
Login Instructions:

Log 125mL-NP for CHLORIDE, FLUORIDE and SULFATE.

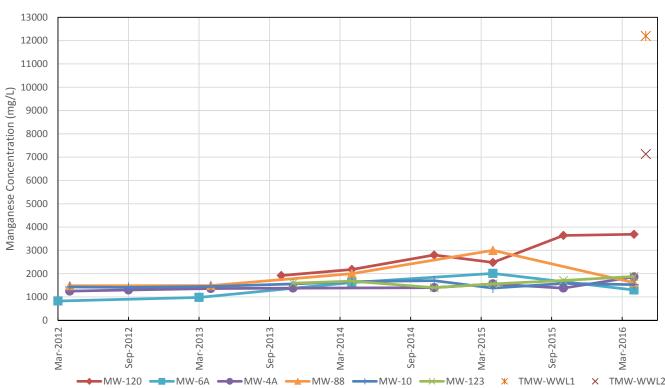
Also, change on all IDs: 8270 to 8270ACID; V8260 to V8260BTEX and only log metals FEICP and MNICP.

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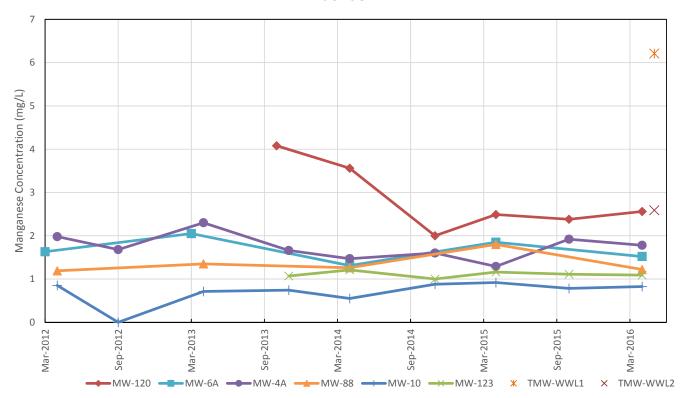
Manganese



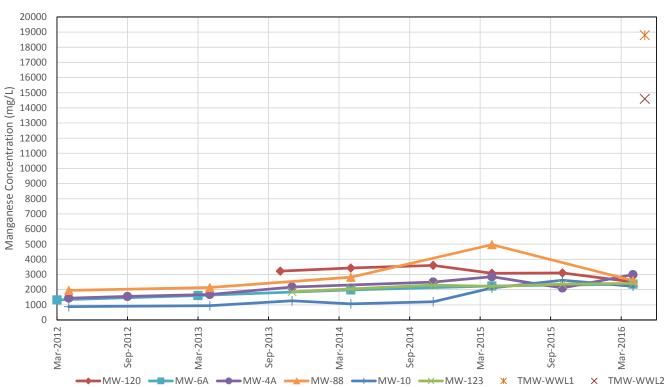




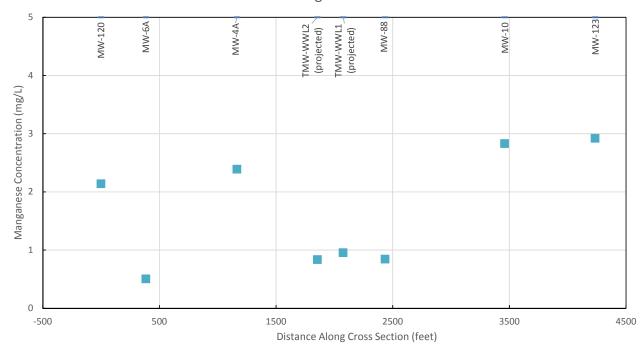
Fluoride



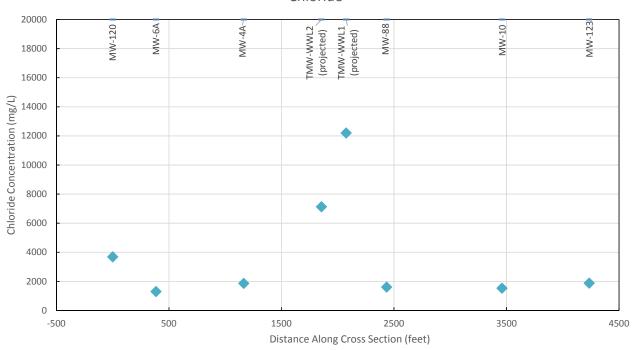




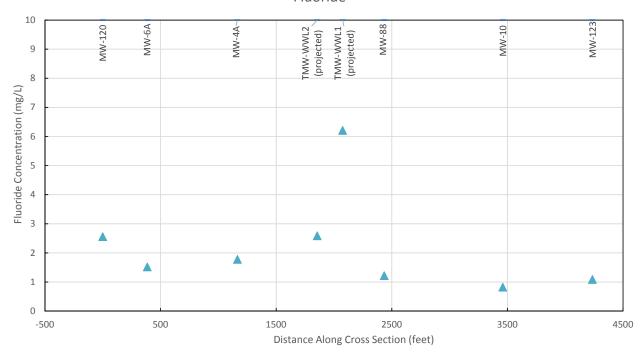
Manganese



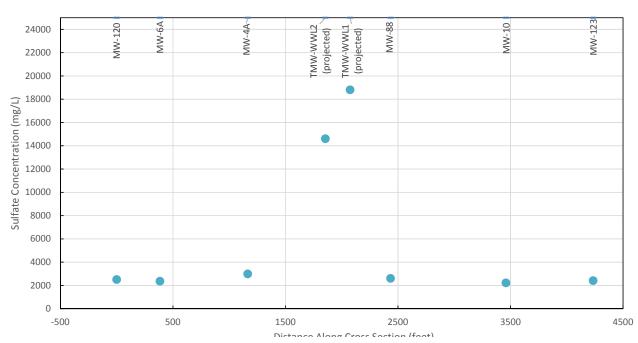




Fluoride



Sulfate



Chavez, Carl J, EMNRD

From: Combs, Robert <Robert.Combs@HollyFrontier.com>

Sent: Thursday, June 11, 2015 3:46 PM

To: Chavez, Carl J, EMNRD

Cc: Tsinnajinnie, Leona, NMENV; Griswold, Jim, EMNRD; Denton, Scott

Subject: RE: Initial C-141 report - Effluent Pipeline Leak 2015-04-12

Attachments: 041215 effluent line release - Action Levels evaluation.pdf; ATT00001.txt

Carl,

In your response below (4/21/15), you recommend that Navajo develop a remediation plan to address the impacted area. We plan to excavate any impacted soil for off-site disposal, but would first like to determine, with OCD, the appropriate action levels for each analyte of concern. In 2013 as part of another investigation (Evaporation Ponds Phase IV Corrective Actions Investigation Report), Navajo performed a study to examine background concentrations (not impacted by refinery use of the area) of several metals and anions; please see the attached evaluation.

As with OCD, Navajo wants to address the impacted area through delineation and soil removal. In the interim, we have backfilled the area excavated for line repair with clean fill material purchased from an off-site source. We will characterize the remediation waste as well as the excavated material dispose of the material at an off-site facility.

Please let me know if you would like to discuss.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Tuesday, April 21, 2015 9:36 AM

To: Combs. Robert

Cc: Tsinnajinnie, Leona, NMENV; Griswold, Jim, EMNRD

Subject: RE: Initial C-141 report - Effluent Pipeline Leak 2015-04-12

Robert:

Received. OCD wants to make sure this properly cleaned up.

This is high Chloride and Sulfate containing fluids with other parameters of concern. Please note the depth to GW and make sure in your CA that the release is properly investigated (i.e., characterization 500 mg/kg Chloride to delineate horiz./vertical extent of release) and OCD expects to receive a remediation plan for final CA.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, New Mexico 87505

O: (505) 476-3490

E-mail: <u>CarlJ.Chavez@State.NM.US</u>
Web: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental



From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Friday, April 17, 2015 2:22 PM

To: Chavez, Carl J, EMNRD; Tsinnajinnie, Leona, NMENV **Cc:** Denton, Scott; Schultz, Michele; Strange, Aaron

Subject: Initial C-141 report - Effluent Pipeline Leak 2015-04-12

Carl and Leona,

Please see the attached C-141 form regarding the effluent pipeline leak on 4/12/15. A Final C-141 form will be prepared once all field activities are complete.

Please contact me for any questions.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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Mr. Scott Denton Environmental Manager Navajo Refining Company, LLC 501 East Main Artesia. New Mexico 88211 ARCADIS U.S., Inc. 2929 Briarpark Drive Suite 300 Houston Texas 77042 Tel 713 953 4800 Fax 713 977 4620 www.arcadis-us.com

Subject:

Potential Soil Response Action Levels for Wastewater Pipeline Break near the Evaporation Ponds Area, Navajo Refining Company Artesia Refinery

Dear Mr. Denton:

ARCADIS is providing this letter discussing potential soil response action levels in relation to the reported release of wastewater that occurred south of the inactive former Evaporation Ponds (EPs) associated with the Navajo Refining Company, L.L.C. (NRC) Artesia Refinery (Refinery). It is our understanding that the release occurred due to a break in the pipeline that conveys treated wastewater from the Refinery to injection wells located approximately 12 miles east of the Refinery. The break occurred approximately one-half mile south of the southwestern corner of the EPs (Figure 1).

The wastewater that is conveyed through the pipeline is sampled quarterly and analyzed for waste characterization purposes. A copy of the most recent wastewater analytical report is provided in Attachment 1 to this letter. The sample was analyzed for total metals, anions, cations, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), corrosivity, reactivity, ignitability, specific conductance, specific gravity, total dissolved solids (TDS), and pH. In addition, the sample was analyzed for eight metals using the toxicity characteristic leaching procedure (TCLP).

The analytical results indicate that the wastewater is not corrosive, not reactive, not ignitable, not toxic (no TCLP metals detected), and contains no VOCs above the New Mexico Water Quality Control Commission (WQCC) standards. The following compounds were reported above the WQCC standards:

- Phenol was reported at 0.0081 mg/L, above the WQCC standard of 0.005mg/L
- Iron was reported at 3.7 mg/L, above the WQCC standard of 1.0 mg/L
- Manganese was reported at 0.25 mg/L, above the WQCC standard of 0.2 mg/L
- Chloride was reported at 300 mg/L, above the WQCC standard of 250 mg/L

Imagine the result

ENVIRONMENT

Date:

June 11, 2015

Contact:

Pamela R. Krueger

Phone:

713.953.4816

Email:

pam.krueger@arcadis-us.com

Our ref: TX001155

ARCADIS

Mr. Scott Denton
June 11, 2015

- Fluoride was reported at 11 mg/L, above the WQCC standard of 1.6 mg/L
- Sulfate was reported at 2,100 mg/L, above the WQCC standard of 600 mg/L
- TDS was reported at 3,710 mg/L, above the WQCC standard of 1,000 mg/L

ARCADIS understands that the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) requested that a soil investigation and remediation be performed, focused on chloride and sulfate.

Although the wastewater sample analytical results do exceed the WQCC standards for water quality parameters, including chloride, it should be noted that the area in which the release occurred is known to have elevated chloride concentrations, along with other cations, anions and total metals. In 2013, as part of the Phase IV Corrective Action Investigation of the EPs, ARCADIS collected soil samples from 12 soil borings and analyzed the samples for thirteen total metals and for three anions, including chloride, fluoride, and sulfate. A statistical evaluation of the background soil sample results was performed to determine an appropriate upper tolerance limit (UTL) for the data obtained. A copy of the statistical evaluation memo is provided as Attachment 2 to this letter, including a table with a summary of the UTLs calculated for each parameter evaluated.

Figure 1 shows the locations of the background soil samples collected in 2013. The borings were located on both sides of the Pecos River, in locations both to the east and west of the EPs. These areas were selected based on their proximity to the EPs, yet outside the area of potential impacts from the operation of the EPs. Thus, these soil borings were considered representative of the native conditions of soil in the vicinity of the EPs. As a result, it would be appropriate to use the UTLs from this background soil study as alternative action levels for screening potential impacts from the wastewater line release.

It is our recommendation that soil samples be collected from either side of the excavation that was performed to repair the wastewater pipeline, within approximately 15 feet of the location of the break. Soil samples should be collected from the surface and from a depth corresponding with the bottom of the pipeline. The samples should be analyzed for the following:

- Total Petroleum Hydrocarbons (TPH):
 - Gasoline Range Organics (GRO)
 - Diesel Range Organics (DRO)
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)

ARCADIS

Mr. Scott Denton
June 11, 2015

- Chloride
- Fluoride
- Sulfate
- Iron
- Manganese
- Phenol

The analytical results should be compared to the calculated background UTL (chloride, fluoride, sulfate, iron, and manganese). For parameters that do not have a calculated background UTL, the analytical results should be compared to the lower of the residential or soil-leaching-to-groundwater soil screening levels (SSLs). Table 1 presents the proposed screening values for the analytical suite. If any of the soil results exceed these screening levels, then additional delineation may be warranted.

Should you have any questions or comments, please feel free to contact me at 713.953.4816.

Sincerely,

ARCADIS U.S., Inc.

Pamela R. Krueger Principal-in-Charge

Enclosures:

Figure 1 Table 1

Attachment 1: Wastewater Analytical Report

Attachment 2: EP Background Soil Statistical Evaluation Memo



Table

Table 1
Proposed Action Levels for Soil Delineation
Wastewater Line Leak, Artesia, NM

Parameter	Background UTL (mg/kg)	Residential SSL (mg/kg)	DAF 20 SSL (mg/kg)		
TPH GRO		-			
TPH DRO		1000			
Benzene		1.78E+01	3.80E-02		
Ethylbenzene		7.51E+01	2.62E-01		
Toluene		5.23E+03	1.21E+01		
Xylenes		8.71E+02	2.98E+00		
Chloride	5264				
Fluoride	17.9				
Sulfate	9336	-1			
Iron	17344				
Manganese	488				
Phenol		1.85E+04	5.23E+01		

DAF 20 = dilution attenuation factor of 20

DRO = diesel range organics

GRO = gasoline range organics

mg/kg = milligrams per kilogram

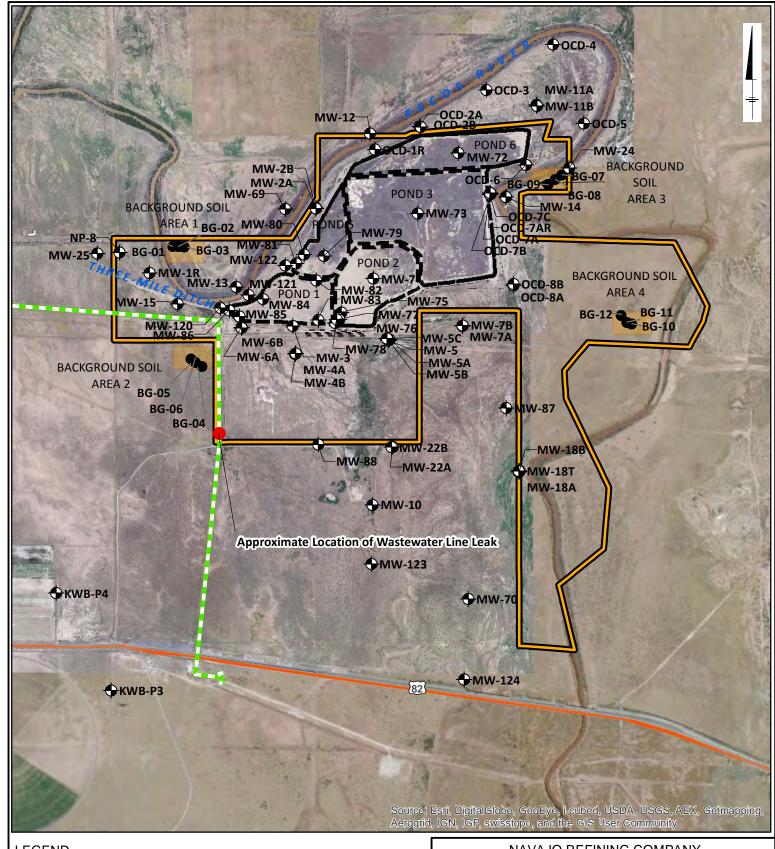
SSL = soil screening level

TPH = total petroleum hydrocarbons

UTL = upper tolerance limit



Figure



LEGEND

- EXISTING MONITORING
 WELLS
- BACKGROUND SOIL SAMPLES
- WASTE WATER
- _ _ _ . APPROXIMATE PIPELINE LOCATION

POND BOUNDARIES

NAVAJO PROPERTY BOUNDARY

PHASE IV BACKGROUND SAMPLE LOCATION

NAVAJO REFINING COMPANY ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

APPROXIMATE LOCATION OF WASTEWATER LINE LEAK



FIGURE

1



Attachment 1

Wastewater Analytical Report



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

March 25, 2015

Dan Crawford Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159

TEL: (575) 748-3311

FAX

RE: Quarterly WDW-1, 2, &3 Inj Well OrderNo.: 1502959

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 2/24/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andel

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Case Narrative

WO#: **1502959**Date: **3/25/2015**

CLIENT: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:

Allyl alcohol

t-amyl ethyl ether

Bis(2-chloroethyl)sulfide

Bromoacetone

Chloral hydrate

1-chlorobutane

1-chlorohexane

2-chloroethanol

Crotonaldehyde

Cis-1,4-Dichloro-2butene

1,3-Dichloro-2-propanol

1,2,3,4-Depoxybutane

Ethanol

Ethylene oxide

Malonitrile

Methanol

Methyl acrylate

2-Nitropropane

Paraldehyde

Pentafluorobenzene

2-Pentanone

2-picoline

1-propanol

2-propanol

Propargyl alcohol

Beta-propiolactone

n-propylamine

Analytical Report

Lab Order **1502959**

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: WDW-1,2,&3 Effluent

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001 **Matrix:** AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL (Qual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	LGT
Fluoride	11	5.0	* mg/L	50	2/24/2015 11:37:59 PM	R24502
Chloride	300	25	mg/L	50	2/24/2015 11:37:59 PM	R24502
Nitrogen, Nitrite (As N)	ND	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Bromide	1.1	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Nitrogen, Nitrate (As N)	ND	0.50	mg/L	5	2/24/2015 11:25:35 PM	R24502
Phosphorus, Orthophosphate (As P)	ND	2.5	mg/L	5	2/24/2015 11:25:35 PM	R24502
Sulfate	2100	25	mg/L	50	2/24/2015 11:37:59 PM	R24502
EPA METHOD 7470: MERCURY					Analyst	MED
Mercury	ND	0.00020	mg/L	1	2/26/2015 9:31:31 AM	17887
MERCURY, TCLP					Analyst	MED
Mercury	ND	0.020	mg/L	1	3/10/2015 8:26:24 AM	18037
EPA METHOD 6010B: TCLP METALS					Analyst	ELS
Arsenic	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Barium	ND	100	mg/L	1	3/7/2015 2:01:03 PM	18024
Cadmium	ND	1.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Chromium	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Lead	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Selenium	ND	1.0	mg/L	1	3/7/2015 2:01:03 PM	18024
Silver	ND	5.0	mg/L	1	3/7/2015 2:01:03 PM	18024
EPA 6010B: TOTAL METALS					Analyst	ELS
Aluminum	2.0	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Antimony	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Arsenic	0.029	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Barium	ND	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
Beryllium	ND	0.0030	mg/L	1	3/7/2015 1:56:58 PM	18024
Cadmium	ND	0.0020	mg/L	1	3/7/2015 1:56:58 PM	18024
Calcium	85	1.0	mg/L	1	3/10/2015 12:46:11 PM	18050
Chromium	ND	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Cobalt	ND	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Copper	0.0068	0.0060	mg/L	1	3/7/2015 1:56:58 PM	18024
Iron	3.7	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Lead	ND	0.0050	mg/L	1	3/7/2015 1:56:58 PM	18024
Magnesium	26	1.0	mg/L	1	3/10/2015 12:46:11 PM	
Manganese	0.25	0.0020	mg/L	1	3/7/2015 1:56:58 PM	18024
Nickel	0.035	0.010	mg/L	1	3/7/2015 1:56:58 PM	18024
Potassium	35	1.0	mg/L	1	3/10/2015 12:46:11 PM	
Selenium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - the Reporting Limit Page 2 of 25
- P Sample pH Not In Range
- RL Reporting Detection Limit

Analytical Report

Lab Order 1502959

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company Client Sample ID: WDW-1,2,&3 Effluent **Project:** Quarterly WDW-1, 2, &3 Inj Well **Collection Date:** 2/23/2015 8:30:00 AM

1502959-001 Lab ID: Matrix: AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS					Analys	t: ELS
Silver	ND	0.0050	mg/L	1	3/7/2015 1:56:58 PM	18024
Sodium	1300	20	mg/L	20	3/10/2015 12:51:05 PM	1 18050
Thallium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Vanadium	ND	0.050	mg/L	1	3/7/2015 1:56:58 PM	18024
Zinc	0.064	0.020	mg/L	1	3/7/2015 1:56:58 PM	18024
EPA METHOD 8260B: VOLATILES					Analys	t: SUB
Acetonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Allyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroprene	ND	0.50	μg/L	1	3/3/2015	R24992
Cyclohexane	ND	0.50	μg/L	1	3/3/2015	R24992
Diethyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Diisopropyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Epichlorohydrin	ND	5.0	μg/L	1	3/3/2015	R24992
Ethyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Ethyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Freon-113	ND	0.50	μg/L	1	3/3/2015	R24992
Isobutanol	ND	50	μg/L	1	3/3/2015	R24992
Isopropyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methacrylonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Methyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl ethyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Methylcyclohexane	ND	1.0	μg/L	1	3/3/2015	R24992
n-Amyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
n-Hexane	ND	1.0	μg/L	1	3/3/2015	R24992
Nitrobenzene	ND	5.0	μg/L	1	3/3/2015	R24992
Pentachloroethane	ND	5.0	μg/L	1	3/3/2015	R24992
p-isopropyltoluene	1.4	0.50	μg/L	1	3/3/2015	R24992
Propionitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Tetrahydrofuran	ND	0.50	μg/L	1	3/3/2015	R24992
Benzene	ND	0.50	μg/L	1	3/3/2015	R24992
Toluene	ND	0.50	μg/L	1	3/3/2015	R24992
Ethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/3/2015	R24992
1,2,4-Trimethylbenzene	2.8	0.50	μg/L	1	3/3/2015	R24992
1,3,5-Trimethylbenzene	2.7	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company Client Sample ID: WDW-1,2,&3 Effluent **Project:** Quarterly WDW-1, 2, &3 Inj Well **Collection Date:** 2/23/2015 8:30:00 AM

1502959-001 Lab ID: Matrix: AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	l Batch
EPA METHOD 8260B: VOLATILES					Į.	Analyst: SUB
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	3/3/2015	R24992
Naphthalene	ND	0.50	μg/L	1	3/3/2015	R24992
Acetone	57	2.5	μg/L	1	3/3/2015	R24992
Bromobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Bromodichloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Bromoform	ND	0.50	μg/L	1	3/3/2015	R24992
Bromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon disulfide	0.53	0.50	μg/L	1	3/3/2015	R24992
Carbon Tetrachloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroform	ND	0.50	μg/L	1	3/3/2015	R24992
Chloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
4-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Dichlorodifluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
2,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
Hexachlorobutadiene	ND	0.50	μg/L	1	3/3/2015	R24992
2-Hexanone	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methylene Chloride	ND	2.5	μg/L	1	3/3/2015	R24992
n-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
n-Propylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
sec-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Styrene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded

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- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: WDW-1,2,&3 Effluent

Project: Quarterly WDW-1, 2, &3 Inj Well

Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001 **Matrix:** AQUEOUS **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	l Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/3/2015	R24992
Trichlorofluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
mp-Xylenes	2.4	1.0	μg/L	1	3/3/2015	R24992
o-Xylene	1.7	0.50	μg/L	1	3/3/2015	R24992
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butyl alcohol	21	10	μg/L	1	3/3/2015	R24992
Acrolein	ND	0.50	μg/L	1	3/3/2015	R24992
Acrylonitrile	ND	0.50	μg/L	1	3/3/2015	R24992
Bromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
lodomethane	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dioxane	ND	20	μg/L	1	3/3/2015	R24992
Surr: 1,2-Dichlorobenzene-d4	110	70-130	%REC	1	3/3/2015	R24992
Surr: 4-Bromofluorobenzene	100	70-130	%REC	1	3/3/2015	R24992
Surr: Toluene-d8	99.6	70-130	%REC	1	3/3/2015	R24992
EPA 8270C: SEMIVOLATILES/MOD					A	Analyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	3/2/2015	R24992
Atrazine	ND	5.0	μg/L	1	3/2/2015	R24992
Benzaldehyde	ND	5.0	μg/L	1	3/2/2015	R24992
Caprolactam	ND	5.0	μg/L	1	3/2/2015	R24992
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	3/2/2015	R24992
Acetophenone	ND	10	μg/L	1	3/2/2015	R24992
1-Methylnaphthalene	ND	10	μg/L	1	3/2/2015	R24992
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4,5-Trichlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4,6-Trichlorophenol	ND	10	μg/L	1	3/2/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - P Sample pH Not In Range
- RL Reporting Detection Limit

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Lab Order 1502959

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company
Client Sample ID: WDW-1,2,&3 Effluent
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001
Matrix: AQUEOUS
Received Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD					Ar	nalyst: SUB
2,4-Dichlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4-Dimethylphenol	710	10	μg/L	1	3/2/2015	R24992
2,4-Dinitrophenol	ND	10	μg/L	1	3/2/2015	R24992
2,4-Dinitrotoluene	ND	10	μg/L	1	3/2/2015	R24992
2,6-Dinitrotoluene	ND	10	μg/L	1	3/2/2015	R24992
2-Chloronaphthalene	ND	10	μg/L	1	3/2/2015	R24992
2-Chlorophenol	ND	10	μg/L	1	3/2/2015	R24992
2-Methylnaphthalene	ND	10	μg/L	1	3/2/2015	R24992
2-Methylphenol	480	10	μg/L	1	3/2/2015	R24992
2-Nitroaniline	ND	10	μg/L	1	3/2/2015	R24992
2-Nitrophenol	ND	10	μg/L	1	3/2/2015	R24992
3,3'-Dichlorobenzidine	ND	10	μg/L	1	3/2/2015	R24992
3-Nitroaniline	ND	10	μg/L	1	3/2/2015	R24992
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	3/2/2015	R24992
4-Bromophenyl phenyl ether	ND	10	μg/L	1	3/2/2015	R24992
4-Chloro-3-methylphenol	ND	5.0	μg/L	1	3/2/2015	R24992
4-Chloroaniline	ND	10	μg/L	1	3/2/2015	R24992
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	3/2/2015	R24992
4-Nitroaniline	ND	10	μg/L	1	3/2/2015	R24992
4-Nitrophenol	ND	10	μg/L	1	3/2/2015	R24992
Acenaphthene	ND	10	μg/L	1	3/2/2015	R24992
Acenaphthylene	ND	10	μg/L	1	3/2/2015	R24992
Anthracene	ND	10	μg/L	1	3/2/2015	R24992
Benzo(g,h,i)perylene	ND	10	μg/L	1	3/2/2015	R24992
Benz(a)anthracene	ND	0.10	μg/L	1	3/2/2015	R24992
Benzo(a)pyrene	ND	0.10	μg/L	1	3/2/2015	R24992
Benzo(b)fluoranthene	ND	0.10	μg/L	1	3/2/2015	R24992
Benzo(k)fluoranthene	ND	0.10	μg/L	1	3/2/2015	R24992
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	3/2/2015	R24992
Bis(2-chloroethyl)ether	ND	10	μg/L	1	3/2/2015	R24992
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	3/2/2015	R24992
Bis(2-ethylhexyl)phthalate	ND	5.0	μg/L	1	3/2/2015	R24992
Butyl benzyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Carbazole	ND	10	μg/L	1	3/2/2015	R24992
Chrysene	ND	0.10	μg/L	1	3/2/2015	R24992
Dibenz(a,h)anthracene	ND	0.10	μg/L	1	3/2/2015	R24992
Dibenzofuran	ND	10	μg/L	1	3/2/2015	R24992
Diethyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Dimethyl phthalate	ND	10	μg/L	1	3/2/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - P Sample pH Not In Range
- RL Reporting Detection Limit

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Analytical ReportLab Order **1502959**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT: Navajo Refining Company
Client Sample ID: WDW-1,2,&3 Effluent
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date: 2/23/2015 8:30:00 AM

Lab ID: 1502959-001
Matrix: AQUEOUS
Received Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
Di-n-butyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Di-n-octyl phthalate	ND	10	μg/L	1	3/2/2015	R24992
Fluoranthene	ND	10	μg/L	1	3/2/2015	R24992
Fluorene	ND	10	μg/L	1	3/2/2015	R24992
Hexachlorobenzene	ND	1.0	μg/L	1	3/2/2015	R24992
Hexachlorobutadiene	ND	10	μg/L	1	3/2/2015	R24992
Hexachlorocyclopentadiene	ND	10	μg/L	1	3/2/2015	R24992
Hexachloroethane	ND	10	μg/L	1	3/2/2015	R24992
Indeno(1,2,3-cd)pyrene	ND	5.0	μg/L	1	3/2/2015	R24992
Isophorone	ND	10	μg/L	1	3/2/2015	R24992
Naphthalene	ND	10	μg/L	1	3/2/2015	R24992
Nitrobenzene	ND	10	μg/L	1	3/2/2015	R24992
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	3/2/2015	R24992
N-Nitrosodiphenylamine	ND	2.0	μg/L	1	3/2/2015	R24992
Pentachlorophenol	ND	10	μg/L	1	3/2/2015	R24992
Phenanthrene	ND	10	μg/L	1	3/2/2015	R24992
Phenol	8.1	5.0	μg/L	1	3/2/2015	R24992
Pyrene	ND	10	μg/L	1	3/2/2015	R24992
o-Toluidine	ND	5.0	μg/L	1	3/2/2015	R24992
Pyridine	ND	5.0	μg/L	1	3/2/2015	R24992
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	3/2/2015	R24992
Surr: 2,4,6-Tribromophenol	121	10-123	%REC	1	3/2/2015	R24992
Surr: 2-Fluorobiphenyl	80.8	19-130	%REC	1	3/2/2015	R24992
Surr: 2-Fluorophenol	83.8	21-110	%REC	1	3/2/2015	R24992
Surr: Nitrobenzene-d5	85.6	25-130	%REC	1	3/2/2015	R24992
Surr: Phenol-d5	86.4	10-125	%REC	1	3/2/2015	R24992
Surr: Terphenyl-d14	29.7	21-141	%REC	1	3/2/2015	R24992
CORROSIVITY						Analyst: SUB
pH	7.01	0.100	pH Units	1	2/27/2015	R24992
IGNITABILITY METHOD 1010						Analyst: SUB
Ignitability	>200	0	°F	1	3/6/2015	R24992
CYANIDE, REACTIVE						Analyst: SUB
Cyanide, Reactive	ND	1.00	mg/L	1	3/5/2015	R24992
SULFIDE, REACTIVE						Analyst: SUB
Reactive Sulfide	ND	1.0	mg/L	1	3/3/2015	R24992
SM2510B: SPECIFIC CONDUCTANCE						Analyst: JRR
Conductivity	4600	0.010	µmhos/cm	1	3/3/2015 3:37:2	29 PM R24621

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Sample pH Not In Range

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RL Reporting Detection Limit

P

Lab Order 1502959

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 3/25/2015

CLIENT:Navajo Refining CompanyClient Sample ID: WDW-1,2,&3 EffluentProject:Quarterly WDW-1, 2, &3 Inj WellCollection Date: 2/23/2015 8:30:00 AMLab ID:1502959-001Matrix: AQUEOUSReceived Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL Qua	l Units	DF	Date Analyzed	Batch
SM4500-H+B: PH					Analys	t: JRR
рН	7.13	1.68 H	pH units	1	3/3/2015 3:37:29 PM	R24621
SM2320B: ALKALINITY					Analys	t: JRR
Bicarbonate (As CaCO3)	240	20	mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
Total Alkalinity (as CaCO3)	240	20	mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
SPECIFIC GRAVITY					Analys	t: JRR
Specific Gravity	1.002	0		1	3/5/2015 12:07:00 PM	R24648
SM2540C MOD: TOTAL DISSOLVE	D SOLIDS				Analys	t: KS
Total Dissolved Solids	3710	200 *	mg/L	1	2/27/2015 8:17:00 AM	17895

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 8 of 25

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502959

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company **Client Sample ID: TRIP BLANK**

Project: Quarterly WDW-1, 2, &3 Inj Well **Collection Date:**

1502959-002 Lab ID: Matrix: TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Acetonitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Allyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroprene	ND	0.50	μg/L	1	3/3/2015	R24992
Cyclohexane	ND	0.50	μg/L	1	3/3/2015	R24992
Diethyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Diisopropyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Epichlorohydrin	ND	5.0	μg/L	1	3/3/2015	R24992
Ethyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Ethyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Freon-113	ND	0.50	μg/L	1	3/3/2015	R24992
Isobutanol	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methacrylonitrile	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl ethyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/3/2015	R24992
Methyl methacrylate	ND	2.5	μg/L	1	3/3/2015	R24992
Methylcyclohexane	ND	1.0	μg/L	1	3/3/2015	R24992
n-Amyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
n-Hexane	ND	1.0	μg/L	1	3/3/2015	R24992
Nitrobenzene	ND	5.0	μg/L	1	3/3/2015	R24992
Pentachloroethane	ND	5.0	μg/L	1	3/3/2015	R24992
p-isopropyltoluene	ND	0.50	μg/L	1	3/3/2015	R24992
Propionitrile	ND	5.0	μg/L	1	3/3/2015	R24992
Tetrahydrofuran	ND	0.50	μg/L	1	3/3/2015	R24992
Benzene	ND	0.50	μg/L	1	3/3/2015	R24992
Toluene	ND	0.50	μg/L	1	3/3/2015	R24992
Ethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/3/2015	R24992
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	3/3/2015	R24992
Naphthalene	ND	0.50	μg/L	1	3/3/2015	R24992
Acetone	5.0	2.5	μg/L	1	3/3/2015	R24992
Bromobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Bromodichloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Bromoform	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order **1502959**

Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date:

Lab ID: 1502959-002 **Matrix:** TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					An	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon disulfide	ND	0.50	μg/L	1	3/3/2015	R24992
Carbon Tetrachloride	ND	0.50	μg/L	1	3/3/2015	R24992
Chlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Chloroform	ND	0.50	μg/L	1	3/3/2015	R24992
Chloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
4-Chlorotoluene	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
Dibromomethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Dichlorodifluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloroethene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,3-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
2,2-Dichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
Hexachlorobutadiene	ND	0.50	μg/L	1	3/3/2015	R24992
2-Hexanone	ND	0.50	μg/L	1	3/3/2015	R24992
Isopropylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Methylene Chloride	ND	2.5	μg/L	1	3/3/2015	R24992
n-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
n-Propylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
sec-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
Styrene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butylbenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,2-DCE	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Lab Order **1502959**Date Reported: 3/25/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Quarterly WDW-1, 2, &3 Inj Well Collection Date:

Lab ID: 1502959-002 **Matrix:** TRIP BLANK **Received Date:** 2/24/2015 8:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/3/2015	R24992
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/3/2015	R24992
Trichlorofluoromethane	ND	0.50	μg/L	1	3/3/2015	R24992
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl chloride	ND	0.50	μg/L	1	3/3/2015	R24992
mp-Xylenes	ND	1.0	μg/L	1	3/3/2015	R24992
o-Xylene	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
tert-Butyl alcohol	ND	10	μg/L	1	3/3/2015	R24992
Acrolein	ND	1.0	μg/L	1	3/3/2015	R24992
Acrylonitrile	ND	0.50	μg/L	1	3/3/2015	R24992
Bromochloromethane	ND	0.50	μg/L	1	3/3/2015	R24992
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	3/3/2015	R24992
Iodomethane	ND	0.50	μg/L	1	3/3/2015	R24992
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/3/2015	R24992
Vinyl acetate	ND	0.50	μg/L	1	3/3/2015	R24992
1,4-Dioxane	ND	20	μg/L	1	3/3/2015	R24992
Surr: 1,2-Dichlorobenzene-d4	102	70-130	%REC	1	3/3/2015	R24992
Surr: 4-Bromofluorobenzene	98.4	70-130	%REC	1	3/3/2015	R24992
Surr: Toluene-d8	100	70-130	%REC	1	3/3/2015	R24992

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB SampType: MBLK TestCode: EPA Method 300.0: Anions PBW Client ID: Batch ID: R24502 RunNo: 24502 Prep Date: Analysis Date: 2/24/2015 SeqNo: 721446 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Fluoride ND 0.10 Chloride ND 0.50 Nitrogen, Nitrite (As N) ND 0.10 Bromide ND 0.10 Nitrogen, Nitrate (As N) ND 0.10 Phosphorus, Orthophosphate (As P ND 0.50 ND 0.50

Sample ID LCS	SampType: LCS TestCode: EPA Method 30						300.0: Anion	s			
Client ID: LCSW	Batch	n ID: R2	4502	F	RunNo: 2	24502					
Prep Date:	Analysis D	ate: 2/	24/2015	SeqNo: 721447			Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Fluoride	0.54	0.10	0.5000	0	108	90	110				
Chloride	4.8	0.50	5.000	0	95.3	90	110				
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.4	90	110				
Bromide	2.5	0.10	2.500	0	99.1	90	110				
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110				
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	100	90	110				
Sulfate	9.8	0.50	10.00	0	97.6	90	110				

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	1D: R2	4992	F	RunNo: 2	4992				
Prep Date:	Analysis D			S	SeqNo: 7	36964	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50								
Allyl chloride	ND	0.50								
Chloroprene	ND	0.50								
Ethyl methacrylate	ND	0.50								
Isobutanol	ND	0.50								
Methacrylonitrile	ND	0.50								
Methyl ethyl ketone	ND	2.5								
Methyl isobutyl ketone	ND	2.5								
Methyl methacrylate	ND	0.50								
Propionitrile	ND	0.50								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Acetone	ND	2.5								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								
Bromomethane	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
1,2-Dibromo-3-chloropropane	ND	0.50								
Dibromochloromethane	ND	0.50								
Dibromomethane	ND	0.50								
1,2-Dichlorobenzene	ND	0.50								
1,4-Dichlorobenzene	ND	0.50								
Dichlorodifluoromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
1,3-Dichloropropane	ND	0.50								
2,2-Dichloropropane	ND	0.50								
1,1-Dichloropropene	ND	0.50								

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampT	pType: MBLK TestCode: EPA Method					8260B: VOL	ATILES		
Client ID: PBW	Batch	1D: R2	4992	F	RunNo: 2	4992				
Prep Date:	Analysis D	ate: 3/	3/2015	S	SeqNo: 7	36964	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	0.50								
Methylene Chloride	ND	2.5								
Styrene	ND	0.50								
1,1,1,2-Tetrachloroethane	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								
trans-1,3-Dichloropropene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Trichlorofluoromethane	ND	0.50								
1,2,3-Trichloropropane	ND	0.50								
Vinyl chloride	ND	0.50								
mp-Xylenes	ND	1.0								
o-Xylene	ND	0.50								
Acrolein	ND	0.50								
Acrylonitrile	ND	0.50								
Bromochloromethane	ND	0.50								
lodomethane	ND	0.50								
trans-1,4-Dichloro-2-butene	ND	0.50								
Vinyl acetate	ND	0.50								

Sample ID LCS-R24992	SampT	SampType: LCS TestCode: EPA Method 8260B: VOLATILES								•
Client ID: LCSW	Batch	n ID: R2	24992	F	RunNo: 2	4992				
Prep Date:	Analysis Date: 3/3/2015			5 SeqNo: 736965			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.8		10.00	0	98.4	80	120			
Toluene	10		10.00	0	99.8	80	120			
Ethylbenzene	10		10.00	0	101	80	120			
Chlorobenzene	9.8		10.00	0	98.5	80	120			
1,1-Dichloroethene	9.2		10.00	0	91.7	80	120			
Tetrachloroethene (PCE)	9.8		10.00	0	98.4	80	120			
Trichloroethene (TCE)	9.6		10.00	0	96.1	80	120			
o-Xylene	10		10.00	0	104	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992	SampT	уре: МІ	BLK	Tes	tCode: E	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	ID: R2	24992	F	RunNo: 2	4992				
Prep Date:	Analysis D	ate: 3/	/2/2015		SeqNo: 7		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetophenone	ND	10								
1-Methylnaphthalene	ND	10								
2,3,4,6-Tetrachlorophenol	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2,4-Dichlorophenol	ND	10								
2,4-Dimethylphenol	ND	10								
2,4-Dinitrophenol	ND	10								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3,3´-Dichlorobenzidine	ND	10								
3-Nitroaniline	ND	10								
4,6-Dinitro-2-methylphenol	ND	10								
4-Bromophenyl phenyl ether	ND	10								
4-Chloro-3-methylphenol	ND	5.0								
4-Chloroaniline	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Anthracene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benz(a)anthracene	ND	0.10								
Benzo(a)pyrene	ND	0.10								
Benzo(b)fluoranthene	ND	0.10								
Benzo(k)fluoranthene	ND	0.10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								

Qualifiers:

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- E Value above quantitation range
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- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
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- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1502959 25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: EPA 8270C: Semivolatiles/Mod PBW Client ID: Batch ID: R24992 RunNo: 24992 Prep Date: Analysis Date: 3/2/2015 SeqNo: 736968 Units: µg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Chrysene ND 0.10 Dibenz(a,h)anthracene ND 0.10 ND Dibenzofuran 10 Diethyl phthalate ND 10 Dimethyl phthalate ND 10 Di-n-butyl phthalate ND 10 Di-n-octyl phthalate ND 10 Fluoranthene ND 10 Fluorene ND 10 ND Hexachlorobenzene 1.0 Hexachlorobutadiene ND 10 ND 10 Hexachlorocyclopentadiene 10 Hexachloroethane ND Isophorone ND 10 Naphthalene ND 10 Nitrobenzene ND 10 N-Nitrosodi-n-propylamine ND 10 Pentachlorophenol ND 10 Phenanthrene ND 1.0 Phenol ND 5.0 Pyrene ND 10 1,2,4,5-Tetrachlorobenzene ND 10

Sample ID LCS-R24992	SampT	ype: LC	cs	Tes	tCode: El	PA 8270C:	Semivolatiles	s/Mod		
Client ID: LCSW	Batch	ID: R2	24992	R	RunNo: 2	4992				
Prep Date:	Analysis D	ate: 3	/2/2015	S	SeqNo: 7	36969	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	5.6		5.000	0	112	49	134			
2-Chlorophenol	4.7		5.000	0	94.8	50	131			
4-Chloro-3-methylphenol	4.2		5.000	0	83.0	42	139			
4-Nitrophenol	2.8		5.000	0	56.8	19	137			
Acenaphthene	5.3		5.000	0	106	36	122			
Bis(2-ethylhexyl)phthalate	5.4		5.000	0	109	43	142			
N-Nitrosodi-n-propylamine	5.3		5.000	0	107	46	135			
Pentachlorophenol	4.0		5.000	0	79.4	22	138			
Phenol	4.1		5.000	0	81.2	45	134			
Pyrene	6.2		5.000	0	123	45	138			

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
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- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-17887 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: **PBW** Batch ID: **17887** RunNo: **24523**

Prep Date: 2/25/2015 Analysis Date: 2/26/2015 SeqNo: 722178 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-17887 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 17887 RunNo: 24523

Prep Date: 2/25/2015 Analysis Date: 2/26/2015 SeqNo: 722179 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0051 0.00020 0.005000 0 102 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-18037 SampType: MBLK TestCode: MERCURY, TCLP

Client ID: PBW Batch ID: 18037 RunNo: 24714

Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728042 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.020

Sample ID LCS-18037 SampType: LCS TestCode: MERCURY, TCLP

Client ID: LCSW Batch ID: 18037 RunNo: 24714

Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728043 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.020 0.005000 0 105 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

0.020

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-18024 SampType: MBLK TestCode: EPA 6010B: Total Metals Client ID: **PBW** Batch ID: 18024 RunNo: 24683 Prep Date: 3/6/2015 Analysis Date: 3/7/2015 SeqNo: 727309 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Aluminum ND 0.020 ND 0.050 Antimony ND Arsenic 0.020 Barium ND 0.020 Beryllium ND 0.0030 Cadmium ND 0.0020 Chromium ND 0.0060 Cobalt ND 0.0060 Copper ND 0.0060 Iron ND 0.050 Lead ND 0.0050 ND 0.0020 Manganese Nickel ND 0.010 Selenium ND 0.050 Silver ND 0.0050 Thallium ND 0.050 Vanadium ND 0.050

Sample ID LCS-18024	Janip	Type: LC	·3	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	h ID: 18	024	F	RunNo: 2	4683				
Prep Date: 3/6/2015	Analysis	Date: 3/	7/2015	S	SeqNo: 7 2	27310	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.48	0.020	0.5000	0	95.4	80	120			
Antimony	0.52	0.050	0.5000	0	104	80	120			
Arsenic	0.47	0.020	0.5000	0	93.5	80	120			
Barium	0.49	0.020	0.5000	0	97.1	80	120			
Beryllium	0.50	0.0030	0.5000	0	99.1	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.49	0.0060	0.5000	0	97.8	80	120			
Cobalt	0.49	0.0060	0.5000	0	97.4	80	120			
Copper	0.52	0.0060	0.5000	0	105	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.48	0.0050	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	98.6	80	120			
Nickel	0.49	0.010	0.5000	0	98.6	80	120			
Selenium	0.49	0.050	0.5000	0	98.0	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			

Qualifiers:

Zinc

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID LCS-18024	SampT	ype: LC	S	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Batch	n ID: 180	024	F	RunNo: 2	4683				
Prep Date: 3/6/2015	Analysis D	ate: 3/	7/2015	8	SeqNo: 7	27310	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.48	0.050	0.5000	0	97.0	80	120			
Vanadium	0.49	0.050	0.5000	0	98.2	80	120			
Zinc	0.48	0.020	0.5000	0	95.1	80	120			

TestCode: EPA 6010B: Total Metals Sample ID 1502959-001BMS SampType: MS Client ID: WDW-1,2,&3 Effluen Batch ID: 18050 RunNo: 24731 Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728505 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

25.84 75 Magnesium 76 1.0 50.00 101 125 Potassium 84 1.0 50.00 34.66 98.8 75 125

Sample ID 1502959-001BMSD SampType: MSD TestCode: EPA 6010B: Total Metals

Client ID: WDW-1,2,&3 Effluen Batch ID: 18050 RunNo: 24731

ND

1.0

Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728506 Units: mg/L

Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Magnesium 75 1.0 50.00 25.84 98.6 75 125 1.52 20 Potassium 86 1.0 50.00 34.66 102 75 125 1.89 20

TestCode: EPA 6010B: Total Metals Sample ID MB-18050 SampType: MBLK Client ID: **PBW** Batch ID: 18050 RunNo: 24731 Prep Date: 3/9/2015 Analysis Date: 3/10/2015 SeqNo: 728508 Units: mg/L SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Analyte Result **PQL** Qual Calcium ND 1.0 ND Magnesium 1.0 Potassium ND 1.0

Sample ID LCS-18050	SampT	ype: LC	s	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Batch	ID: 18	050	F	RunNo: 2	4731				
Prep Date: 3/9/2015	Analysis D	ate: 3/	10/2015	S	SeqNo: 7	28509	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	57	1.0	50.00	0	113	80	120			
Magnesium	56	1.0	50.00	0	113	80	120			
Potassium	53	1.0	50.00	0	105	80	120			
Sodium	58	1.0	50.00	0	116	80	120			

Qualifiers:

Sodium

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: CYANIDE, Reactive

Client ID: PBW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/5/2015 SeqNo: 736973 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive ND 1.00

Sample ID LCS-R24992 SampType: LCS TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/5/2015 SeqNo: 736974 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Cyanide, Reactive 0.480 0.5000 0 96.0 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R24992 SampType: MBLK TestCode: SULFIDE, Reactive

Client ID: PBW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/3/2015 SeqNo: 736976 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide ND 1.0

Sample ID LCS-R24992 SampType: LCS TestCode: SULFIDE, Reactive

Client ID: LCSW Batch ID: R24992 RunNo: 24992

Prep Date: Analysis Date: 3/3/2015 SeqNo: 736977 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Reactive Sulfide 0.20 0.2000 0 100 70 130

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID mb-1 SampType: MBLK TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R24621 RunNo: 24621

Prep Date: Analysis Date: 3/3/2015 SeqNo: 725674 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) ND 20

Sample ID Ics-1 SampType: LCS TestCode: SM2320B: Alkalinity

Client ID: LCSW Batch ID: R24621 RunNo: 24621

Prep Date: Analysis Date: 3/3/2015 SeqNo: 725675 Units: mg/L CaCO3

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Alkalinity (as CaCO3) 79 20 80.00 0 99.2 90 110

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID 1502959-001ADUP SampType: DUP TestCode: Specific Gravity

Client ID: WDW-1,2,&3 Effluen Batch ID: R24648 RunNo: 24648

Prep Date: Analysis Date: 3/5/2015 SeqNo: 726439 Units:

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Specific Gravity 0.9999 0 0.220 20

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

Project: Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-17895 SampType: MBLK TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 17895 RunNo: 24545

Prep Date: 2/25/2015 Analysis Date: 2/27/2015 SeqNo: 722782 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids ND 20.0

Sample ID LCS-17895 SampType: LCS TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW Batch ID: 17895 RunNo: 24545

Prep Date: 2/25/2015 Analysis Date: 2/27/2015 SeqNo: 722783 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Total Dissolved Solids 1010 20.0 1000 0 101 80 120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory 4901 Hawkus NE Albuquerque, NM 87109

Sample Log-In Check List

TEL, 305-345-3975 FAX: 505-345-4107. Website: www.hallenvironmental.com

Client Name: NAVAJO REFINING CO Work Order Number	r: 1502959		RcptNo: 1
Received by/date: CD 24/15 Logged By: Ashley Gallegos 2/24/2015 8:00:00 AM Completed By: Ashley Gallegos 2/24/2015 9:49:07 AM		A	
Reviewed By: (15 02/24/15			
Chain of Custody			
1, Custody seals intact on sample bottles?	Yes 🗔	No _	Not Present 🗹
2. Is Chain of Custody complete?	Yes 🗸	No Li	Not Present
3. How was the sample delivered?	Courier		
<u>Log In</u>			
4. Was an altempt made to cool the samples?	Yes 🗸	No	NA
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes 🛂	No L	NA 🗆
6. Sample(s) in proper container(s)?	Yes 🗸	No 🗆	
7. Sufficient sample volume for indicated test(s)?	Yes 🗹	No 🗆	
8. Are samples (except VOA and ONG) properly preserved?	Yes 🗹	No 🗆	
9. Was preservative added to bottles?	Yes	No V	NA 🗆
10. VOA vials have zero headspace?	Yes V	No E	No VOA Vials
11. Were any sample containers received broken?	Yes 🗀	No 🗹	# of preserved bottles checked
12 Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes 🗸	No 🗆	for pH. 2/2/or 12 unless noted
13. Are matrices correctly identified on Chain of Custody?	Yes 🗸	No 🗆	Adjusted?
14. Is it clear what analyses were requested?	Yes V	No 🗆	A CONTRACT CONTRACT
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes 🗸	No 🗆	Checked by:
Special Handling (if applicable)			
16. Was client notified of all discrepancies with this order?	Yes 🗆	No. 🗆	NA 🔀
Person Notified: Date By Whom: Via Regarding: Client Instructions:	eMail	Phone 🗌 Fax	☐ In Person
17. Additional remarks:			
18. Cooler Information Cooler No Temp °C Condition Seal Intact Seal No	Seal Date	Signed By	
1 1.0 Good Yes			

ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report. Remarks: Report these results separately from all other www.hallenvironmental.com Fax 505-345-4107 Analysis Request 261/ SW-846 Method 1311 TCLP Metals, only M0 CFR Part Ca, K, Mg, Na/40 CFR 136.3 7470 (see attached list 'Metals') Shain of Custody kits provided. Tel. 505-345-3975 Metals/SW-846 Mthd 6010, R,C,I/40 CFR part 261 × (see attached list 'SVOCs') 2VOCs/SW-846 Method 8270D (see attached list 'VOCs') VOCs/SVV-846 Method 8260C Cation/anion bal., Br, Eh/40 SO4, TDS, pH, cond.,FI, Specific Gravity, HCO3, CO3, CI, 15080 9 -00 50395 HEAL No. Quarterly WDW-1, 2, & 3 Inj Well oN □ Preservative □ Rush Neat/H2S04 Project #: P.O. # 167796 Sample Temperature: **Oyyes** HN03 Turn-Around Time Neat Neat Neat Neat 건 Project Manager Dan Crawford Project Name Container Type and # □ Standar Received by Sampler On Ice: ო ო 7 $^{\circ}$ Relinquished by: 21, TQD octh Salsberry Sample Request ID □ Level 4 (Full Validation) WDW-1 2, & 3 Effluent WDW-1, 2, & 3 Effluent Xalobern Chain-of-Custody Record Temperature Blank Trip Blank Mailing Address: P.O. Box 159 Artesia, Sugar Sugar email or Fax#; 575-746-5451 Matrix 1980 Liquid Client: Navajo Refining Co. 2830 | Liquid 830 Liquid SSC Liquid Liguid 830 Liquid COSO Liquid Phone #: 575-748-3311 10880 0230 Time NM 88211-0159 Other Time: QA/QC Package: □ Standard Date 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 2/23/15 Date: 2/23/15 Date:



Injection Well Quarterly Sample Details

Attachment

Navajo Relining Company, LL7 501 E. Main Artesia, NM 88210 (Tel) 575.748.3311 (Fax) 575.746.5451 Project Name WDW-1.2, & 3 Ortly Inj Well Samplers Name Elizabeth Salsberry Samplers Affiliation Navajo Refining Co. LLC Start Date and Time 2/23/2015 @ 08:25 End Date and Time 2/23/2015 @ 08:35

Outfall / Sample Location: Waste water effluent pumps to injection wells.

	Samole Type		Physical Property
	Grab		Solid
	Time Weighted Composite		Liquid 🖾
	Flow Weighted Composite		Sludge 🔲
	Parts / Sample Intervals One		Type of Sampler Directly to sample
<u>10</u>	☐ P-849 sample point (first from east)		P-856 sample point (third from east)
	☑ P-854 sample point (second from east)		P-857 sample point (fourth from east
		l	

ampler | Directly to sample jars

							Preservatives	es			
		# Of	Neat	Ē	V CN I	H2SO4	HOKN	HOIL HNOW HOSON	NaHSO4	Other	Analysis and/or Wethod Requested
ontainer Size	Iviatorial	COLLIGIN	/1808IC/	2							Specific Gravity, HCO3, CO3, Cl. SO4, TDS,
		~	×			×					pH, cond.,FI, Cation/anion bal., Br, Eh/40
		,	<			;					CFR 136.3
1											VOCs/SW-846 Method 8260C (see attached
7		ν-		•	×			•			list 'VOCs')
					l					i	SVOCs/SW-846 Method 8270D (see
с		m —		×		-					attached list 'SVOCs')
		,	×								R,C,I/40 CFR part 261
+		1									Metals/SW-846 Wthd 6010, 7470 (see
ıç		2	×								attached list 'Metals')
		c	×				1				Ca, K, Mg, Na/40 CFR 136.3
D		1									TCLP Metals, only /40 CFR Part 261/ SW-
7		_	×								846 Method 1311
	*			3				į			
					1						
e e					1						
10					_	-					

Ctorage Mothod		Refrigerated	Other		Shipping Media	[Se]	Other	
	2/23/2015 08:35 Tmp. 19.4, Humidity 100%, Wind Dir. NNE, Wind Speed 11.5 mpn, Conducans light show							
	Field Data (Weather, Observations, Etc):			20.00				
	reld Data (Weather	Date and Time:	100 Sec. 2000	ופות זפווף. מסס				

Classification	Analyte name ⁽¹⁾		Units	RL
Inorganics	Mercury	SW-846 Method 7470		
Inorganics	Arsenic	SW-846 Method 6010		
Inorganics	Silver	SW-846 Method 6010		
Inorganics	Aluminum	SW-846 Method 6010		
Inorganics	Barium	SW-846 Method 6010		
Inorganics	Beryllium	SW-846 Method 6010		
Inorganics	Calcium	SW-846 Method 6010		
Inorganics	Cadmium	SW-846 Method 6010	<u></u>	
Inorganics	Cobalt	SW-846 Method 6010		
Inorganics	Chromium	SW-846 Method 6010		
Inorganics	Copper	SW-846 Method 6010		
Inorganics	Iron	SW-846 Method 6010		
Inorganics	Mercury	SW-846 Method 6010		
Inorganics	Potassium	SW-846 Method 6010		
Inorganics	Magnesium	SW-846 Method 6010		
Inorganics	Manganese	SW-846 Method 6010		<u>'</u>
Inorganics	Sodium	SW-846 Method 6010		
Inorganics	Nickel	SW-846 Method 6010		
Inorganics	Lead	SW-846 Method 6010		
Inorganics	Antimony	SW-846 Method 6010		
Inorganics	Selenium	SW-846 Method 6010		
Inorganics	Thallium	SW-846 Method 6010		
Inorganics	Vanadium	SW-846 Method 6010		
Inorganics	Zinc	SW-846 Method 6010		

^{**} dilute elements only if necessary

(1) 23 TAL Metals



Attachment 2

EP Background Soil Statistical Evaluation Memo



MEMO

To:

Karel Schnebele

Copies:

Pam Krueger

ARCADIS U.S., Inc. 100 East Campus View Blvd. Suite 200 Columbus Ohio 43235 Tel 614 985 9100

Fax 614 985 9170

Mark Lupo

Date:

August 14, 2013

ARCADIS Project No.: TX000864.0004

Subject:

Statistical Determination of Background Concentrations in Soil, Navajo Refinery, Artesia, New Mexico.

Soil borings were advanced in four designated background soil areas surrounding the Evaporation Ponds near the Navajo Refinery in Artesia, New Mexico in order to determine the background concentrations of key constituents in soil. The data were statistically analyzed in order to calculate values representative of naturally occurring background concentrations. In this memo, the method and results of these calculations are presented.

Location of the Soil Borings

Four areas were designated as "background soil areas" in which soil borings were advanced for collecting background samples. The areas were selected to be representative of native soils similar to those encountered both in the Refinery and in the Evaporation Ponds. However, the four areas were also selected in locations that would not be expected to have impacts from refinery operations or other potential hydrocarbon impacts. Three borings were advanced in each of the areas, designated BG-01 to BG-12. Two samples were collected for analysis from each boring. The first sample was collected one foot below ground surface (bgs) in a soil identified in the boring logs as sandy silt. The second sample was collected within the first foot after encountering a soil identified as silty clay in the boring logs. Table 1 lists the borings, the depths of the samples, and the background areas from which they were obtained.



List of Chemical Constituents

Statistical analysis was conducted for the following thirteen metallic constituents: arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc. Three ions were also selected for statistical analysis due to interest to the project team: chloride, fluoride, and sulfate. Of the metals for which data were available, only silver lacked a sufficient number of detections to allow parametric testing. Silver was detected only once out of 24 samples, in BG-05 at a depth of one foot bgs. Eleven of the metals were detected in 24 of 24 samples, as were the ions. Selenium had one non-detection, and mercury had three. The analytical data used in the statistical analysis are presented in Table 1.

Statistical Test Method

Representative background concentrations of the COCs were determined by constructing a statistical interval that would capture 95 percent (%) of the background values with 95% confidence. In statistics, this interval is called a Tolerance Interval, and its upper limit is called the Upper Tolerance Limit (UTL). Because of the application and the COCs, the interval was single-tailed. In this memorandum, all UTLs are "95/95 UTLs", that is, they are the upper limit of an interval designed to capture 95% of the background values with 95% confidence.

A UTL can be computed for a given COC from the mean of the background values (x) and the standard deviation (S) using the following parametric formula:

UTL =
$$x + S \kappa$$

The value of the parameter κ is chosen based upon the level of confidence, the coverage, and the number of points in the data set. The appropriate values of κ can be found in a table provided by the United States Environmental Protection Agency (USEPA) in its 2009 Unified Guidance document for groundwater statistics. (Table 17-3, USEPA, 2009). These values are also available in the statistics literature. In computing the UTLs in this memorandum, we used the table provided by the USEPA (USEPA, 2009).

There are requirements for the use of the above equation. The data must be independent, normally distributed, and free of severe outliers. The distribution of the data points can be tested using a normality test. The Shapiro-Wilk test was run at a 5% level of significance. The Shapiro-Wilk Test is a robust test and is recommended in Unified Guidance (USEPA, 2009). If the data set failed the normality test, a transformation was made and the normality test was repeated. The transformations were made in the following order: square root, cube root, and logarithmic (Box and Cox, 1964). In the event that the data could not be normalized, the parametric equation above could not be used and a non-parametric method for determining the UTL was used. Non-parametric methods are not discussed further in this memo, because their use was not necessary, as discussed below. In addition to testing for normality, the Dixon



test was applied to identify any statistical outliers that might be present. The Dixon test was run at a 5% level of significance. Only one outlier was identified (for cadmium) and its handling is discussed below where the cadmium results are presented.

Environmental data often include non-detected results. Statisticians refer to this condition as censorship. If the detection rate is 85% or better, non-detections were replaced by one half of the detection limit. If the detection rate had been less than 85% for any data set, procedures specified in Unified Guidance (USEPA, 2009) would have been applied. These measures were not needed, because none of the data sets for which UTLs were computed had detection rates less than 85%.

Because the data were collected from two distinct soil types, it was of interest to see if the background data points were of the same statistical population. Toward that end, the data collected from sandy silt and silty clay were compared using a parametric Student's t-test at 95% confidence. If the test identified a statistical difference between the two groups, separate UTLs were computed for each of the two soil types.

Laboratories indicate the concentration as "estimated" and place a "J-flag" if a COC is detected at a concentration higher than the Method Detection Limit (MDL), but lower than the Practical Quantitation Limit (PQL), sometimes called a "reporting limit". All values that were J-flagged were used in the computation of UTLs as if they were quantitative.

Results

The results of the UTL calculations are summarized in Table 2. Each of the sixteen COCs for which a UTL was computed is discussed in a separate section below. In these sections, distribution determinations and outlier tests are discussed. Statistical independence was assumed, since it appears that an effort was made to identify the background soil areas. It is also clear that no two data points came from the same location, but that the twelve borings were distinct.

Arsenic

Arsenic was detected in all of the 24 background samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 2.18 mg/kg. The average concentrations of arsenic in the two soil types were 2.11 mg/kg and 2.24 mg/kg for the sandy silt and the silty clay, respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 3.92 mg/kg. This means that 95% of soil samples can be expected to have a naturally occurring arsenic concentration of 3.92 mg/kg or less with 95% confidence. Thus 3.92 mg/kg can be adopted as the background concentration for arsenic in soil at this site.



Barium

Barium was detected in all of the 24 background samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 144 mg/kg. The average concentrations of barium in the two soil types were 158 mg/kg and 130 mg/kg for the sandy silt and the silty clay, respectively. The t-test indicated that barium was statistically elevated in the sandy silt. The parametric analysis of variance (ANOVA) did not indicate a difference in the populations, but its non-parametric counterpart, the Kruskal-Wallis test did. Therefore the barium data for sandy silt and silty clay were treated as separate statistical populations. Both data sets were normally distributed. No statistical outliers were identified in either group. The sandy silt data had a UTL of 252 mg/kg. The silty clay had a UTL of 227 mg/kg. Thus, a soil sample collected from sandy silt can be expected to have a naturally occurring barium concentration of 252 mg/kg or less. In like manner, a sample is collected from silty clay can be expected to have a naturally occurring barium concentration of 227 mg/kg or less.

Cadmium

All but one of the cadmium analyses resulted in a concentration that was below the reporting limit. Cadmium was detected in all 24 samples at concentrations above the method detection limit. Although the data is thus 96% composed of J-flagged data, the data have a discernable distribution. The full data set failed the Shapiro-Wilk test of normality. Successive transformations were undertaken using the method of Box and Cox (1964). The data were found to be lognormally distributed. One statistical outlier was identified, which was the result from BG-12 at one foot bgs. Usually, that data point would be set aside. It would be compelling to do so, because the other 23 data points would be normally distributed (with no other outliers). However, removing the outlier from the calculation would also remove the only point that was not J-flagged.

The decision to include outlier was based upon the following reasoning. First, there is no evidence to suggest that the measurement of the cadmium concentration at BG-12 was the result of an error on the part of field personnel or the laboratory. On the contrary, this concentration of 0.465 mg/kg is believable when compared to the other two samples collected in sandy silt in Background Soil Area 4. BG-11 had the second highest concentration of 0.242 mg/kg. BG-10 had 0.184 mg/kg, which was also greater than the arithmetic mean for the sandy silt. It is therefore more likely that the high concentration is an accurate measurement rather than a sampling or analytical error. The present view of the environmental statistics community is to retain data points rather than dismiss them unless there is evidence of some sort or error or distortion in the data point. The evidence points in the opposite direction. Second, the data set is lognormally distributed with the data point from BG-12 included. That a known distribution is exhibited supports the view that the data point belongs to the population. Third, the twelve data points of each of the sandy silt and silty clay subsets pass the Shapiro-Wilk test when lognormally transformed. Finally, as stated already, the data point in question is the only member of the data set that is not flagged as estimated. For all of these reasons, the outlier was retained.



Whenever a data set is not normally distributed, the arithmetic mean may not be the best estimate of central tendency. It is more accurate to compute the mean in transformed space and back-transform the result. In lognormally distributed data sets, such a measure is known as the geometric mean. For the complete cadmium data set, the geometric mean was 0.139 mg/kg. The geometric mean of the sandy silt was 0.153 mg/kg; the geometric mean of the silty clay was 0.126 mg/kg. The parametric t-test was performed on the log-transformed data and indicated that the data from the two soil types were a single population. The UTL was computed and back-transformed to be 0.339 mg/kg. This means that a soil sample could be expected to have a naturally occurring cadmium concentration of 0.339 mg/kg or less.

Chromium

Chromium was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 10.0 mg/kg. The average concentrations of chromium in the two soil types were nearly the same: 10.03 mg/kg and 9.97 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 18.8 mg/kg. This means that a soil sample could be expected to have a naturally occurring chromium concentration of 18.8 mg/kg or less.

Copper

Copper was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 6.62 mg/kg. The average concentrations of copper in the two soil types were nearly the same: 6.64 mg/kg and 6.61 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 12.4 mg/kg. This means that a soil sample could be expected to have a naturally occurring copper concentration of 12.4 mg/kg or less.

Iron

Iron was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 9,242 mg/kg. The average concentrations of iron in the two soil types were nearly the same: 9,335 mg/kg and 9,149 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 17,344 mg/kg. This means that a soil sample could be expected to have a naturally occurring iron concentration of 17,344 mg/kg or less.

Lead

Lead was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 6.66 mg/kg. The



average concentrations of lead in the two soil types were 6.94 mg/kg and 6.38 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 12.1 mg/kg. This means that a soil sample could be expected to have a naturally occurring lead concentration of 12.1 mg/kg or less.

Manganese

Manganese was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 305 mg/kg. The average concentrations of manganese in the two soil types were 309 mg/kg and 301 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 488 mg/kg. This means that a soil sample could be expected to have a naturally occurring manganese concentration of 488 mg/kg or less.

Mercury

The mercury data set contained 21 detections and 3 non-detections. The detection rate of 87.5% is greater than the 85% threshold, below which it would no longer be acceptable to replace the non-detections with one half of the method detection limit. With these substitutions, the data were found to be lognormally distributed. The geometric mean, the relevant measure of the mean of a lognormally distributed data set, was 0.00210 mg/kg. The geometric mean of the mercury concentration in sandy silt was 0.00195 mg/kg; the geometric mean in the silty clay was 0.00225 mg/kg. The parametric t-test was performed on the log-transformed data and indicated that the data from the two soil types were a single population. The UTL was computed and back-transformed to be 0.0302 mg/kg. This means that a soil sample could be expected to have a naturally occurring mercury concentration of 0.0302 mg/kg or less.

Nickel

Nickel was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 9.15 mg/kg. The average concentrations of nickel in the two soil types were nearly the same: 9.25 mg/kg and 9.05 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 16.2 mg/kg. This means that a soil sample could be expected to have a naturally occurring nickel concentration of 16.2 mg/kg or less.

Selenium

The selenium data set contained 23 detections out of 24 data points. The detection rate of 96% is great enough to justify replacing the non-detection with one half of the method detection limit. With this substitution, the data were statistically analyzed. The data set was found to be normally distributed and



free of outliers. The selenium data had an average value of 0.378 mg/kg. The average concentrations of selenium in the two soil types were 0.391 mg/kg and 0.365 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 0.682 mg/kg. This means that a soil sample could be expected to have a naturally occurring selenium concentration of 0.682 mg/kg or less.

Vanadium

Vanadium was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 15.6 mg/kg. The average concentrations of vanadium in the two soil types were 14.6 mg/kg and 16.6 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 28.3 mg/kg. This means that a soil sample could be expected to have a naturally occurring vanadium concentration of 28.3 mg/kg or less.

Zinc

Zinc was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 25.1 mg/kg. The average concentrations of zinc in the two soil types were 26.1 mg/kg and 24.1 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 46.6 mg/kg. This means that a soil sample could be expected to have a naturally occurring zinc concentration of 46.6 mg/kg or less.

Chloride

Chloride was detected in all 24 of the background soil samples. The data set was tested and found be to normally distributed and free of statistical outliers. The data had an average value of 1,952 mg/kg. The average concentrations of chloride in the two soil types were 1,704 mg/kg and 2,200 mg/kg for the sandy silt and the silty clay respectively. The 24 data points were found to be a single population based upon a parametric t-test. The UTL was computed to be 5,264 mg/kg. This means that a soil sample could be expected to have a naturally occurring chloride concentration of 5,264 mg/kg or less.

Fluoride

Fluoride was detected in all of the 24 background soil samples. The data were found to be cube-root normally distributed. The relevant measure of the mean of a cube-root normal data set is to compute the mean of the cube roots of the data points and cube the result. This value was 3.56 mg/kg. The cube-root corrected mean of the fluoride concentration in sandy silt was 2.80 mg/kg; for the silty clay it was 4.45 mg/kg. The parametric t-test was performed on the cube-root transformed data and indicated that the



fluoride data from the two soil types were a single population. The UTL was computed and back-transformed to be 17.9 mg/kg. This means that a soil sample could be expected to have a naturally occurring fluoride concentration of 17.9 mg/kg or less.

Sulfate

Sulfate data was detected in all of the 24 background soil samples. The data were found to be cube-root normally distributed. The cube-root corrected mean was 1,464 mg/kg. The cube-root corrected mean of the sulfate concentration in sandy silt was 553 mg/kg; for the silty clay it was 3,113 mg/kg. The parametric t-test was performed on the cube-root transformed data and indicated that sulfate was statistically elevated in the silty clay compared to the sandy silt. The parametric analysis of variance (ANOVA) and its non-parametric counterpart, the Kruskal-Wallis test concurred. Therefore the sulfate data for sandy silt and silty clay were treated as separate statistical populations. Both data sets were cube-root normally distributed. No statistical outliers were identified in either group. The sandy silt data had a UTL of 9,336 mg/kg. The silty clay had a UTL of 21,620 mg/kg. Thus, a soil sample collected from sandy silt could be expected to have a naturally occurring sulfate concentration of 9,336 mg/kg or less. In like manner, a sample collected from silty clay could be expected to have a naturally occurring sulfate concentration of 21,260 mg/kg or less.

Discussion

It has been stated above that the tolerance intervals from which the UTLs were computed were designed with 95% coverage. By definition, 5% of all background samples will have concentrations that exceed the UTLs. From a practical standpoint, this means that if a soil sample has a concentration that is less than or equal to the UTL, it can be considered to be background, but the converse is not true. If a sample exceeds the UTL it might indicate contamination, but this is not necessarily the case. In order to categorize such a sample as "above background", another line of evidence is necessary. It may be convenient to simply judge samples as "background" and "above background" on the basis of these UTLs, but in practice, one would be wrong 5% of the time. Stated another way, a suite of samples that were truly from the background and were compared to the UTLs presented in Table 2 would exceed the UTLs and be falsely identified as "above background" 5% of the time. In summary, a thorough interpretation of the field data must be made in view of the definition of the coverage of the UTL. To simply classify all concentrations that exceed the UTL as contaminated is a conservative assumption.

Conclusion

The background soil data were statistically analyzed for sixteen constituents, including thirteen metals and three ions. After testing to be sure the concentrations of the constituent collected from two soil types were a single population, UTLs were computed for the combined data set or for the subsets for the soil types, as appropriate. Procedures were followed to correctly identify the distribution of the data and to account



for outliers. The UTLs are presented in the text of this memo and in a summary table (Table 2). The UTLs were computed for 95% coverage and with 95% confidence. For a given constituent, 95% of background soil samples can be expected to have a concentration at or less than the UTL presented in this memo with 95% confidence. If a soil sample collected in the Refinery area or near the Evaporation Ponds had a concentration less than or equal to its UTL, that concentration of that constituent could be considered to be naturally occurring.

References

Box G.E.P. and D.R. Cox. 1964. An analysis of transformations (with discussion). *Journal of Royal Statistical Society Series B*, 26, 211-252.

United States Environmental Protection Agency. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, U.S. Environmental Protection Agency. EPA 530-R-09-007. March, 2009.



Table 1. Data from Background Soil Borings Navajo Refining Company, Artesia Refinery, New Mexico

Davina	A ====	Depth	Arsenic	Barium	Cadmium	Chromium		Iron	Lead	Manganese	Mercury
Boring	Area	feet	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BG-01	1	1	1.07	97.2		J 3.70	2.25	3,740	3.00	191	0.00048 U
BG-01	1	5	2.12	144		J 8.65	6.98	8,940	6.57	348	0.00157 J
BG-02	1	1	1.12	129	0.129	J 5.56	3.21	5,210	3.99	204	0.00121 J
BG-02	1	5	2.75	176	0.139	J 13.8	9.59	12,700	8.77	371	0.00448
BG-03	1	1	2.28	186	0.131	J 10.9	6.44	10,400	6.62	344	0.00155 J
BG-03	1	6	2.88	162	0.198	J 16.9	10.1	15,300	9.54	431	0.00274 J
BG-04	2	1	2.62	153	0.187	J 14.8	9.48	13,700	9.13	405	0.00580
BG-04	2	3	1.61	85.6	0.123	J 8.02	4.86	6,370	4.00	178	0.00184 J
BG-05	2	1	1.99	150	0.163	J 8.82	7.34	7,600	7.66	268	0.0300
BG-05	2	4	3.56	58.6	0.145	J 9.58	7.11	8,070	5.43	241	0.00199 J
BG-06	2	1	2.54	178	0.144	J 10.6	7.49	9,670	7.80	348	0.00574
BG-06	2	4	2.36	88.6	0.140	J 8.96	5.81	7,130	5.51	266	0.00181 J
BG-07	3	1	0.93	103	0.0719	J 3.80	2.27	3,810	2.93	181	0.00048 U
BG-07	3	5	1.42	139		J 6.67	4.42	6,550	4.57	244	0.00157 J
BG-08	3	1	1.92	167		J 8.99	6.31	8,000	5.83	299	0.00050 U
BG-08	3	4	1.88	145		J 8.47	5.71	8,230	5.98	261	0.00141 J
BG-09	3	1	1.94	214		J 9.45	5.51	9,090	6.11	328	0.00076 J
BG-09	3	4	1.24	129		J 6.47	3.39	5,910	4.05	232	0.00192 J
BG-10	4	1	2.34	176		J 12.2	8.33	11,500	8.30	307	0.00314 J
BG-10	4	4	2.62	158		J 12.5	8.45	12,200	8.56	358	0.00545
BG-11	4	1	2.58	166		J 11.4	8.89	11,000	9.50	384	0.00662
BG-11	4	5	2.59	127		J 10.4	7.47	9,580	8.09	386	0.00537
BG-11	4	1	4.04	179	0.465	20.1	12.1	18,300	12.4	445	0.00337
BG-12 BG-12	4	5	1.80	152		J 9.25	5.44		5.53	301	
DG-12	4	5	1.60	132	0.114	J 9.Z5	უ.44	8,810	ა.აა	301	0.00108 J

Notes:

Area: The designated background soil area in which the boring was advanced.

mg/kg: Milligrams per kilogram.

J: Estimated value; the constituent was detected at a concentration between the method detection limit and the reporting limit.

U: Non-detection; the constituent was not detected above the method detection limit, the value shown on this table. One half the method detection limit was the value used in the statistical calculations.



Table 1. Data from Background Soil Borings Navajo Refining Company, Artesia Refinery, New Mexico

		Depth	Nickel	Selenium		Silver	١	/anadium	Zinc	Chloride	Fluoride	Sulfate
Boring	Area	feet	mg/kg	mg/kg		mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BG-01	1	1	3.60	0.351	J	0.483	U	6.57	10.0	47.6	0.816 J	
BG-01	1	5	9.51	0.394	J	0.457	U	13.6	22.0	1120	4.33	972
BG-02	1	1	5.02	0.170	U	0.468	U	8.72	15.0	14.7	0.388 J	87.8
BG-02	1	5	12.7	0.485		0.440	U	20.4	33.3	3550	3.43	2560
BG-03	1	1	10.5	0.354	J	0.456	U	17.0	26.7	5760	4.10	4390
BG-03	1	6	13.5	0.433	J	0.467	U	23.9	38.9	1720	1.40	1910
BG-04	2	1	12.8	0.576		0.433	U	19.8	36.9	2480	1.75	4890
BG-04	2	3	5.83	0.192	J	0.425	U	14.2	16.1	860	11.0	7830
BG-05	2	1	8.22	0.399	J	0.262	J	12.1	31.9	45.1	2.56	18.2
BG-05	2	4	7.95	0.394	J	0.488	U	27.6	23.8	1950	20.7	13500
BG-06	2	1	10.8	0.451		0.419	U	15.1	28.1	993	2.21	1080
BG-06	2	4	7.64	0.316	J	0.456	U	16.7	20.8	865	12.1	10600
BG-07	3	1	3.64	0.168	J	0.431	U	6.68	9.94	607	3.34	56.5
BG-07	3	5	6.82	0.270	J	0.472	U	10.9	17.1	3260	3.04	2960
BG-08	3	1	8.46	0.467	J	0.468	U	13.2	21.7	4150	11.1	1130
BG-08	3	4	8.51	0.381	J	0.438	U	13.2	21.3	3810	3.78	4260
BG-09	3	1	9.91	0.287	J	0.443	U	14.9	24.0	1180	6.6	834
BG-09	3	4	5.85	0.222	J	0.453	U	10.2	15.0	2080	3.38	960
BG-10	4	1	11.3	0.394	J	0.425	U	17.9	29.5	2530	2.14	198
BG-10	4	4	11.5	0.468	J	0.484	U	19.0	30.3	2280	3.16	1520
BG-11	4	1	11.6	0.509		0.462	U	16.3	30.8	955	5.03	364
BG-11	4	5	10.3	0.495		0.425	U	14.3	28.3	2960	1.01	1080
BG-12	4	1	15.2	0.654		0.438	U	26.9	49.0	1680	1.64	90.4
BG-12	4	5	8.48	0.330	J	0.388	U	14.6	22.5	1950	1.87	1480

Notes:

Area: The designated background soil area in which the boring was advanced.

mg/kg: Milligrams per kilogram.

J: Estimated value; the constituent was detected at a concentration between the method detection limit and the reporting limit.

U: Non-detection; the constituent was not detected above the method detection limit, the value shown on this table. One half the method detection limit was the value used in the statistical calculations.



Table 2. Background Concentrations of Key Constituents in Soil Navajo Refining Company, Artesia Refinery, New Mexico

		1171	M	
		UTL	Mean	
Constituent	Lithology	mg/kg	mg/kg	Distribution
Arsenic	All	3.92	2.18	Normal
Barium	Sandy silt	252	158	Normal
Barium	Silty clay	227	130	Normal
Cadmium	All	0.339	0.139	Lognormal
Chromium	All	18.8	10.0	Normal
Copper	All	12.4	6.62	Normal
Iron	All	17,344	9,242	Normal
Lead	All	12.1	6.66	Normal
Manganese	All	488	305	Normal
Mercury	All	0.0302	0.00210	Lognormal
Nickel	All	16.2	9.15	Normal
Selenium	All	0.682	0.378	Normal
Vanadium	All	28.3	15.6	Normal
Zinc	All	46.6	25.1	Normal
Chloride	All	5,264	1,952	Normal
Fluoride	All	17.9	3.56	Cube root
Sulfate	Sandy silt	9,336	533	Cube root
Sulfate	Silty clay	21,620	3,113	Cube root

Notes:

UTL: Upper tolerance limit, with 95% coverage and 95% confidence.

mg/kg: Milligrams per kilogram.

Mean: Not necessarily the arithmetic mean, but the mean computed according to the distribution indicated on this table and back-transformed. See text.

GW - 028

C-141s
(4)

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Wednesday, November 29, 2017 10:38 AM

To: 'Combs, Robert'

Cc: Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Griswold, Jim, EMNRD

RE: 2017-10-22 Effluent Pipeline Release Subject:

Robert, et al.:

The New Mexico Oil Conservation Division (OCD) approves the corrective action(s) approach for the above subject release documented by Navajo below.

OCD awaits the receipt of the Final C-141 with attachments verifying soils have been remediated from the pipeline release.

Please contact me if you have questions. Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Wednesday, November 1, 2017 6:56 AM

To: Chavez, Carl J, EMNRD < Carl J. Chavez@state.nm.us>

Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis

(Randy) <Lewis.Dade@HollyFrontier.com>

Subject: RE: 2017-10-22 Effluent Pipeline Release

Carl,

Please see below for our remediation plan for the wastewater effluent release on 10/22/17. The release occurred from the Navajo pipeline that conveys treated wastewater from Navajo's Artesia Refinery (refinery) to injection wells for disposal in accordance with Discharge Permit GW-028 and UIC permits.

- 1. Actions completed:
 - a. Operations noticed flow and pressure changes and immediately shut down the pipeline.
 - b. The leak location was found and area was excavated to enable repairs of the line.
 - c. The impacted area was defined by wet soil, there was no staining present. Personnel used paint to outline the wet area.

- d. Free liquids, primarily from within the excavation, were removed by vacuum truck and returned to the refinery.
- e. A sample of the discharge water was collected near the pipeline pumps within the refinery and submitted for analysis of WQCC constituents (20.6.2.3103 A-C).
- f. Soil removed from the excavation was segregated by appearance with wet soil defined as impacted and dry soil as not impacted.
- g. The line was put back in service on 10/24/17.

2. Future Actions Pending Completion:

- a. Backfill of the excavation is underway utilizing sand from an off-site source to fill around the pipeline and will be completed using the dry excavation material. This is ongoing and expected to be complete by 11/3/17.
- b. The wet impacted soil from the line repair excavation will be characterized and disposed.
- c. Five discrete surface samples will be collected from within the outlined area to provide impacted concentrations and five discrete samples will be collected outside of the wet area to provide background concentrations. The samples will be analyzed for COCs that exceeded WQCC standards in the water effluent collected within the refinery. One duplicate sample will be collected from within the spill area and background location. Based on the attached preliminary report for the released water, the soil will be analyzed for fluoride, chloride, sulfate, iron, and DRO. Adequate sample volume will be collected for potential SPLP analysis.
- d. If the samples within the spill area (surface impacts) exceed the average concentrations of the background samples, those parameters will be analyzed for SPLP to determine leachability. If the SPLP concentrations exceed the WQCC standards, then those areas that exceed will be excavated to average background concentrations.
- e. Excavation of the area with SPLP exceedances will be limited due to the presence of several other buried pipelines and will proceed as needed.
- f. Confirmation samples will be collected from the bottom of the excavation for surface impacts. The confirmation samples will be analyzed for the same constituents that exceeded the WQCC standard for SPLP and results will be compared to the average background concentrations. The confirmation samples will also be analyzed for SPLP if concentrations exceed the average background concentrations. Additional excavation will be conducted as necessary.
- g. A letter report with findings and actions taken will be prepared and submitted to OCD with the Final C-141 form. This submittal will include all analytical reports, photos, copies of any waste manifests, and a discussion of the investigation findings.

We intend to implement this remediation plan (Item 2 above) by 11/3/17. Please reply to this email with any comments, or give me a call to discuss.

Thanks, Robert

Robert Combs

Artesia, NM 88211-0159 office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Tuesday, October 31, 2017 4:51 PM

To: Combs, Robert

Subject: RE: 2017-10-22 Effluent Pipeline Release

Robert:

The New Mexico Oil Conservation Division is in receipt of your C-141 submittal and will respond soon.

Also, after speaking with you this afternoon, a remediation plan will soon be submitted.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099) New Mexico Oil Conservation Division Energy Minerals and Natural Resources Department 1220 South St Francis Drive Santa Fe, New Mexico 87505 Ph. (505) 476-3490

E-mail: CarlJ.Chavez@state.nm.us

"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]

Sent: Friday, October 27, 2017 3:34 PM

To: Chavez, Carl J, EMNRD < CarlJ.Chavez@state.nm.us>

Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>; Sahba, Arsin M. <Arsin.Sahba@HollyFrontier.com>; Dade, Lewis

(Randy) < Lewis. Dade@HollyFrontier.com >; Orosco, Richard < Richard. Orosco@HollyFrontier.com >

Subject: 2017-10-22 Effluent Pipeline Release

Carl,

Please see the attached initial C-141 form for the effluent pipeline release from 10/22/17.

If you have any questions please call to discuss.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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Chavez, Carl J, EMNRD

From: Combs, Robert < Robert.Combs@HollyFrontier.com>

Sent: Friday, October 27, 2017 3:34 PM

To: Chavez, Carl J, EMNRD

Cc: Denton, Scott; Sahba, Arsin M.; Dade, Lewis (Randy); Orosco, Richard

Subject: 2017-10-22 Effluent Pipeline Release **Attachments:** 2017-10-22 Effluent Leak Initial C-141.pdf

Carl,

Please see the attached initial C-141 form for the effluent pipeline release from 10/22/17.

If you have any questions please call to discuss.

Thanks, Robert

Robert Combs

Environmental Specialist The HollyFrontier Companies P.O. Box 159 Artesia, NM 88211-0159

office: 575-746-5382 cell: 575-308-2718 fax: 575-746-5451

Robert.Combs@hollyfrontier.com

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<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88210 District III

1000 Rio Brazos Road, Aztec, NM 87410

District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505

Form C-141 Revised April 3, 2017

			Rele	ease Notific	ation	and Co	rrective A	ction				
						OPERATOR						Final Report
Name of Co	mpany: I	HollyFrontie	r Navajo	Refining LLC		Contact Ro		0.2				
Address: 50 Facility Nar						Telephone No. 575-746-5382 Facility Type Petroleum Refinery						
		TOILLET TAV	ajo recin									
Surface Ow	ner			Mineral O	wner				API No	•		
	·					OF REI		T =				
Unit Letter	Section	Township	Range	Feet from the	North/	South Line	Feet from the	East/W	Vest Line	County		
	<u></u>	Latitud	e32°	°51'12.59"N_ L o	ongitud	e104°2	22'41.30"W		NAD8	33		
NATURE OF RELEASE												
		l Refinery wa	ste water e			Volume of	Release: >25 bb			Recovered:		
Source of Re	lease Effl	uent pipeline				Date and F 10/22/17,	lour of Occurrenc	e		Hour of Dis ~11:00 a.m		
Was Immedia	ate Notice (If YES, To			10/22/17,	11.00 a.m	•	
		\boxtimes	Yes [No Not Re	equired		ez, OCD Santa Fe					
By Whom? Was a Water	Robert C						lour 10/22/17 1					
was a water	course Read		Yes 🗵] No		n ies, ve	nume impacting t	ine wate	acourse.			
If a Watercon	urse was Im	pacted, Descr	ibe Fully.	*								
Describe Cau	Describe Cause of Problem and Remedial Action Taken.* The treated waste water effluent pipeline developed a leak at approximately 9:15 a.m. on 10/22/17 as determined by the decrease in the effluent line pressure and increase in discharge flow. The pipeline pumps were shut down immediately.											
		and Cleanup			re and in	crease in dis	charge flow. The	pipeline	e pumps we	ere shut dov	/n imm	ediately.
The leak loca	ation was id	lentified at app	oroximate	y 11:00 a.m. on 1	0/22/17	at the Bolton	Rd crossing, adja	acent to	Eagle Drav	w; an aerial	photo is	s attached
on the east si	l location in de of Bolto	n Rd and flow	leak occur	red within a steel south and southea	cased se st of the	leak location	opeline that passe, but did not enter	es below r Eagle l	Draw. A c	n. The water	r reacne pany w	as called to
excavate and	make line	repairs. Soil	was piled	along the sidewall	s of the	waterway and	d impacted soil wa	as segre	gated base	d on appeara	ance (no	o staining
present, only reported with			uum truck	s were used to rec	over free	e liquid and r	eturned the water	to the re	efinery. T	he recovere	d volun	ne will be
A water sam	ple was col	lected from th	e pipeline	near the effluent	pipeline	pumps and s	ubmitted for analy	ysis of V	VQCC stan	dards (20.6.	.2.3103	A-C NMAC).
Pending thos	se results, th	ne site will be	characteri	zed for any param at a non-hazardou	eters tha	t exceed the	standards. Il as any remediat	tion was	te from the	surface cle	anun if	annronriate
A final C-14	1 form will	be submitted	following	these actions as v	vell as pl	notos, analyti	cal results, and ar	ny dispo	sal records			
I hereby cert	ify that the	information g	iven abov	e is true and comp	lete to the	ne best of my	knowledge and u	understa	nd that pur	suant to NN	IOCD r	rules and
regulations a	III operators	re required in the requirement. The	to report a e acceptan	nd/or file certain r ce of a C-141 repo	reiease n ort by the	ouncations a e NMOCD m	na periorii correc arked as "Final R	ctive act Report" d	lons for rel	ieuses which	rator o	f liability
should their	operations l	have failed to	adequately	y investigate and r	emediat	e contaminat	ion that pose a thi	reat to g	round wate	r, surface w	ater, hu	ıman health
		addition, NM0 ws and/or reg		ptance of a C-141	report d	oes not reliev	e the operator of	respons	ibility for o	compliance	with an	y other
Tederal, State	, or rocar ra	1 a	diditions.				OIL CON	SERV	ATION	DIVISION	ON	
Signature:	// Al	l. K										
Approved by Environmental Specialist:												
Printed Name: Robert Combs												
Title: Envir	onmental S	pecialist				Approval Da	te:		Expiration	Date:		
E-mail Addr	ress: robert	.combs@holly	frontier.c	om		Conditions of	f Approval:			Attache	d 🗌	
Date: 10)/27/17	Pl	none: 575	-746-5382								
* Attach Add	itional She	ets If Neces	sary									



Analytical Report

Lab Order 1710C41

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project: Collection Date:

Lab ID: 1710C41-002 Matrix: TRIP BLANK Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL (Qual Units	DF I	ate Analyzed	Batch
EPA METHOD 8011/504.1: EDB					Analys	t: JME
1,2-Dibromoethane	ND	0.0096	μg/L	1	10/25/2017 11:08:44 P	M 34591
EPA METHOD 8260B: VOLATILES					Analys	t: RAA
Benzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	
Toluene	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
Ethylbenzene	ND	1.0	μg/L	-	10/25/2017 9:53:00 AN	
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
1,2,4-Trimethylbenzene	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
1,3,5-Trimethylbenzene	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
1,2-Dichloroethane (EDC)	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
1,2-Dibromoethane (EDB)	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
Naphthalene	ND	2.0	μg/L		10/25/2017 9:53:00 AN	
1-Methylnaphthalene	ND	4.0	μg/L		10/25/2017 9:53:00 AN	
2-Methylnaphthalene	ND	4.0	μg/L		10/25/2017 9:53:00 AN	
Acetone	ND	10	μg/L		10/25/2017 9:53:00 AN	
Bromobenzene	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
Bromodichloromethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Bromoform	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Bromomethane	ND	3.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
2-Butanone	ND	10	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Carbon disulfide	ND	10	μg/L		10/25/2017 9:53:00 AN	
Carbon Tetrachloride	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Chlorobenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Chloroethane	ND	2.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Chloroform	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Chloromethane	ND	3.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
2-Chlorotoluene	ND	1.0	μg/L		10/25/2017 9:53:00 AN	
4-Chlorotoluene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
cis-1,2-DCE	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Dibromochloromethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Dibromomethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	/ R4661
1,2-Dichlorobenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,3-Dichlorobenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,4-Dichlorobenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
Dichlorodifluoromethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,1-Dichloroethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,1-Dichloroethene	ND	1.0	µg/L	1	10/25/2017 9:53:00 AN	1 R4661
1,2-Dichloropropane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AN	1 R4661

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 0
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1710C41

Hall Environmental Analysis Laboratory, Inc.

Date Reported:

CLIENT: Navajo Refining Company

Client Sample ID: TRIP BLANK

Project:

Collection Date:

Lab ID:

1710C41-002

Matrix: TRIP BLANK

Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	RAA
1,3-Dichloropropane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
2,2-Dichloropropane	ND	2.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,1-Dichloropropene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Hexachlorobutadiene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
2-Hexanone	ND	10	μg/L	1	10/25/2017 9:53:00 AM	R46616
Isopropyibenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
4-isopropyltoluene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
4-Methyl-2-pentanone	ND	10	μg/L	1	10/25/2017 9:53:00 AM	R46616
Methylene Chloride	ND	3.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
n-Butylbenzene	ND	3.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
n-Propylbenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
sec-Butylbenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Styrene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
tert-Butylbenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
trans-1,2-DCE	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,3-Trichlorobenzene	ND	1.0	µg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,1-Trichloroethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,1,2-Trichloroethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Trichloroethene (TCE)	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Trichlorofluoromethane	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
1,2,3-Trichloropropane	ND	2.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Vinyl chloride	ND	1.0	μg/L	1	10/25/2017 9:53:00 AM	R46616
Xylenes, Total	ND	1.5	μg/L	1	10/25/2017 9:53:00 AM	R46616
Surr: 1,2-Dichloroethane-d4	99.6	70-130	%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: 4-Bromofluorobenzene	99.6	70-130	%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: Dibromofluoromethane	103	70-130	%Rec	1	10/25/2017 9:53:00 AM	R46616
Surr: Toluene-d8	100	70-130	%Rec	1	10/25/2017 9:53:00 AM	R46616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 6 of 0
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Date Reported:

CLIENT: Navajo Refining Company

Client Sample ID: Waste Water Effluent to Wells

Collection Date: 10/23/2017 9:45:00 AM

Project: Lab ID:

1710C41-001

Matrix: AQUEOUS

Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst:	JLF
Arsenic	0.019	0.0010	*	mg/L	1	10/25/2017 9:34:41 PM	C46652
Lead	ND	0.00050		mg/L	1	10/25/2017 9:34:41 PM	C46652
Selenium	0.041	0.0010		mg/L	1	10/25/2017 9:34:41 PM	C46652
Uranium	0.00070	0.00050		mg/L	1	10/25/2017 9:34:41 PM	C46652
EPA METHOD 300.0: ANIONS						Analyst:	MRA
Fluoride	30	2.0	*	mg/L	20	10/25/2017 9:36:11 AM	R46679
Chloride	710	25		mg/L	50	10/25/2017 12:17:30 PM	/I R46679
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	10/25/2017 9:23:47 AM	R46679
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	10/25/2017 9:23:47 AM	R46679
Sulfate	920	10		mg/L	20	10/25/2017 9:36:11 AM	R46679
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analyst:	KS
Total Dissolved Solids	2680	40.0	*D	mg/L	1	10/26/2017 8:06:00 PM	34626
SM4500-H+B: PH						Analyst:	JRR
pН	7.88		Н	pH units	1	10/26/2017 5:49:34 PM	R46730
EPA METHOD 200.7: DISSOLVED ME	TALS					Analyst:	pmf
Aluminum	0.34	0.020	*	mg/L	1	10/25/2017 7:52:43 PM	A46658
Barium	0.010	0.0020		mg/L	· 1	10/25/2017 7:52:43 PM	A46658
Boron	0.13	0.040		mg/L	1	10/25/2017 7:52:43 PM	A46658
Cadmium	ND	0.0020		mg/L	1	10/25/2017 7:52:43 PM	A46658
Chromium	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Cobalt	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Copper	ND	0.0060		mg/L	1	10/25/2017 7:52:43 PM	A46658
Iron	1.8	0.20	*	mg/L	10	10/25/2017 7:59:56 PM	A46658
Manganese	0.14	0.0020	*	mg/L	1	10/25/2017 7:52:43 PM	A46658
Molybdenum	0.014	0.0080		mg/L	1	10/25/2017 7:52:43 PM	A46658
Nickel	ND	0.010		mg/L	1	10/25/2017 7:52:43 PM	A46658
Silver	ND	0.0050		mg/L	1	10/25/2017 7:52:43 PM	A46658
Zinc	0.094	0.010		mg/L	1	10/25/2017 7:52:43 PM	A46658
EPA METHOD 245.1: MERCURY						Analyst:	MED
Mercury	ND	0.00020		mg/L	1	10/27/2017 12:52:27 PN	1 34672
EPA METHOD 8011/504.1: EDB						Analyst:	JME
1,2-Dibromoethane	ND	0.0092		μg/L	1	10/25/2017 10:53:29 PN	1 34591
EPA METHOD 8082A: PCB'S						Analyst:	SCC
Aroclor 1016	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1221	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1232	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
 - % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Ε Value above quantitation range
- Analyte detected below quantitation limits Page 1 of 0 J
- P Sample pH Not In Range
- RLReporting Detection Limit
- Sample container temperature is out of limit as specified

Analytical Report Lab Order 1710C41

Hall Environmental Analysis Laboratory, Inc.

Date Reported:

CLIENT: Navajo Refining Company

Client Sample ID: Waste Water Effluent to Wells

Project:

Collection Date: 10/23/2017 9:45:00 AM

Lab ID: 1710C41-001

Matrix: AQUEOUS

Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL (Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8082A: PCB'S		_				Analyst:	scc
Aroclor 1242	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1248	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1254	ND	1.0		μg/L	1	10/26/2017 2:09:00 PM	34612
Aroclor 1260	ND	1.0		μg/L	. 1	10/26/2017 2:09:00 PM	34612
Surr: Decachlorobiphenyl	67.6	50.4-123		%Rec	1	10/26/2017 2:09:00 PM	34612
Surr: Tetrachloro-m-xylene	64.8	41.2-147		%Rec	1	10/26/2017 2:09:00 PM	34612
EPA METHOD 8015M/D: DIESEL RANG	E					Analyst:	TOM
Diesel Range Organics (DRO)	7.2	1.0		mg/L	1	10/27/2017 9:11:41 AM	34668
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	10/27/2017 9:11:41 AM	34668
Surr: DNOP	119	77.5-161		%Rec	1	10/27/2017 9:11:41 AM	34668
EPA METHOD 8015D: GASOLINE RANG	SE .					Analyst:	NSB
Gasoline Range Organics (GRO)	ND	0.10	D	mg/L	2	10/25/2017 10:25:51 AM	л G46639
Surr: BFB	114	69.3-150	D	%Rec	2	10/25/2017 10:25:51 AN	/I G46639
EPA METHOD 8310: PAHS						Analyst:	SCC
Naphthalene	ND	2.0		μg/L	1	10/26/2017 12:18:00 PN	/I 34613
1-Methylnaphthalene	ND	2.0		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
2-Methylnaphthalene	ND	2.0		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Acenaphthylene	ND	2.5		μg/L	1	10/26/2017 12:18:00 PN	/I 34613
Acenaphthene	ND	2.0		μg/L	1	10/26/2017 12:18:00 PN	/ 1 34613
Fluorene	ND	0.80		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Phenanthrene	ND	0.60		μg/L	1	10/26/2017 12:18:00 PM	/I 3 4613
Anthracene	ND	0.6 0		μg/L	1	10/26/2017 12:18:00 PN	/I 34613
Fluoranthene	ND	0.30		μg/L	1	10/26/2017 12:18:00 PN	/I 34613
Pyrene	ND	0.30		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Benz(a)anthracene	ND	0.070		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Chrysene	ND	0.20		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Benzo(b)fluoranthene	ND	0.10		μg/L	1	10/26/2017 12:18:00 PM	A 34613
Benzo(k)fluoranthene	ND	0.070		μg/L	1	10/26/2017 12:18:00 PN	A 34613
Benzo(a)pyrene	ND	0.070		μg/L	1	10/26/2017 12:18:00 PM	/I 34613
Dibenz(a,h)anthracene	ND	0.12		μg/L	1	10/26/2017 12:18:00 PM	134613
Benzo(g,h,i)perylene	ND	0.12		μg/L	1	10/26/2017 12:18:00 PM	/ 34613
Indeno(1,2,3-cd)pyrene	ND	0.25		μg/L	1	10/26/2017 12:18:00 PM	1 34613
Surr: Benzo(e)pyrene	83.6	49.1-127		%Rec	1	10/26/2017 12:18:00 PM	1 34613
EPA METHOD 8260B: VOLATILES						Analyst:	RAA
Benzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Toluene	7.0	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Ethylbenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616

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- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 0
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order 1710C41

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Waste Water Effluent to Wells

 Project:
 Collection Date: 10/23/2017 9:45:00 AM

 Lab ID:
 1710C41-001
 Matrix: AQUEOUS
 Received Date: 10/24/2017 9:45:00 AM

Result **PQL Qual Units** DF Date Analyzed Batch Analyses **EPA METHOD 8260B: VOLATILES** Analyst: RAA ND 2.0 D 2 10/25/2017 9:23:00 AM R46616 Methyl tert-butyl ether (MTBE) μg/L ND D 2 10/25/2017 9:23:00 AM R46616 1,2,4-Trimethylbenzene 2.0 μg/L ND 2.0 2 1,3,5-Trimethylbenzene D μg/L 10/25/2017 9:23:00 AM R46616 1.2-Dichloroethane (EDC) ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 2 1,2-Dibromoethane (EDB) ND 2.0 D μg/L 10/25/2017 9:23:00 AM R46616 Naphthalene ND 4.0 D 2 10/25/2017 9:23:00 AM R46616 µg/L 2 1-Methylnaphthalene ND 8.0 D μg/L 10/25/2017 9:23:00 AM R46616 2-Methylnaphthalene ND 8.0 D 2 10/25/2017 9:23:00 AM R46616 μg/L Acetone 27 20 D µg/L 2 10/25/2017 9:23:00 AM R46616 ND 2.0 D 2 10/25/2017 9:23:00 AM Bromobenzene μg/L R46616 Bromodichloromethane ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 2 ND 2.0 D 10/25/2017 9:23:00 AM R46616 Bromoform μg/L 6.0 D 2 10/25/2017 9:23:00 AM R46616 Bromomethane ND μg/L 2 2-Butanone ND 20 D 10/25/2017 9:23:00 AM R46616 μg/L 20 D 2 10/25/2017 9:23:00 AM Carbon disulfide ND µg/L R46616 2 Carbon Tetrachloride ND 2.0 D µg/L 10/25/2017 9:23:00 AM R46616 Chlorobenzene ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 2 D 10/25/2017 9:23:00 AM Chloroethane ND 4.0 µg/L R46616 Chloroform ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 2 Chloromethane ND 6.0 D 10/25/2017 9:23:00 AM R46616 µg/L ND 2.0 D 2 10/25/2017 9:23:00 AM R46616 2-Chlorotoluene μg/L 4-Chlorotoluene 2 ND 2.0 D µg/L 10/25/2017 9:23:00 AM R46616 2 cis-1,2-DCE ND 2.0 D 10/25/2017 9:23:00 AM R46616 μg/L cis-1,3-Dichloropropene ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 4.0 D 2 1,2-Dibromo-3-chloropropane ND µg/L 10/25/2017 9:23:00 AM R46616 2 Dibromochloromethane ND 2.0 D µg/L 10/25/2017 9:23:00 AM R46616 2 10/25/2017 9:23:00 AM Dibromomethane ND 2.0 D µg/L R46616 1.2-Dichlorobenzene ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 1,3-Dichlorobenzene ND 2.0 D µg/L 2 10/25/2017 9:23:00 AM R46616 ND 2.0 D 2 10/25/2017 9:23:00 AM R46616 1,4-Dichlorobenzene μg/L 2 Dichlorodifluoromethane ND 2.0 D μg/L 10/25/2017 9:23:00 AM R46616 ND 2.0 D 2 1.1-Dichloroethane µg/L 10/25/2017 9:23:00 AM R46616 1,1-Dichloroethene ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM R46616 2 1,2-Dichioropropane ND 2.0 D μg/L 10/25/2017 9:23:00 AM R46616 2.0 D 2 10/25/2017 9:23:00 AM R46616 1,3-Dichloropropane ND µg/L 2 ND 4.0 D 10/25/2017 9:23:00 AM R46616 2,2-Dichloropropane μg/L 2 1.1-Dichloropropene ND 2.0 D µg/L 10/25/2017 9:23:00 AM R46616 R46616 Hexachlorobutadiene ND 2.0 D μg/L 2 10/25/2017 9:23:00 AM 2-Hexanone ND 20 D μg/L 2 10/25/2017 9:23:00 AM R46616

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Analytical Report Lab Order 1710C41

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Waste Water Effluent to Wells

Collection Date: 10/23/2017 9:45:00 AM

Project: Lab ID:

1710C41-001

Matrix: AQUEOUS

Received Date: 10/24/2017 9:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst:	RAA
lsopropyibenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
4-Isopropyitoluene	· ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
4-Methyl-2-pentanone	ND	20	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Methylene Chloride	ND	6.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
n-Butylbenzene	ND	6.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
n-Propylbenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
sec-Butylbenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Styrene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
tert-Butylbenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,1,2-Tetrachloroethane	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,2,2-Tetrachloroethane	ND	4.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Tetrachloroethene (PCE)	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
trans-1,2-DCE	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
trans-1,3-Dichloropropene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,3-Trichlorobenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,4-Trichlorobenzene	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,1-Trichloroethane	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,1,2-Trichloroethane	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Trichloroethene (TCE)	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Trichtorofluoromethane	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
1,2,3-Trichloropropane	ND	4.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Vinyl chloride	ND	2.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Xylenes, Total	ND	3.0	D	μg/L	2	10/25/2017 9:23:00 AM	R46616
Surr: 1,2-Dichloroethane-d4	99.8	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: 4-Bromofluorobenzene	96.9	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: Dibromofluoromethane	103	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
Surr: Toluene-d8	101	70-130	D	%Rec	2	10/25/2017 9:23:00 AM	R46616
TOTAL PHENOLICS BY SW-846 9067						Analyst:	scc
Phenolics	39	2.5		μg/L	1	10/26/2017	34649

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1710C41-001I WASTE WATER EFFLUENT TO WEL

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE,

Collected date/time: 10/23/17 09:45

Wet Chemistry by Method 4500CN E-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>	
Analyte	mg/l		mg/l		date / time		
Cyanide	0.0117		0.00500	1	10/30/2017 13:10	WG1036070	



















