# GW-028

# ANNUAL DP REPORT (1)

2014



Mr. Carl Chavez New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division 1220 South St. Francis Drive Santa Fe, NM 87505

Mr. John E. Kieling, Chief Hazardous Waste Bureau New Mexico Environmental Department 2905 Rodeo Park Drive East, Building 1 Santa Fe. New Mexico 87505

March 13, 2015

RE: Submittal of the 2014 Annual Discharge Permit Report for the Navajo Refining Company,

Artesia Refinery

Discharge Permit GW-028

RCRA Permit No. NMD048918817

Dear Mr. Chavez and Mr. Kieling:

Enclosed are one paper copy and one electronic copy of the 2014 Annual Discharge Permit Report for the Navajo Refining Company, LLC Artesia Refinery. This report is being submitted to fulfill the requirement of Section 2.F. of Discharge Permit GW-028.

If you have any questions or comments regarding this report, please feel free to contact me at 575-746-5294 or Robert Combs at 575-746-5382.

Sincerely,

Brian Stone, P.E.

**Environmental Specialist** 

Navajo Refining Company, LLC

BM STANE

c: Robert Combs, NRC

Mike Holder, HFC

Pamela R. Krueger, ARCADIS

#### 2014 ANNUAL DISCHARGE PERMIT REPORT NAVAJO REFINING COMPANY-ARTESIA REFINERY DISCHARGE PERMIT GW-028

#### **EXECUTIVE SUMMARY**

This report was prepared to fulfill the requirement in Section 2.F. of the Discharge Permit GW-028 for Navajo Refining Company L.L.C. The requirement specifies that an Annual Report be submitted by March 15 following the reporting year and should include:

- A. Summary of major refinery activities and events.
- B. Summary of discharge activities.
- C. Summary of all leaks, spills, and releases and corrective actions taken.
- D. Summary of discovery of new groundwater contamination.

#### A. MAJOR REFINERY ACTIVITIES

The refinery conducted normal operations for 2014. The refinery did not undergo any expansions in regards to production capacity, but did make several modifications to improve operability and reliability.

In August 2012, OCD issued a new discharge permit (GW-028) to the refinery. One of the major conditions of the permit is to discontinue the discharge of reverse osmosis (RO) reject water to the farm fields within 36 months. The required engineering and planning to achieve the requirement are underway. Section 6.D of Discharge Permit GW-028 required a site investigation of the fields, which was performed throughout 2013. The Final Report for the investigation was completed and submitted on February 21, 2014.

In November 2014, NRC requested that the Refinery's discharge permit be modified to allow for continued land application of the RO reject until the expiration of the permit or the installation and operation of the planned fourth injection well, whichever comes first. This extension was necessary due to decreased capacity of the current three injection wells and limitations on effluent discharged to the City's POTW. Studies are currently underway to allow for alternate disposal of effluent at the Refinery. As part of these efforts, NRC also began working with the OCD in 2014 on the permitting of a fourth injection well and the rulemaking required to allow for conversion of the well to use for hazardous effluent in the future.

In the fall of 2013, it was discovered that selenium concentrations in the refinery waste water effluent exceeded the toxicity characteristic limit of 1.0 mg/L. To address this problem, NRC met with OCD and NMED Hazardous Waste Bureau to discuss options. The refinery and OCD signed an Agreed Compliance Order and Amendment to outline the path forward

and a letter agreement with NMED. Selenium concentration in the waste water stream was reduced by addition of ferric chloride to facilitate co-precipitate with selenium. This was the initial action until a Selenium Reduction Technology (SeRT) unit could be put online. The SeRT unit became operational in January 2014 and is used in conjunction with ferric chloride co-precipitation to meet pretreatment concentration limits for discharge to both the POTW and to the injection wells.

In December 2011, construction of the light non-aqueous phase liquid (LNAPL) Recovery System Phase I upgrades began, and became operational in April 2012. The system upgrades replaced several of the existing pumps and segregated recovery of produced groundwater and recovered hydrocarbons in order to reduce the process load on the NRC WWTP. The Phase I wells addressed were RW-5R, RW-12R, RW-13R, RW-14R, RW-15, RW-19, RW-20, and RW-22. Implementation of Phase II of the recovery system upgrades began in late 2013 and operation of those upgrades was started in January of 2014. Phase II included minor retrofits to Phase I equipment, a controls and communications system, installation of two additional lift stations, and implemented recovery wells RW-1R, RW-2R, RW-4R, RW-6R, RW-7R, and RW-8R. In 2014, the system recovered 2,969,066 gallons (70,692 barrels) of groundwater and 104,272 gallons (2483 barrels) of PSH. Further details of the recovery system operation are discussed in Section 6 of the 2014 Annual Groundwater Report, submitted to OCD and NMED on February 27, 2015.

In November 2014, NRC submitted a well abandonment plan (plugging plan) to the New Mexico Office of the State Engineer (OSE) requesting approval to abandon the three recovery wells located immediately west of Bolton Road (RW-12, RW-13, and RW-14) because these wells have been replaced and are no longer used for the recovery system. The OSE approved the plugging plan but raised questions on the diversion of groundwater from the shallow saturated zone. OSE verbally requested that NRC cease pumping of groundwater from the recovery system until a review of the operation and potential water rights issues could be completed. As a result, the groundwater pumps in all of the recovery wells were turned off on November 17, 2014, with the exception of the total fluids pump located in the french drain immediately east of Bolton Road (RW-20). The PSH skimming pumps continued to be operated throughout the remainder of 2014. A letter describing the situation and the concerns of OSE, along with the current status of the recovery system operation, was submitted to NMED and OCD on January 30, 2015. A copy of the letter is provided in Appendix A of this report.

In July of 2014, NRC began a background groundwater study to evaluate upgradient/crossgradient groundwater concentrations, and to potentially establish alternative standards for select COCs, as appropriate. NRC is utilizing existing wells in the monitoring network and also installed two additional monitoring wells to complete the evaluation. A report summarizing the activities associated with the background groundwater study will be submitted to OCD and NMED no later than July 31, 2015.

#### B. SUMMARY OF DISCHARGE ACTIVITIES

Navajo's primary discharges are treated waste water from the WWTP (WWTP effluent) and the RO Reject. The WWTP effluent is discharged to NRC's Injection Wells (WDW-1, WDW-2, and WDW-3) and to the City of Artesia's POTW. The details of each discharge are provided below:

#### 1. Injection Wells

The injection rates, volume, and quality of treated waste water disposed of in the injection wells are reported quarterly in a report to OCD, in addition to monthly C-115 reports. Those reports are included in Appendix B, tab 1. The total injected water volume for 2014 was 4,515,886 barrels.

#### 2. POTW

The flow rates, volume, and quality of water discharged to the POTW are reported semiannually to the City of Artesia; those letter reports are included in Appendix B, tab 2. The total transferred water volume for 2014 was 915,507 gallons, or 21,798 barrels.

Navajo continued to discharge the blow-down from the cooling tower to the POTW in 2014. The total volume discharged at a rate of 99 gpm is estimated to be 44,936,053 gallons, or 1,069,906 barrels.

#### 3. Reverse Osmosis Reject

A secondary waste stream is the RO reject water. This RO process is fed by fresh ground water provided by either the refinery's agricultural supply wells or purchased water from the City of Artesia. The reject waste stream is comprised of water with concentrated salts, primarily chloride, fluoride, and sulfate, and is a high total dissolved solids (TDS) waste stream which is discharged to two farm fields. The stream is sampled semiannually as required by Section 4.B.1. of Discharge Permit GW-028 and the data is included in Appendix B, tab 3. The flow rate is continuously recorded with the Process History Database (PHD). Based on the data in the PHD, the total discharged RO reject water volume for 2014 was 128,930,388 gallons, or 3,069,771 barrels.

As noted in a March 13, 2015 telephone call from Mr. Mike Holder (HollyFrontier Corporate Environmental Specialist) to OCD Staff, it was determined during report preparation that the above figures do not take into account RO reject water discharged from a temporary RO unit installed in 2011 and that has been used to supplement the two permanent RO units. Considering this discharge, and subject to ongoing review and confirmation, NRC believes it has exceeded the permitted discharge volume of approximately 10,000 barrels per day. Discharge levels vary, and NRC is continuing to review this matter, including operation of the temporary RO unit since installation. NRC will further communicate with OCD when it has additional information and will work with OCD to resolve this issue.

#### C. SUMMARY OF ALL LEAKS, SPILLS, AND RELEASES

The Artesia refinery had 2 spills of reportable quantities in 2014. It should be mentioned here that this demonstrates the continued improvements compared to previous years (4 spills in 2013, 7 spills 2012; 9 spills in 2011). The refinery aspires to continue this trend for 2015. Appendix C contains information about the spills.

#### 1. 7/15/2014 – Southwest Tank Farm Diesel Pipeline Leak

At approximately 0710 on 7/15/2014, it was reported that an above ground diesel suction line had developed a leak sometime during the previous night where it penetrated an earthen dike between two adjacent containment areas in the Southwest Tank Farm (AOC 4 – Tanks 111, 112, 113, 417, 418, 419 and 434). Because it had rained during the night, rainwater had pooled in the low spots within the diked containment areas. At the morning shift inspection it was determined that the rainwater contained diesel product. The leaking line was isolated and blocked off to prevent any additional release. Vapor suppressant foam was applied to the pooled liquid to prevent volatile organics from being released during the heat of the day. Three vacuum trucks were sent to the containment area and vacuumed the diesel/water/foam liquid mixture. The volume of water and diesel from each truckload was recorded separately to determine the amount of diesel that leaked and was returned to the crude process unit.

Following completion of the removal of liquids from the containment areas, the earthen berm was removed to allow access to the pipeline for repairs. A hand auger was used to inspect the soil within the containment areas to evaluate the depth of saturation. Soil samples were submitted to a laboratory for analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO). Limited soil excavation was performed to remove saturated soil from the floor of the containment areas around Tanks 434 and 113 and around Tanks 111 and 112. Excavation was not possible in the containment area surrounding Tanks 417, 418, and 419 due to the presence of above ground piping on all four sides of that containment area. Microbial agents were applied to the soil within all three of the containment areas to promote biodegradation of any remaining hydrocarbons in the soil.

Treatment of the soil within the containment areas is ongoing. A final report will be submitted summarizing the release response and remediation activities during the first half of 2015.

#### 2. 10/17/2014 – Hydrocarbons in Clark Draw

At approximately 1100 on 10/17/2014, a small area of stained concrete was observed in the base of Clark Draw. Clark Draw is an east-west oriented drainage ditch that conveys stormwater from west of US Highway 285 through the northern portion of the refinery, just south of the North Colony Landfarm into Eagle Draw. There was no water flowing in the waterway at the time of discovery. It was determined that the hydrocarbons were seeping up from below the concrete in the bottom of the draw. The observed hydrocarbon material was removed using absorbent pads and absorbent booms were

placed to prevent residual hydrocarbons being released during flowing conditions in the waterway.

Inspection of nearby monitoring and recovery wells determined that the groundwater elevation had risen significantly, likely due to heavier than normal rainfall to the west and northwest of Artesia. On 10/17/2014, fluid levels in RW-17, located immediately north of Clark Draw on the west side of Eagle Draw, were measured as 9.12 feet (ft) to product and 9.35 ft to groundwater, relative to the top of casing. Between 2011 and March 2014, no hydrocarbon product was identified in this recovery well and the depth to groundwater measured ranged from 9.6 to 14 ft below top of casing. It is believed that the elevated groundwater resulting from heavy rainfall and recharge to the shallow groundwater bearing unit caused a small amount of hydrocarbon product to be mobilized and to enter Clark Draw.

A vacuum truck was used to remove the hydrocarbon product from RW-17 periodically between 10/17/2014 and 11/10/2014, as appropriate. During this time period, a total of 650 barrels of hydrocarbons and groundwater were removed from RW-17.

No further expression of hydrocarbons has been observed within Clark Draw since 10/17/2014. A final report will be submitted summarizing the remediation activities.

#### D. SUMMARY OF NEW GROUNDWATER CONTAMINATION

New groundwater contamination and changes in existing constituents are discussed in Section 7 of the *2014 Annual Groundwater Report* submitted to OCD and NMED on February 27, 2015. The conclusions of that report are listed below:

- Groundwater flow direction and gradient remains generally consistent with that measured during past years. Discharge of the RO reject water to the RO reject fields and operation of the recovery system groundwater pumps have localized influence of groundwater gradients, creating a slight mound beneath the RO reject fields. Localized groundwater sinks are observed around recovery wells when the total fluids pumps are operating.
- The PSH plume shapes were modified, as shown in Figures 8 and 9, based on the findings of the Contaminant Migration Evaluation (CME) Investigation performed in 2014. The findings included refinement of the lithologic model for the site through identification of gravel lenses. However, a general reduction in the PSH plume was observed during the second semiannual event, which is attributable to the rise in the groundwater potentiometric surface throughout the area.
- Concentrations of dissolved phase organic constituents have generally remained stable, although increasing trends were noted in specific areas. The overall shape of the dissolved phase constituent plumes remain similar to previous years, although slight changes were observed due to installation of additional wells.

- Upgrades to the PSH recovery system have been completed and the system operated more consistently throughout 2014.
- The OSE requested that pumping of groundwater be halted while a review of the water rights associated with the shallow saturated zone is completed. The recovery system is currently being operated using the PSH pumps only, with the exception of the total fluids pump placed in the french drain immediately to the east of Bolton Road (RW-20).

# **Appendices**

Appendix A	Recov	very System Status Letter
Appendix B	Refine	ery Discharges
	B.1	Treated Wastewater to Injection Wells
	B.2	Treated Wastewater to Artesia POTW
	B.3	RO Reject Discharge Volumes
Appendix C	Leaks	, Spills, and Releases
	C.1	7/15/2014 – Southwest Tank Farm Diesel Pipeline Leak
	C.2	10/17/2014 – Hydrocarbons in Clark Draw

# Appendix A

Recovery System Status Letter



Mr. Dave Cobrain New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, NM 87505

Mr. Carl Chavez
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

January 30, 2015

RE: Status of the Groundwater Recovery System

Navajo Refining Company, Artesia Refinery

RCRA Permit No. NMD048918817

Discharge Permit GW-028

Dear Mr. Cobrain and Mr. Chavez:

The Navajo Refining Company, LLC (NRC) has been operating a groundwater recovery system to capture phase separated hydrocarbons (PSH) present within the shallow water bearing zone beneath the Artesia Refinery (Refinery) and the field east of the Refinery owned by NRC. The operation of the system is conducted in accordance with the Post Closure Care Permit (PCC Permit) administered by the New Mexico Environment Department (NMED) and the Discharge Permit administered by the Oil Conservation Division (OCD) of the New Mexico Energy, Minerals and Natural Resources Department.

The recovery system consists of a series of trenches and recovery wells located throughout the Refinery and the field east of the Refinery owned by NRC. The typical recovery well contains two pumps: a groundwater pump typically placed near the bottom of the recovery well and a PSH-only "skimming" pump placed near the interface between the groundwater and PSH. The groundwater pumps are operated on an as-needed basis to depress the groundwater beneath the PSH, drawing additional PSH into each recovery well. The groundwater pumps are typically cycled in order to minimize the volume of groundwater produced. Recovered groundwater is piped to the process wastewater system for treatment and ultimate discharge to either the City of Artesia wastewater treatment system or a deep well injection site(s) located approximately 12 miles east of the Refinery. Recovered PSH is placed into the crude stream for processing. The volume of PSH and groundwater recovered is reported to both NMED and OCD annually in the required annual monitoring report.

In November 2014, NRC submitted a well abandonment plan (plugging plan) to the New Mexico Office of the State Engineer (OSE) requesting approval to abandon three recovery wells located adjacent to Bolton Road that are no longer used as collection points within the recovery system. The OSE approved the plugging plan but raised questions on the diversion of groundwater as part of the recovery system. OSE verbally requested that NRC cease pumping of groundwater from the recovery system until a review of the operation and potential water rights issues could be completed. As a result, the groundwater pumps associated with the recovery system were turned off on November 17, 2014, with the exception of the total fluids pump located in the french drain immediately east of Bolton Road. The PSH skimming pumps continue to be operated; thus, the recovery system is still operating but at slightly reduced efficiency. The change in operational mode (i.e. not operating the groundwater pumps) will be documented in the 2014 Groundwater Report and the 2014 Annual Report.

A meeting was conducted on December 29, 2014 to describe the recovery system to OSE personnel and to discuss any potential water rights requirements. The volume of groundwater "diverted" from the shallow water bearing zone by the recovery system (since 1995) was provided to OSE and compared to the volume of water discharged to the reverse osmosis (RO) reject discharge fields for the same period. Although not permitted by OSE for the purpose, the discharge to the RO reject fields provides return flow to the shallow water bearing zone, as demonstrated by the investigation of the RO reject fields conducted in 2013 at the request of OCD. Accordingly, any water diverted in connection with the recovery system from the shallow water bearing zone is "offset" by water returned to the same aguifer. NRC presented the volume information to OSE and requested whether the return flow through the RO reject fields could be considered as an offset to the volume of groundwater diverted for remediation purposes. As an initial matter, the OSE personnel with whom the meeting was held stated that this would likely not be allowable since the RO was currently associated with NRC's artesian groundwater rights and, as currently permitted, NRC may not apply any excess artesian water rights to the shallow water bearing zone diversion. OSE personnel stated that NRC would likely need to obtain shallow water rights through either a leasing agreement or purchase of existing water rights to continue operation of the system. Another alternative suggested by OSE was to inject the recovered/diverted groundwater phase into the shallow water bearing zone.

NRC is currently reviewing various options for addressing the OSE concerns for water rights for the shallow groundwater, including:

- Modifying the existing water rights permit for the artesian aquifer to apply the return flow credit from discharge to the RO reject fields allowed under this permit to the diversion of the shallow groundwater from the recovery system. This modification would be submitted along with a request for emergency approval under Section 72-5-25 New Mexico Statutes Amended 1978 (NMSA 1978).
- Identifying shallow groundwater rights nearby that may be obtainable under either a lease or purchase agreement. This approach may require a significant amount of time, resulting in a longer period in which the groundwater pumps are not operating.

Evaluating the potential for re-injection of the groundwater into the shallow groundwater. This
approach will require approval of both NMED and OCD and is expected to require a modification
of the Discharge Permit. As part of this evaluation, the possibility of using the re-injection of
groundwater for either gradient control (i.e., a hydraulic barrier) or for flushing of groundwater
contaminants to the recovery system is being considered. This approach will require a significant
amount of time for design and construction of treatment (if required) and injection infrastructure.

The groundwater pumps, as described above, will remain inactive until an agreement can be reached with the various agencies to allow the diversion of groundwater from the shallow water bearing zone for the remediation system. The PSH-only pumps will remain active; however, NRC believes that operation of the remediation system in this fashion is not the most efficient or effective method to control potential migration of the PSH plume. As we proceed with evaluation of the various options we will keep you informed and may request your assistance with regard to ensuring an effective resolution of this matter with the OSE.

NRC will continue to update both NMED and OCD regarding the status of the remediation system periodically. If you have any questions or comments regarding this request, please feel free to contact me at 575-746-5294 or Robert Combs at 575-746-5382.

Sincerely,

Brian Stone

Environmental Specialist

Bon Stone

Navajo Refining Company, LLC

C:

Robert Combs. NRC

Pamela R. Krueger, ARCADIS

# Appendix B

Refinery Discharges

B.1 Treated Wastewater to Injection Wells



May 22, 2014

Mr. Carl Chavez, CHMM NM Energy, Minerals & Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr. Santa Fe, NM 87505-5472

Certified Mail/Return Receipt 7007 3020 0000 3028 8048

RE: 2014 1st Quarter Injection Report for Wells WDW-1, WDW-2 and WDW-3, Navajo Refining Company, L.L.C.

Dear Mr. Chavez,

Enclosed, please find the first quarter 2014 sampling results for fluids injected into WDW-1, WDW-2 and WDW-3 and a spread sheet showing various volumes and pressures as required under Permit Condition 2.I.1, Quarterly Reports.

This report covers the period from January 1, 2014 to March 31, 2014. We have disposed a total of 1,271,325 barrels of fluid into the three wells during the first quarter 2014. The volume per well is:

- 444,572 barrels into WDW-1
- 461,609 barrels into WDW-2
- 365,144 barrels into WDW-3

This report is signed and certified in accordance with WQCC section 5101.G. If there are any questions, please call me at 575-748-3311.

Respectfully, whal D. Roker

Michael McKee

Vice-President, Refinery Manager

Navajo Refining Company L.L.C.

Electronic cc (w/enc.):

D Crawford, R Combs, M Schultz, A Strange

Injection Wells/Reports C-115 & Quarterly/2014/1st quarter/2014-05-22 1st QTR Inj Rpt for Wells WDW-1,2,3 Environmental File:

Navajo: (ART: REF 14-4,A.02,D)



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

April 09, 2014

Mike Holder Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159 TEL: (575) 748-3311

**FAX** 

RE: WDW-1, 2 & 3 Qtrly Inj Well

OrderNo.: 1403871

#### Dear Mike Holder:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/20/2014 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 <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> 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

andyl

4901 Hawkins NE

Albuquerque, NM 87109

# Lab Order 1403871

#### Date Reported: 4/9/2014

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

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

WDW-1, 2 & 3 Qtrly Inj Well

Collection Date: 3/20/2014 9:00:00 AM

Lab ID: 1403871-001

Project:

Matrix: AQUEOUS Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF Date Analyzed Ba	atch
EPA METHOD 300.0: ANIONS				Analyst: Ji	RR
Fluoride	5.5	1.0	* mg/L	10 3/21/2014 12:08:26 AM R	₹17472
Chloride	410	50	mg/L	100 3/21/2014 12:20:50 AM R	₹17472
Nitrogen, Nitrite (As N)	ND	1.0	mg/L	10 3/21/2014 12:08:26 AM R	₹17472
Bromide	1.6	1.0	mg/L	10 3/21/2014 12:08:26 AM R	र17472
Nitrogen, Nitrate (As N)	ND	1.0	mg/L	10 3/21/2014 12:08:26 AM R	र17472
Phosphorus, Orthophosphate (As P)	ND	5.0	mg/L	10 3/21/2014 12:08:26 AM R	₹17472
Sulfate	3900	50	mg/L	100 3/21/2014 12:20:50 AM R	₹17472
EPA METHOD 7470: MERCURY				Analyst: Ji	ML
Mercury	ND	0.00020	mg/L	1 3/24/2014 5:57:04 PM 12	2328
MERCURY, TCLP				Analyst: JI	ML
Mercury	ND	0.020	mg/L	1 3/21/2014 4:08:02 PM 12	2307
EPA METHOD 6010B: TCLP METALS				Analyst: E	LS
Arsenic	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Barium	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Cadmium	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Chromium	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Lead	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Selenium	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
Silver	ND	0.10	mg/L	1 3/21/2014 10:39:40 AM 12	2293
EPA 6010B: TOTAL METALS				Analyst: E	LS
Aluminum	2.3	0.10	mg/L	5 3/21/2014 10:29:25 AM 1:	2293
Antimony	ND	0.050	mg/L	1 3/21/2014 10:25:56 AM 12	2293
Arsenic,	ND	0.020	mg/L	1 3/21/2014 10:25:56 AM 12	2293
Barium	0.049	0.020	mg/L	1 3/21/2014 10;25:56 AM 1	12293
Beryllium	ND	0.0030	mg/L	1 3/21/2014 10:25:56 AM 1	2293
Cadmium	ND	0.0020	mg/L	1 3/21/2014 10:25:56 AM 1:	2293
Calcium	93	1.0	mg/L	1 3/21/2014 10:25:56 AM 12	12293
Chromium	ND.	0.0060	mg/L	1 3/21/2014 10:25:56 AM 12	12293
Cobalt	ND	0.0060	mg/L	1 3/21/2014 10:25:56 AM 1:	2293
Copper	0.0092	0.0060	mg/L	1 3/21/2014 10:25:56 AM 1:	2293
Iron	3.3	0.25	mg/L	5 3/21/2014 10:29:25 AM 1:	2293
Lead	ND	0.0050	mg/L	1 3/21/2014 10:25:56 AM 1:	2293
Magnesium	30	1.0	mg/L	1 3/21/2014 10:25:56 AM 1:	
Manganese	0.12	0.0020	mg/L	1 3/21/2014 10:25:56 AM 1:	
Nickel	0.016	0.010	mg/L	1 3/21/2014 10:25:56 AM 1:	
Potassium	37	1.0	mg/L		12293
Selenium	0.13	0.050	mg/L	1 3/21/2014 10:25:56 AM 1:	2293

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 1 of 24

- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 3/20/2014 9:00:00 AM

Lab ID: 1403871-001

Matrix: AQUEOUS

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS					Analyst	: EL\$
Silver	ND	0.0050	mg/L	1	3/21/2014 10:25:56 AM	12293
Sodium	1400	20	mg/L	20	3/21/2014 10:31:26 AM	12293
Thallium	ND	0.050	mg/L	1	3/21/2014 10:25:56 AM	12293
Vanadium	ND	0.050	mg/L	1	3/21/2014 10:25:56 AM	12293
Zinc	0.15	0.020	mg/L	1	3/21/2014 10:25:56 AM	12293
EPA METHOD 8260B: VOLATILES					Analyst	SUB
Acetonitrile	ND	10	μg/L	1	3/26/2014	R1784
Allyl chloride	ND	0.50	μg/L	1	3/26/2014	R1784
Chloroprene	ND	0.50	μg/L	1	3/26/2014	R1784
Cyclohexane	1.6	0.50	μg/L	1	3/26/2014	R1784
Diethyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Diisopropyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Epichlorohydrin	ND	5.0	μg/L	1	3/26/2014	R1784
Ethyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
Ethyl methacrylate	. ND	0.50	μg/L	1	3/26/2014	R1784
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Freon-113	ND	0.50	μg/L	1	3/26/2014	R1784
Isobutanoi	ND	20	μg/L	1	3/26/2014	R1784
Isopropyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
Methacrylonitrile	ND	0.50	μg/L	1	3/26/2014	R1784
Methyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
Methyl ethyl ketone	5.6	2.5	μg/L	1	3/26/2014	R1784
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/26/2014	R1784
Methyl methacrylate	ND	0.50	μg/L,	1	3/26/2014	R1784
Methylcyclohexane	1.2	1.0	μg/L	1	3/26/2014	R1784
n-Amyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
n-Hexane	ND	0.50	μg/L	1	3/26/2014	R1784
Nitrobenzene	ND	5.0	μg/L	1	3/26/2014	R1784
Pentachloroethane	ND	5.0	μg/L	1	3/26/2014	R1784
p-isopropyltoluene	ND	0.50	μg/L	1	3/26/2014	R1784
Propionitrile	ND	0.50	μg/L	1	3/26/2014	R1784
Tetrahydrofuran	ND	0.50	μg/L	1	3/26/2014	R1784
Benzene	0.63	0.50	μg/L	1	3/26/2014	R1784
Toluene	ND	0.50	μg/L	1	3/26/2014	R1784
Ethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/26/2014	R1784
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/26/2014	R1784

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 24

- P Sample pH greater than 2.
- RL Reporting Detection Limit

# **Analytical Report**

Lab Order 1403871

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/9/2014

CLIENT: Navajo Refining Company

1403871-001

Lab ID:

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

Matrix: AQUEOUS

Client Sample ID: WDW-1, 2 & 3 Effluent Collection Date: 3/20/2014 9:00:00 AM Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ana	lyst: SUB
1,2-Dibromoethane (EDB)	. ND	0.50	μg/L	1	3/26/2014	R1784
Naphthalene	ND	0.50	μg/L	1	3/26/2014	R1784
Acetone	42	2.5	μg/L	1	3/26/2014	R1784
Bromobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
Bromodichloromethane	ND	0.50	μg/L	1	3/26/2014	R1784
Bromoform	ND	0.50	μg/L	1	3/26/2014	R178
Bromomethane	ND	0.50	μg/L	1	3/26/2014	R178-
Carbon disulfide	5.6	0.50	μg/L	1	3/26/2014	R178
Carbon Tetrachloride	ND	0.50	μg/L	1	3/26/2014	R178
Chlorobenzene	ND	0.50	μg/L.	1	3/26/2014	R178
Chloroethane	ND	0.50	μg/L	1	3/26/2014	R178
Chloroform	0.64	0.50	µg/L	1	3/26/2014	R178
Chloromethane	ND	0.50	μg/L	1	3/26/2014	R178
2-Chlorotoluene	ND	0.50	μg/L	1	3/26/2014	R178
4-Chlorotoluene	ND	0.50	μg/L	1	3/26/2014	R178
cis-1,2-DCE	ND	0.50	μg/L,	1	3/26/2014	R178
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/26/2014	R178
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/26/2014	R178
Dibromochloromethane	ND	0.50	μg/L	1	3/26/2014	R178
Dibromomethane	ND	0.50	μg/L	1	3/26/2014	R178
1,2-Dichlorobenzene	· ND	0.50	µg/L	1	3/26/2014	R178
1,3-Dichlorobenzene	ND	0.50	µg/L	1	3/26/2014	R178
1,4-Dichlorobenzene	ND	0.50	µg/∟	1	3/26/2014	R178
Dichlorodifluoromethane	ND	0.50	µg/∟	1	3/26/2014	R178
1,1-Dichloroethane	ND	0.50	μg/∟	1	3/26/2014	R178
1,1-Dichloroethene	ND	0.50	μg/L	1	3/26/2014	R178
1,2-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R178
1,3-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R178
2,2-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R178
1,1-Dichloropropene	ND .	0.50	μg/L	1	3/26/2014	R178
Hexachlorobutadiene	ND	0.50	μg/L	1	3/26/2014	R178
2-Hexanone	ND	0.50	μg/L	1	3/26/2014	R178
Isopropylbenzene	ND	0.50	μg/L	1	3/26/2014	R178
4-isopropyltoluene	ND	0.50	μg/L	1	3/26/2014	R178
Methylene Chloride	ND	2.5	μg/L	1	3/26/2014	R178
n-Butylbenzene	ND	0.50	μg/L	1	3/26/2014	R178
n-Propylbenzene	ND	0.50	μg/L	1	3/26/2014	R178
sec-Butylbenzene	ND	0.50	μg/L	1	3/26/2014	R178
Styrene	ND	0.50	μg/L	1	3/26/2014	R178

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
- j Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - Page 3 of 24
- P Sample pH greater than 2.
- Reporting Detection Limit

Date Reported: 4/9/2014

**CLIENT:** Navajo Refining Company

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

Project: WD

WDW-1, 2 & 3 Qtrly Inj Well

Collection Date: 3/20/2014 9:00:00 AM

Lab ID: 1403871-001

Matrix: AQUEOUS

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES		<u> </u>				Analyst: SUB
tert-Butylbenzene	ND	0.50	µg/L	1	3/26/2014	R1784
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/26/2014	R1784
trans-1,2-DCE	ND	0.50	μg/L.	1	3/26/2014	R1784
trans-1,3-Dichloropropene	ND	0.50	µg/L	1	3/26/2014	R1784
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/26/2014	R1784
Trichlorofluoromethane	ND	0.50	μg/L	1	3/26/2014	R1784
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/26/2014	R1784
Vinyl chloride	ND	0.50	μg/L	1	3/26/2014	R1784
mp-Xylenes	ND	1.0	μg/L	1	3/26/2014	R1784
o-Xylene	ND	0.50	μg/L	1	3/26/2014	R1784
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
tert-Butyl alcohol	ND	20	μg/L	1	3/26/2014	R1784
Acrolein	ND	10	μg/L	1	3/26/2014	R1784
Acrylonitrile	ND	10	μg/L	1	3/26/2014	R1784
Bromochloromethane	ND	0.50	μg/L	1	3/26/2014	R1784
2-Chloroethyl vinyl ether	ND	1.0	μg/L	1	3/26/2014	R1784
lodomethane	ND	0.50	μg/L	1	3/26/2014	R1784
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/26/2014	R1784
Vinyl acetate	ND	0.50	µg/L	1	3/26/2014	R1784
1,4-Dioxane	ND .	20	µg/L	1	3/26/2014	R1784
Surr: 1,2-Dichloroethane-d4	116	70-130	%REC	1	3/26/2014	R1784
Surr: 4-Bromofluorobenzene	104	70-130	%REC	1	3/26/2014	R1784
Surr: Toluene-d8	101	70-130	%REC	1	3/26/2014	R1784
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
1,1-Biphenyl	ND	1.0	μg/L	1	3/28/2014	R1784
Caprolactam	ND	0.10	µg/L	1	3/28/2014	R1784
N-Nitroso-di-n-butylamine	ND	1.0	µg/L	1	3/28/2014	R1784
Acetophenone	ND	10	μg/L	1	3/28/2014	R1784
1-Methylnaphthalene	ND	10	μg/L	1	3/28/2014	R1784
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	3/28/2014	R1784
2,4,5-Trichlorophenol	ND	10	μg/L	1	3/28/2014	R1784
2,4,6-Trichlorophenol	ND	10	μg/L	1	3/28/2014	R1784
2,4-Dichlorophenol	ND	10	μg/L	1	3/28/2014	R1784

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 greater than 2.
- P Sample pH greater than 2.
  RL Reporting Detection Limit
- Page 4 of 24

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 3/20/2014 9:00:00 AM

Lab ID: 1403871-001

Matrix: AQUEOUS

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD					An	alyst: SUB
2,4-Dimethylphenol	ND	10	μg/L	1	3/28/2014	R1784
2,4-Dinitrophenol	ND	10	μg/L	1	3/28/2014	R1784
2,4-Dinitrotoluene	ND	10	μg/L	1	3/28/2014	R1784
2,6-Dinitrotoluene	ND	10	μg/L	1	3/28/2014	R1784
2-Chloronaphthalene	ND	10	μg/L	1	3/28/2014	R1784
2-Chlorophenol	ND	10	μg/L	1	3/28/2014	R1784
2-Methylnaphthalene	ND	10	μg/L	1	3/28/2014	R1784
2-Methylphenol	ND	10	μg/L	1	3/28/2014	R1784
2-Nitroaniline	ND	10	μg/L	1	3/28/2014	R1784
2-Nitrophenol	ND	10	μg/L	1	3/28/2014	R1784
3,3'-Dichlorobenzidine	ND	10	μg/L	1	3/28/2014	R1784
3-Nitroaniline	ND	10	μg/L	1	3/28/2014	R1784
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	3/28/2014	R1784
4-Bromophenyi phenyi ether	ND	10	μg/L	1	3/28/2014	R1784
4-Chloro-3-methylphenol	ND	5.0	μg/L	1	3/28/2014	R1784
4-Chloroaniline	ND	10	μg/L	1	3/28/2014	R1784
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	3/28/2014	R1784
4-Nitroaniline	ND	10	μg/L	1	3/28/2014	R1784
4-Nitrophenol	<sup>1</sup> ND	10	μg/L	1	3/28/2014	R1784
Acenaphthene	ND	10	μg/L	1	3/28/2014	R1784
Acenaphthylene	ND	10	μg/L	1	3/28/2014	R1784
Anthracene	ND	10	μg/L	1	3/28/2014	R1784
Benzo(g,h,i)perylene	ND	1.0	μg/L	1	3/28/2014	R1784
Benz(a)anthracene	. ND	1.0	μg/L	1	3/28/2014	R1784
Benzo(a)pyrene	ND	1.0	· µg/L	1	3/28/2014	R1784
Benzo(b)fluoranthene	ND	1.0	μg/L	1	3/28/2014	R1784
Benzo(k)fluoranthene	ND	1.0	μg/L	1	3/28/2014	R1784
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	3/28/2014	R1784
Bis(2-chloroethyl)ether	ND	10	μg/L	1	3/28/2014	R1784
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	3/28/2014	R1784
Bis(2-ethylhexyl)phthalate	ND	5.0	μg/L	1	3/28/2014	R1784
Butyl benzyl phthalate	ND	10	μg/L	1	3/28/2014	R1784
Carbazole	ND	10	μg/L	1	3/28/2014	R1784
Chrysene	ND	0.10	µg/L	1	3/28/2014	R1784
Dibenz(a,h)anthracene	ND	1.0	µg/L	1	3/28/2014	R1784
Dibenzofuran	ND	10	μg/L	1	3/28/2014	R1784
Diethyl phthalate	ND	10	μg/L	1	3/28/2014	R1784
Dimethyl phthalate	ND	10	μg/L	1	3/28/2014	R1784
Di-n-butyl phthalate	ND	10	μg/L	1	3/28/2014	R1784

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 5 of 24

- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 3/20/2014 9:00:00 AM

**Lab ID:** 1403871-001

Matrix: AQUEOUS

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qua	l Units	DF	Date Analyze	d	Batch
EPA 8270C: SEMIVOLATILES/MOD			·		ı	Analyst:	SUB
Di-n-octyl phthalate	ND	10	μg/L	1	3/28/2014		R17842
Fluoranthene	ND	10	μg/L	1	3/28/2014		R17842
Fluorene	ND	10	μg/L	1	3/28/2014		R1784
Hexachlorobenzene	ND	1.0	μg/L	1	3/28/2014		R1784
Hexachlorobutadiene	ND	10	μg/L	1	3/28/2014		R17842
Hexachlorocyclopentadiene	ND	10	μg/L	1	3/28/2014		R17842
Hexachloroethane	ND	10	μg/L	1	3/28/2014		R1784
Indeno(1,2,3-cd)pyrene	ND	1.0	μg/L	1	3/28/2014		R1784
Isophorone	ND	10	μg/L	1	3/28/2014		R1784
Naphthalene	ND	10	μg/L	1	3/28/2014		R1784
Nitrobenzene	ND	10	μg/L	1	3/28/2014		R1784
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	3/28/2014		R1784
N-Nitrosodiphenylamine	ND	2.0	μg/L	1	3/28/2014		R1784
Pentachlorophenol	ND	10	μg/L	1	3/28/2014		R1784
Phenanthrene	ND	10	μg/L	1	3/28/2014		R1784
Phenol	ND	5.0	μg/L	1	3/28/2014		R1784
Pyrene	ND	10	μg/L	1	3/28/2014		R1784
o-Toluidine	ND	1.0	μg/L	1	3/28/2014		R1784
Pyridine	ND	1.0	μg/L	1	3/28/2014		R1784
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	3/28/2014		R1784
Surr: 2,4,6-Tribromophenol	90.5	10-123	%REC	1	3/28/2014		R1784
Surr: 2-Fluorobiphenyl	84.5	19-130	%REC	1	3/28/2014		R1784
Surr: 2-Fluorophenol	79.4	21-110	%REC	1	3/28/2014		R1784
Surr: Nitrobenzene-d5	84.7	25-130	%REC	1	3/28/2014		R1784
Surr: Phenol-d5	80.6	10-125	%REC	1	3/28/2014		R1784
Surr: Terphenyl-d14	101	33-141	%REC	1	3/28/2014		R1784
CORROSIVITY					ı	Analyst:	SUB
рН	7.45	0.100	pH Units	1	3/25/2014		R1784
IGNITABILITY METHOD 1010						Analyst:	SUB
lgnitabil <b>ity</b>	>200	0	°F	1	4/2/2014		R1784
CYANIDE, REACTIVE						Analyst:	SUB
Reactive Cyanide	ND	1.00	mg/Kg	1	4/2/2014		R1784
SULFIDE, REACTIVE						Analyst:	SUB
Reactive Sulfide	5.1	1.0	mg/Kg	1	3/25/2014		R1784
SM2510B: SPECIFIC CONDUCTANCE						Analyst:	JML
Conductivity	7000	0.010	µmhos/cm	1	3/20/2014 3:57	:42 PM	R17458

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 6 of 24
- P Sample pH greater than 2.
- RL Reporting Detection Limit

#### **Analytical Report**

#### Lab Order 1403871

Date Reported: 4/9/2014

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

WDW-1, 2 & 3 Qtrly Inj Well

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

C-11--43--- T

Collection Date: 3/20/2014 9:00:00 AM

Lab ID: 1403871-001

Project:

Matrix: AQUEOUS

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qual Units			DF	Date Analyzed	Batch
SM4500-H+B: PH						Analys	t: JML
рН	7.45	1.68	Η.	pH units	1	3/20/2014 3:57:42 PM	R17458
SM2320B: ALKALINITY						Analys	t: JML
Bicarbonate (As CaCO3)	270	20		mg/L. CaCO3	1	3/20/2014 3:57:42 PM	R17458
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	-1	3/20/2014 3:57:42 PM	R17458
Total Alkalinity (as CaCO3)	270	20		mg/L CaCO3	1	3/20/2014 3:57:42 PM	R17458
SPECIFIC GRAVITY						Analys	t: SRM
Specific Gravity	1.006	0			1	3/24/2014 11:49:00 AM	/ R17512
SM2540C MOD: TOTAL DISSOLVE	ED SOLIDS					Analys	t: KS
Total Dissolved Solids	6180	100	*	mg/L	1	3/25/2014 5:22:00 PM	12342

#### 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 7 of 24

- P Sample pH greater than 2.
- RL Reporting Detection Limit

#### **Analytical Report**

# Lab Order 1403871

Date Reported: 4/9/2014

#### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

WDW-1, 2 & 3 Qtrly Inj Well

Client Sample ID: Trip Blank

**Collection Date:** 

Lab ID: 1403871-002

Project:

Matrix: TRIP BLANK

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ana	ılyst: SUB
Acetonitrile	ND	10	μg/L.	1	3/26/2014	R1784
Allyl chloride	ND	0.50	μg/L	1	3/26/2014	R1784
Chloroprene	ND	0.50	μg/L	1	3/26/2014	R1784
Cyclohexane	ND	0.50	μg/L	1	3/26/2014	R1784
Diethyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Diisopropyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Epichlorohydrin	ND	5.0	μg/L	1	3/26/2014	R1784
Ethyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
Ethyl methacrylate	ND	0.50	μg/L	1	3/26/2014	R1784
Ethyl tert-butyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
Freon-113	ND	0.50	μg/L	1	3/26/2014	R1784
Isobutanol	ND	20	μg/L	1	3/26/2014	R1784
Isopropyl acetate	ND	0.50	μg/L.	1	3/26/2014	R1784
Methacrylonitrile	ND	0.50	μg/L.	1	3/26/2014	R1784
Methyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
Methyl ethyl ketone	ND	2.5	μg/L	1	3/26/2014	R1784
Methyl isobutyl ketone	ND	2.5	μg/L	1	3/26/2014	R1784
Methyl methacrylate	ND	0.50	μg/L	1	3/26/2014	R1784
Methylcyclohexane	ND	1.0	μg/L.	1	3/26/2014	R1784
n-Amyl acetate	ND	0.50	μg/L.	1	3/26/2014	R1784
n-Hexane	ND	0.50	μg/L	1	3/26/2014	R1784
Nitrobenzene	ND	5.0	μg/L.	1	3/26/2014	R1784
Pentachloroethane	ND	5.0	μg/L	1	3/26/2014	R1784
p-isopropyltoluene	ND	0.50	μg/L	1	3/26/2014	R1784
Propionitrile	ND	0.50	μg/L	1	3/26/2014	R1784
Tetrahydrofuran	ND	0.50	μg/L	1	3/26/2014	R1784
Benzene	ND	0.50	μg/L	1	3/26/2014	R1784
Toluene	ND	0.50	μg/L	1	3/26/2014	R1784
Ethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	3/26/2014	R1784
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	3/26/2014	R1784
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	3/26/2014	R1784
Naphthalene	ND	0.50	μg/L	1	3/26/2014	R1784
Acetone	ND	2.5	μg/L	1	3/26/2014	R1784
Bromobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
Bromodichloromethane	ND	0.50	μg/L	1	3/26/2014	R1784
Bromoform	ND	0.50	μg/L	1	3/26/2014	R1784

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
- $R \quad \ RPD \ outside \ accepted \ recovery \ limits$
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

Page 8 of 24

- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

CLIENT: Navajo Refining Company

Client Sample ID: Trip Blank

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

Collection Date:

Lab ID: 1403871-002

Matrix: TRIP BLANK

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ana	alyst: SUB
Bromomethane	ND	0.50	μg/L	1	3/26/2014	R17842
Carbon disulfide	ND	0.50	μg/L	1	3/26/2014	R17842
Carbon Tetrachloride	ND	0.50	μ <b>g/</b> L	1	3/26/2014	R17842
Chlorobenzene	ND	0.50	μg/Ĺ	1	3/26/2014	R17842
Chloroethane	ND	0.50	μg/l	1	3/26/2014	R17842
Chloroform	ND	0.50	μg/L	1	3/26/2014	R17842
Chloromethane	ND	0.50	μg/L	1	3/26/2014	R17842
2-Chlorotoluene	ND	0.50	μg/L	1,	3/26/2014	R17842
4-Chlorotoluene	ND	0.50	μg/L	1	3/26/2014	R17842
cis-1,2-DCE	ND	0.50	μg/L	1	3/26/2014	R17842
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	3/26/2014	R17842
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	3/26/2014	R17842
Dibromochloromethane	ND	0.50	μg/L	1	3/26/2014	R17842
Dibromomethane	ND	0.50	μg/L	1	3/26/2014	R17842
1,2-Dichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R17842
1,3-Dichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R17842
1,4-Dichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R17842
Dichlorodifluoromethane	ND	0.50	μg/L	1	3/26/2014	R17842
1,1-Dichloroethane	ND	0.50	μg/L	1	3/26/2014	R17842
1,1-Dichloroethene	ND	0.50	μg/L	1	3/26/2014	R17842
1,2-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R17842
1,3-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R17842
2,2-Dichloropropane	ND	0.50	μg/L	1	3/26/2014	R17842
1,1-Dichloropropene	ND	0.50	μg/L	1	3/26/2014	R17842
Hexachiorobutadiene	ND	0.50	μg/L.	1	3/26/2014	R17842
2-Hexanone	ND	0.50	μg/L	1	3/26/2014	R17842
Isopropylbenzene	ND	0.50	μg/L	1	3/26/2014	R17842
4-Isopropyltoluene	ND	0.50	μg/L	1	3/26/2014	R17842
Methylene Chloride	ND	2.5	μg/L	1	3/26/2014	R17842
n-Butylbenzene	ND	0.50	μg/L	1	3/26/2014	R17842
n-Propylbenzene	ND	0.50	μg/L	1	3/26/2014	R17842
sec-Butylbenzene	ND	0.50	μg/L	1	3/26/2014	R17842
Styrene	ND	0.50	μg/L	1	3/26/2014	R17842
tert-Butylbenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	3/26/2014	R17842
1,1,2,2-Tetrachloroethane	· ND	0.50	μg/L	1	3/26/2014	R17842
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	3/26/2014	R17842
trans-1,2-DCE	ND	0.50	μg/L	1	3/26/2014	R17842
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	3/26/2014	R17842

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

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- ND Not Detected at the Reporting Limit
  - Sample pH greater than 2.
- RL Reporting Detection Limit

P

#### Analytical Report Lab Order 1403871

# Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/9/2014

CLIENT: Navajo Refining Company

Client Sample ID: Trip Blank

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

**Collection Date:** 

Lab ID: 14038

1403871-002 Matrix: TRIP BLANK

Received Date: 3/20/2014 1:50:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES				•	А	nalyst: SUB
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,1-Trichloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
1,1,2-Trichloroethane	ND	0.50	μg/L	1	3/26/2014	R1784
Trichloroethene (TCE)	ND	0.50	μg/L	1	3/26/2014	R1784
Trichlorofluoromethane	ND	0.50	μg/L	1	3/26/2014	R1784
1,2,3-Trichloropropane	ND	0.50	μg/L	1	3/26/2014	R1784:
Vinyl chloride	ND	0.50	μg/L	1	3/26/2014	R1784
mp-Xylenes	ND	1.0	μg/L	1	3/26/2014	R1784
o-Xylene	ND	0.50	μg/L	1	3/26/2014	R1784
tert-Amyl methyl ether	ND	0.50	μg/L	1	3/26/2014	R1784
tert-Butyl alcohol	ND	20	μg/L	1	3/26/2014	R1784
Acrolein	ND	10	μg/L	1	3/26/2014	R1784
Acrylonitrile	ND	10	μg/L	1	3/26/2014	R1784
Bromochloromethane	ND	0.50	μg/L	1	3/26/2014	R1784
2-Chloroethyl vinyl ether	ND	1.0	μg/L	1	3/26/2014	R1784
lodomethane	ND	0.50	μg/L	1	3/26/2014	R1784
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	3/26/2014	R1784
Vinyl acetate	ND	0.50	μg/L	1	3/26/2014	R1784
1,4-Dioxane	ND	20	μg/L	1	3/26/2014	R1784
Surr: 1,2-Dichloroethane-d4	111	70-130	%REC	1	3/26/2014	R1784
Surr: 4-Bromofluorobenzene	103	70-130	%REC	1	3/26/2014	R1784
Surr; Toluene-d8	100	70-130	%REC	1	3/26/2014	R1784

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 proparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - Page 10 of 24
- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB Client ID: PBW		ype: Mie i ID: R1	MBLK         TestCode: EPA Method 3           R17472         RunNo: 17472			300.0: Anions	\$			
Prep Date:	Analysis D	ate: 3/	20/2014	8	SeqNo: 5	03279	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	Samp1	ype: LC	s	Tes	tCode: El	3					
Client ID: LCSW	Batcl	n ID: R1	7472	F	RunNo: 1	7472					
Prep Date:	Analysis D	Date: 3/	20/2014	8	SeqNo: 5	03281	281 Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Fluoride	0.51	0.10	0.5000	0	102	90	110		·		
Chloride	4.8	0.50	5.000	0	95.7	90	110				
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.3	90	110		ť,		
Bromide	2.5	0.10	2.500	0	99.2	90	110				
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110				
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.9	90	110				
Sulfate	9.7	0.50	10.00	0	96.7	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-R17842	SampT	ype: MBLK	Tes	tCode: EP	A Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	n ID: <b>R17842</b>	F	RunNo: <b>17</b>	842				
Prep Date:	Analysis D	ate: 3/26/2014	8	SeqNo: <b>51</b>	4551	Units: µg/L			
Analyte	Result	PQL SPK valu	e 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							
Taluene	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				1			
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:

- \* 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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-R17842	SampType: MBLK			Tes	tCode: El	PA Method	8260B: VOL	ATILES		·
Client ID: PBW	Batcl	i ID: <b>R1</b>	7842	٠F	RunNo: 1	7842				
Prep Date:	Analysis E	ate: 3/	26/2014	9	SeqNo: 5	14551	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								
Tetrachioroethene (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-R17842	Samp1	ype: LC	s	Tes	tCode: El	ATILES				
Client ID: LCSW	Batcl	n ID: <b>R1</b>	7842	. F	RunNo: 1	7842				
Prep Date:	Analysis [	Analysis Date: 3/26/2014			SeqNo: 514552 Units:					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	4.9	0.50	5.000	. 0	97.2	80	120			
Toluene	4.9	0.50	5.000	0	98.2	80	120			
Ethylbenzene	5.0	0.50	5.000	0	99.0	80	120			
Chlorobenzene	4.9	0.50	5.000	0	98.2	80	120			
1,1-Dichloroethene	4.5	0.50	5.000	0	89.4	80	120			
Tetrachloroethene (PCE)	4.4	0.50	5.000	0	87.8	80	120			
Trichloroethene (TCE)	4.6	0.50	5.000	0	93.0	80	120			
o-Xylene	5.2	0.50	5.000	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project: W

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-R17842	SampT	ype: ME	BLK	TestCode: EPA 8270C: Semivolatiles/Mod						
Client ID: PBW	Batch	ID: R1	7842	F	RunNo: 17	7842	•			
Prep Date:	Analysis D	ate: 3/	28/2014	5	SeqNo: 5'	15354	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1-Methylnaphthalene	ND	0.50						-		
2,3,4,6-Tetrachlorophenol	ND	0.50								
2,4,5-Trichlorophenol	ND	0.50								
2,4,6-Trichlorophenol	ND	0.50	,							
2,4-Dichlorophenol	ND	0.50								
2,4-Dimethylphenol	ND	0.50								
2,4-Dinitrophenol	ND	0.50								
2,4-Dinitrotoluene	ND	0.50								
2,6-Dinitrotoluene	ND	0.50								
2-Chloronaphthalene	ND	0.50								
2-Chlorophenol	ND	0.50								
2-Methylnaphthalene	ND	0.50								
2-Methylphenol	ND	0.50								
2-Nitroaniline	ND	0.50								
2-Nitrophenol	ND	0.50					*			
3,3'-Dichlorobenzidine	ND	0.50								
3-Nitroaniline	ND	0.50								
4,6-Dinitro-2-methylphenol	, ND	0.50								
4-Bromophenyl phenyl ether	ND	0.50								
4-Chloro-3-methylphenol	ND	0.50								
4-Chloroaniline	ND	0.50								
4-Chlorophenyl phenyl ether	ND	0.50								
4-Nitroaniline	ND	0.50								
4-Nitrophenol	ND	0.50								
Acenaphthene	ND	0.50								
Acenaphthylene	ND	0.50								
Anthracene	ND	0.50								
Benzo(g,h,i)perylene	ND	0,50								
Benz(a)anthracene	ND	0.50								
Benzo(a)pyrene	ND	0.50								
Benzo(b)fluoranthene	ND	0.50								
Benzo(k)fluoranthene	ND	0.50								
Bis(2-chloroethoxy)methane	ND	0.50								
Bis(2-chloroethyl)ether	ND	0.50								
Bis(2-chloroisopropyl)ether	ND	0.50							•	
Bis(2-ethylhexyl)phthalate	ND	0.50								
Butyl benzyl phthalate	ND	0.50								
Carbazole	ND	0.50								
Chrysene	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-R17842	SampT	уре: МЕ	BLK	Tes	tCode: E	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	1D: <b>R1</b>	7842	F	RunNo: 1	7842				
Prep Date:	Analysis E	ate: 3/	28/2014	8	SeqNo: 5	15354	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	ND	0.50								
Dibenzofuran	ND	0.50								
Diethyl phthalate	ND	0.50								
Dimethyl phthalate	ND	0.50								
Di-n-butyl phthalate	ND	0.50								
Di-n-octyl phthalate	ND	0.50								
Fluoranthene	ND	0.50								
Fluorene	ND	0.50								
Hexachlorobenzene	ND	0.50								
Hexachlorobutadiene	ND	0.50								
Hexachlorocyclopentadiene	ND	0.50								
Hexachloroethane	ND	0.50								
Isophorone	ND	0.50								
Naphthalene	ND	0.50								
Nitrobenzene	ND	0.50								
N-Nitrosodi-n-propylamine	ND	0.50								
N-Nitrosodiphenylamine	ND	0.50								
Pentachlorophenol	ND	0.50								
Phenanthrene	ND	0.50								
Phenol	ND	0.50								
Pyrene	ND	0.50								

Sample ID LCS-R17842	SampT	ype: <b>LC</b>	S	Tes						
Client ID: LCSW	Batch	1D: <b>R1</b>	7842	F	RunNo: 1	7842				
Prep Date:	Analysis D	ate: 3/	28/2014	8	SeqNo: 5	15355	Units: μg/L			
Analyte	Result	PQL.	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	6.6	1.0	5.000	0	131	42	143			
2-Chlorophenol	5.8	1.0	5.000	0	116	50	131			
4-Chloro-3-methylphenol	5.5	1.0	5.000	0	110	42	139			
4-Nitrophenol	4.7	1.0	5.000	0	94.6	19	137			
Acenaphthene	5.9	1.0	5.000	0	118	45	129			
Bis(2-ethylhexyl)phthalate	6.6	1.0	5.000	0	131	43	142			
N-Nitrosodi-n-propylamine	6.0	1.0	5.000	0	120	. 46	135			
Pentachlorophenol	5.2	1.0	5.000	0	104	22	138			
Phenol	5.3	1.0	5.000	0	106	45	134			
Pyrene	6.3	1.0	5.000	0	126	45	139			

#### 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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-12328

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: PBW

Batch ID: 12328

RunNo: 17527

Prep Date: 3/24/2014

Analysis Date: 3/24/2014

Units: mg/L SeqNo: 505323

Analyte Mercury

Result

SPK value SPK Ref Val %REC LowLimit

**H**ighLimit

PQL ND 0.00020

Sample ID LCS-12328

SampType: LCS

TestCode: EPA Method 7470: Mercury

LowLimit

80

Client ID: LCSW

Batch ID: 12328

RunNo: 17527

Prep Date: 3/24/2014 Analysis Date: 3/24/2014

SeqNo: 505324

Units: mg/L HighLimit

**RPDLimit** %RPD

**RPDLimit** 

Analyte

0

100

PQL

%REC

120

Mercury

SPK value SPK Ref Val 0.0050 0.00020 0.005000

%RPD

Qual

Qual

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits J

0 RSD is greater than RSDImit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits S

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

P Sample pH greater than 2.

Reporting Detection Limit

Page 16 of 24

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-12307

SampType: MBLK

TestCode: MERCURY, TCLP

PBW Client ID:

3/21/2014

Batch ID: 12307

PQL.

RunNo: 17489

Analysis Date: 3/21/2014

Units: mg/L

Analyte

Prep Date:

Result

SeqNo: 503698

HighLimit

**RPDLimit** 

Qual

Mercury

ND 0.020

Sample ID LCS-12307

SampType: LCS

TestCode: MERCURY, TCLP

Client ID: LCSW Prep Date: 3/21/2014 Batch ID: 12307

RunNo: 17489

HighLimit

Analysis Date: 3/21/2014

SeqNo: 503699

Units: mg/L

%RPD

Analyte

Result SPK value SPK Ref Val %REC LowLimit

80

120

%RPD **RPDLimit** 

Qual

Mercury

ND 0.020 0.005000

0

SPK value SPK Ref Val %REC LowLimit

101

Qualifiers:

Value exceeds Maximum Contaminant Level.

Е Value above quantitation range

J Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

 $\mathbf{H}$ Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Page 17 of 24

P Sample pH greater than 2.

RLReporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-12293		SampType: MBLK			TestCode: EPA Method 6010B: TCLP RunNo: 17477					
Client ID: PBW	Batch	Batch ID: 12293			RunNo: 1	7477				
Prep Date: 3/20/2014	Analysis D	Analysis Date: 3/21/2014			SeqNo: 5	03513	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID LCS-12293	SampT	ype: LC	s	Tes	tCode: El					
Client ID: LCSW	Batch	1D: <b>12</b> :	293	R	tunNo: 1	7477				
Prep Date: 3/20/2014	Analysis D	ate: 3/	21/2014	8	SeqNo: 5	03514	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			
Barium	ND	100	0.5000	0	102	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	100	80	120			
Selenium	ND	1.0	0.5000	0	101	80	120			
Silver	ND	5.0	0.1000	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 greater than 2.
- RL Reporting Detection Limit

Page 18 of 24

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-12293 TestCode: EPA 6010B: Total Metals SampType: MBLK Client ID: PBW Batch ID: 12293 RunNo: 17477 Prep Date: 3/20/2014 Analysis Date: 3/21/2014 SeqNo: 503563 Units: mg/L SPK value SPK Ref Val %REC HighL.imit %RPD **RPDLimit** Qual Result **PQL** LowLimit Analyte ND 0.020 Aluminum 0.050 ND Antimony 0.020 Arsenic ND ND 0.020 Barium ND 0.0030 Beryllium ND 0.0020 Cadmium Calcium ND 1.0 0.0060 ND Chromium ND 0.0060 Cobalt ND 0.0060 Copper ND 0.050 Iron Lead ND 0.0050 Magnesium ND 1.0 Manganese ND 0.0020 Nickel ND 0.010 Potassium ND 1.0 ND 0.050 Selenium Silver ND 0.0050 Thallium ND 0.050 ND 0.050 Vanadium Zinc ND 0.020

Sample ID LCS-12293	Samp	Type: LC	s	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	h ID: 12	293	F	RunNo: 1	7477				
Prep Date: 3/20/2014	Analysis	Date: 3/	21/2014	8	SeqNo: 5	03564	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.55	0.020	0.5000	0	111	80	120			
Antimony	0.50	0.050	0.5000	. 0	99.3	80	120			
Arsenic	0.52	0.020	0.5000	0	104	80	120			
Barium	0.51	0.020	0.5000	0	102	80	120			
Beryllium	0.54	0.0030	0.5000	0	107	80	120			
Cadmium	0.51	0.0020	0.5000	σ	102	80	120			
Calcium	53	1.0	50.00	0	106	80	120			
Chromium	0.51	0.0060	0.5000	0	102	80	120			
Cobalt	0.50	0.0060	0.5000	0	100	80	120			
Copper	0.52	0.0060	0.5000	0	104	80	120			
Iron	0.52	0.050	0.5000	0	103	80	120			
Lead	0.50	0.0050	0.5000	0	100	. 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 greater than 2.
- RL Reporting Detection Limit

Page 19 of 24

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

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

Sample ID LCS-12293	Samp	Type: LC	S	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	h ID: 12	293	F	RunNo: 1	7477				
Prep Date: 3/20/2014	Analysis	Analysis Date: 3/21/2014			SeqNo: 5	03564	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	52	1.0	50.00	0	104	80	120		-	
Manganese	0.51	0.0020	0.5000	0	103	80	120			
Nickel	0.50	0.010	0.5000	0	99.5	80	120			
Potassium	50	1.0	50.00	0	101	80	120			
Selenium	0.50	0.050	0.5000	0	101	80	120			
Silver	0.11	0.0050	0.1000	0	105	80	120			
Thallium	0.51	0.050	0.5000	0	102	80	120			
Vanadium	0.53	0.050	0.5000	0	105	80	120			
Zinc	0.51	0.020	0.5000	0	102	80	120			

#### Qualifiers:

- \* Value exceeds Maximum Contaminant Level.
- 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 greater than 2.

RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID LCS-R17842

PBS

SampType: LCS

TestCode: CYANIDE, Reactive

Client ID: . LCSS

Batch ID: R17842

RunNo: 17842

Prep Date:

Analysis Date: 4/2/2014

SeqNo: 515168

Units: mg/Kg

120

Analyte

Result

SPK value SPK Ref Val 0.5000

%REC

HighLimit

**RPDLimit** 

Reactive Cyanide

0.533

SPK value SPK Ref Val %REC LowLimit

107

SegNo: 515169

80

LowLimit 1

%RPD

PQL 0.100

Client ID:

Sample ID MB-R17842

SampType: MBLK Batch ID: R17842

Analysis Date: 4/2/2014

TestCode: CYANIDE, Reactive RunNo: 17842

HighLimit

Units: mg/Kg

%RPD

**RPDLimit** 

Qual

Prep Date: Analyte

Result

**PQL** 

Reactive Cyanide

ND 1.00

Qualifiers:

\* Value exceeds Maximum Contaminant Level.

 $\mathbf{E}$ Value above quantitation range

J Analyte detected below quantitation limits

RSD is greater than RSDIimit 0

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

И Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

RLReporting Detection Limit Page 21 of 24

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-R17842

SampType: MBLK

TestCode: SULFIDE, Reactive

Client ID:

PBS

Batch ID: R17842

1.0

RunNo: 17842

Prep Date:

Analysis Date: 3/25/2014

Units: mg/Kg

Analyte

Result

SeqNo: 515170

SPK value SPK Ref Val %REC LowLimit

0

HighLimit

**PQL** Reactive Sulfide ND

Sample ID LCS-R17842

SampType: LCS

TestCode: SULFIDE, Reactive

Client ID: LCSS

Batch ID: R17842

RunNo: 17842

Prep Date:

Units: mg/Kg

Analysis Date: 3/25/2014

SeqNo: 515171

Analyte

**PQL** 

SPK value SPK Ref Val %REC LowLimit

80.0

HighLimit

%RPD **RPDLimit** 

**RPDLimit** 

Qual

Reactive Sulfide

0.10

120

Result 0.16

0.2000

%RPD

Qual

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range Е

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

Analyte detected in the associated Method Blank В

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH greater than 2.

RLReporting Detection Limit Page 22 of 24

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID mb-1

SampType: mblk

TestCode: SM2320B: Alkalinity

Client ID:

PBW

Batch ID: R17458

PQL

RunNo: 17458

Prep Date:

Analysis Date: 3/20/2014

SeqNo: 502901

Units: mg/L CaCO3

Analyte

Result

SPK value SPK Ref Val %REC LowLimit

HighLimit

**RPDLimit** 

Qual

Total Alkalinity (as CaCO3)

ND

20

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID: LCSW

RunNo: 17458

Batch ID: R17458

20

Units: mg/L CaCO3

Prep Date:

Analysis Date: 3/20/2014

SeqNo: 502902

Analyte

**PQL** 

SampType: Ics

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

%RPD

**RPDLimit** 

Qual

Total Alkalinity (as CaCO3)

81

80.00

0

101

110

**Oualifiers:** 

Value exceeds Maximum Contaminant Level.

Ę Value above quantitation range

Analyte detected below quantitation limits J

 $\mathbf{o}$ RSD is greater than RSDlimit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits В Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Page 23 of 24

P Sample pH greater than 2.

RLReporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1403871

09-Apr-14

Client:

Navajo Refining Company

Project:

WDW-1, 2 & 3 Qtrly Inj Well

Sample ID MB-12342

PBW

3/24/2014

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Batch ID: 12342

RunNo: 17558

Client ID: Prep Date:

Units: mg/L

Analysis Date: 3/25/2014

SeqNo: 505731

Analyte

Result **PQL** 

SPK value SPK Ref Val %REC LowLimit

HighLimit

**RPDLimit** 

Qual

Total Dissolved Solids

ND

SampType: LCS

20.0

RunNo: 17558

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW

Sample ID LCS-12342

Batch ID: 12342

Units: mg/L

Prep Date: 3/24/2014

Analyte

Analysis Date: 3/25/2014

SeqNo: 505732

LowLimit

**RPDLimit** 

Qual

SPK value SPK Ref Val %REC 1000

0

103

HighLimit

%RPD

%RPD

Total Dissolved Solids

Result 1030

20.0

120

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- В 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 greater than 2.
- RLReporting Detection Limit

Page 24 of 24



szan zarri omnemus zaniysis zanorunoy 4901 Hawkins NE Albuquerque, NM 87105

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

### Sample Log-In Check List

Client Name: NAVAJO REFINING COM Work Order Number: 1403871 RcptNo: 1 Received by/date: Logged By: Michelle García 3/20/2014 1:50:00 PM Completed By: Michelle Barcia 3/20/2014 2:03:05 PM Reviewed By: Chain of Custody Not Present Yes 🗌 No 🗌 1. Custody seals intact on sample bottles? Yes 🗹 No 🗌 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In NA 🗌 No 🗆 4. Was an attempt made to cool the samples? Yes 🔽 No  $\square$ NA 🗌 5. Were all samples received at a temperature of >0° C to 6.0°C Yes 🗸 No 🗔 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 NA 🗌 9. Was preservative added to bottles? Yes 🗌 No 🗹 No VOA Vials Yes V No 🗔 10.VOA vials have zero headspace? Yes No 🗹 11. Were any sample containers received broken? # of preserved bottles checked No 🗌 for pH: 12. Does paperwork match bottle labels? Yes 🔽 unless noted) (Note discrepancies on chain of custody) Adjusted<sup>a</sup> No 🗌 Yes 🗹 13. Are matrices correctly identified on Chain of Custody? No 🗌 Yes 🗸 14. Is it clear what analyses were requested? Checked by: No 🗌 15. Were all holding times able to be met? Yes **V** (If no, notify customer for authorization.) Special Handling (if applicable) NA 🔽 16. Was client notified of all discrepancies with this order? Yes 🗌 No 🗌 Person Notified: Date: By Whom: ☐ eMail ☐ Phone ☐ Fax ☐ In Person Via: Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp C Condition | Seal Intact | Seal No Seal Date | Signed By 2.3 Good

### ANALYSIS LABORATORY HALL ENVIRONMENTAL 4901 Hawkins NE - Albuquerque, NM 87109 Remarks: Report these results separately from all other www.hallenvironmental.com Fax 505-345-4107 Analysis Request 1151 borteM 848-W8 \181 TCLP Metals, only 140 CFR Part Ca, K, Mg, Na/40 CFR 136.3 × 7470 (see attached list 'Metals') Chain of Custody kits provided. Tel. 505-345-3975 .0109 britM 848-W2\alkaleieM 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, 1001 K 001 20 00 8 WDW-1, 2, & 3 Otrly Inj Well Project #. Preservative □ Rush Neat/H2SO4 Sampler, Jerry Sosa HN03 Neat Neat Neat Neat 건 Project Manager Project Name: □ Standar Mike Holder Container Type and # Received by d beviews က ო Ø $\sim$ S Sample Request ID ☐ Level 4 (Full Validation) WDW-1, 2, & 3 Effluent WDW-1, 2, & 3 Effluent WDW-1, 2, & 3 Effluent WDW-1, 2, & 3 Effuent WDW-1, 2, & 3 Effluent Temperature Blank Relinguished by: Jerry Sosa Trip Blank Mailing Address: P.O. Box 159 Artesia, email or Fax#: 575-746-5451 Matrix Liquid Liquid Liquid Liquid Liquid Liquid Liquid Client: Navajo Refining Co. Phone #: 575-748-3311 Time NM 88211-0159 9:00 9:00 9.00 9:00 9:00 9:00 9:00 Time: 10:00 QA/QC Package: П ЕОО (Туре) □ Standard □ Other 3/20/14 3/20/14 3/20/14 Date 3/20/14 3/20/14 3/20/14 3/20/14 Date: 3/20/14 Date:

If necessary, samples submitted to Hall Environmental may be subcombacted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report

### Strange, Aaron

From:

Strange, Aaron

Sent:

Thursday, May 22, 2014 11:21 AM

To: Subject: Schultz, Michele Injection Wells

Micki,

The temperature was 90.3F and the pH was 7.71 for the Injection well samples on 3-20-14.

Thank you, Aaron

Aaron Strange Environmental Specialist Environmental Department Navajo Refining Co, LLC Artesia NM

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

### Navajo Refining Company, L.L.C.

# 2014 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

							Average	Maximum	Minimum					TOTAL
	Average	Maximum	Minimum	Average	Maximum	Minimum	Annular	Annular	Annular	Average	Maximum	Minimum		CUMULATIVE
	Pressure	Pressure	Pressure	Flow	Flow	Flow	Pressure	Pressure	Pressure	Volume	Volume	Volume	Volume	Volume
	(bsig)	(bsig)	(bsig)	(apm)	(apm)	(gpm)	(bsig)	(bsig)	(bsig)	(pdq)	(pdq)	(pdq)	(barrels)	(barrels)
WDW-1												Previ	Previous Quarter	34,369,800
Jan-14	1,161	1,197	1,093	142	152	122	272	422	182	4,869	5,211	4,183	151,696	34,521,496
Feb-14	1,200	1,225	1,131	147	154	135	443	610	211	5,040	5,280	4,629	141,482	34,662,978
Mar-14	1,206	1,247	1,077	142	150	129	576	843	218	4,869	5,143	4,423	151,394	34,814,372
WDW-2												Previ	Previous Quarter	21,592,917
Jan-14	1,166	1,208	1,105	152	161	141	394	989	105	5,211	5,520	4,834	162,143	21,755,060
Feb-14	1,202	1,225	1,134	152	160	128	385	599	132	5,211	5,486	4,389	145,969	21,901,029
Mar-14	1,205	1,248	1,081	144	157	125	539	824	219	4,937	5,383	4,286	153,497	22,054,526
WDW-3	_											Previ	Previous Quarter	11,583,990
Jan-14	1,120	1,193	938	106	130	23	499	989	306	3,634	4,457	789	112,425	11,696,415
Feb-14	1,199	1,225	1,143	128	138	66	737	920	444	4,389	4,731	3,394	122,680	11,819,095
Mar-14	1,183	1,248	983	122	145	40	622	983	231	4,183	4,971	1,371	130,039	11,949,135
												Total Inje	Total Injected fluids:	68,818,033

## 2014 FIRST QUARTER WEEKLY WAMS LEVEL TABLE

	1/6/14	1/6/14   1/15/14   1/20/14   1/30/14	1/20/14	1/30/14	2/3/14	2/3/14   2/10/14   2/17/14   2/24/14	2/17/14	2/24/14	3/3/14	3/12/14	3/12/14   3/17/14   3/27/14   3/31/14	3/27/14	3/31/14	
												-		
WDW -11	145	145	160	155	155	150	150	150	150	150	150	150	150	
WDW-21	145	145	145	145	145	145	145	145	145	145	145	145	145	
WDW-31	100	100	155	150	150	150	150	150	150	150	150	150	150	
Comments:	1/20/14 2 (	drums glyco	added to V	Comments: 1/20/14 2 drums glycol added to WDW-1 and 1/21/14 1 drum glycol added to WDW-3 after surface tubing leaks repaired	1/21/14 1 d	rum glycol a	dded to WI	DW-3 after s	urface tubii	ng leaks rep	vaired			

<sup>1</sup> Graduated tank gauged weekly in the field. Reading is in gallons.

5/7/201410:50 AM



July 30, 2014

Mr. Carl Chavez, CHMM
NM Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, NM 87505-5472

Certified Mail/Return Receipt 7007 3020 0000 3028 8413

RE: 2014 2nd Quarter Injection Report for Wells WDW-1, WDW-2 and WDW-3, Navajo Refining Company, L.L.C.

Dear Mr. Chavez,

Enclosed, please find the second quarter 2014 sampling results for fluids injected into WDW-1, WDW-2 and WDW-3 and a spread sheet showing various volumes and pressures as required under Permit Condition 2.I.1, Quarterly Reports.

Over the second quarter, the average injection pressure for all three wells was 1180 psig and the average flows were 134 gpm for WDW-1, 132 gpm for WDW-2 and 111 gpm for WDW-3. There were no significant losses from the glycol expansion tanks Well Annulus Monitoring System (WAMS) although minor above ground tubing leaks at two of the wells were identified and repaired. The quarterly effluent analyses indicated parameters are within limits.

This report covers the period from April 1, 2014 to June 30, 2014. We have disposed a total of 1,179,825 barrels of fluid into the three wells during the second quarter of 2014. The volume per well is:

421,136 barrels into WDW-1

412,743 barrels into WDW-2

345,946 barrels into WDW-3

This report is signed and certified in accordance with WQCC section 5101.G. If there are any questions, please call me at 575-748-3311.

Respectfully,

Michael McKee

Vice-President & Refinery Manager Navajo Refining Company, L.L.C.

hishel Dh. Ky

Enc.

Electronic cc (w/enc.): Environmental File: D Crawford, R Combs, M Schultz, A Strange

Injection Wells/Reports C-115 & Quarterly/2014/2nd quarter/2014-07-31 2nd QTR Inj Rpt for Wells WDW-1,2,3

Navajo Refining Company, L.L.C. 501 East Main • Artesia, NM 88210 (575) 748-3311 • http://www.hollyfrontier.com

# 2014 SECOND QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

							Average	Maximum	Minimum					TOTAL
	Average	Maximum	Minimum	Average	Maximum	Minimum	Annular	Annular	Annular	Average	Maximum	Minimum		CUMULATIVE
	Pressure	Pressure	Pressure	Flow	Flow	Flow	Pressure	Pressure	Pressure	Volume	Volume	Volume	Volume	Volume
	(bsig)	(bsig)	(bsid)	(mdg)	(gpm)	(mdg)	Av (psig)	Mx (psig)	Mn (psig)	(pdq)	(pdq)	(pdq)	(barrels)	(barrels)
WDW-1												Previ	Previous Quarter	34,814,372
Apr-14	1,198	1,226	1,138	136	140	129	335	483	202	4,663	4,800	4,423	140,351	34,954,723
May-14	1,173	1,250	947	133	147	115	508	874	189	4,560	5,040	3,943	141,827	35,096,550
Jun-14	1,194	1,261	972	135	144	121	746	993	232	4,629	4,937	4,149	138,958	35,235,507
WDW-2												Previ	Previous Quarter	22,054,526
Apr-14	1,192	1,226	1,109	211	347	109	477	630	241	7,234	11,897	3,737	216,878	22,271,404
May-14	1,163	1,248	826	86	121	34	662	1,251	198	3,360	4,149	1,166	103,840	22,375,244
Jun-14	1,206	1,265	1,155	88	116	32	537	1,018	146	3,051	3,977	1,097	92,025	22,467,269
WDW-3												Previ	Previous Quarter	11,949,135
Apr-14	1,176	1,225	1,100	119	133	96	462	869	268	4,080	4,560	3,291	122,621	12,071,756
May-14	1,139	1,250	961	100	140	11	519	666	226	3,429	4,800	377	106,412	12,178,167
Jun-14	1,184	1,248	686	114	133	27	572	876	267	3,909	4,560	926	116,913	12,295,081
												Total Inje	Total Injected fluids:	69,997,857

## 2014 SECOND QUARTER WEEKLY WAMS LEVEL TABLE

	4/7/14		4/14/14   4/22/14   4/28/14	4/28/14	5/5/14	5/16/14	5/5/14   5/16/14   5/23/14   5/29/14   6/2/14   6/9/14   6/17/14   6/25/14	5/29/14	6/2/14	6/9/14	6/17/14	6/25/14	_
							27						
WDW -11	145	145	145	145	145	140	140	135	130	125	100	100	
WDW-21	150	150	150	150	150	145	145	145	145	145	145	130	
				243									
WDW-31	145	145	145	145	145	145	145	145	145	145	145	145	
Comments:	6/9/14 sm	all tubing le	ak at WDW-	1 reported ar	nd repaire	d. 6/17/14	Comments: 6/9/14 small tubing leak at WDW-1 reported and repaired. 6/17/14 a second tubing leak at WDW-1 was	ing leak at M	/DW-1 was				
	report	ed and repa	ired, 6/25/14	reported and repaired, 6/25/14 small tubing leak at WDW-2 reported and repaired	q leak at	WDW-2 re	ported and re	paired.					

1 Graduated tank gauged weekly in the field. Reading is in gallons.

WDW-1 is Mewbourne WDW-2 is Chukka WDW-3 is Gaines



### Injection Well



Navajo Refining Company, LLC  Quarterly Sample Artesia, NM 88210  Details  HOLLYFRONTIER  The HollyFrontier Companies	Sample Type  Grab ☑  Time Weighted Composite □  Flow Weighted Composite □  Parts / Sample Intervals One	effluent pumps to injection wells. ☐ P-849 sample point (first from east) ☐ P-854 sample point (second from east)
Navajo Refining Co 501 E. Main Na Va Jo. (Tel) 575.748.3311 (Fax) 575.746.5451	Project Name WDW-1,2, & 3 Ortly Inj Well Samplers Name Aaron Strange Samplers Affiliation Navajo Refining Co. LLC Start Date and Time 6/19/2014 @ 09:35 End Date and Time 6/19/2014 @ 09:35	Outfall / Sample Location: Waste water effluent pumps to

					100		Preservatives	, say			
tainer Size	Material	# of Gontainers	Neat (None)	HCL	HNO3	HNO3 H2SO4	NaOH	NaOH Na2S203 NaHSO4	NaHSO4	Other	Analysis and/or Method Requested
		ю	×			×					Specific Gravity, HCO3, CO3, CI, SO4, TDS, pH, cond., FI, Cation/anion bal., Br, Eh/40 CFR 136.3
2		-			×						VOCs/SW-846 Method 8260C (see attached list "VOCs")
		8		×							SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')
		2	×								R,C,I/40 CFR part 261
5		2	×								Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')
6		2	×							1000	Ca, K, Mg, Na/40 CFR 136.3
		-	×								TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
8											
9											
10											

Storage Method	Other	Shipping Media	ice <a> Other</a>
6/19/2014 09:35 Tmp. 77.0, Humidity 61%, Wind Dir. N, Wind Speed 10.4 mph, Conditions Clear			
Observations, Etc):	Field pH 7.37		
Field Data (Weather, Obs Date and Time:	Field Temp. 116.6°F		



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

July 17, 2014

Dan Crawford Navajo Refining Company P.O. Box 159 Artesia, NM 88211-0159 TEL: (575) 748-3311

FAX

RE: WDW-1, 2, & 3 Qtrly Inj Well

OrderNo.: 1406935

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 6/19/2014 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 <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> 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

Only

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#:

1406935

Date:

7/17/2014

CLIENT:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be  $\sim$ 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

### Hall Environmental Analysis Laboratory, Inc.

Date Reported: 7/17/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 6/19/2014 9:30:00 AM

Lab ID: 1406935-001

Matrix: AQUEOUS

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst:	JRR
Fluoride	28	2.0	* mg/L	20	6/19/2014 5:43:17 PM	R19410
Chloride	290	10	mg/L	20	6/19/2014 5:43:17 PM	R19410
Nitrogen, Nitrite (As N)	1.5	0.50	mg/L	5	6/19/2014 5:30:53 PM	R19410
Bromide	0.72	0.50	mg/L	5	6/19/2014 5:30:53 PM	R19410
Nitrogen, Nitrate (As N)	ND	0.50	mg/L	5	6/19/2014 5:30:53 PM	R19410
Phosphorus, Orthophosphate (As P)	ND	2.5	mg/L	5	6/19/2014 5:30:53 PM	R19410
Sulfate	2600	50	mg/L	100	7/7/2014 4:18:15 PM	R1972
EPA METHOD 7470: MERCURY					Analyst	MMD
Mercury	ND	0.00020	mg/L	1	6/26/2014 9:07:50 AM	13883
MERCURY, TCLP					Analyst	MMD
Mercury	ND	0.020	mg/L	. 1	7/8/2014 12:50:03 PM	14082
EPA METHOD 6010B: TCLP METALS					Analyst	ELS
Arsenic	ND	5.0	mg/L	1	7/8/2014 12:02:28 PM	14080
Barium	ND	100	mg/L	1	7/8/2014 12:02:28 PM	14080
Cadmium	ND	1.0	mg/L	1	7/8/2014 12:02:28 PM	14080
Chromium	ND	5.0	mg/L	1	7/8/2014 12:02:28 PM	14080
Lead	ND	5.0	mg/L	1	7/8/2014 12:02:28 PM	14080
Selenium	ND	1.0	mg/L	1	7/8/2014 12:02:28 PM	14080
Silver	ND	5.0	mg/L	1	7/8/2014 12:02:28 PM	14080
EPA 6010B: TOTAL METALS					Analyst	ELS
Aluminum	1.2	0.020	mg/L	1	7/11/2014 10:29:51 AM	14172
Antimony	ND	0.050	mg/L	1	7/7/2014 12:25:17 PM	14075
Arsenic	0.027	0.020	mg/L	1	7/7/2014 12:25:17 PM	14075
Barium	ND	0.020	mg/L	1	7/7/2014 12:25:17 PM	14075
Beryllium	ND	0.0030	mg/L	1	7/7/2014 12:25:17 PM	14075
Cadmium	ND	0.0020	mg/L	1	7/7/2014 12:25:17 PM	14075
Calcium	27	1.0	mg/L	1	7/7/2014 12:25:17 PM	14075
Chromium	ND	0.0060	mg/L	1	7/7/2014 12:25:17 PM	14075
Cobalt	ND	0.0060	mg/L	1	7/7/2014 12:25:17 PM	14075
Copper	ND	0.0060	mg/L	1	7/7/2014 12:25:17 PM	14075
Iron	0.21	0.050	mg/L	. 1	7/7/2014 12:25:17 PM	14075
Lead	ND	0.0050	mg/L	1	7/7/2014 12:25:17 PM	14075
Magnesium	9.2	1.0	mg/L	1	7/7/2014 12:25:17 PM	14075
Manganese	0.032	0.0020	mg/L	1	7/7/2014 12:25:17 PM	14075
Nickel	ND	0.010	mg/L	1	7/7/2014 12:25:17 PM	14075
Potassium	69	1.0	mg/L	1	7/7/2014 12:25:17 PM	14075
Selenium	0.069	0.050	mg/L	1	7/7/2014 12:25:17 PM	14075

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- 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
  - Detected at the Reporting Limit Page 2 of 31
- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1406935

Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

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

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

Collection Date: 6/19/2014 9:30:00 AM

Lab ID: 1406935-001

Matrix: AQUEOUS

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS	9					Analyst	ELS
Silver	ND	0.0050		mg/L	1	7/7/2014 12:25:17 PM	14075
Sodium	1200	20		mg/L	20	7/7/2014 12:31:46 PM	14075
Thallium	ND	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Vanadium	ND	0.050		mg/L	1	7/7/2014 12:25:17 PM	14075
Zinc	ND	0.020		mg/L	1	7/7/2014 12:25:17 PM	14075
EPA METHOD 8260B: VOLATILES						Analyst	SUB
Ethyl tert-butyl ether	ND	0.50		μg/L	1	6/26/2014	R1989
Acetonitrile	ND	0.50		μg/L	1	6/26/2014	R1989
Allyl chloride	ND	0.50		μg/L	1	6/26/2014	R1989
Chloroprene	ND	0.50		μg/L	1	6/26/2014	R1989
Cyclohexane	ND	2.5		μg/L	1	6/26/2014	R1989
Diethyl ether	ND	0.50		μg/L	1	6/26/2014	R1989
Diisopropyl ether	ND	0.50		μg/L	1	6/26/2014	R1989
Epichlorohydrin	ND	5.0		μg/L	1	6/26/2014	R1989
Ethyl acetate	ND	0.50		μg/L	1	6/26/2014	R1989
Ethyl methacrylate	ND	2.5		µg/L	1	6/26/2014	R1989
Freon-113	ND	0.50		μg/L	1	6/26/2014	R1989
Isobutanol	ND	50		μg/L	1	6/26/2014	R1989
Isopropyl acetate	ND	0.50		μg/L	1	6/26/2014	R1989
Methacrylonitrile	ND	2.5		μg/L	1	6/26/2014	R1989
Methyl acetate	ND	0.50		μg/L	1	6/26/2014	R1989
Methyl ethyl ketone	ND	2.5		μg/L	1	6/26/2014	R1989
Methyl isobutyl ketone	ND	2.5		μg/L	1	6/26/2014	R1989
Methyl methacrylate	ND	2.5		μg/L	1	6/26/2014	R1989
Methylcyclohexane	ND	1.0		μg/L	1	6/26/2014	R1989
n-Amyl acetate	ND	0.50		µg/L	1	6/26/2014	R1989
n-Hexane	ND	0.50		μg/L	1	6/26/2014	R1989
Nitrobenzene	ND	5.0		μg/L	1	6/26/2014	R1989
Pentachloroethane	ND	5.0		μg/L	1	6/26/2014	R1989
p-isopropyltoluene	ND	0.50		μg/L	1	6/26/2014	R1989
Propionitrile	ND	2.5		μg/L	1	6/26/2014	R1989
Tetrahydrofuran	ND	0.50		μg/L	1	6/26/2014	R1989
Benzene	0.64	0.50		μg/L	1	6/26/2014	R1989
Toluene	ND	0.50		μg/L	1	6/26/2014	R1989
Ethylbenzene	ND	0.50		μg/L	1	6/26/2014	R1989
Methyl tert-butyl ether (MTBE)	ND	10		μg/L	1	6/26/2014	R1989
1,2,4-Trimethylbenzene	ND	0.50		μg/L	1	6/26/2014	R1989
1,3,5-Trimethylbenzene	ND	0.50		μg/L	1	6/26/2014	R1989
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	1	6/26/2014	R19890

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

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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

Page 3 of 31

- ND Not Detected at the Reporting Limit -
- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

Date Reported: 7/17/2014

CLIENT: Navajo Refining Company

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

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Collection Date: 6/19/2014 9:30:00 AM

Lab ID:

1406935-001

Matrix: AQUEOUS

Received Date: 6/19/2014 2:35:00 PM

analyses	Result	RL Qu	al Units	DF	Date Analyze	l Batch
EPA METHOD 8260B: VOLATILES					,	Analyst: SUB
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	6/26/2014	R1989
Naphthalene	ND	0.50	μg/L	1	6/26/2014	R1989
Acetone	15	2.5	μg/L	1	6/26/2014	R1989
Bromobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Bromodichloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
Bromoform	ND	0.50	μg/L	1	6/26/2014	R1989
Bromomethane	ND	0.50	μg/L	1	6/26/2014	R1989
Carbon disulfide	ND	0.50	μg/L	1	6/26/2014	R1989
Carbon Tetrachloride	ND	0.50	μg/L	1	6/26/2014	R1989
Chlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Chloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
Chloroform	ND	0.50	μg/L	1	6/26/2014	R1989
Chloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
2-Chlorotoluene	ND	0.50	μg/L	1	6/26/2014	R1989
4-Chlorotoluene	ND	0.50	μg/L	1	6/26/2014	R1989
cis-1,2-DCE	ND	0.50	μg/L	1	6/26/2014	R1989
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
Dibromochloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
Dibromomethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,3-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,4-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Dichlorodifluoromethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloroethene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
1,3-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
2,2-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloropropene	ND	0.50	μg/L	1	6/26/2014	R1989
Hexachlorobutadiene	ND	0.50	μg/L	1	6/26/2014	R1989
2-Hexanone	ND	0.50	μg/L	1	6/26/2014	R1989
Isopropylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Methylene Chloride	ND	2.5	μg/L	1	6/26/2014	R1989
n-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
n-Propylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
sec-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Styrene	ND	0.50	μg/L	1	6/26/2014	R1989
tert-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989

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

### Qualifiers:

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- 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 4 of 31
- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

Date Reported: 7/17/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 6/19/2014 9:30:00 AM

Lab ID: 1406935-001

Matrix: AQUEOUS

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	l Batch
EPA METHOD 8260B: VOLATILES			-		A	Analyst: SUB
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	6/26/2014	R1989
trans-1,2-DCE	ND	0.50	µg/L	1	6/26/2014	R1989
trans-1,3-Dichloropropene	ND	0.50	µg/L	1	6/26/2014	R1989
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,1,1-Trichloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1,2-Trichloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
Trichloroethene (TCE)	ND	0.50	μg/L	1	6/26/2014	R1989
Trichlorofluoromethane	ND	0.50	µg/L	1	6/26/2014	R1989
1,2,3-Trichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
Vinyl chloride	ND	0.50	μg/L	1	6/26/2014	R1989
mp-Xylenes	ND	1.0	μg/L	1	6/26/2014	R1989
o-Xylene	ND	0.50	μg/L	1	6/26/2014	R1989
tert-Amyl methyl ether	ND	0.50	μg/L	1	6/26/2014	R1989
tert-Butyl alcohol	ND	10	μg/L	1	6/26/2014	R1989
Acrolein	ND	2.5	μg/L	1	6/26/2014	R1989
Acrylonitrile	ND	10	μg/L	1	6/26/2014	R1989
Bromochloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
2-Chloroethyl vinyl ether	ND	2.5	μg/L	1	6/26/2014	R1989
Iodomethane	ND	0.50	μg/L	1	6/26/2014	R1989
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	6/26/2014	R1989
Vinyl acetate	ND	0.50	μg/L	1	6/26/2014	R1989
1,4-Dioxane	ND	20	μg/L	1	6/26/2014	R1989
Surr: 1,2-Dichloroethane-d4	104	70-130	%REC	1	6/26/2014	R1989
Surr: 4-Bromofluorobenzene	100	70-130	%REC	1	6/26/2014	R1989
Surr: Toluene-d8	101	70-130	%REC	1	6/26/2014	R1989
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
1,1-Biphenyl	ND	0.10	μg/L	1	6/26/2014	R1993
Atrazine	ND	0.10	μg/L	1	6/26/2014	R1993
Benzaldehyde	ND	0.10	μg/L	1	6/26/2014	R1993
Caprolactam	ND	0.10	μg/L	1	6/26/2014	R1993
N-Nitroso-di-n-butylamine	ND	0.10	μg/L	1	6/26/2014	R1993
Acetophenone	ND	10	µg/L	1	6/26/2014	R1993
1-Methylnaphthalene	ND	10	μg/L	1	6/26/2014	R1993
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	6/26/2014	R1993
2,4,5-Trichlorophenol	ND	10	µg/L	1	6/26/2014	R1993
2,4,6-Trichlorophenol	ND	10	μg/L	1	6/26/2014	R1993

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

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- 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
- 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 greater than 2.
- RL Reporting Detection Limit

### Lab Order 1406935

Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

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

Collection Date: 6/19/2014 9:30:00 AM

Lab ID: 1406935-001 Matrix: AQUEOUS Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			An	alyst: SUB
2,4-Dichlorophenol	ND	10	μg/L	1	6/26/2014	R1993
2,4-Dimethylphenol	ND	10	μg/L	1	6/26/2014	R1993
2,4-Dinitrophenol	ND	10	μg/L	1	6/26/2014	R1993
2,4-Dinitrotoluene	ND	10	μg/L	1	6/26/2014	R1993
2,6-Dinitrotoluene	ND	10	μg/L	1	6/26/2014	R1993
2-Chloronaphthalene	ND	10	µg/L	1	6/26/2014	R1993
2-Chlorophenol	ND	10	μg/L	1	6/26/2014	R1993
2-Methylnaphthalene	ND	10	μg/L	1	6/26/2014	R1993
2-Methylphenol	ND	10	μg/L	1	6/26/2014	R1993
2-Nitroaniline	ND	10	μg/L	1	6/26/2014	R1993
2-Nitrophenol	ND	10	μg/L	1	6/26/2014	R1993
3,3'-Dichlorobenzidine	ND	10	µg/L	1	6/26/2014	R1993
3-Nitroaniline	ND	10	µg/L	1	6/26/2014	R1993
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	6/26/2014	R1993
4-Bromophenyl phenyl ether	ND	10	μg/L	1	6/26/2014	R1993
4-Chloro-3-methylphenol	ND	5.0	μg/L	1	6/26/2014	R1993
4-Chloroaniline	ND	10	μg/L	1	6/26/2014	R1993
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	6/26/2014	R1993
4-Nitroaniline	ND	10	μg/L	1	6/26/2014	R1993
4-Nitrophenol	ND	10	µg/L	1	6/26/2014	R1993
Acenaphthene	ND	10	μg/L	1	6/26/2014	R1993
Acenaphthylene	ND	10	μg/L	1	6/26/2014	R1993
Anthracene	ND	10	μg/L	1	6/26/2014	R1993
Benzo(g,h,i)perylene	ND	10	μg/L	1	6/26/2014	R1993
Benz(a)anthracene	ND	0.10	μg/L	1	6/26/2014	R1993
Benzo(a)pyrene	ND	0.10	μg/L	1	6/26/2014	R1993
Benzo(b)fluoranthene	ND	0.10	μg/L	1	6/26/2014	R1993
Benzo(k)fluoranthene	ND -	0.10	μg/L	1	6/26/2014	R1993
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	6/26/2014	R1993
Bis(2-chloroethyl)ether	ND	10	μg/L	1	6/26/2014	R1993
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	6/26/2014	R1993
Bis(2-ethylhexyl)phthalate	ND	5.0	μg/L	1	6/26/2014	R1993
Butyl benzyl phthalate	ND	10	μg/L	1	6/26/2014	R1993
Carbazole	. ND	10	μg/L	1	6/26/2014	R1993
Chrysene	ND	0.10	μg/L	1	6/26/2014	R1993
Dibenz(a,h)anthracene	ND	0.10	μg/L	1	6/26/2014	R1993
Dibenzofuran	ND	10	μg/L	1	6/26/2014	R1993
Diethyl phthalate	ND	10	µg/L	1	6/26/2014	R1993
Dimethyl phthalate	ND	10	μg/L	1	6/26/2014	R1993

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 6 of 31

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1406935

### Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

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

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

Collection Date: 6/19/2014 9:30:00 AM

Lab ID: 1406935-001

Matrix: AQUEOUS

Received Date: 6/19/2014 2:35:00 PM

analyses	Result	RL Q	Qual	Units	DF	Date Analyz	ed	Batch
EPA 8270C: SEMIVOLATILES/MOD							Analyst:	SUB
Di-n-butyl phthalate	ND	10		μg/L	1	6/26/2014		R1993
Di-n-octyl phthalate	ND	10		μg/L	1	6/26/2014		R1993
Fluoranthene	ND	10		µg/L	1	6/26/2014		R1993
Fluorene	ND	10		μg/L	1	6/26/2014		R1993
Hexachlorobenzene	ND	1.0		µg/L	1	6/26/2014		R1993
Hexachlorobutadiene	ND	10		μg/L	1	6/26/2014		R1993
Hexachlorocyclopentadiene	ND	10		μg/L	1	6/26/2014		R1993
Hexachloroethane	ND	10		μg/L	1	6/26/2014		R1993
Indeno(1,2,3-cd)pyrene	ND	0.10		μg/L	1	6/26/2014		R1993
Isophorone	ND	10		μg/L	1	6/26/2014		R1993
Naphthalene	ND	10		μg/L	1	6/26/2014		R1993
Nitrobenzene	ND	10		μg/L	1	6/26/2014		R1993
N-Nitrosodi-n-propylamine	ND	10		μg/L	1	6/26/2014		R1993
N-Nitrosodiphenylamine	ND	2.0		μg/L	1	6/26/2014		R199
Pentachlorophenol	ND	10		μg/L	1	6/26/2014		R199
Phenanthrene	ND	10		μg/L	1	6/26/2014		R199
Phenol	ND	5.0		μg/L	1	6/26/2014		R199
Pyrene	ND	10		μg/L	1	6/26/2014		R199
o-Toluidine	ND	0.10		μg/L	1	6/26/2014		R199
Pyridine	ND	0.10		μg/L	1	6/26/2014		R199
1,2,4,5-Tetrachlorobenzene	ND	10		μg/L	1	6/26/2014		R199
Surr: 2,4,6-Tribromophenol	101	10-123		%REC	1	6/26/2014		R199
Surr: 2-Fluorobiphenyl	102	19-130		%REC	1	6/26/2014		R199
Surr: 2-Fluorophenol	76.2	21-110		%REC	1	6/26/2014		R199
Surr: Nitrobenzene-d5	91.1	25-130		%REC	1	6/26/2014		R199
Surr: Phenol-d5	79.3	10-125		%REC	1	6/26/2014		R199
Surr: Terphenyl-d14	92.2	33-141		%REC	1	6/26/2014		R199
CORROSIVITY							Analyst	SUB
pH	7.90		Н	pH Units	1	7/2/2014		R199
IGNITABILITY METHOD 1010							Analyst	SUB
Ignitability	>200	0		°F	1	7/7/2014		R199
CYANIDE, REACTIVE							Analyst	SUB
Cyanide, Reactive	ND	1.00		mg/L	1	7/2/2014		R199
SULFIDE, REACTIVE							Analyst	SUB
Reactive Sulfide	ND	1.0		mg/L	1	6/26/2014		R199
SM2510B: SPECIFIC CONDUCTANCE							Analyst	JRR
Conductivity	6000	0.010		µmhos/cm	1	6/23/2014 3:	26:39 PM	R194
Refer to the QC Summary report a	and sample log	in checklist	for fl	agged QC da	ta and	preservation i	nformatio	n.

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 7 of 31

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1406935

Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

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

WDW-1, 2, & 3 Qtrly Inj Well

Collection Date: 6/19/2014 9:30:00 AM

1406935-001

Lab ID:

Received Date: 6/19/2014 2:35:00 PM

Analyses	1	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM4500-H+B: PH					2/3/04/		Analyst	JRR
рН		7.91	1.68	Н	pH units	1	6/23/2014 3:26:39 PM	R19484
SM2320B: ALKALINITY							Analyst	JRR
Bicarbonate (As CaCO3)		290	20		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
Carbonate (As CaCO3)		ND	2.0		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
Total Alkalinity (as CaCO3)		290	20		mg/L CaCO3	1	6/23/2014 3:26:39 PM	R19484
SPECIFIC GRAVITY							Analyst	SRM
Specific Gravity		1.003	0			1	6/30/2014 10:37:00 AM	R19574
SM2540C MOD: TOTAL DISSOL	VED SOLI	DS					Analyst	KS
Total Dissolved Solids		4440	40.0	*	ma/L	1	6/23/2014 11:26:00 AM	13798

Matrix: AQUEOUS

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

В

### 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 H Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit

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- P Sample pH greater than 2.
- Reporting Detection Limit RL

### Lab Order 1406935

Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Trip Blank

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

**Collection Date:** 

Lab ID: 1406935-002

Matrix: TRIP BLANK

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES			-01);		А	nalyst: SUB
Ethyl tert-butyl ether	ND	0.50	μg/L	1	6/26/2014	R1989
Acetonitrile	ND	2.5	μg/L	1	6/26/2014	R1989
Allyl chloride	ND	0.50	μg/L	1	6/26/2014	R1989
Chloroprene	ND	0.50	µg/L	1	6/26/2014	R1989
Cyclohexane	ND	0.50	µg/L	1	6/26/2014	R1989
Diethyl ether	ND	0.50	μg/L	1	6/26/2014	R1989
Diisopropyl ether	ND	0.50	µg/L	1	6/26/2014	R1989
Epichlorohydrin	ND	5.0	μg/L	1	6/26/2014	R1989
Ethyl acetate	ND	0.50	μg/L	1	6/26/2014	R1989
Ethyl methacrylate	ND	2.5	μg/L	1	6/26/2014	R1989
Freon-113	ND	0.50	μg/L	1	6/26/2014	R1989
Isobutanol	ND	50	μg/L	1	6/26/2014	R1989
Isopropyl acetate	ND	0.50	μg/L	1	6/26/2014	R1989
Methacrylonitrile	ND	2.5	μg/L	1	6/26/2014	R1989
Methyl acetate	ND	0.50	μg/L	1	6/26/2014	R1989
Methyl ethyl ketone	ND	2.5	μg/L	1	6/26/2014	R1989
Methyl isobutyl ketone	ND	2.5	μg/L	1	6/26/2014	R1989
Methyl methacrylate	ND	2.5	μg/L	1	6/26/2014	R1989
Methylcyclohexane	ND	1.0	μg/L	1	6/26/2014	R1989
n-Amyl acetate	ND	0.50	μg/L	1	6/26/2014	R1989
n-Hexane	ND	0.50	μg/L	1	6/26/2014	R1989
Nitrobenzene	ND	5.0	μg/L	1	6/26/2014	R1989
Pentachloroethane	ND	5.0	μg/L	1	6/26/2014	R1989
p-isopropyltoluene	ND	0.50	μg/L	1	6/26/2014	R1989
Propionitrile	ND	2.5	μg/L	1	6/26/2014	R1989
Tetrahydrofuran	ND	0.50	μg/L	1	6/26/2014	R1989
Benzene	ND	0.50	μg/L	1	6/26/2014	R1989
Toluene	ND	0.50	μg/L	1	6/26/2014	R1989
Ethylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	6/26/2014	R1989
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	6/26/2014	R1989
Naphthalene	ND	0.50	μg/L	1	6/26/2014	R1989
Acetone	ND	2.5	μg/L	1	6/26/2014	R1989
Bromobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Bromodichloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
Bromoform	ND	0.50	μg/L	1	6/26/2014	R1989

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 greater than 2.
- RL Reporting Detection Limit

### Lab Order 1406935

Date Reported: 7/17/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company

Client Sample ID: Trip Blank

Collection Date:

Lab ID: 1406935-002

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Matrix: TRIP BLANK

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ana	yst: SUB
Bromomethane	ND	0.50	μg/L	1	6/26/2014	R1989
Carbon disulfide	ND	0.50	μg/L	1	6/26/2014	R1989
Carbon Tetrachloride	ND	0.50	μg/L	1	6/26/2014	R1989
Chlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Chloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
Chloroform	ND	0.50	μg/L	1	6/26/2014	R1989
Chloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
2-Chlorotoluene	ND	0.50	μg/L	1	6/26/2014	R1989
4-Chlorotoluene	ND	0.50	μg/L	1	6/26/2014	R1989
cis-1,2-DCE	ND	0.50	μg/L	1	6/26/2014	R1989
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
Dibromochloromethane	ND	0.50	μg/L	1	6/26/2014	R1989
Dibromomethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,3-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,4-Dichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Dichlorodifluoromethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloroethene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
1,3-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
2,2-Dichloropropane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1-Dichloropropene	ND	0.50	μg/L	1	6/26/2014	R1989
Hexachlorobutadiene	ND	0.50	μg/L	1	6/26/2014	R1989
2-Hexanone	ND	0.50	μg/L	1	6/26/2014	R1989
Isopropylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Methylene Chloride	ND	2.5	μg/L	1	6/26/2014	R1989
n-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
n-Propylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
sec-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
Styrene	ND	0.50	μg/L	1	6/26/2014	R1989
tert-Butylbenzene	ND	0.50	μg/L	1	6/26/2014	R1989
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	6/26/2014	R1989
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	6/26/2014	R1989
trans-1,2-DCE	ND	0.50	μg/L	1	6/26/2014	R1989
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	6/26/2014	R1989
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R1989

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

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- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.

RL Reporting Detection Limit

### Lab Order 1406935

### Hall Environmental Analysis Laboratory, Inc.

Date Reported: 7/17/2014

CLIENT: Navajo Refining Company

Client Sample ID: Trip Blank

Project:

WDW-1, 2, & 3 Qtrly Inj Well

**Collection Date:** 

Lab ID:

1406935-002

Matrix: TRIP BLANK

Received Date: 6/19/2014 2:35:00 PM

Analyses	Result	RL Qua	Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES				1.50		Analyst: SUB
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	6/26/2014	R19890
1,1,1-Trichloroethane	ND	0.50	μg/L	1	6/26/2014	R19890
1,1,2-Trichloroethane	ND	0.50	μg/L	1	6/26/2014	R19890
Trichloroethene (TCE)	ND	0.50	μg/L	1	6/26/2014	R19890
Trichlorofluoromethane	ND	0.50	μg/L	1	6/26/2014	R19890
1,2,3-Trichloropropane	ND	0.50	μg/L	1	6/26/2014	R19890
Vinyl chloride	ND	0.50	μg/L	1	6/26/2014	R19890
mp-Xylenes	ND	1.0	μg/L	1	6/26/2014	R19890
o-Xylene	ND	0.50	μg/L	1	6/26/2014	R19890
tert-Amyl methyl ether	ND	0.50	μg/L	1	6/26/2014	R19890
tert-Butyl alcohol	ND	0.50	μg/L	1	6/26/2014	R19890
Acrolein	ND	0.50	μg/L	1	6/26/2014	R19890
Acrylonitrile	ND	10	μg/L	1	6/26/2014	R19890
Bromochloromethane	ND	0.50	μg/L	1	6/26/2014	R19890
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	6/26/2014	R19890
Iodomethane	ND	0.50	μg/L	1	6/26/2014	R19890
trans-1,4-Dichloro-2-butene	ND	0.50	µg/L	1	6/26/2014	R19890
Vinyl acetate	ND	0.50	μg/L	1	6/26/2014	R19890
1,4-Dioxane	ND	20	μg/L	1	6/26/2014	R19890
Surr: 1,2-Dichloroethane-d4	100	70-130	%REC	1	6/26/2014	R19890
Surr: 4-Bromofluorobenzene	102	70-130	%REC	1	6/26/2014	R19890
Surr: Toluene-d8	99.6	70-130	%REC	1	6/26/2014	R1989

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

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 11 of 31
- Sample pH greater than 2. P
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID LCS	SampType: LCS			Tes	tCode: El	PA Method	300.0: Anions	3			
Phosphorus, Orthophosphate (As P	ND	0.50									
Nitrogen, Nitrate (As N)	ND	0.10									
Bromide	ND	0.10									
Nitrogen, Nitrite (As N)	ND	0.10									
Chloride	ND	0.50									
Fluoride	ND	0.10									
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Prep Date:	Analysis D	ate: 6/	19/2014	S	SeqNo: 5	61479	Units: mg/L				
Client ID: PBW	Batch	1D: R1	9410	F	RunNo: 1	9410					
Sample ID MB	SampType: MBLK			Tes	tCode: E	PA Method	300.0: Anions	3			
Phosphorus, Orthophosphate (As P	7.8	0.50	8.000	0	97.4	90	110				
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	102	90	110				
Bromide	7.9	0.10	8.000	0	98.4	90	110				
Nitrogen, Nitrite (As N)	3.2	0.10	3.200	0	99.5	90	110				
Chloride	7.8	0.50	8.000	0	96.9	90	110				
Fluoride	1.4	0.10	1.600	0	90.3	90	110				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Prep Date:	Analysis D	ate: 6/	19/2014	SeqNo: <b>561477</b>			Units: mg/L				
Client ID: BatchQC	Batch	1D: <b>R1</b>	9410	F	RunNo: 1	9410					
Sample ID A5	Sampi	ype: cc	<b>/_</b> 5	les	tCode: E	PA Method	300.0: Anions	3			

Client ID: LCSW	Batcl	n ID: <b>R1</b>	9410	F	RunNo: 1	9410				
Prep Date:	Analysis E	)ate: 6/	19/2014	5	SeqNo: 5	61480	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.47	0.10	0.5000	0	94.3	90	110			
Chloride	4.7	0.50	5.000	0	94.8	90	110			
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	93.7	90	110			
Bromide	2.4	0.10	2.500	0	96.2	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.8	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	97.6	90	110			

Sample ID A6	Samp7	ype: cc	v_6	Tes	tCode: El	S				
Client ID: BatchQC	Batcl	n ID: R1	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	ate: 6/	19/2014	8	SeqNo: 5	61489	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.3	0.10	2.400	0	95.4	90	. 110			
Chloride	12	0.50	12.00	0	102	90	110			
Nitrogen, Nitrite (As N)	4.9	0.10	4.800	0	102	90	110			
Bromide	12	0.10	12.00	0	100	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

Page 12 of 31

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project: WDW-1	, 2, & 3 Qt	rly Inj V	Well							
Sample ID A6	SampT	Гуре: сс	v_6	Tes	tCode: E	PA Method	300.0: Anion	s		
Client ID: BatchQC	Batcl	h ID: R1	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	Date: 6/	19/2014	5	SeqNo: 5	61489	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	7.8	0.10	7.200	0	108	90	110			
Phosphorus, Orthophosphate (As P	12	0.50	12.00	0	101	90	110			
Sample ID A4	SampT	ype: cc	v_4	Tes	tCode: E	PA Method	300.0: Anion	s		
Client ID: BatchQC	Batch	h ID: R1	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	Date: 6/	19/2014	\$	SeqNo: 5	61501	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.94	0.10	1.000	0	93.7	90	110			
Chloride	4.6	0.50	5.000	0	92.9	90	110			
Nitrogen, Nitrite (As N)	2.0	0.10	2.000	0	97.9	90	110			
Bromide	4.8	0.10	5.000	0	96.0	90	110			
Nitrogen, Nitrate (As N)	3.0	0.10	3.000	0	98.7	90	110			
Phosphorus, Orthophosphate (As P	4.8	0.50	5.000	0	95.8	90	110			
Sample ID A5	SampT	ype: cc	v_5	Tes	tCode: E	PA Method	300.0: Anion	s		
Client ID: BatchQC	Batch	h ID: <b>R1</b>	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	Date: 6/	19/2014	5	SeqNo: 5	61513	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.10	1.600	0	96.1	90	110			
Chloride	7.8	0.50	8.000	0	97.0	90	110			
Nitrogen, Nitrite (As N)	3.1	0.10	3.200	0	98.3	90	110			
Bromide	7.6	0.10	8.000	0	95.3	90	110			
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	102	90	110			
Phosphorus, Orthophosphate (As P	7.7	0.50	8.000	0	96.6	90	110		-	
Sample ID A6	SampT	ype: cc	v_6	Tes	tCode: El	PA Method	300.0: Anion	s		
Client ID: BatchQC	Batch	n ID: <b>R1</b>	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	Date: 6/	19/2014	8	SeqNo: 5	61525	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.3	0.10	2.400	0	97.8	90	110			
Chloride	12	0.50	12.00	0	101	90	110			
Nitrogen, Nitrite (As N)	4.8	0.10	4.800	0	101	90	110			
Bromide	12	0.10	12.00	0	100	90	110			
Nitrogen, Nitrate (As N)	7.7	0.10	7.200	0	107	90	110			
Phosphorus, Orthophosphate (As P	12	0.50	12.00	0	101	90	110			

### Qualifiers:

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

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Sample pH greater than 2. Reporting Detection Limit RL

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB	SampT	SampType: MBLK			tCode: El	PA Method	s	*		
Client ID: PBW	Batch	Batch ID: R19410			RunNo: 19410					
Prep Date:	Analysis D	ate: 6/	19/2014	\$	SeqNo: 5	61529	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10					1,-4,-4,-1			
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								

Sample ID LCS	SampT	ype: LC	s	Tes	TestCode: EPA Method 300.0: Anions						
Client ID: LCSW	Batcl	1D: <b>R1</b>	9410	F	RunNo: 1						
Prep Date:	Analysis D	ate: 6/	19/2014	\$	SeqNo: 5	61530	Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Fluoride	0.51	0.10	0.5000	0	101	90	110				
Chloride	4.8	0.50	5.000	0	96.1	90	110				
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	97.0	90	110				
Bromide	2.5	0.10	2.500	0	99.2	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	99.0	90	110				

Sample ID A4	SampT	ype: cc	v_4	Tes	tCode: El	PA Method	300.0: Anion	s		
Client ID: BatchQC	Batch	ID: R1	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	ate: 6/	20/2014	5	SeqNo: 5	61537	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.96	0.10	1.000	0	95.6	90	110			
Chloride	4.7	0.50	5.000	0	93.1	90	110			
Nitrogen, Nitrite (As N)	2.0	0.10	2.000	0	98.8	90	110			
Bromide	4.8	0.10	5.000	0	96.5	90	110			
Nitrogen, Nitrate (As N)	2.9	0.10	3.000	0	97.9	90	110			
Phosphorus, Orthophosphate (As P	4.8	0.50	5.000	0	96.0	90	110			

Sample ID A5	SampT	ype: cc	v_5	Tes						
Client ID: BatchQC	Batch	1D: <b>R1</b>	9410	F	RunNo: 1	9410				
Prep Date:	Analysis D	ate: 6/	20/2014	- 5	SeqNo: 5	61549	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.10	1.600	0	96.4	90	110			
Chloride	7.8	0.50	8.000	0	97.5	90	110			
Nitrogen, Nitrite (As N)	3.2	0.10	3.200	0	100	90	110			
Bromide	7.8	0.10	8.000	0	98.0	90	110			

### Qualifiers:

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

Page 14 of 31

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID A5	Sampi	Type: cc	v_5	TestCode: EPA Method 300.0: Anions							
Client ID: BatchQC	Batch	h ID: R1	9410	F	RunNo: 1						
Prep Date:	Analysis D	Date: 6/	20/2014	\$	SeqNo: 5	61549	Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Nitrogen, Nitrate (As N)	4.9	0.10	4.800	0	103	90	110				
Phosphorus, Orthophosphate (As P	7.9	0.50	8.000	0	98.2	90	110				
Sample ID A6	SampT	Гуре: сс	v_6	Tes	tCode: E	PA Method	300.0: Anion:	s	100		
Client ID: BatchQC	Batcl	h ID: R1	9410	· F	RunNo: 1	9410					
Prep Date:	Analysis D	Date: 6/	20/2014	5	SeqNo: 5	61555	Units: mg/L				
14000404040		2020			728 222 28		V 42-12-12-12-12-12-12-12-12-12-12-12-12-12				

Analysis E	Date: 6/	20/2014	8	SeqNo: 5	61555	Units: mg/L			
Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2.3	0.10	2.400	0	97.5	90	110			
12	0.50	12.00	0	101	90	110			
4.9	0.10	4.800	0	102	90	110			
12	0.10	12.00	0	99.7	90	110			
7.7	0.10	7.200	0	107	90	110			
12	0.50	12.00	0	101	90	110			
	Result 2.3 12 4.9 12 7.7	Result PQL  2.3 0.10  12 0.50  4.9 0.10  12 0.10  7.7 0.10	Result         PQL         SPK value           2.3         0.10         2.400           12         0.50         12.00           4.9         0.10         4.800           12         0.10         12.00           7.7         0.10         7.200	Result         PQL         SPK value         SPK Ref Val           2.3         0.10         2.400         0           12         0.50         12.00         0           4.9         0.10         4.800         0           12         0.10         12.00         0           7.7         0.10         7.200         0	Result         PQL         SPK value         SPK Ref Val         %REC           2.3         0.10         2.400         0         97.5           12         0.50         12.00         0         101           4.9         0.10         4.800         0         102           12         0.10         12.00         0         99.7           7.7         0.10         7.200         0         107	Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit           2.3         0.10         2.400         0         97.5         90           12         0.50         12.00         0         101         90           4.9         0.10         4.800         0         102         90           12         0.10         12.00         0         99.7         90           7.7         0.10         7.200         0         107         90	Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit           2.3         0.10         2.400         0         97.5         90         110           12         0.50         12.00         0         101         90         110           4.9         0.10         4.800         0         102         90         110           12         0.10         12.00         0         99.7         90         110           7.7         0.10         7.200         0         107         90         110	Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         %RPD           2.3         0.10         2.400         0         97.5         90         110           12         0.50         12.00         0         101         90         110           4.9         0.10         4.800         0         102         90         110           12         0.10         12.00         0         99.7         90         110           7.7         0.10         7.200         0         107         90         110	Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         %RPD         RPDLimit           2.3         0.10         2.400         0         97.5         90         110           12         0.50         12.00         0         101         90         110           4.9         0.10         4.800         0         102         90         110           12         0.10         12.00         0         99.7         90         110           7.7         0.10         7.200         0         107         90         110

Sample ID A6	SampTy	V_6	Tes	TestCode: EPA Method 300.0: Anions						
Client ID: BatchQC	F	RunNo: 1	9725							
Prep Date:	Analysis Date: 7/7/2014				SeqNo: 5	72917	Units: mg/L	ic.		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30	0.50	30.00	0	101	90	110			

Sample ID	ample ID MB SampType: MBLK				Tes	tCode: I	EPA Method	300.0: Anion	s		
Client ID: PBW Batch ID: R19725				9725	1	RunNo:	19725				
Prep Date:	Date: Analysis Date: 7/7/2014		Analysis Date: 7/7/2014			SeqNo:	572919	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	1.3944.7	ND	0.50						3511		

Sample ID LCS	SampType: LCS			Tes	tCode: E	PA Method	s			
Client ID: LCSW	Batch	ID: R1	9725	F	RunNo: 1	9725				
Prep Date:	Analysis Da	ate: 7/	7/2014	5	SeqNo: 5	72920	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.3	0.50	10.00	0	93.5	90	110			

### Qualifiers:

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

Page 15 of 31

- P Sample pH greater than 2.
- Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:	WDV	V-1, 2, & 3 Qtrly Inj Well			
Sample ID	A4	SampType: CCV_4	TestCode: EPA Method	300.0: Anions	
Client ID:	BatchQC	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572929	Units: mg/L	
Analyte		Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qu	ual
Sulfate		12 0.50 12.50	0 94.3 90	110	
Sample ID	A5	SampType: CCV_5	TestCode: EPA Method	300.0: Anions	
Client ID:	BatchQC	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572941	Units: mg/L	
Analyte		Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qu	ıal
Sulfate		20 0.50 20.00	0 98.2 90	110	
Sample ID	A6	SampType: CCV_6	TestCode: EPA Method	300.0: Anions	
Client ID:	BatchQC	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572953	Units: mg/L	
Analyte		Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qu	ual
Sulfate		31 0.50 30.00	0 102 90	110	
Sample ID	A4	SampType: CCV_4	TestCode: EPA Method	300.0: Anions	_
Client ID:	BatchQC	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572968	Units: mg/L	
Analyte		Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qu	ual
Sulfate		12 0.50 12.50	0 95.2 90	110	
Sample ID	мв	SampType: MBLK	TestCode: EPA Method	300.0: Anions	
Client ID:	PBW	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572970	Units: mg/L	
Analyte	520 m	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qu	ıal
Sulfate	r-oc sits:	ND 0.50	5.1		
Sample ID	LCS	SampType: LCS	TestCode: EPA Method	300.0: Anions	
Client ID:	LCSW	Batch ID: R19725	RunNo: 19725		
Prep Date:		Analysis Date: 7/7/2014	SeqNo: 572971	Units: mg/L	

### Qualifiers:

Analyte

Sulfate

Value exceeds Maximum Contaminant Level.

Result

9.5

0.50

- Value above quantitation range E
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank

LowLimit

- Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND

95.0

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**RPDLimit** 

Qual

%RPD

HighLimit

110

Sample pH greater than 2.

SPK value SPK Ref Val %REC

10.00

Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

20

0.50

Project:	WDW-	-1, 2, & 3 Qtrl	ly Inj V	Vell							
Sample ID	A5	SampTy	pe: CC	V_5	Tes	tCode: El	PA Method	300.0: Anions			
Client ID:	BatchQC	Batch	ID: R1	9725	F	RunNo: 1	9725				
Prep Date:		Analysis Da	ate: 7/	7/2014	8	SeqNo: 5	72980	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate		20	0.50	20.00	0	98.6	90	110			
Sample ID	A6	SampTy	pe: CC	V_6	Tes	tCode: El	PA Method	300.0: Anions			
Client ID:	BatchQC	Batch	ID: R1	9725	F	RunNo: 1	9725				
Prep Date:		Analysis Da	ate: 7/	8/2014	8	SeqNo: 5	72992	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	-	30	0.50	30.00	0	102	90	110			
Sample ID	A4	SampTy	/pe: <b>C</b> C	V_4	Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID:	BatchQC	Batch	ID: R1	9725	F	RunNo: 1	9725				
Prep Date:		Analysis Da	ate: 7/	8/2014	\$	SeqNo: 5	73004	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate		12	0.50	12.50	0	94.7	90	110		- 07	
Sample ID	A5	SampTy	ype: CC	CV_5	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID:	BatchQC	Batch	ID: R1	9725	F	RunNo: 1	9725				
Prep Date:		Analysis Da	ate: 7	/8/2014	\$	SeqNo: 5	73016	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

20.00

### Qualifiers:

Sulfate

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В

LowLimit 90

110

- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit

Page 17 of 31

- Sample pH greater than 2.
- Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19890	SampT	ype: MBLK	Tes	tCode: EP	A Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R19890	1	RunNo: 19	890				
Prep Date:	Analysis D	ate: 6/26/2014		SeqNo: 57	8052	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							
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							
2-Hexanone	ND	0.50							
E LIVAGIIVIIV	110	0.00							

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19890	Samp1	ype: ME	BLK	Tes	tCode: I	EPA Method	8260B: VOLA	ATILES		
Client ID: PBW	Batcl	n ID: R1	9890	F	RunNo:	19890				
Prep Date:	Analysis [	ate: 6/	26/2014	\$	SeqNo:	578052	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methylene Chloride	ND	0.50	W0.00							
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	0.50								
o-Xylene	ND	0.50								
Acrolein	ND	10								
Bromochloromethane	ND	0.50								
lodomethane	ND	0.50								
Vinyl acetate	ND	0.50								

Sample ID LCS-R19890	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES				
Client ID: LCSW	Batcl	n ID: R1	9890	F	RunNo: 1					
Prep Date:	Analysis E	ate: 6/	26/2014	8	SeqNo: 5	78053	053 Units: μg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.6	0.50	10.00	0	95.5	80	120			
Toluene	9.8	0.50	10.00	0	98.2	80	120			
Ethylbenzene	10	0.50	10.00	0	99.9	80	120			
Chlorobenzene	9.8	0.50	10.00	0	97.5	80	120			
1,1-Dichloroethene	9.5	0.50	10.00	0	94.9	80	120			
Tetrachloroethene (PCE)	9.9	0.50	10.00	0	98.9	80	120			
Trichloroethene (TCE)	9.9	0.50	10.00	0	98.8	80	120			
o-Xylene	10	0.50	10.00	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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19935	SampT	ype: MBI	LK	Tes	tCode: E	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	ID: R19	935	- F	RunNo: 1	9935				
Prep Date:	Analysis Da	ate: 6/2	6/2014	\$	SeqNo: 5	79511	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								
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	1.0								
Benz(a)anthracene	ND	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								
Carbazole	ND	10								

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19935 SampType: MBLK			TestCode: EPA 8270C: Semivolatiles/Mod							
Client ID: PBW	Batch ID: R19935			F	RunNo: 1	9935				
Prep Date:	Analysis Date: 6/26/2014		SeqNo: 579511			Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chrysene	ND	0.10	14.	-11-5	7 2 3			***		
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								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	5.0								
Pyrene	ND	10								

Sample ID LCS-R19935	SampType: LCS  Batch ID: R19935  Analysis Date: 6/26/2014			TestCode: EPA 8270C: Semivolatiles/Mod						
Client ID: LCSW Prep Date:				F	RunNo: 1	9935				
				SeqNo: 579512			Units: µg/L			
Analyte	Result	PQL.	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	5.3		5.000	0	106	49	134		7	
2-Chlorophenol	4.4		5.000	0	87.0	50	131			
4-Chloro-3-methylphenol	5.4		5.000	0	108	42	139			
4-Nitrophenol	4.6		5.000	0	92.8	19	137			
Acenaphthene	4.6		5.000	0	93.0	36	122			
Bis(2-ethylhexyl)phthalate	4.9		5.000	0	97.8	43	142			
N-Nitrosodi-n-propylamine	4.5		5.000	0	89.6	46	135			
Pentachlorophenol	4.1		5.000	0	82.6	22	138			
Phenol	6.3		5.000	0	126	45	134			
Pyrene	4.7		5.000	0	93.6	45	138			

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

**RPDLimit** 

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-13883

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: **PBW**  Batch ID: 13883

RunNo: 19515

Prep Date: 6/25/2014 Analysis Date: 6/26/2014

SeqNo: 564933

Units: mg/L

Analyte

PQL ND 0.00020

Sample ID LCS-13883

LCSW

SampType: LCS Batch ID: 13883 TestCode: EPA Method 7470: Mercury

LowLimit

Result

Result

RunNo: 19515

HighLimit

Prep Date: 6/25/2014 Analysis Date: 6/26/2014

SegNo: 564934

Units: mg/L

120

125

Analyte

Client ID:

PQL SPK value SPK Ref Val

%REC

LowLimit

Client ID:

0.0046 0.00020

0.005000

0.005000

SPK value SPK Ref Val

92.4

HighLimit 80

%RPD

%RPD

**RPDLimit** 

Qual

Qual

Mercury

Mercury

Sample ID 1406935-001BMS WDW-1, 2, & 3 Efflu

SampType: MS

TestCode: EPA Method 7470: Mercury

SPK value SPK Ref Val %REC

RunNo: 19515

Prep Date:

6/25/2014

Batch ID: 13883

PQL

SeqNo: 564941

Units: mg/L

Analyte

Analysis Date: 6/26/2014

0.0048 0.00020

%REC

HighLimit

%RPD **RPDLimit** 

Qual

Mercury

SampType: MSD

TestCode: EPA Method 7470: Mercury

LowLimit

LowLimit

Client ID:

WDW-1, 2, & 3 Efflu

Batch ID: 13883

RunNo: 19515

Prep Date: 6/25/2014

Sample ID 1406935-001BMSD

Analysis Date: 6/26/2014

SeqNo: 564944

Units: mg/L HighLimit

%RPD

**RPDLimit** Qual

Analyte Mercury

Result PQL SPK value SPK Ref Val 0.0048 0.00020 0.005000

%REC

95.6

75

125

0.263

20

**Oualifiers:** 

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

Spike Recovery outside accepted recovery limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Analyte detected in the associated Method Blank

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

Reporting Detection Limit

Н Holding times for preparation or analysis exceeded

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Qual

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-14082

SampType: MBLK

TestCode: MERCURY, TCLP

Client ID:

PBW

Batch ID: 14082

RunNo: 19737

Prep Date: 7/7/2014

Analysis Date: 7/8/2014

Units: mg/L

SeqNo: 573374

HighLimit

Analyte Mercury

SPK value SPK Ref Val %REC LowLimit Result PQL ND 0.020

TestCode: MERCURY, TCLP

LowLimit

Client ID: LCSW

Sample ID LCS-14082

SampType: LCS

Prep Date: 7/7/2014

Batch ID: 14082

RunNo: 19737

Units: mg/L

Analyte

Analysis Date: 7/8/2014

SeqNo: 573375

%RPD

%RPD **RPDLimit** Qual

**RPDLimit** 

SPK value SPK Ref Val %REC PQL

HighLimit 120

ND 0.020 0.005000 100 80 Mercury

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Н
- Not Detected at the Reporting Limit ND
- P Sample pH greater than 2.
- Reporting Detection Limit RL

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

				7,000		77-77-				
Sample ID MB-14080	Samp1	уре: М	BLK	Tes	tCode: El	PA Method	6010B: TCLF	Metals		
Client ID: PBW	Batcl	n ID: 14	080	F	RunNo: 1	9736				
Prep Date: 7/7/2014	Analysis D	)ate: 7/	8/2014	\$	SeqNo: 5	73325	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
admium	ND	1.0								
Chromium	ND	5.0								
ead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID LCS-14080	SampT	ype: LC	S	Tes	tCode: El	PA Method	6010B: TCL	P Metals		
Client ID: LCSW	Batch	n ID: 14	080	F	RunNo: 1	9736				
Prep Date: 7/7/2014	Analysis D	ate: 7/	8/2014	8	SeqNo: 5	73326	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	99.9	80	120			
Barium	ND	100	0.5000	0	96.7	80	120			
Cadmium	ND	1.0	0.5000	0	97.9	80	120			
Chromium	ND	5.0	0.5000	0	96.1	80	120			
.ead	ND	5.0	0.5000	0	94.4	80	120			
Selenium	ND	1.0	0.5000	0	97.1	80	120			
Silver	ND	5.0	0.1000	0	101	80	120			

Sample ID	1406935-001CMS	SampT	ype: MS	3	Tes	tCode: El	PA Method	6010B: TCL	P Metals		
Client ID:	WDW-1, 2, & 3 Eff	lu Batch	ID: 14	080	F	RunNo: 1	9736				
Prep Date:	7/7/2014	Analysis D	ate: 7/	8/2014		SeqNo: 5	73329	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		ND	5.0	0.5000	0.02968	108	75	125			
Barium		ND	100	0.5000	0.04484	98.2	75	125			
Cadmium		ND	1.0	0.5000	0	103	75	125			
Chromium		ND	5.0	0.5000	0.001840	98.1	75	125			
_ead		ND	5.0	0.5000	0	95.5	75	125			
Selenium		ND	1.0	0.5000	0.09485	103	75	125			
Silver		ND	5.0	0.1000	0	107	75	125			

Arsenic		ND	5.0 0.5000	0.02968	109	75	125	0	20	
Analyte		Result PC	QL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Prep Date:	7/7/2014 A	nalysis Date:	7/8/2014	S	SeqNo: 5	73330	Units: mg/L			
Client ID:	WDW-1, 2, & 3 Efflu	Batch ID:	14080	F	RunNo: 1	9736				
Sample ID	1406935-001CMSD	SampType:	MSD	les	tCode: El	PA Method	6010B: TCLI	Metals		

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit

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- P Sample pH greater than 2.
- Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID 1406935-0	01CMSD SampT	ype: MS	SD	Tes	tCode: E	PA Method	6010B: TCL	P Metals		
Client ID: WDW-1, 2	, & 3 Efflu Batch	n ID: 14	080	F	RunNo: 1	9736				
Prep Date: 7/7/2014	Analysis D	oate: 7/	8/2014	8	SeqNo: 5	73330	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0.04484	98.1	- 75	125	0	20	
Cadmium	ND	1.0	0.5000	0	102	75	125	0	20	
Chromium	ND	5.0	0.5000	0.001840	97.8	75	125	0	20	
.ead	ND	5.0	0.5000	0	95.1	75	125	0	20	
Selenium	ND	1.0	0.5000	0.09485	108	75	125	0	20	
Silver	ND	5.0	0.1000	0	107	75	125	0	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-14075	Samp <sup>-</sup>	Type: ME	BLK	Tes	tCode: E	PA 6010B:	Total Metals			
Client ID: PBW	Batc	h ID: 14	075	F	RunNo: 1	9704				
Prep Date: 7/5/2014	Analysis [	Date: 7/	7/2014		SeqNo: 5	72184	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.050								
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								
Thallium	ND	0.050								
Vanadium	ND	0.050								
Zinc	ND	0.020								

Sample ID LCS-14075	Samp	Type: LC	S	Tes	tCode: El	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	h ID: 14	075	F	RunNo: 1	9704				
Prep Date: 7/5/2014	Analysis	Date: 7/	7/2014	S	SeqNo: 5	72185	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.55	0.050	0.5000	0	110	80	120			
Arsenic	0.55	0.020	0.5000	0	110	80	120			
Barium	0.54	0.020	0.5000	0	109	80	120			
Beryllium	0.57	0.0030	0.5000	0	115	80	120			
Cadmium	0.54	0.0020	0.5000	0	109	80	120			
Calcium	57	1.0	50.00	0	114	80	120			
Chromium	0.54	0.0060	0.5000	0	108	80	120			
Cobalt	0.52	0.0060	0.5000	0	104	80	120			
Copper	0.56	0.0060	0.5000	0	112	80	120			
Iron	0.55	0.050	0.5000	0	110	80	120			
Lead	0.53	0.0050	0.5000	0	107	80	120			
Magnesium	57	1.0	50.00	0	113	80	120			
Manganese	0.54	0.0020	0.5000	0	108	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID	LCS-14075	Samp	Type: LC	S	Tes	tCode: E	PA 6010B:	Total Metals		D2-714	
Client ID:	LCSW	Bato	h ID: 14	075	F	RunNo: 1	9704				
Prep Date:	7/5/2014	Analysis	Date: 7/	7/2014	8	SeqNo: 5	72185	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nickel		0.52	0.010	0.5000	0	105	80	120			
Potassium		54	1.0	50.00	0	109	80	120			
Selenium		0.53	0.050	0.5000	0	106	80	120			
Silver		0.11	0.0050	0.1000	0	112	80	120			
Thallium		0.53	0.050	0.5000	0	106	80	120			
√anadium		0.57	0.050	0.5000	0	113	80	120			
Zinc		0.53	0.020	0.5000	0	106	80	120			
Sample ID	MB-14172	Samp	Туре: МЕ	BLK	Tes	tCode: E	PA 6010B:	Total Metals			
Client ID:	PBW	Bato	h ID: 14	172	F	RunNo: 1	9829				
Prep Date:	7/10/2014	Analysis I	Date: 7/	11/2014	8	SeqNo: 5	76105	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		ND	0.020								
Sample ID	LCS-14172	Samp	Type: LC	s	Tes	tCode: E	PA 6010B:	Total Metals			61
Client ID:	LCSW	Bato	h ID: 14	172	F	RunNo: 1	9829				
Prep Date:	7/10/2014	Analysis I	Date: 7/	11/2014	5	SeqNo: 5	76106	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	96.2	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19940

SampType: MBLK

TestCode: CYANIDE, Reactive

Client ID:

PBW

Batch ID: R19940

RunNo: 19940

Prep Date:

Analysis Date: 7/2/2014

SeqNo: 579570

Units: mg/L

HighLimit

%RPD

%RPD

**RPDLimit** 

Qual

Analyte Cyanide, Reactive Result PQL ND 1.00

Sample ID LCS-R19940

SampType: LCS

TestCode: CYANIDE, Reactive

Client ID: LCSW Batch ID: R19940

RunNo: 19940

Prep Date:

Analysis Date: 7/2/2014

SeqNo: 579571

Units: mg/L

Analyte

SPK value SPK Ref Val

%REC LowLimit

HighLimit

**RPDLimit** 

Qual

Result

0.5000

0

102

Cyanide, Reactive

0.512

SPK value SPK Ref Val %REC LowLimit

80

120

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits J
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2. Reporting Detection Limit

Page 28 of 31

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-R19940

SampType: MBLK

TestCode: SULFIDE, Reactive

Client ID:

PBW

Batch ID: R19940

RunNo: 19940

Analysis Date: 6/26/2014

Analyte Result

SeqNo: 579573

Units: mg/L

**RPDLimit** HighLimit %RPD

Qual

Reactive Sulfide

Prep Date:

PQL ND 1.0

SampType: LCS

TestCode: SULFIDE, Reactive

Client ID: LCSW

Sample ID LCS-R19940

Batch ID: R19940

PQL

RunNo: 19940

SeqNo: 579574

Units: mg/L

Prep Date: Analyte

Analysis Date: 6/26/2014

SPK value SPK Ref Val %REC LowLimit

HighLimit %RPD

**RPDLimit** 

Qual

Reactive Sulfide

SPK value SPK Ref Val %REC LowLimit

0

100

Result 0.20

0.2000

70

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

Value above quantitation range E

Analyte detected below quantitation limits J

RSD is greater than RSDlimit 0

RPD outside accepted recovery limits R

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded H

Not Detected at the Reporting Limit ND

P Sample pH greater than 2.

RL Reporting Detection Limit Page 29 of 31

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW Batch ID: R19484

RunNo: 19484

SeqNo: 563920

Units: mg/L CaCO3

Prep Date:

Analysis Date: 6/23/2014

HighLimit

Analyte

Result PQL

20

SPK value SPK Ref Val %REC LowLimit

**RPDLimit** Qual

Total Alkalinity (as CaCO3)

ND

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID:

LCSW Batch ID: R19484 RunNo: 19484

0

Analysis Date: 6/23/2014

Units: mg/L CaCO3

%RPD

Analyte

Prep Date:

SeqNo: 563921

110

**RPDLimit** 

Result 79 SPK value SPK Ref Val 80.00

%REC 98.7

LowLimit HighLimit %RPD

Qual

Total Alkalinity (as CaCO3)

Sample ID mb-2

SampType: MBLK

20

PQL

RunNo: 19484

TestCode: SM2320B: Alkalinity

90

Client ID: Prep Date:

PBW

Batch ID: R19484

Analysis Date: 6/23/2014

SeqNo: 563943

Units: mg/L CaCO3

Analyte

Result 20

SampType: LCS

SPK value SPK Ref Val %REC LowLimit

HighLimit

**RPDLimit** %RPD

Qual

Total Alkalinity (as CaCO3)

ND

TestCode: SM2320B: Alkalinity

Sample ID Ics-2 Client ID: LCSW

Batch ID: R19484

RunNo: 19484

%RPD

Prep Date: Analyte

Analysis Date: 6/23/2014

20

SeqNo: 563944

LowLimit

Units: mg/L CaCO3

**RPDLimit** 

Qual

Total Alkalinity (as CaCO3)

PQL Result

80

SPK value SPK Ref Val %REC 80.00

0

100

90

HighLimit 110

#### Qualifiers:

0

- Value above quantitation range E
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit R RPD outside accepted recovery limits
- Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

- В Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND

Reporting Detection Limit

P

RL

Sample pH greater than 2.

Page 30 of 31

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1406935

18-Jul-14

Client:

Navajo Refining Company

Project:

Analyte

WDW-1, 2, & 3 Qtrly Inj Well

Sample ID MB-13798

SampType: MBLK Batch ID: 13798

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PRW

RunNo: 19431

SPK value SPK Ref Val %REC LowLimit

HighLimit

Prep Date: 6/19/2014 Analysis Date: 6/23/2014 PQL

SegNo: 561986

Units: mg/L

**RPDLimit** 

Qual

Total Dissolved Solids

ND 20.0 SampType: LCS

TestCode: SM2540C MOD: Total Dissolved Solids

LowLimit

LowLimit

80

80

Sample ID LCS-13798 Client ID: LCSW

Batch ID: 13798

Result

RunNo: 19431

%RPD

6/19/2014

Prep Date:

Analysis Date: 6/23/2014

SeqNo: 561987

Units: mg/L

Analyte Total Dissolved Solids PQL

1010

SPK value SPK Ref Val

%REC

HighLimit 120 %RPD **RPDLimit**  Qual

Sample ID 1406935-001AMS

SampType: MS

20.0

RunNo: 19431

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: Prep Date: 6/19/2014

WDW-1, 2, & 3 Efflu

Batch ID: 13798

Analysis Date: 6/23/2014

SeqNo: 562008

Units: mg/L

%RPD

Analyte

Result PQL SPK value SPK Ref Val 2000

2000

1000

%REC

101

HighLimit

120

**RPDLimit** 

Qual

Qual

Total Dissolved Solids

6460 Sample ID 1406935-001AMSD SampType: MSD

6460

4442

4442

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: WDW-1, 2, & 3 Efflu

Batch ID: 13798

RunNo: 19431

101

Units: mg/L

Analyte Total Dissolved Solids

Prep Date: 6/19/2014

Analysis Date: 6/23/2014

40.0

40.0

SegNo: 562009

%RPD

**RPDLimit** 

Result PQL SPK value SPK Ref Val

%REC LowLimit

HighLimit 120

0.124

5

#### Qualifiers:

R

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2. Reporting Detection Limit

RL

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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

# Sample Log-In Check List

Client Name: **NAVAJO REFINING CO** Work Order Number: 1406935 RcptNo: 1 Received by/date: anne Sham Logged By: 6/19/2014 2:35:00 PM Anne Thorne Completed By: Anne Thorne 6/19/2014 Reviewed By: Chain of Custody Not Present ✓ 1. Custody seals intact on sample bottles? Yes No 🗆 Not Present Yes 🗸 2. Is Chain of Custody complete? 3 How was the sample delivered? Courier Log In NA 🗆 No 🗌 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 Yes 🗸 No Sample(s) in proper container(s)? Yes 🗸 No 🗆 7. Sufficient sample volume for indicated test(s)? No 🗌 8. Are samples (except VOA and ONG) properly preserved? Yes NA 🗆 No V 9. Was preservative added to bottles? Yes No VOA Vials No 🗆 10. VOA vials have zero headspace? Yes 🗸 Yes No V 11. Were any sample containers received broken? # of preserved bottles checked for pH: Yes 🗸 No 🗀 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 🗹 No 🗌 14. Is it clear what analyses were requested? Yes 🗸 Checked by: 15. Were all holding times able to be met? No 🗔 Yes V (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: ☐ eMail Via: 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 4.6 Good Yes

Mailing Address: P.O. Box 15 NM 88211-0159 Phone #: 575-748-3311 email or Fax#: 575-746-5451 QA/QC Package:	Mailing Address: P.O. Box 16 NM 88211-0159 Phone #: 575-748-3311 email or Fax#: 575-746-5451 QA/QC Package:	i9 Artesia,	D Standar Project Name: WDW-1, 2, & 3 Q Project #: P.O. # Project Manager:	☐ Standar ☐ Rush Project Name: WDW-1, 2, & 3 Qtrly Inj Well Project #: P.O. # 167796 Project Manager:		05/4	## 75 GOTS8 b	≥ ' ('zistaM'	Albuquero Fax 50 Analysis	9 2 4 5 110	A 50 KA 10 Kal. com	ý O a a a a a a a a a a a a a a a a a a a	
Standard     Other     EDD (Type)     Date     Time	Matrix	□ Level 4 (Full Validation) □ Sample Request ID	Dan Crawford Sampler: Jerry Sosa On the Arrest Sample amperature Container Preserv	erry Sosa  ** Yes*  mperature  Preservative	No. A State No. The State No.	Specific Gravity, HCO3, or SO4, TDS, pH, cond.,FI, Cation/anion bal., Br, Eh VOCs/SW-846 Method 8	(see attached list 'VOCs SVOCs/SW-846 Methoo (see attached list 'SVOC	R,C,1/40 CFR part 261 Metals/SW-846 Mthd 60 7470 (see attached list '	Ca, K, Mg, Na/40 CFR	TCLP Metals, only 140 C		1	
848	Liquid	WDW-1, 2, & 3 Effluent WDW-1, 2, & 3 Effluent	1 3	Neat/H2SO4 HNO3	192			×	×				
	Liquid	WDW-1, 2, & 3 Effluent WDW-1, 2, & 3 Effluent	2 2	HCL. Neat	600	×	×	×					
3 23 23	Liquid	WDW-1, 2, & 3 Emuent Trip Blank Temperature Blank	2 1	Neat Neat	20-	×							
	THAT I	Teliperature prains	-										
Time: 10:00 Time:	Relinquished by:	Relinquished by: Jerry Sosa Relinquished by:	Received by:	hu	Date Time 450 Object Time	S Remarks:	Report the	Remarks: Report these results Chain of Custody kits provided	separate	Remarks: Report these results separately from all other Chain of Custody kits provided.			

Classification	Analyte name	Method	Units	RL
Volatile organics	Acetone	SW-846 Method 8260C	μg/L	10
Volatile organics	Acetonitrile	SW-846 Method 8260C	μg/L	
Volatile organics	Acrolein	SW-846 Method 8260C	μg/L	
Volatile organics	Allyl alcohol	SW-846 Method 8260C	μg/L	
Volatile organics	Allyl chloride	SW-846 Method 8260C	μg/L	
Volatile organics	t-Amyl ethyl ether (TAEE)	SW-846 Method 8260C	μg/L	
Volatile organics	t-Amyl methyl ether (TAME)	SW-846 Method 8260C	μg/L	
Volatile organics	Benzene	SW-846 Method 8260C	μg/L	1
Volatile organics	Benzyl chloride	SW-846 Method 8260C	μg/L	
Volatile organics	Bis(2-chloroethyl)sulfide	SW-846 Method 8260C	μg/L	
Volatile organics	Bromoacetone	SW-846 Method 8260C	μg/L	1
Volatile organics	Bromobenzene	SW-846 Method 8260C	μg/L	
Volatile organics	Bromochloromethane	SW-846 Method 8260C	μg/L	5
Volatile organics	Bromodichloromethane	SW-846 Method 8260C	μg/L	1
Volatile organics	4-Bromofluorobenzene (surr)	SW-846 Method 8260C	μg/L	
Volatile organics	Bromoform	SW-846 Method 8260C	μg/L	4
Volatile organics	Bromomethane	SW-846 Method 8260C	μg/L	2
Volatile organics	n-Butanol	SW-846 Method 8260C	μg/L	
Volatile organics	2-Butanone (MEK)	SW-846 Method 8260C	µg/L	10
Volatile organics	n-Butylbenzene	SW-846 Method 8260C	μg/L	
Volatile organics	sec-Butylbenzene	SW-846 Method 8260C	μg/L	
Volatile organics	tert-Butylbenzene	SW-846 Method 8260C	μg/L	
Volatile organics	t-Butyl alcohol	SW-846 Method 8260C	μg/L	
Volatile organics	Carbon disulfide	SW-846 Method 8260C	μg/L	2
Volatile organics	Carbon tetrachloride	SW-846 Method 8260C	µg/L	1 1
Volatile organics	Chloral hydrate	SW-846 Method 8260C	μg/L	
Volatile organics	Chlorobenzene	SW-846 Method 8260C	μg/L	1
Volatile organics	Chlorobenzene-d5 (IS)	SW-846 Method 8260C	μg/L	
Volatile organics	1-Chlorobutane	SW-846 Method 8260C	μg/L	
Volatile organics	Chlorodibromomethane	SW-846 Method 8260C	µg/L	- 11 -021
Volatile organics	1-Chlorohexane	SW-846 Method 8260C	μg/L	
Volatile organics	Chloroethane	SW-846 Method 8260C	μg/L	1 1
Volatile organics	2-Chloroethanol	SW-846 Method 8260C	μg/L	
Volatile organics	2-Chloroethyl vinyl ether	SW-846 Method 8260C	μg/L	
Volatile organics	Chloroform	SW-846 Method 8260C	μg/L	1
Volatile organics	Chloromethane	SW-846 Method 8260C	μg/L	1
Volatile organics	Chloroprene	SW-846 Method 8260C	μg/L	
Volatile organics	4-Chlorotoluene	SW-846 Method 8260C	μg/L	
Volatile organics	Crotonaldehyde	SW-846 Method 8260C	μg/L	
Volatile organics	Cyclohexane	SW-846 Method 8260C	μg/L	5
Volatile organics	1,2-Dibromo-3-chloropropane	SW-846 Method 8260C	µg/L	10
Volatile organics	1,2-Dibromoethane	SW-846 Method 8260C	µg/L	2
Volatile organics	Dibromochloromethane	SW-846 Method 8260C	μg/L	+ 1
Volatile organics	Dibromomethane	SW-846 Method 8260C	µg/L	
Volatile organics	1,2-Dichlorobenzene	SW-846 Method 8260C	µg/L	1
Volatile organics	1,3-Dichlorobenzene	SW-846 Method 8260C	µg/L	

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Volatile organics	1,4-Dichlorobenzene	SW-846 Method 8260C	μg/L	1
Volatile organics	1,4-Dichlorobenzene-d4 (IS)	SW-846 Method 8260C	μg/L	
Volatile organics	cis-1,4-Dichloro-2-butene	SW-846 Method 8260C	μg/L	
Volatile organics	trans-1,4-Dichloro-2-butene	SW-846 Method 8260C	μg/L	
Volatile organics	Dichlorodifluoromethane	SW-846 Method 8260C	μg/L	5
Volatile organics	1,1-Dichloroethane	SW-846 Method 8260C	μg/L	1
Volatile organics	1,2-Dichloroethane	SW-846 Method 8260C	μg/L	1
Volatile organics	1,2-Dichloroethane-d4 (surr)	SW-846 Method 8260C	μg/L	
Volatile organics	1,1-Dichloroethene	SW-846 Method 8260C	μg/L	1
Volatile organics	cis-1,2-Dichloroethene	SW-846 Method 8260C	μg/L	1
Volatile organics	trans-1,2-Dichloroethene	SW-846 Method 8260C	μg/L	1
Volatile organics	1,2-Dichloropropane	SW-846 Method 8260C	μg/L	1
Volatile organics	1,3-Dichloropropane	SW-846 Method 8260C	μg/L	
Volatile organics	2,2-Dichloropropane	SW-846 Method 8260C	μg/L	
Volatile organics	1,1-Dichloropropene	SW-846 Method 8260C	μg/L	
Volatile organics	1,3-Dichloro-2-propanol	SW-846 Method 8260C	μg/L	
Volatile organics	cis-1,3-Dichloropropene	SW-846 Method 8260C	μg/L	1
Volatile organics	trans-1,3-Dichloropropene	SW-846 Method 8260C	μg/L	1
Volatile organics	1,2,3,4-Depoxybutane	SW-846 Method 8260C	μg/L	
Volatile organics	Diethyl ether	5W-846 Method 8260C	μg/L	
Volatile organics	Diisopropyl either (DIPE)	SW-846 Method 8260C	μg/L	
Volatile organics	1,4-Difluorobenzene (IS)	SW-846 Method 8260C	μg/L	
Volatile organics	1,4-Dioxane	SW-846 Method 8260C	μg/L	130
Volatile organics	Epichlorohydrin	SW-846 Method 8260C	μg/L	
Volatile organics	Ethanol	SW-846 Method 8260C	μg/L	
Volatile organics	Ethyl acetate	SW-846 Method 8260C	μg/L	
Volatile organics	Ethylbenzene	SW-846 Method 8260C	μg/L	1
Volatile organics	Ethylene oxide	SW-846 Method 8260C	μg/L	
Volatile organics	Ethyl methacrylate	SW-846 Method 8260C	μg/L	
Volatile organics	Fluorobenzene (IS)	SW-846 Method 8260C	μg/L	
Volatile organics	Freon 113	SW-846 Method 8260C	μg/L	5
Volatile organics	Ethyl tert-butyl ether (ETBE)	SW-846 Method 8260C	μg/L	
Volatile organics	Hexachlorobutadiene	SW-846 Method 8260C	μg/L	
Volatile organics	Hexachloroethane	SW-846 Method 8260C	μg/L	
Volatile organics	2-Hexanone	SW-846 Method 8260C	μg/L	5
Volatile organics	Iodomethane	SW-846 Method 8260C	μg/L	
Volatile organics	Isobutyl alcohol	SW-846 Method 8260C	μg/L	
Volatile organics	Isopropylbenzene	SW-846 Method 8260C	μg/L	2
Volatile organics	p-Isopropyltoluene	SW-846 Method 8260C	μg/L	
Volatile organics	Malononitrile	SW-846 Method 8260C	μg/L	
Volatile organics	Methacrylonitrile	SW-846 Method 8260C	μg/L	
Volatile organics	Methanol	SW-846 Method 8260C	μg/L	
Volatile organics	Methyl acetate	SW-846 Method 8260C	μg/L	5
Volatile organics	Methylcyclohexane	SW-846 Method 8260C	μg/L	5
Volatile organics	Methyl acrylate	SW-846 Method 8260C	μg/L	
Volatile organics	Methylene chloride	SW-846 Method 8260C	μg/L	2
Volatile organics	Methyl methacrylate	SW-846 Method 8260C	μg/L	

Volatile organics	4-Methyl-2-pentanone (MIBK)	SW-846 Method 8260C	μg/L	5
Volatile organics	Methyl tert-butyl ether (MTBE)	SW-846 Method 8260C	μg/L	1
Volatile organics	Naphthalene	SW-846 Method 8260C	μg/L	
Volatile organics	Nitrobenzene	SW-846 Method 8260C	μg/L	
Volatile organics	2-Nitropropane	SW-846 Method 8260C	μg/L	
Volatile organics	N-Nitroso-di-n-butylamine	SW-846 Method 8260C	μg/L	
Volatile organics	Paraldehyde	SW-846 Method 8260C	μg/L	
Volatile organics	Pentachloroethane	SW-846 Method 8260C	μg/L	
Volatile organics	Pentafluorobenzene	SW-846 Method 8260C	μg/L	
Volatile organics	2-Pentanone	SW-846 Method 8260C	μg/L	
Volatile organics	2-Picoline	SW-846 Method 8260C	μg/L	
Volatile organics	1-Propanol	SW-846 Method 8260C	μg/L	
Volatile organics	2-Propanol	SW-846 Method 8260C	μg/L	
Volatile organics	Propargyl alcohol	SW-846 Method 8260C	μg/L	
Volatile organics	beta-Propiolactone	SW-846 Method 8260C	μg/L	
Volatile organics	Propionitrile	SW-846 Method 8260C	μg/L	
Volatile organics	n-Propylamine	SW-846 Method 8260C	μg/L	
Volatile organics	n-Propylbenzene	SW-846 Method 8260C	μg/L	
Volatile organics	Pyridine	SW-846 Method 8260C	μg/L	
Volatile organics	Styrene	SW-846 Method 8260C	μg/L	5
Volatile organics	1,1,1,2-Tetrachloroethane	SW-846 Method 8260C	μg/L	
Volatile organics	1,1,2,2-Tetrachloroethane	SW-846 Method 8260C	μg/L	1
Volatile organics	Tetrachloroethene (PCE)	SW-846 Method 8260C	μg/L	1
Volatile organics	Toluene	SW-846 Method 8260C	μg/L	1
Volatile organics	Toluene-d8 (surr)	SW-846 Method 8260C	μg/L	
Volatile organics	o-Toluidine	SW-846 Method 8260C	μg/L	
Volatile organics	1,2,3-Trichlorobenzene	SW-846 Method 8260C	μg/L	5
Volatile organics	1,2,4-Trichlorobenzene	SW-846 Method 8260C	μg/L	5
Volatile organics	1,1,1-Trichloroethane	SW-846 Method 8260C	μg/L	1
Volatile organics	1,1,2-Trichloroethane	SW-846 Method 8260C	μg/L	1
Volatile organics	Trichloroethene (TCE)	SW-846 Method 8260C	μg/L	1
Volatile organics	Trichlorofluoromethane	SW-846 Method 8260C	μg/L	5
Volatile organics	1,2,3-Trichloropropane	SW-846 Method 8260C	μg/L	
Volatile organics	1,2,4-Trimethylbenzene	SW-846 Method 8260C	μg/L	50.00
Volatile organics	1,3,5-Trimethylbenzene	SW-846 Method 8260C	μg/L	
Volatile organics	Vinyl acetate	SW-846 Method 8260C	μg/L	
Volatile organics	Vinyl chloride	SW-846 Method 8260C	μg/L	1
Volatile organics	o-Xylene	SW-846 Method 8260C	μg/L	1
Volatile organics	m-Xylene	SW-846 Method 8260C	μg/L	1
Volatile organics	p-Xylene	SW-846 Method 8260C	μg/L	1
Volatile organics	Xylene, total	SW-846 Method 8260C	μg/L	1

(surr) - Surrogate

(IS) - Internal Standard

Method 8260C Volatile Organic Compounds by Gas Chromatograhy/Mass Spectrometry (GC/MS) (EPA, Revision 3, August 2006)

Constituents with RLs are on the VOC Target Compound List (TCL) (SOMO 1.1)

Classification	Analyte name	Method	Units	RL
Semivolatile organics	1,1'-Biphenyl	SW-864 Method 8270B	μg/L	1
Semivolatile organics	1,2,4,5-Tetrachlorobenzene	SW-864 Method 8270B	μg/L	2
Semivolatile organics	2-Chloronaphthalene	SW-864 Method 8270B	µg/L	5
Semivolatile organics	2-Chlorophenol	SW-864 Method 8270B	μg/L	5
Semivolatile organics	2-Methylphenol	SW-864 Method 8270B	μg/L	
Semivolatile organics	2-Nitroaniline	SW-864 Method 8270B	μg/L	10
Semivolatile organics	2-Nitrophenol	SW-864 Method 8270B	μg/L	5
Semivolatile organics	2,3,4,6-Tetrachlorophenol	SW-864 Method 8270B	μg/L	5
Semivolatile organics	2,4-Dichlorophenol	SW-864 Method 8270B	μg/L	
Semivolatile organics	2,4-Dimethylphenol	SW-864 Method 8270B	μg/L	5
Semivolatile organics	2,4-Dinitrophenol	SW-864 Method 8270B	μg/L	10
Semivolatile organics	2,4-Dinitrotoluene	SW-864 Method 8270B	μg/L	
Semivolatile organics	2,4,5-Trichlorophenol	SW-864 Method 8270B	μg/L	10
Semivolatile organics	2,4,6-Trichlorophenol	SW-864 Method 8270B	μg/L	- 5
Semivolatile organics	2,6-Dinitrotoluene	SW-864 Method 8270B	μg/L	
Semivolatile organics	3-Nitroaniline	SW-864 Method 8270B	μg/L	10
Semivolatile organics	3,3'-Dichlrobenzidine	SW-864 Method 8270B	μg/L	
Semivolatile organics	4-Bromophenyl-phenylether	SW-864 Method 8270B	μg/L	5
Semivolatile organics	4-Chloro-3-methylphenol	SW-864 Method 8270B	μg/L	į
Semivolatile organics	4-Chloroaniline	SW-864 Method 8270B	μg/L	
Semivolatile organics	4-Chlorophenyl-phenyl ether	SW-864 Method 8270B	μg/L	
Semivolatile organics	4-Nitroaniline	SW-864 Method 8270B	μg/L	10
Semivolatile organics	4-Nitrophenol	SW-864 Method 8270B	μg/L	10
Semivolatile organics	4,6-Dinitro-2-methylphenol	SW-864 Method 8270B	μg/L	10
Semivolatile organics	Acetophenone	SW-864 Method 8270B	μg/L	2
Semivolatile organics	Acenaphthene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Acenaphthylene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Anthracene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Atrazine	SW-864 Method 8270B	μg/L	
Semivolatile organics	Benzaldehyde	SW-864 Method 8270B	μg/L	
Semivolatile organics	Benzo(a)anthracene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Benzo(a)pyrene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Benzo(b)fluoranthene	SW-864 Method 8270B	μg/L	1 9
Semivolatile organics	Benzo(g,h,i)perylene	SW-864 Method 8270B	µg/L	
Semivolatile organics	Benzo(k)fluoranthene	SW-864 Method 8270B	μg/L	
Semivolatile organics	bis(2-Chloroethoxy)-methane	SW-864 Method 8270B	µg/L	
Semivolatile organics	bis(2-Chloroethyl) ether	SW-864 Method 8270B	μg/L	
Semivolatile organics	bis(2-Chloroisopropyl) ether	SW-864 Method 8270B	µg/L	2
Semivolatile organics	bis(2-Ethylhexyl)phthalate	SW-864 Method 8270B	μg/L	- 2
Semivolatile organics	Butylbenzylphthalate	SW-864 Method 8270B	μg/L	
Semivolatile organics	Carbazole	SW-864 Method 8270B	μg/L	
Semivolatile organics	Caprolactam	SW-864 Method 8270B	μg/L	- 2
Semivolatile organics	Chrysene	SW-864 Method 8270B	μg/L	0.1
Semivolatile organics	Di-n-butyiphthalate	SW-864 Method 8270B	μg/L	
Semivolatile organics	Di-n-octylphthalate	SW-864 Method 8270B	μg/L	
Semivolatile organics	Dibenz(a,h)anthracene	SW-864 Method 8270B	μg/L	
Semivolatile organics	Dibenzofuran	SW-864 Method 8270B	μg/L	
Semivolatile organics	Diethylphthalate	SW-864 Method 8270B	μg/L	

Semivolatile organics	Dimethylphthalate	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Fluroanthene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Fluorene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Hexachlorobenzene	SW-864 Method 8270B	μg/L	. 5
Semivolatile organics	Hexachlorobutadiene	SW-864 Method 8270B	μg/L	1
Semivolatile organics	Hexachlorocyclopentadiene	SW-864 Method 8270B	μg/L	10
Semivolatile organics	Hexachloroethane	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Indeno(1,2,3-cd)peryline	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Isophorone	SW-864 Method 8270B	μg/L	5
Semivolatile organics	1-Methylnaphthalene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	2-Methylnaphthalene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	N-Nitroso-di-n-propylamine	SW-864 Method 8270B	μg/L	5
Semivolatile organics	N-Nitrosodiphenylamine	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Napthtalene	SW-864 Method 8270B	μg/L	. 5
Semivolatile organics	Nitrobenzene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Pentachlorophenol	SW-864 Method 8270B	μg/L	10
Semivolatile organics	Phenanthrene	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Phenol	SW-864 Method 8270B	μg/L	5
Semivolatile organics	Pyrene	SW-864 Method 8270B	μg/L	5

Target Compound List 1.5 for SVOCs by SW-846 Method 8270

Classification	Analyte name <sup>(1)</sup>	Method	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		
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		
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		

<sup>\*\*</sup> dilute elements only if necessary

<sup>(1) 23</sup> TAL Metals



October 27, 2014

Mr. Carl Chavez, CHMM
NM Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, NM 87505-5472

Certified Mail/Return Receipt 7007 3020 0000 3028 9359

RE: 2014 3rd Quarter Injection Report for Wells WDW-1, WDW-2 and WDW-3, Navajo Refining Company, L.L.C.

Dear Mr. Chavez,

Enclosed, please find the third quarter 2014 sampling results for fluids injected into WDW-1, WDW-2 and WDW-3 and a spread sheet showing various volumes and pressures as required under Permit Condition 2.I.1, Quarterly Reports.

Over the third quarter, the average injection pressure for all three wells was 1260 psig and the average flows were 105 gpm for WDW-1, 98 gpm for WDW-2 and 106 gpm for WDW-3. There were no significant losses from the glycol expansion tanks Well Annulus Monitoring System (WAMS). The quarterly effluent analyses indicated parameters are within permit limits.

This report covers the period from July 1, 2014 to September 30, 2014. We have disposed a total of 976,643 barrels of fluid into the three wells during the third quarter of 2014. The volume per well is:

- 423,882 barrels into WDW-1
- 143,954 barrels into WDW-2
- 408,807 barrels into WDW-3

This report is signed and certified in accordance with WQCC section 5101.G. If there are any questions, please call me at 575-748-3311.

Respectfully,

Michael McKee

Vice-President & Refinery Manager Navajo Refining Company, L.L.C.

Mikal & Thicker

Enc.

Electronic cc (w/enc.): Environmental File:

R Combs, M Schultz, A Strange

Injection Wells/Reports C-115 & Quarterly/2014/3rd quarter/2014-10-27 3rd QTR Inj Rpt for Wells WDW-1,2,3

# 2014 THIRD QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

					20.10		Average	Maximum	Minimum					TOTAL
	Average	Maximum	Minimum	Average	Maximum	Minimum	Annular	Annular	Annular	Average	Maximum	Minimum		CUMULATIVE
	Pressure	Pressure	Pressure	Flow	Flow	Flow	Pressure	Pressure	Pressure	Volume	Volume	Volume	Volume	Volume
	(bsig)	(psig)	(bsig)	(gpm)	(apm)	(gpm)	Av (psig)	Mx (psig)	Mn (psig)	(pbd)	(pdq)	(pdq)	(barrels)	(barrels)
WDW-1												Previ	Previous Quarter	35,238,254
Jul-14	1,241	1,275	970	153	393	140	722	819	179	5,246	13,474	4,800	163,199	35,401,453
Aug-14	1,235	1,275	966	138	144	112	550	692	62	4,731	4,937	3,840	146,646	35,548,099
Sep-14	1,305	1,350	1,273	111	143	76	110	361	0	3,806	4,903	2,606	114,037	35,662,136
WDW-2												Previ	Previous Quarter	22,198,479
Jul-14	1,241	1,275	983	35	37	11	573	943	265	1,200	1,269	377	37,182	22,235,661
Aug-14	1,235	1,275	1,011	33	37	10	320	402	271	1,131	1,269	343	34,872	22,270,533
Sep-14	1,303	1,350	1,265	70	129	33	285	304	268	2,400	4,423	1,131	71,900	22,342,432
WDW-3					100000000000000000000000000000000000000					0.00		Previ	Previous Quarter	12,357,942
Jul-14	1,238	1,275	987	128	140	15	914	1,023	260	4,389	4,800	514	136,278	12,494,220
Aug-14	1,239	1,275	1,012	123	137	13	811	935	308	4,217	4,697	446	130,920	12,625,140
Sep-14	1,301	1,350	1,143	138	150	80	782	926	260	4,731	5,143	2,743	141,609	12,766,749
												Total Inje	Total Injected fluids:	70,771,318

# 2014 THIRD QUARTER WEEKLY WAMS LEVEL TABLE

	7/1/14	7/7/14	7/14/14 7/22/14	7/22/14	7/28/14	8/4/14	8/11/14	8/11/14 8/18/14 8/26/14	8/26/14	9/3/14	9/8/14	9/8/14   9/15/14   9/22/14	9/22/14	9/29/14
		Branch South III Control of the										Name and Applications		
WDW -11	150	145	145	145	145	145	145	145	145	145	145	145	145	145
WDW-21	130	100	100	100	100	100	100	100	100	100	100	100	100	100
WDW-31	145	145	145	145	145	145	145	145	145	145	145	145	145	145
	Comm	ente: WDV	V-2 Minor s	Comments: WDW-2 Minor surface tubing leak identified and renaired week of 7/7	leak identifi	ad and ren	aired week	of 717						
	)		V - WILLION O	2000	200	20 000	מונים הייים		The second secon	A STATE OF STREET OF STREET	Contract of the Contract of th			

1 Graduated tank gauged weekly in the field. Reading is in gallons.

WDW-1 is Mewbourne WDW-2 is Chukka WDW-3 is Gaines



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

October 09, 2014

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.: 1409594

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 1 sample(s) on 9/12/2014 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 <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> 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

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#:

1409594

Date:

10/9/2014

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  $\sim 10$ ppb:

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

Date Reported: 10/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					2/8/2	Analyst:	LGP
Fluoride	7.0	2.0	*	mg/L	20	9/13/2014 4:23:10 AM	R2120
Chloride	350	10		mg/L	20	9/13/2014 4:23:10 AM	R2120
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R2120
Bromide	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R2120
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	9/13/2014 4:10:46 AM	R2120
Phosphorus, Orthophosphate (As P)	ND	10		mg/L	20	9/13/2014 4:23:10 AM	R2120
Sulfate	2500	50		mg/L	100	9/19/2014 12:23:58 AM	R2132
<b>EPA METHOD 7470: MERCURY</b>						Analyst	MMD
Mercury	ND	0.00020		mg/L	1	9/18/2014 1:55:03 PM	15362
MERCURY, TCLP						Analyst	JLF
Mercury	ND	0.020		mg/L	1	9/23/2014 11:17:20 AM	15428
EPA METHOD 6010B: TCLP METALS						Analyst:	ELS
Arsenic	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Barium	ND	100		mg/L	1	9/20/2014 10:20:57 AM	15405
Cadmium	ND	1.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Chromium	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Lead	ND	5.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Selenium	ND	1.0		mg/L	1	9/20/2014 10:20:57 AM	15405
Silver	ND	5.0		mg/L	1	9/25/2014 12:34:33 PM	15405
EPA 6010B: TOTAL METALS						Analyst	ELS
Aluminum	0.18	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Antimony	ND	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405
Arsenic	0.061	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Barium	0.022	0.020		mg/L	1	9/20/2014 9:40:32 AM	15405
Beryllium	ND	0.0030		mg/L	1	9/20/2014 9:40:32 AM	15405
Cadmium	ND	0.0020		mg/L	1	9/20/2014 9:40:32 AM	15405
Calcium	80	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Chromium	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Cobalt	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Copper	ND	0.0060		mg/L	1	9/20/2014 9:40:32 AM	15405
Iron	0.50	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405
Lead	ND	0.0050		mg/L	1	9/20/2014 9:40:32 AM	15405
Magnesium	28	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Manganese	0.21	0.0020		mg/L	1	9/20/2014 9:40:32 AM	15405
Nickel	0.012	0.010		mg/L	1	9/20/2014 9:40:32 AM	15405
Potassium	58	1.0		mg/L	1	9/20/2014 9:40:32 AM	15405
Selenium	ND	0.050		mg/L	1	9/20/2014 9:40:32 AM	15405

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 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Date Reported: 10/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS					Analyst	ELS
Silver	ND	0.0050	mg/L	1	9/23/2014 1:35:48 PM	15405
Thallium	ND	0.050	mg/L	1	9/20/2014 9:40:32 AM	15405
Titanium	ND	0.0050	mg/L	1	9/20/2014 9:40:32 AM	15405
Silica	9.8	1.1	mg/L	1	9/20/2014 9:40:32 AM	15405
EPA METHOD 8260B: VOLATILES					Analyst	SUB
Acetonitrile	73	0.50	μg/L	1	9/24/2014	R2175
Allyl chloride	ND	0.50	μg/L	1	9/24/2014	R2175
Chloroprene	ND	0.50	μg/L	1	9/24/2014	R2175
Cyclohexane	ND	0.50	μg/L	1	9/24/2014	R2175
Diethyl ether	ND	0.50	μg/L	1	9/24/2014	R2175
Diisopropyl ether	ND	0.50	µg/L	1	9/24/2014	R2175
Epichlorohydrin	ND	5.0	μg/L	1	9/24/2014	R2175
Ethyl acetate	ND	0.50	μg/L	1	9/24/2014	R2175
Ethyl methacrylate	. ND	0.50	μg/L	1	9/24/2014	R2175
Ethyl tert-butyl ether	ND	0.50	μg/L	1	9/24/2014	R2175
Freon-113	ND	0.50	μg/L	1	9/24/2014	R2175
Isobutanol	ND	50	μg/L	1	9/24/2014	R2175
Isopropyl acetate	ND	0.50	μg/L	1	9/24/2014	R2175
Methacrylonitrile	ND	0.50	μg/L	1	9/24/2014	R2175
Methyl acetate	ND	0.50	μg/L	1	9/24/2014	R2175
Methyl ethyl ketone	ND	2.5	μg/L	1	9/24/2014	R2175
Methyl isobutyl ketone	ND	2.5	μg/L	1	9/24/2014	R2175
Methyl methacrylate	ND	0.50	μg/L	1	9/24/2014	R2175
Methylcyclohexane	ND	1.0	μg/L	1	9/24/2014	R2175
n-Amyl acetate	ND	0.50	μg/L	1	9/24/2014	R2175
n-Hexane	ND	0.50	μg/L	1	9/24/2014	R2175
Nitrobenzene	ND	5.0	μg/L	1	9/24/2014	R2175
Pentachloroethane	ND	5.0	μg/L	1	9/24/2014	R2175
p-isopropyltoluene	ND	0.50	µg/L	1	9/24/2014	R2175
Propionitrile	0.97	0.50	μg/L	1	9/24/2014	R2175
Tetrahydrofuran	ND	0.50	μg/L	1	9/24/2014	R2175
Benzene	ND	0.50	μg/L	1	9/24/2014	R2175
Toluene	ND	0.50	μg/L	1	9/24/2014	R2175
Ethylbenzene	ND	0.50	μg/L	1	9/24/2014	R2175
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	1	9/24/2014	R2175
1,2,4-Trimethylbenzene	ND	0.50	μg/L	1	9/24/2014	R2175
1,3,5-Trimethylbenzene	ND	0.50	μg/L	1	9/24/2014	R2175
1,2-Dichloroethane (EDC)	ND	0.50	μg/L	1	9/24/2014	R2175
1,2-Dibromoethane (EDB)	ND	0.50	μg/L	1	9/24/2014	R2175

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 3 of 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Date Reported: 10/9/2014

CLIENT: Navajo Refining Company

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

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

Collection Date: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

nalyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
PA METHOD 8260B: VOLATILES					Ana	lyst: SUB
Naphthalene	ND	0.50	μg/L	1	9/24/2014	R2175
Acetone	18	2.5	μg/L	1	9/24/2014	R2175
Bromobenzene	ND	0.50	μg/L	1	9/24/2014	R2175
Bromodichloromethane	ND	0.50	μg/L	1	9/24/2014	R217
Bromoform	ND	0.50	μg/L	1	9/24/2014	R217
Bromomethane	ND	0.50	μg/L	1	9/24/2014	R217
Carbon disulfide	0.56	0.50	µg/L	1	9/24/2014	R217
Carbon Tetrachloride	ND	0.50	μg/L	1	9/24/2014	R217
Chlorobenzene	ND	0.50	μg/L	1	9/24/2014	R217
Chloroethane	ND	0.50	μg/L	1	9/24/2014	R217
Chloroform	ND	0.50	μg/L	1	9/24/2014	R217
Chloromethane	ND	0.50	μg/L	1	9/24/2014	R217
2-Chlorotoluene	ND	0.50	μg/L	1	9/24/2014	R217
4-Chlorotoluene	ND	0.50	μg/L	1	9/24/2014	R217
cis-1,2-DCE	ND	0.50	μg/L	1	9/24/2014	R217
cis-1,3-Dichloropropene	ND	0.50	μg/L	1	9/24/2014	R217
1,2-Dibromo-3-chloropropane	ND	0.50	μg/L	1	9/24/2014	R217
Dibromochloromethane	ND	0.50	μg/L	1	9/24/2014	R217
Dibromomethane	ND	0.50	μg/L	1	9/24/2014	R217
1,2-Dichlorobenzene	ND	0.50	μg/L	1	9/24/2014	R217
1,3-Dichlorobenzene	ND	0.50	μg/L	1	9/24/2014	R217
1,4-Dichlorobenzene	ND	0.50	μg/L	1	9/24/2014	R217
Dichlorodifluoromethane	ND	0.50	μg/L	1	9/24/2014	R217
1,1-Dichloroethane	ND	0.50	μg/L	1	9/24/2014	R217
1,1-Dichloroethene	ND	0.50	μg/L	1	9/24/2014	R217
1,2-Dichloropropane	ND	0.50	μg/L	1	9/24/2014	R217
1,3-Dichloropropane	ND	0.50	μg/L	1	9/24/2014	R217
2,2-Dichloropropane	ND	0.50	μg/L	1	9/24/2014	R217
1,1-Dichloropropene	ND	0.50	μg/L	1	9/24/2014	R217
Hexachlorobutadiene	ND	0.50	μg/L	1	9/24/2014	R217
2-Hexanone	ND	0.50	μg/L	1	9/24/2014	R217
Isopropylbenzene	ND	0.50	μg/L	1	9/24/2014	R217
4-Isopropyltoluene	ND	0.50	μg/L	1	9/24/2014	R217
4-Methyl-2-pentanone	ND	0.50	μg/L	1	9/24/2014	R217
Methylene Chloride	ND	2.5	μg/L	1	9/24/2014	R217
n-Butylbenzene	ND	0.50	μg/L	1	9/24/2014	R217
n-Propylbenzene	ND	0.50	μg/L	1	9/24/2014	R217
sec-Butylbenzene	ND	0.50	μg/L	1	9/24/2014	R217
Styrene	ND	0.50	μg/L	1	9/24/2014	R217

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 4 of 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

#### **Analytical Report**

#### Lab Order 1409594

Date Reported: 10/9/2014

# 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: 9/11/2014 9:30:00 AM

Lab ID:

1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL (	Qual Units	DF	Date Analyze	d Batch
EPA METHOD 8260B: VOLATILES						Analyst: SUB
tert-Butylbenzene	ND	0.50	μg/L	1	9/24/2014	R21755
1,1,1,2-Tetrachloroethane	ND	0.50	μg/L	1	9/24/2014	R21755
1,1,2,2-Tetrachloroethane	ND	0.50	μg/L	1	9/24/2014	R21755
Tetrachloroethene (PCE)	ND	0.50	μg/L	1	9/24/2014	R21755
trans-1,2-DCE	ND	0.50	μg/L	1	9/24/2014	R21755
trans-1,3-Dichloropropene	ND	0.50	μg/L	1	9/24/2014	R21755
1,2,3-Trichlorobenzene	ND	0.50	μg/L	1	9/24/2014	R21755
1,2,4-Trichlorobenzene	ND	0.50	μg/L	1	9/24/2014	R21755
1,1,1-Trichloroethane	ND	0.50	μg/L	1	9/24/2014	R21755
1,1,2-Trichloroethane	ND	0.50	μg/L	1	9/24/2014	R21755
Trichloroethene (TCE)	ND	0.50	μg/L	1	9/24/2014	R21755
Trichlorofluoromethane	ND	0.50	μg/L	1	9/24/2014	R21755
1,2,3-Trichloropropane	ND	0.50	μg/L	1	9/24/2014	R21755
Vinyl chloride	ND	0.50	μg/L	1	9/24/2014	R21758
Xylenes, Total	ND	1.0	μg/L	1	9/24/2014	R21755
mp-Xylenes	ND	1.0	μg/L	1	9/24/2014	R2175
o-Xylene	ND	0.50	μg/L	1	9/24/2014	R21755
tert-Amyl methyl ether	ND	0.50	μg/L	1	9/24/2014	R21755
tert-Butyl alcohol	23	0.50	μg/L	1	9/24/2014	R21755
Acrolein	ND	0.50	μg/L	1	9/24/2014	R2175
Acrylonitrile	ND	10	μg/L	1	9/24/2014	R21755
Bromochloromethane	ND	0.50	μg/L	1	9/24/2014	R21755
2-Chloroethyl vinyl ether	ND	0.50	μg/L	1	9/24/2014	R21755
Iodomethane	ND	0.50	μg/L	1	9/24/2014	R21755
trans-1,4-Dichloro-2-butene	ND	0.50	μg/L	1	9/24/2014	R21755
Vinyl acetate	ND	0.50	μg/L	1	9/24/2014	R21755
1,4-Dioxane	ND	20	μg/L	1	9/24/2014	R21755
Surr: 1,2-Dichloroethane-d4	110	70-130	%REC	1	9/24/2014	R21755
Surr: 4-Bromofluorobenzene	99.6	70-130	%REC	1	9/24/2014	R21755
Surr: Toluene-d8	104	70-130	%REC	1	9/24/2014	R21755
EPA 8270C: SEMIVOLATILES/MOD						Analyst: SUB
1,1-Biphenyl	ND	5.0	μg/L	1	9/23/2014	R21755
Atrazine	ND	5.0	μg/L	1	9/23/2014	R21755
Benzaldehyde	ND	5.0	μg/L	1	9/23/2014	R21755
Caprolactam	ND	5.0	μg/L	1	9/23/2014	R21755
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	9/23/2014	R21755
Acetophenone	- ND	10	μg/L	1	9/23/2014	R21755
1-Methylnaphthalene	ND	10	μg/L	1	9/23/2014	R21755
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	9/23/2014	R21755

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
- RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- 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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- Sample pH greater than 2.
- RL Reporting Detection Limit

Date Reported: 10/9/2014

CLIENT: Navajo Refining Company

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

Project: Qua

Quarterly WDW-1, 2, &3 Inj Well

Collection Date: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA 8270C: SEMIVOLATILES/MOD		10			Ana	alyst: SUB
2,4,5-Trichlorophenol	ND	10	μg/L	1	9/23/2014	R2175
2,4,6-Trichlorophenol	ND	10	μg/L	1	9/23/2014	R2175
2,4-Dichlorophenol	ND	10	μg/L	1	9/23/2014	R2175
2,4-Dimethylphenol	ND	10	μg/L	1	9/23/2014	R2175
2,4-Dinitrophenol	ND	10	μg/L	1	9/23/2014	R2175
2,4-Dinitrotoluene	ND	10	μg/L	1	9/23/2014	R2175
2,6-Dinitrotoluene	ND	10	µg/L	1	9/23/2014	R2175
2-Chloronaphthalene	ND	10	μg/L	1	9/23/2014	R2175
2-Chlorophenol	ND	10	μg/L	1	9/23/2014	R2175
2-Methylnaphthalene	ND	10	μg/L	1	9/23/2014	R2175
2-Methylphenol	ND	10	μg/L	1	9/23/2014	R2175
2-Nitroaniline	ND	10	μg/L	1	9/23/2014	R2175
2-Nitrophenol	ND	10	μg/L	1	9/23/2014	R2175
3,3'-Dichlorobenzidine	ND	10	μg/L	1	9/23/2014	R2175
3-Nitroaniline	ND	10	µg/L	1	9/23/2014	R2175
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	9/23/2014	R217
4-Bromophenyl phenyl ether	ND	10	µg/L	. 1	9/23/2014	R2175
4-Chloro-3-methylphenol	ND	5.0	µg/L	1	9/23/2014	R2175
4-Chloroaniline	ND	10	μg/L	1	9/23/2014	R2175
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	9/23/2014	R2175
4-Nitroaniline	ND	10	μg/L	1	9/23/2014	R2175
4-Nitrophenol	ND	10	μg/L	1	9/23/2014	R2175
Acenaphthene	ND	10	μg/L	1	9/23/2014	R2175
Acenaphthylene	ND	10	μg/L	1	9/23/2014	R2175
Anthracene	ND	10	µg/L	1	9/23/2014	R2175
Benzo(g,h,i)perylene	ND	10	μg/L	1	9/23/2014	R2175
Benz(a)anthracene	ND	0.10	μg/L	1	9/23/2014	R2175
Benzo(a)pyrene	ND	0.10	μg/L	1	9/23/2014	R2175
Benzo(b)fluoranthene	ND	0.10	μg/L	1	9/23/2014	R2175
Benzo(k)fluoranthene	ND	0.10	μg/L	1	9/23/2014	R217
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	9/23/2014	R2175
Bis(2-chloroethyl)ether	ND	10	μg/L	1	9/23/2014	R2175
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	9/23/2014	R2175
Bis(2-ethylhexyl)phthalate	ND	5.0	μg/L	1	9/23/2014	R2175
Butyl benzyl phthalate	ND	10	μg/L	1	9/23/2014	R217
Carbazole	ND	10	μg/L	1	9/23/2014	R217
Chrysene	ND	0.10	μg/L	1	9/23/2014	R2175
Dibenz(a,h)anthracene	ND	0.10	μg/L	1	9/23/2014	R2175
Dibenzofuran	ND	10	μg/L	1	9/23/2014	R2175

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

Qualifiers:

- Value exceeds Maximum Contaminant Level.
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- 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 greater than 2.
- RL Reporting Detection Limit

#### **Analytical Report**

#### Lab Order 1409594

Date Reported: 10/9/2014

# 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: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyze	d Bate
EPA 8270C: SEMIVOLATILES/MOD		<del>8</del> 0	X.		0.5	Analyst: SUB
Diethyl phthalate	ND	10	μg/L	1	9/23/2014	R217
Dimethyl phthalate	ND	10	μg/L	1	9/23/2014	R217
Di-n-butyl phthalate	ND	10	μg/L	1	9/23/2014	R217
Di-n-octyl phthalate	ND	10	μg/L	1	9/23/2014	R217
Fluoranthene	ND	10	μg/L	1	9/23/2014	R217
Fluorene	ND	10	μg/L	1	9/23/2014	R217
Hexachlorobenzene	ND	1.0	μg/L	1	9/23/2014	R217
Hexachlorobutadiene	ND	10	μg/L	1	9/23/2014	R217
Hexachlorocyclopentadiene	ND	10	μg/L	1	9/23/2014	R217
Hexachloroethane	ND	10	μg/L	1	9/23/2014	R217
Indeno(1,2,3-cd)pyrene	ND	5.0	μg/L	1	9/23/2014	R217
Isophorone	ND	10	µg/L	1	9/23/2014	R217
Naphthalene	ND	10	μg/L	1	9/23/2014	R217
Nitrobenzene	ND	10	μg/L	1	9/23/2014	R217
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	9/23/2014	R217
N-Nitrosodiphenylamine	ND	2.0	μg/L	1	9/23/2014	R217
Pentachlorophenol	ND	10	μg/L	1	9/23/2014	R217
Phenanthrene	ND	10	μg/L	1	9/23/2014	R217
Phenol	ND	5.0	µg/L	1	9/23/2014	R217
Pyrene	ND	10	μg/L	1	9/23/2014	R217
o-Toluidine	ND	5.0	μg/L	1	9/23/2014	R217
Pyridine	ND	5.0	μg/L	1	9/23/2014	R217
1,2,4,5-Tetrachlorobenzene	ND	10	μg/L	1	9/23/2014	R217
Surr: 2,4,6-Tribromophenol	80.2	10-123	%REC	1	9/23/2014	R217
Surr: 2-Fluorobiphenyl	100	19-130	%REC	1	9/23/2014	R217
Surr: 2-Fluorophenol	77.0	21-110	%REC	- 1	9/23/2014	R217
Surr: Nitrobenzene-d5	91.2	25-130	%REC	1	9/23/2014	R217
Surr: Phenol-d5	94.4	10-125	%REC	1	9/23/2014	R217
Surr: Terphenyl-d14	39.9	33-141	%REC	1	9/23/2014	R217
CORROSIVITY						Analyst: SUE
pH	6.61		pH Units	1	9/18/2014	R217
IGNITABILITY METHOD 1010						Analyst: SUE
Ignitability	>200	0	°F	1	9/24/2014	R217
CYANIDE, REACTIVE						Analyst: SUE
Cyanide, Reactive	ND	1.00	mg/L	1	9/25/2014	R217
SULFIDE, REACTIVE						Analyst: SUE
Reactive Sulfide	ND	1.0	mg/L	1	9/30/2014	R21

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

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

Page 7 of 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

#### **Analytical Report**

#### Lab Order 1409594

Date Reported: 10/9/2014

# 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: 9/11/2014 9:30:00 AM

Lab ID: 1409594-001

Matrix: AQUEOUS

Received Date: 9/12/2014 9:45:00 AM

Analyses	Result	RL (	Qual Units	DF	Date Analyzed	Batch
SM2510B: SPECIFIC CONDUCTANG	CE				Analyst	: JRR
Conductivity	5400	0.010	µmhos/cm	1	9/19/2014 8:48:13 PM	R21338
SM2320B: ALKALINITY					Analyst	: JRR
Bicarbonate (As CaCO3)	120	20	mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
Total Alkalinity (as CaCO3)	120	20	mg/L CaCO3	1	9/19/2014 8:48:13 PM	R21338
SPECIFIC GRAVITY					Analyst	SRM
Specific Gravity	1.001	0		1	9/23/2014 4:39:00 PM	R21384
SM2540C MOD: TOTAL DISSOLVE	SOLIDS				Analyst	: KS
Total Dissolved Solids	4700	20.0	* mg/L	1	9/17/2014 10:23:00 AM	15289

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

#### Qualifiers:

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- 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 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	od 300.0: Anions					
Client ID: PBW	Batch	n ID: R2	1201	F	RunNo: 2	1201						
Prep Date:	Analysis D	Date: 9/	12/2014	\$	SeqNo: 6	17354	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			2000	1700	<u> </u>	- 2 - 2-99				
Sample ID LCS	Samp	Type: LC	S	Tes	tCode: E	PA Method	300.0: Anions	s				
Client ID: LCSW	Batc	h ID: <b>R2</b>	1201	F	RunNo: 2	1201						
Prep Date:	Analysis D	Date: 9/	12/2014	5	SeqNo: 6	17355	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	4.9	0.50	5.000	0	97.9	90	110					
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	97.0	90	110					
Bromide	2.4	0.10	2.500	0	96.4	90	110					
Nitrogen, Nitrate (As N)	2.6	0.10	2.500	0	103	90	110					
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	101	90	110					
Sample ID MB	Samp	Гуре: МЕ	BLK	Tes	tCode: E	PA Method	300.0: Anions	s				
Client ID: PBW	Batc	h ID: R2	1201	F	RunNo: 2	1201						
Prep Date:	Analysis [	Date: 9/	12/2014	5	SeqNo: 6	17410	Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Fluoride	ND	0.10			***				201			
Chloride	ND	0.50										
Nitrogen, Nitrite (As N)	ND	0.10										
Bromide	ND	0.10										
Nitrogen, Nitrate (As N)	ND	0.10										

Sample ID LCS	SampT	ype: LC	s	Tes	tCode: E	PA Method	300.0: Anion:	S			
Client ID: LCSW	Batch	ID: R2	1201	F	RunNo: 2	1201					
Prep Date:	Analysis D	ate: 9/	12/2014	8	SeqNo: 6	17411	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	103	90	110		32337		
Chloride	4.7	0.50	5.000	0	94.7	90	110				
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	93.9	90	110				
Bromide	2.4	0.10	2.500	0	96.7	90	110				

#### Qualifiers:

\* Value exceeds Maximum Contaminant Level.

ND

0.50

E Value above quantitation range

Phosphorus, Orthophosphate (As P

- 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 9 of 26

- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Sample ID LCS	SampTyp	SampType: LCS			tCode: El	PA Method	300.0: Anions	0.0: Anions				
Client ID: LCSW	Batch ID	Batch ID: R21201			RunNo: 2	1201						
Prep Date:	Analysis Date	Analysis Date: 9/12/2014			SeqNo: 6	17411	Units: mg/L					
Analyte	Result F	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	99.1	90	110					
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	99.5	90	110					
Sample ID MB	SampTyp	е: МВ	LK	Tes	tCode: El	PA Method	300.0: Anions		1.122			
Client ID: PBW	Batch II	D: <b>R2</b> 1	1321	F	RunNo: 2	1321						
Prep Date:	Analysis Date	e: <b>9/1</b>	18/2014	S	SeqNo: 6	22134	Units: mg/L					
Analyte	Result F	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Sulfate	ND	0.50										
Sample ID LCS	SampTyp	e: LC	s	Tes	tCode: El	PA Method	300.0: Anions	:				
Client ID: LCSW	Batch ID	D: <b>R2</b> 1	1321	F	RunNo: 2	1321						
Prep Date:	Analysis Date	e: <b>9/1</b>	18/2014	S	SeqNo: 6	22135	Units: mg/L					
Analyte	Result F	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Sulfate	9.6	0.50	10.00	0	96.2	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755	SampT	ype: MBLK	Test	Code: EPA Method	8260B: VOL	ATILES		
Client ID: PBW		ID: <b>R21755</b>	R	unNo: 21755				
Prep Date:		ate: 9/24/2014	S	eqNo: <b>638768</b>	Units: µg/L			
Analyte	Result	PQL SPK valu	e SPK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50						
Allyl chloride	ND	0.50						
Chloroprene	ND	0.50						
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	0.50						
Ethyl tert-butyl ether	ND	0.50						
Freon-113	ND	0.50						
Isobutanol	ND	50						
Isopropyl acetate	ND	0.50						
Methacrylonitrile	ND	0.50						
Methyl acetate	ND	0.50						
Methyl ethyl ketone	ND	2.5						
Methyl isobutyl ketone	ND	2.5						
Methyl methacrylate	ND	0.50						
Methylcyclohexane	ND	1.0						
n-Amyl acetate	ND	0.50						
n-Hexane	ND	0.50						
Nitrobenzene	ND	0.50						
Pentachloroethane	ND	5.0				7		
p-isopropyltoluene	ND	0.50						
Propionitrile	ND	0.50						
Tetrahydrofuran	ND	0.50						
Benzene	ND	0.50						
Toluene	ND	0.50						
Ethylbenzene	ND	0.50						
Methyl tert-butyl ether (MTBE)	ND	10						
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						
Bromobenzene	ND	0.50						
Bromodichloromethane	ND	0.50						
Bromoform	ND	0.50						
DIGNOOM	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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755	SampT	уре: МЕ	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R2	1755	F	RunNo: 2	1755				
Prep Date:	Analysis D	ate: 9/	24/2014		SeqNo: 6	38768	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
2-Chlorotoluene	ND	0.50								
4-Chlorotoluene	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								
1,3-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								
Hexachlorobutadiene	ND	0.50								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.50								
4-Isopropyltoluene	ND	0.50								
4-Methyl-2-pentanone	ND	0.50								
Methylene Chloride	ND	2.5								
n-Butylbenzene	ND	0.50								
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								
tano 1,2-DOL	110	0.00								

#### 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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755	SampT	ype: ME	BLK	Tes	tCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batcl	n ID: R2	1755	F	RunNo: 2	1755					
Prep Date:	Analysis D	Date: 9/	24/2014	8	SeqNo: 6	38768	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
rans-1,3-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,4-Trichlorobenzene	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									
Xylenes, Total	ND	1.0									
mp-Xylenes	ND	1.0									
o-Xylene	ND	0.50									
ert-Amyl methyl ether	ND	0.50									
ert-Butyl alcohol	ND	0.50									
Acrolein	ND	0.50									
Acrylonitrile	ND	10									
Bromochloromethane	ND	0.50									
2-Chloroethyl vinyl ether	ND	0.50									
odomethane	ND	0.50									
trans-1,4-Dichloro-2-butene	ND	0.50									
Vinyl acetate	ND	0.50									
1,4-Dioxane	ND	20									

Sample ID LCS-R21755	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batcl	n ID: R2	21755	F	RunNo: 21755					
Prep Date:	Analysis D	)ate: 9	/24/2014	\$	SeqNo: 6	38769	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.9		10.00	0	99.2	80	120	-7.0		
Toluene	10		10.00	0	102	80	120			
Ethylbenzene	10		10.00	0	99.6	80	120			
Chlorobenzene	9.9		10.00	0	99.3	80	120			
1,1-Dichloroethene	9.2		10.00	0	91.9	80	120			
Tetrachloroethene (PCE)	9.8		10.00	0	98.4	80	120			
Trichloroethene (TCE)	9.5		10.00	0	95.2	80	120			
o-Xylene	10		10.00	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

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- P Sample pH greater than 2.
- RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Alrazine ND 10 Caprolactam ND 10 N-hitroso-di-n-butylamine ND 10 N-hitroso-di-n-butylamine ND 10 N-hitroso-di-n-butylamine ND 10 N-hitroso-di-n-butylamine ND 10 ND 10 ND 10 2,3,4,6-Tetrachlorophenol ND 10 2,4,6-Trichlorophenol ND 10 2,4-Frichlorophenol ND 10 2,4-Dinitrophenol ND 10 2,4-Dinitrophenol ND 10 2,4-Dinitrophenol ND 10 2,4-Dinitrotoluene ND 10 2-Methylaphthalene ND 10 2-Methylaphthalene ND 10 2-Methylaphthalene ND 10 2-Methylaphthalene ND 10 3,3-Dichlorobenzidine ND 10 3,3-Dichlorobenzidine ND 10 3,3-Dichlorobenzidine ND 10 3,4-Frichlorophenol ND 10 4-Gromophenyl ether ND 10 4-Gromophenyl phenyl ether ND 10 4-Gromophenyl phenyl ether ND 10 4-Chloron-methylphenol ND 10 4-Chloron-methylphenol ND 10 4-Chloron-methylphenol ND 10 4-Gromophenyl phenyl ether ND 10 4-Chloron-methylphenol ND 10	Sample ID MB-R21755	SampTy	pe: M	BLK	Tes	tCode: El	PA 8270C:	Semivolatiles	/Mod		
Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual 1.1-Biphenyl ND 10 Arracine ND 10 Caprolactam ND 10 NNitroso-di-h-butylamine ND 10 NNitroso-di-h-butylamine ND 10 1-Methylnaphthalene ND 10 1-	Client ID: PBW	Batch	ID: R2	21755	F	RunNo: 2	1755				
1.1-Biphenyl ND 10 Altrazine ND 10 Caprolactarm ND 10 Caprolactarm ND 10 N-Nitroso-di-n-butylamine ND 10 N-Nitroso-di-n-butylamine ND 10 N-Nitroso-di-n-butylamine ND 10 Caclophenone ND 10 Caclophenone ND 10 Caclophenone ND 10 Caclophenol ND 10 Ca	Prep Date:	Analysis Da	ate: 9	/23/2014	8	SeqNo: 6	38842	Units: µg/L			
Alrazine ND 10 Caprolactaria ND 10 Caprolactaria ND 10 Acetophenone ND 10 Altoranine ND 0.10 Benzo(a)pyrene ND 0.10	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Caprolactam         ND         10           N-Nitroso-Gira-butylamine         ND         10           Acetophenone         ND         10           1-Methylnaphthalene         ND         10           2,3,4,5-Tichlorophenol         ND         10           2,4,5-Tichlorophenol         ND         10           2,4,5-Tichlorophenol         ND         10           2,4-Dimethylphenol         ND         10           2,4-Dimitrophenol         ND         10           2,4-Dimitrophenol         ND         10           2,4-Dimitrophenol         ND         10           2,4-Dimitrophenol         ND         10           2-Chlorophenol         ND         10           2-Methylyhaphthalene         ND         10           2-Methylyhaphthalene         ND         10           2-Mitrophenol         ND         10           3-Nitroaniline         ND         10           4-Mitrophenol         ND         10           4-Follorophenyl phenol         ND         10           4-Follorophenyl phenol         ND         10           4-Follorophenyl phenol         ND         10           4-Chlorophenyl phenyl ether <td>1,1-Biphenyl</td> <td>ND</td> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	1,1-Biphenyl	ND	10								
N-Nitroso-din-butylamine ND 10 Acetophenone ND 10 Acetophenone ND 10 Acetophenone ND 10 Acetophenone ND 10 Assistance ND 10 Anthracene ND 10 Anthracene ND 10 Anthracene ND 10 Anthracene ND 10 Benzo(a)pyrene ND 0.10 Benzo(blucranthene ND 0.10 Belacochiorosymethane ND 0.10	Atrazine	ND	10								
Acetophenone ND 10 -1-Methyriaphthalene ND 10 -2,4,5-Trichalcrophenol ND 10 -2,4,5-Trichalcrophenol ND 10 -2,4,5-Trichalcrophenol ND 10 -2,4,5-Trichalcrophenol ND 10 -2,4-Dimitrophenol ND 10 -3,3-Dichlorobenizdine ND 10 -3,3-Dichlorobenizdine ND 10 -4,5-Dimitro-2,-methylphenol ND 10 -4,5-Dimitro-2,-methylphenol ND 10 -4,Dimitro-2,-methylphenol ND 10 -4-Dimitro-2,-methylphenol ND 10 -4-Dimitrophenol ND 10 -4-Dimitro-2,-methylphenol ND 10 -4-Dimit	Caprolactam	ND	10								
Methylnaphthalene	N-Nitroso-di-n-butylamine	ND	10								
2,3,4,5-Tetrachlorophenol         ND         10           2,4,5-Trichlorophenol         ND         10           2,4-Dirichlorophenol         ND         10           2,5-Diritrotoluene         ND         10           2-Chloropapithalene         ND         10           2-Chlorophenol         ND         10           2-Methylyaphenol         ND         10           2-Mitrophenol         ND         10           2-Mitrophenol         ND         10           3,3-Dichlorobenzidine         ND         10           4-Bromophenyl phenyl ether         ND         10           4-Chrorophenyl phenyl ether         ND         10           4-Chloropamiline         ND         10           4-Chloropamiline         ND         10           4-Chlorophenyl phenyl ether         ND         10           4-Chlorophenyl phenyl ether         ND         10           4-Ritrophinol         ND         10	Acetophenone	ND	10								
2,4,5-Trichlorophenol         ND         10           2,4,6-Trichlorophenol         ND         10           2,4-Dimethylphenol         ND         10           2,4-Dimitrophenol         ND         10           2,4-Dimitrophenol         ND         10           2,4-Dinitrodoluene         ND         10           2,4-Dinitrodoluene         ND         10           2-Chloronaphthalene         ND         10           2-Chlorophenol         ND         10           2-Methylphaphthalene         ND         10           2-Methylphenol         ND         10           2-Mitrophenol         ND         10           2-Mitrophenol         ND         10           3-Nitroaniline         ND         10           4-Schroorbenzidine         ND         10           4-Romophenyl phenyl ether         ND         10           4-Chloro-3-methylphenol         ND         10           Acenaphthyl	1-Methylnaphthalene	ND	10								
2.4.6-Trichlorophenol         ND         10           2.4-Dimetrylphenol         ND         10           2.4-Dimetrylphenol         ND         10           2.4-Dimitrophenol         ND         10           2.4-Dimitrotoluene         ND         10           2.6-Dimitrotoluene         ND         10           2.6-Dimitrotoluene         ND         10           2.6-Dimitrotoluene         ND         10           2-Chlorophenol         ND         10           2-Methylphanol         ND         10           2-Methylphenol         ND         10           2-Mitrophenol         ND         10           3.3-Dichlorobenzidine         ND         10           3.3-Dichlorobenzidine         ND         10           4.6-Dinitro-2-methylphenol         ND         10           4.6-Dinitro-2-methylphenol         ND         10           4-Chioros-3-methylphenol         ND         5.0           4-Chioros-3-methylphenol         ND         10           4-Chiorophenyl phenyl ether         ND         10           4-Nitrophenol         ND         10           4-Nitrophenol         ND         10           Acenaphth	2,3,4,6-Tetrachlorophenol	ND	10								
2,4-Dichlorophenol       ND       10         2,4-Dinitrophenol       ND       10         2,4-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2-Chloropaphthalene       ND       10         2-Methyhaphthalene       ND       10         2-Methylaphthalene       ND       10         2-Methylphenol       ND       10         2-Mitropaniline       ND       10         3,3-Olchlorobenzidine       ND       10         3,3-Olchlorobenzidine       ND       10         4,6-Dinitro-2-methylphenol       ND       10         4-Bromophenyl phenyl ether       ND       10         4-Chloro-aniline       ND       10         4-Chloro-aniline       ND       10         4-Chlorophenyl phenyl ether       ND       10	2,4,5-Trichlorophenol	ND	10								
2,4-Dimethylphenol       ND       10         2,4-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2-Chloronaphthalene       ND       10         2-Methylaphthalene       ND       10         2-Methylaphthalene       ND       10         2-Methylaphthalene       ND       10         2-Mitrophenol       ND       10         2-Mitrophenol       ND       10         3-Mitrophenol       ND       10         3-Mitrophenol       ND       10         4-Bromophenyl phenyl ether       ND       10         4-Chloro-3-methylphenol       ND       10         4-Chloro-3-methylphenol       ND       10         4-Chlorophenyl phenyl ether       ND       10         4-Ch	2,4,6-Trichlorophenol	ND	10								
2,4-Dinitrophenol       ND       10         2,4-Dinitrotoluene       ND       10         2,6-Dinitrotoluene       ND       10         2-Chlorophthalene       ND       10         2-Chlorophenol       ND       10         2-Methylaphthalene       ND       10         2-Methylphenol       ND       10         2-Mitrophinol       ND       10         2-Mitrophenol       ND       10         3,3-Dichlorobenzidine       ND       10         3-Nitrophinol       ND       10         4-Shiritor-2-methylphenol       ND       10         4-Fornophenyl phenyl ether       ND       10         4-Chloro-3-methylphenyl ether       ND       10         4-Chlorophinyl phenyl ether       ND       10         4-Chlorophenyl phenyl ether       ND       10         4-Nitrophenol       ND       10         4-Nitrophenol       ND       10         Acenaphthene       ND       10         Acenaphthylene       ND       10         Benzo(g,hi)perylene       ND       10         Benzo(g,hi)perylene       ND       0.10         Benzo(g,hi)perylene       ND <t< td=""><td>2,4-Dichlorophenol</td><td>ND</td><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	2,4-Dichlorophenol	ND	10								
2,4-Dinitrotoluene         ND         10           2,6-Dinitrotoluene         ND         10           2-Chlorophthalene         ND         10           2-Methylnaphthalene         ND         10           2-Methylphenol         ND         10           2-Mitrophienol         ND         10           2-Nitrophenol         ND         10           3-Nitroaniline         ND         10           3-Nitroaniline         ND         10           4,6-Dinitro-2-methylphenol         ND         10           4-Chloro-3-methylphenol         ND         10           4-Chloro-3-methylphenol         ND         10           4-Chloro-3-methylphenol         ND         10           4-Chloro-3-methylphenol         ND         10           4-Chlorophilphenyl phenyl ether         ND         10           4-Chlorophilphenyl phenyl ether         ND         10           4-Nitropaniline         ND         10           4-Nitropaniline         ND         10           4-Nitropaniline         ND         10           Accenaphthylene         ND         10           Accenaphthylene         ND         10           Benzo(s),	2,4-Dimethylphenol	ND	10								
2.6-Dinitrotoluene       ND       10         2-Chloronaphthalene       ND       10         2-Chlorophenol       ND       10         2-Methylaphthalene       ND       10         2-Methylaphthalene       ND       10         2-Mitroaniline       ND       10         2-Nitroaniline       ND       10         3-Nitroaniline       ND       10         4,6-Dinitro-2-methylphenol       ND       10         4,6-Dinitro-2-methylphenol       ND       10         4-Chloro-3-methylphenol       ND       10         4-Chloro-3-methylphenol       ND       5.0         4-Chloro-3-methylphenol       ND       10         4-Chloro-Iniline       ND       10         4-Chloro-benyl phenyl ether       ND       10         4-Nitroaniline       ND       10         4-Nitroaniline       ND       10         4-Nitroaniline       ND       10         Acenaphthene       ND       10         Acenaphthylene       ND       10         Benzo(s), i)perylene       ND       10         Benzo(s), plycorene       ND       0.10         Benzo(s), plycorathene       ND	2,4-Dinitrophenol	ND	10								
2-Chlorophenol ND 10 2-Chlorophenol ND 10 2-Methylpaphthalene ND 10 2-Methylpaphthalene ND 10 2-Methylphenol ND 10 2-Methylphenol ND 10 3,3'-Dichlorobenzidine ND 10 3,3'-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 4-Bromophenyl phenyl ether ND 10 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 10 4-Chloroaniline ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 4-Nitrophenyl phenyl ether ND 10 4-Nitrophenyl phenyl ether ND 10 Acenaphthylene ND 10 Acenaphthylene ND 10 Acenaphtylene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(g,h,i)perylene ND 0.10 Benzo(g,h,i)perylene ND 0.10 Benzo(y)pyrene ND 0.10 Benzo(y)pyrene ND 0.10 Benzo(y)pyrene ND 0.10 Benzo(y)piluoranthene ND 0.10	2,4-Dinitrotoluene	ND	10								
2-Chlorophenol ND 10 2-Methylnaphthalene ND 10 2-Methylphenol ND 10 2-Nitrophenol ND 10 2-Nitrophenol ND 10 3-Nitrophenol ND 10 3-Nitrophenol ND 10 3-Nitrophenol ND 10 3-Nitrophenol ND 10 4-Chlorophenol ND 10 4-Chlorophenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 5.0 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Acenaphthylene ND 10 Benzo(a), niperylene ND 0.10 Benzo(a) pyrene ND 0.10 Benzo(b) fluoranthene ND 0.10	2,6-Dinitrotoluene	ND	10								
2-Methylnaphthalene         ND         10           2-Methylphenol         ND         10           2-Nitrophenol         ND         10           3-Nichorobenzidine         ND         10           3-Nitroaniline         ND         10           4,6-Dinitro-2-methylphenol         ND         10           4-Eromophenyl phenyl ether         ND         10           4-Chloro-3-methylphenol         ND         10           4-Chlorophenyl phenyl ether         ND         10           4-Chlorophenyl phenyl ether         ND         10           4-Nitroaniline         ND         10           4-Nitrophenol         ND         10           Acenaphthene         ND         10           Acenaphthylene         ND         10           Benzo(a),i)perylene         ND         10           Benzo(a),biperylene         ND         0.10           Benzo(a)pyrene         ND         0.10           Benzo(b)fluoranthene         ND         0.10           Benzo(b)fluoranthene         ND         0.10           Benzo(a)pyrene         ND         0.10           Benzo(a)pyrene         ND         0.10           Benzo(a)pyrene	2-Chloronaphthalene	ND	10								
2-Methylphenol ND 10 2-Nitroaniline ND 10 2-Nitrophenol ND 10 3.3-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 3-Nitroaniline ND 10 4-G-Dinitro-2-methylphenol ND 10 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 4-Chloroa-3-methylphenol ND 10 4-Chloroa-3-methylphenol ND 10 4-Chloroa-3-methylphenol ND 10 4-Chloroa-3-methylphenol ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 Acenaphthene ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Abenzo(a), niperylene ND 10 Benzo(a), niperylene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	2-Chlorophenol	ND	10								
2-Nitrophenol ND 10 2-Nitrophenol ND 10 3,3'-Dichlorobenzidine ND 10 3-Nitroaniline ND 10 4-G-Dinitro-2-methylphenol ND 10 4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chloro-3-methylphenol ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Acenaphthylene ND 10 Acenaphthylene ND 10 Benzo(a), hi)perylene ND 10 Benzo(a), hi)perylene ND 0.10 Benzo(a) pyrene ND 0.10 Benzo(a) pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	2-Methylnaphthalene	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-Chloro-alline ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Acenaphtylene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(g,h)rervlene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	2-Methylphenol	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-Chloro-a-methylphenol ND 10 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitroaniline ND 10 A-Nitroaniline ND 10 Acenaphthene ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Anthracene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(g,h,i)perylene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	2-Nitroaniline	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-Chlorophenyl phenyl ether       ND       10         4-Nitrophenyl phenyl ether       ND       10         4-Nitrophenol       ND       10         Acenaphthene       ND       10         Acenaphthylene       ND       10         Anthracene       ND       10         Benzo(g,h,i)perylene       ND       10         Benzo(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	2-Nitrophenol	ND	10								
4,6-Dinitro-2-methylphenol       ND       10         4-Bromophenyl phenyl ether       ND       10         4-Chloro-3-methylphenol       ND       5.0         4-Chlorophinyl phenyl ether       ND       10         4-Chlorophenyl phenyl ether       ND       10         4-Nitrophenol       ND       10         Acenaphthene       ND       10         Acenaphthylene       ND       10         Anthracene       ND       10         Benzo(g,h,i)perylene       ND       10         Benzo(a)anthracene       ND       0.10         Benzo(a)pyrene       ND       0.10         Benzo(b)fluoranthene       ND       0.10         Benzo(k)fluoranthene       ND       0.10         Benzo(k)fluoranthene       ND       0.10         Benzo(k)fluoranthene       ND       0.10	3,3'-Dichlorobenzidine	ND	10								
4-Bromophenyl phenyl ether ND 10 4-Chloro-3-methylphenol ND 5.0 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitrophenol ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	3-Nitroaniline	ND	10								
4-Chloro-3-methylphenol ND 5.0 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Acenaphtylene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(a)pyrene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	4,6-Dinitro-2-methylphenol	ND	10								
4-Chloro-3-methylphenol ND 5.0 4-Chlorophenyl phenyl ether ND 10 4-Chlorophenyl phenyl ether ND 10 4-Nitroaniline ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Acenaphtylene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(a)pyrene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	4-Bromophenyl phenyl ether	ND	10								
4-Chlorophenyl phenyl ether 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 Benzo(a)anthracene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10	4-Chloro-3-methylphenol		5.0								
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 Benzo(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	4-Chloroaniline										
4-Nitrophenol ND 10 4-Nitrophenol ND 10 Acenaphthene ND 10 Acenaphthylene ND 10 Anthracene ND 10 Benzo(g,h,i)perylene ND 10 Benzo(a)pyrene ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10 Benzo(k)fluoranthene ND 0.10 Bis(2-chloroethoxy)methane 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	4-Nitroaniline										
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											
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	NG 17 7 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
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											
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											
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											
Benzo(a)pyrene         ND         0.10           Benzo(b)fluoranthene         ND         0.10           Benzo(k)fluoranthene         ND         0.10           Bis(2-chloroethoxy)methane         ND         10											
Benzo(b)fluoranthene         ND         0.10           Benzo(k)fluoranthene         ND         0.10           Bis(2-chloroethoxy)methane         ND         10											
Benzo(k)fluoranthene ND 0.10 Bis(2-chloroethoxy)methane ND 10											
Bis(2-chloroethoxy)methane ND 10	· · · · · · · · · · · · · · · · · · ·										
	* *										
note-animoenthenia IID II											
	219/2-MINORGENY/Jeffel	ND	10								

#### 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 greater than 2.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755	SampT	уре: МЕ	BLK	Test	Code: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: PBW	Batch	ID: R2	1755	R	tunNo: 2	1755				
Prep Date:	Analysis D	ate: 9/	23/2014	S	SeqNo: 6	38842	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Bis(2-chloroisopropyt)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
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								
Indeno(1,2,3-cd)pyrene	ND	10								
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	1.0								
Phenol	ND	5.0								
Pyrene	ND	10								
o-Toluidine	ND	10								
Pyridine	ND	10								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID LCS-R21755	SampType: LCS Batch ID: R21755			Tes	TestCode: EPA 8270C: Semivolatiles/Mod						
Client ID: LCSW				F	1755						
Prep Date:	Analysis D	Date: 9	/23/2014	8	SeqNo: 6	38843	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4-Dinitrotoluene	3.1		5.000	0	61.2	49	134		1755		
2-Chlorophenol	3.4		5.000	0	67.6	50	131				
4-Chloro-3-methylphenol	3.3		5.000	0	66.4	42	139				

#### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID LCS-R21755	SampT	ype: LC	S	Tes	tCode: El	PA 8270C: S	Semivolatiles	/Mod		
Client ID: LCSW	Batch	ID: R2	21755	F	RunNo: 2	1755				
Prep Date:	Analysis D	ate: 9	/23/2014	8	SeqNo: 6	38843	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Nitrophenol	2.6		5.000	0	53.0	19	137			
Acenaphthene	4.0		5.000	0	79.6	36	122			
Bis(2-ethylhexyl)phthalate	3.9		5.000	0	78.2	43	142			
N-Nitrosodi-n-propylamine	4.1		5.000	0	82.0	46	135			
Pentachlorophenol	2.5		5.000	0	49.6	22	138			
Phenol	3.7		5.000	0	73.4	45	134			
Pyrene	3.6		5.000	0	73.0	45	138			

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-15362

SampType: MBLK

TestCode: EPA Method 7470: Mercury

PBW Client ID:

Batch ID: 15362

RunNo: 21286

Prep Date: 9/18/2014 Analysis Date: 9/18/2014

SeqNo: 621116

Units: mg/L HighLimit

Analyte Mercury

PQL SPK value SPK Ref Val %REC LowLimit ND 0.00020

TestCode: EPA Method 7470: Mercury

Sample ID LCS-15362 Client ID:

LCSW

WDW-1,2,&3 Effluen

9/18/2014

SampType: LCS Batch ID: 15362

RunNo: 21286

Prep Date: Analyte

Analysis Date: 9/18/2014

SeqNo: 621117

Units: mg/L

HighLimit

**RPDLimit** 

**RPDLimit** 

Mercury

SPK value SPK Ref Val Result PQL 0.0053 0.00020 0.005000

%REC 105

LowLimit 120 %RPD

Qual

Qual

0

%RPD

Sample ID 1409594-001BMS

SampType: MS

TestCode: EPA Method 7470: Mercury RunNo: 21286

Client ID: Prep Date:

9/18/2014

Analysis Date: 9/18/2014

SeqNo: 621119

Units: mg/L

Analyte

Batch ID: 15362

0.0050 0.00020

PQL SPK value SPK Ref Val 0.005000

%REC LowLimit HighLimit

125

%RPD

Qual

Mercury

Sample ID 1409594-001BMSD

SampType: MSD

TestCode: EPA Method 7470: Mercury

Client ID:

WDW-1,2,&3 Effluen

Batch ID: 15362

RunNo: 21286

Prep Date: 9/18/2014

Analysis Date: 9/18/2014

SeqNo: 621120

Units: mg/L

**RPDLimit** 

**RPDLimit** Qual

Analyte Mercury

SPK value SPK Ref Val 0.0050 0.00020 0.005000

%REC 101

75

HighLimit 125 %RPD 0.392

20

### Qualifiers:

Value exceeds Maximum Contaminant Level.

Analyte detected below quantitation limits

- E Value above quantitation range
- 0 RSD is greater than RSDlimit R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank B
- Holding times for preparation or analysis exceeded H Not Detected at the Reporting Limit ND
- P Sample pH greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Result

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-15428

SampType: MBLK

TestCode: MERCURY, TCLP

PBW Client ID:

Prep Date:

9/22/2014

Batch ID: 15428 Analysis Date: 9/23/2014

PQL

RunNo: 21367

SeqNo: 623963

Units: mg/L HighLimit

%RPD

**RPDLimit** 

Qual

Analyte Mercury

ND 0.020

Sample ID LCS-15428

LCSW

SampType: LCS

TestCode: MERCURY, TCLP

Batch ID: 15428

RunNo: 21367

Units: mg/L

Prep Date: Analyte

Client ID:

9/22/2014

Analysis Date: 9/23/2014

SPK value SPK Ref Val %REC LowLimit

SeqNo: 623964 %REC LowLimit

HighLimit

%RPD

**RPDLimit** Qual

Result

98.4 ND 0

120

Mercury

SPK value SPK Ref Val PQL 0.020 0.005000

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

Value above quantitation range E

Analyte detected below quantitation limits

RSD is greater than RSDlimit 0

R RPD outside accepted recovery limits

Analyte detected in the associated Method Blank B

Holding times for preparation or analysis exceeded H

Not Detected at the Reporting Limit

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Sample pH greater than 2. P

RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Analysis Date: 9/23/2014

PQL

5.0

SPK value SPK Ref Val

0.1000

Result

ND

Sample ID MB-15405	SampType: M	BLK	Tes	tCode: El	PA Method	6010B: TCLP	Metals		
Client ID: PBW	Batch ID: 15	5405	F	RunNo: 2	1324				
Prep Date: 9/19/2014	Analysis Date: 9	/20/2014	8	SeqNo: 6	26611	Units: mg/L			
Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND 5.0						1		
Barium	ND 100	Š							
Cadmium	ND 1.0	6							
Chromium	ND 5.0	É							
Lead	ND 5.0								
Selenium	ND 1.0								
Sample ID LCS-15405	SampType: L	cs	Tes	tCode: E	PA Method	6010B: TCLP	Metals		
Client ID: LCSW	Batch ID: 1:	5405	F	RunNo: 2	1324				
Prep Date: 9/19/2014	Analysis Date: §	/20/2014	\$	SeqNo: 6	26612	Units: mg/L			
Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND 5.0	0.5000	0	106	80	120			
Barium	ND 100	0.5000	0	101	80	120			
Cadmium	ND 1.0		0	102	80	120			
Chromium	ND 5.0		0	100	80	120			
Lead	ND 5.0		0	98.6	80	120			
Selenium	ND 1.0	0.5000	0	104	80	120			
Sample ID MB-15405	SampType: M	BLK	Tes	tCode: E	PA Method	6010B: TCLF	Metals		
Client ID: PBW	Batch ID: 1	5405	F	RunNo: 2	1385				
Prep Date: 9/19/2014	Analysis Date: 9	9/23/2014	5	SeqNo: 6	26633	Units: mg/L			
						HighLimit	%RPD	RPDLimit	Qual
Analyte Silver	Result PQL ND 5.0		SPK Ref Val	%REC	LOWLITTIL	ragnizimit	MILD	N. DEIIIII	Qual
	91650 75.15	*							
Sample ID LCS-15405	SampType: L	cs	Tes	tCode: E	PA Method	6010B: TCLF	Metals		
Client ID: LCSW	Batch ID: 1	5405	F	RunNo: 2	1385				
						DESCRIPTION OF SOME			

### Qualifiers:

Analyte

Silver

- \* Value exceeds Maximum Contaminant Level.
- E Value above quantitation range

Prep Date: 9/19/2014

- 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

Units: mg/L

HighLimit 120

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

SeqNo: 626634

LowLimit

%REC

104

0

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**RPDLimit** 

Qual

%RPD

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-15405	Samp	Туре: МЕ	BLK	Tes	tCode: E	PA 6010B:	Total Metals			
Client ID: PBW	Bato	ch ID: 15	405	F	RunNo:	21324				
Prep Date: 9/19/2014	Analysis	Date: 9/	20/2014	\$	SeqNo:	622303	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020						18-24		
Antimony	ND	0.050								
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								
Thallium	ND	0.050								
Titanium	ND	0.0050								
Silica	ND	1.1								

Sample ID LCS-15405	Samp	Type: LC	s	Tes	tCode: E	PA 6010B:	Total Metals			
Client ID: LCSW	Bato	h ID: 15	405	F	RunNo: 2	1324				
Prep Date: 9/19/2014	Analysis	Date: 9/	20/2014	S	SeqNo: 6	22304	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.57	0.020	0.5000	0	114	80	120			
Antimony	0.50	0.050	0.5000	0	100	80	120			
Arsenic	0.53	0.020	0.5000	0	106	80	120			
Barium	0.50	0.020	0.5000	0	101	80	120			
Beryllium	0.53	0.0030	0.5000	0	106	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Calcium	52	1.0	50.00	0	105	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Cobalt	0.49	0.0060	0.5000	0	97.9	80	120			
Copper	0.51	0.0060	0.5000	0	102	80	120			
ron	0.51	0.050	0.5000	0	101	80	120			
Lead	0.49	0.0050	0.5000	0	98.6	80	120			
Magnesium	52	1.0	50.00	0	103	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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID LCS-15405	SampType: LC	s	Test	Code: EF	PA 6010B: 1	Total Metals			
Client ID: LCSW	Batch ID: 154		-,	unNo: 2	190				
Prep Date: 9/19/2014	Analysis Date: 9/			eqNo: 6		Units: mg/L			
Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.50 0.0020	0.5000	0	100	80	120			
Nickel	0.49 0.010	0.5000	0	98.7	80	120			
Potassium	49 1.0	50.00	0	98.1	80	120			
Selenium	0.52 0.050	0.5000	0	104	80	120			
Thallium	0.49 0.050	0.5000	0	97.7	80	120			
Titanium	0.52 0.0050	0.5000	0	104	80	120			
Silica	5.6 1.1	5.350	0	104	80	120			
Sample ID MB-15405	SampType: ME	BLK	Test	Code: EF	PA 6010B:	Total Metals			
Client ID: PBW	Batch ID: 154	405	R	tunNo: 2	1385				
Prep Date: 9/19/2014	Analysis Date: 9/	23/2014	S	eqNo: 6	24518	Units: mg/L			
Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	ND 0.0050								
Sample ID LCS-15405	SampType: LC	s	Tes	tCode: EF	PA 6010B:	Total Metals			
Client ID: LCSW	Batch ID: 154	405	R	RunNo: 2	1385				
	Analysis Date: 9/	23/2014	S	SeqNo: 6	24519	Units: mg/L			
Prep Date: 9/19/2014	) 보니 10 11 <b>를</b> 10 11는 12 12 12 12 12 12 12 12 12 12 12 12 12								
Prep Date: 9/19/2014 Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

### 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 greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755

SampType: MBLK

TestCode: CYANIDE, Reactive

Client ID:

PBW

Batch ID: R21755

RunNo: 21755

Prep Date:

Analysis Date: 9/25/2014

Units: mg/L

Analyte

Result PQL

SeqNo: 639462 SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit** 

Qual

Cyanide, Reactive

ND 1.00

Sample ID LCS-R21755

SampType: LCS

Client ID: LCSW

Batch ID: R21755 Analysis Date: 9/25/2014 RunNo: 21755

SeqNo: 639463

Units: mg/L

Prep Date: Analyte

Result

PQL

SPK value SPK Ref Val %REC LowLimit

TestCode: CYANIDE, Reactive

HighLimit

%RPD

Cyanide, Reactive

0.487

97.4

120

**RPDLimit** 

Qual

0.5000

0

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits J

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank B

Holding times for preparation or analysis exceeded H

Not Detected at the Reporting Limit ND

P Sample pH greater than 2. Reporting Detection Limit RL

Page 22 of 26

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Result

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R21755

SampType: MBLK

TestCode: SULFIDE, Reactive

Client ID: PBW

Batch ID: R21755

PQL

RunNo: 21755

Prep Date: Analyte

Analysis Date: 9/30/2014

SeqNo: 639465

Units: mg/L HighLimit

**RPDLimit** 

Qual

Reactive Sulfide

ND 1.0

Sample ID LCS-R21755

SampType: LCS

TestCode: SULFIDE, Reactive

Client ID: LCSW

Batch ID: R21755

RunNo: 21755

Prep Date:

Analysis Date: 9/30/2014

SeqNo: 639466

Units: mg/L

%RPD **RPDLimit** 

Qual

0.2000

SPK value SPK Ref Val %REC LowLimit

80.0

Analyte

Result

0

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

Reactive Sulfide

0.16

130

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- Reporting Detection Limit

Page 23 of 26

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

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: R21338

RunNo: 21338

Units: mg/L CaCO3

Prep Date:

Analysis Date: 9/19/2014

SeqNo: 622910

Analyte

SPK value SPK Ref Val %REC LowLimit PQL 20

HighLimit

**RPDLimit** Qual

Total Alkalinity (as CaCO3)

ND

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID: LCSW

Batch ID: R21338

RunNo: 21338

Prep Date:

Analysis Date: 9/19/2014

SeqNo: 622911

Units: mg/L CaCO3

Qual

Analyte

Result PQL SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

%RPD

**RPDLimit** 

**RPDLimit** 

SPK value SPK Ref Val %REC LowLimit

0

110

Total Alkalinity (as CaCO3)

80.00

80.00

TestCode: SM2320B: Alkalinity

Prep Date:

Analyte

Sample ID mb-2 Client ID:

SampType: MBLK Batch ID: R21338

RunNo: 21338

Units: mg/L CaCO3

Result PQL ND

81

Analysis Date: 9/19/2014

SegNo: 622914

HighLimit

%RPD

Qual

Total Alkalinity (as CaCO3) Sample ID Ics-2

Total Alkalinity (as CaCO3)

SampType: LCS

TestCode: SM2320B: Alkalinity

Prep Date: Analyte

Client ID:

LCSW

Batch ID: R21338 Analysis Date: 9/19/2014

PQL

20

RunNo: 21338 SeqNo: 622915

Units: mg/L CaCO3

%RPD

Page 24 of 26

**RPDLimit** Qual

SPK value SPK Ref Val %REC 102

90

HighLimit 110

Value exceeds Maximum Contaminant Level.

Value above quantitation range E

RPD outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH greater than 2.

Н

Reporting Detection Limit RL

Qualifiers:

Analyte detected below quantitation limits 0 RSD is greater than RSDlimit

Spike Recovery outside accepted recovery limits

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID 1409594-001ADUP

SampType: DUP

TestCode: Specific Gravity

Client ID: WDW-1,2,&3 Effluen

Batch ID: R21384

RunNo: 21384

Prep Date:

Analysis Date: 9/23/2014

SeqNo: 624495

Units:

Analyte

Result

PQL

SPK value SPK Ref Val %REC LowLimit

%RPD **RPDLimit**  Qual

0.110

Specific Gravity

1.000

0

HighLimit

20

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

0 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

Not Detected at the Reporting Limit ND

Sample pH greater than 2.

Reporting Detection Limit RL

Page 25 of 26

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1409594

09-Oct-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-15289

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

PBW Client ID:

Batch ID: 15289

RunNo: 21253

Prep Date: 9/15/2014

Analysis Date: 9/17/2014

SeqNo: 619558

Units: mg/L

HighLimit

%RPD

**RPDLimit** Qual

Analyte Total Dissolved Solids

PQL ND 20.0

Sample ID LCS-15289

SampType: LCS Batch ID: 15289 TestCode: SM2540C MOD: Total Dissolved Solids

RunNo: 21253 SeqNo: 619559

Units: mg/L

Qual

Analyte

Client ID: LCSW

Prep Date: 9/15/2014

Result

SPK value SPK Ref Val

%RPD

Analysis Date: 9/17/2014

HighLimit

**RPDLimit** 

**Total Dissolved Solids** 

PQL 20.0

102

%REC LowLimit

1020

Result

1000

0

SPK value SPK Ref Val %REC LowLimit

120

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

E Value above quantitation range

Analyte detected below quantitation limits

RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Н

Not Detected at the Reporting Limit ND

Page 26 of 26

P Sample pH greater than 2.

RL Reporting Detection Limit



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

### Sample Log-In Check List

Client Name: NAVAJO REFINING COM Work Order Nu	mber: 1409594		RcptNo: 1
Received by/date: 691214			
Logged By: Lindsay Mangin 9/12/2014 9:45:0	0 AM	gradiy Hago	
	AV-58450	- Julian	1
Completed By: Lindsay Mangin 9/12/2014 10:09:	46 AM	Compliance	
Reviewed By: 09/12/14			
Chain of Custody	_		
Custody seals intact on sample bottles?	Yes 🗌	No 🗆	Not Present ✓
2. Is Chain of Custody complete?	Yes 🗹	No 🗔	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	Yes <b>✓</b>	No 🗆	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 🗹	NA 🗆
3. Was preservative added to bottles?	res 🗀	110	
10.VOA vials have zero headspace?	Yes 🗹	No 🗆	No VOA Vials
11. Were any sample containers received broken?	Yes	No 🗹	# of preserved
			bottles checked 2. 2
12. Does paperwork match bottle labels?	Yes 🗹	No □	for pH: (<2)or >12 unless noted)
(Note discrepancies on chain of custody)  13. Are matrices correctly identified on Chain of Custody?	Yes 🗹	No 🗆	Adjusted? ho
14. Is it clear what analyses were requested?	Yes 🗹	No 🗆	46
15. Were all holding times able to be met?	Yes 🗹	No 🗆	Checked by:
(If no, notify customer for authorization.)		L	
Caralal Handling (if applicable)			
Special Handling (if applicable)		·- □	NA ☑
16. Was client notified of all discrepancies with this order?	Yes 🗔	No 🗆	NA 🖭
Person Notified:	Date:	1 7 to 5; (8 a 1 to 10 a a	,
By Whom:	fia: eMail P	hone 🗌 Fax	In Person
Regarding:	and the same of the same of the best of the same of th	**************************************	all all to a consideration and are security of the security of
Client Instructions:	* * * * * * * * * * * * * * * * * * *		5.5.500 (DOS)
17. Additional remarks:	# 2		
18. Cooler Information Cooler No Temp °C Condition Seal Intact Seal N 1 5.3 Good Yes	No Seal Date	Signed By	

								1	- 91	2			
Client: Navajo Refining Co.	ivajo Refil	ning Co.		□ Standar	□ Rush			. <b>ଏ</b> 1 ୮	NAL	YSIS	LAB	ABORATO	ORY
				Project Name:	ie:				www.h	allenviror	www.hallenvironmental.com		
Mailing A	ddress: P	.O. Box 1	Mailing Address: P.O. Box 159 Artesia,	Quarterly W	Quarterly WDW-1, 2, & 3 Inj Well	ıj Well	4	901 Hawk	4901 Hawkins NE - A	Ibuquerq	Albuquerque, NM 87109		
NM 88211-0159	1-0159	10		Project #: P.	Project #: P.O. # 167796	97. G	Г	Tel. 505-3	505-345-3975	Fax 505	505-345-4107		
Phone #: 575-748-3311	575-748-	3311							(	Analysis Request	Request		
email or Fax#: 575-746-5451	ax#: 575-	-746-5451		Project Man	nager:				. (,s	-			
QA/QC Package:	ckage:						140	( 827		- 40	LL		
□ Standard	ard		☐ Level 4 (Full Validation)	Dan Crawford	p :		H''	yod yod	09		51 E		
□ Other				Sampler: C	states UMBAN	٩w	and Br eth	νς Net	thc		oou		
□ EDD (Type)	Гуре)			On loe Sample Terr	peranie 6	ISI NO	pH, co n bal.,	tail be 1 846 I	N 9 <del>1</del> 8		e Me		
Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEALING HOUSE THE	Specific Gra SO4, TDS, Cation/anio	(see attache SVOCs/SW (see attache	R,C,I/40 CF Metals/SW- 7470 (see a	Ca, K, Mg, I	561/ SW-84	57023	
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	3	Neat/H2SO4	<u>Q</u>	×			×			
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	-	HNO3	-80-			×	×			
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	3	HCL	-B)	×						
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	. 2	Neat	-B(		×					
9/11/14	9:30	Liquid	WDW-1, 2, & 3 Effluent	2	Neat	-001			×				
9/11/14	9:30	Liquid	Trip Blank	2	Neat	-00-	CS ×						
9/11/14	9:30	Liquid	Temperature Blank	-	Neat	1	titalleo						
Date:	Time:	Relinquished by:	Steven Craw	Received by:		Date Time	Remarks: Report these results Chain of Custody kits provided	eport thes	se results se	parately	Remarks: Report these results separately from all other Chain of Custody kits provided.		
. John	i i				V CB	12 4 0945	4	in blu	blank samole		was not recieved	riewed	
nate		Kelinquished by:		Received by:		Date	172719	. ^	41/41/60				
	li noncon	o columna so	many and an interpretational production and an interpretational production and an interpretation and an interp	shooted to other	And the desired and	This contract on addition of this	Accordingly American	b. annihonalad	acolo ad Illin atal	on bushalow	to analytical paners		



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

### Quarterly Sample Injection Well Attachment Details

### HOLLYFRONTIER The HollyFrontier Companies

Grab posite	Flow Weighted Com	Time Weighted Com		Sample
	posite	posite	Grab	Type

			pri
Sludge	Liquid	Solid	Physic
	<		cal Proper
			y

Outfall / Sample Location: Waste water effluent pumps to injection wells.	Start Date and Time 9/11/2014 @ \$1.50 End Date and Time 9/11/2014 @ 16 10\$	Project Name WDW-1,2, & 3 Ortly Inj Well Samplers Name Steven Urban Samplers Affiliation Navajo Refining Co. LLC
☐ P-849 sample point (first from east) ☐ P-854 sample point (second from east)	Parts / Sample Intervals One	Time Weighted Composite
☐ P-856 sample point (third from east) ☐ P-857 sample point (fourth from east)	Type of Sampler Directly to sample jars	Liquid 🖸 Sluoge 🗌

Container   Size   Material   Containers   (None)   HOL   HNO3   H2SO4   NaOH   Na2S2O3   NaHSO4   Other   Analysis-andor Method Requested					1		+	-				9
Material   Containers (None)   HCL   HNO3   H2504   NaOH   Na25203   NaHS04   Other						1	1	1				8
Material   Containers (None)   HCL   HNO3   H2SO4   NaOH   Na2S2O3   NaHSO4   Other					1		+	1			_	
Material   Containers (None)   HCL   HNO3   H2SO4   NaOH   Na2S2O3   NaHSO4   Other	846 Method 1311							×				4
Size   Material   Containers (None)   HCL   HNO3   H2SO4   NaOH   Na2S2O3   NaHSO4   Other	TCLP Metals, only /40 CFR Part			1	+		-	×	2			6
#of Neat   Neat	Ca, K, Mg, Na/40 CFR 13						-					O
Size   Material   Containers (None)   HOL   HNO3   H2SO4   NaOH   Na2S203   NaHSO4   Other	attached list 'Metals')						_	×	2			
# of Neat   Neat   NaOH   Na2S203 NaHS04   Other   NaOH   NaDH   Na	Metals/SW-846 Mthd 6010, 74				1	-	+	×	2			4
# of Neat   Neat   NaOH   Na2S203 NaHS04   Other   NaOH   NaDH   NaSOH   NaOH   NaDH   NaSOH   NaOH   NaDH   NaDH   NaDH   Na2S203 NaHS04   Other   NaOH   NaDH   NaDH	R,C,1/40 CFR part 261						+	-				c.
Size Material Containers (None) HCL HNO3 H2S04 NaOH Na2S203 NaHS04 Other.	attached list 'SVOCs')					-		×	ω —			Total Control
Size Material Containers (None) HCL HNO3 H2SO4 NaOH Na2S2O3 NaHSO4 Other	SVOCs/SW-846 Method 8270	A STATE OF THE STA					-					*
Size Material Containers (None) HCL HNO3 H2SO4 NaOH Na2S2O3 NaHSO4 Other.	list 'VOCs')						×	-				)
Size Material Containers (None) HCL HNO3 H2SO4 NaOH Na2S2O3 NaHSO4 Other	VOCs/SW-846 Method 8260C (se				1							
# of Neat HOL HNO3 H2S04 NaOH Na2S203 NaHS04 Other	CFR 136.3					>		×				1
# of Neat HOC HNOS H2SO4 NaOH Na2S2O3 NaHSO4 Other	pH, cond., FI, Cation/anion bal., I					<					The second second	
# of Neat HO HN03 H2804 NaOH Na2S203 NaHS04 Other	Specific Gravity, HCO3, CO3, CI,						-40		18	THE PERSON NAMED IN	Size	75 B
	Analysis and/or Method Requ		NaHSO4	Na2S203	NaOH	H2SO4	distant les		800	The factor	1	
	のでは、これので、一大な中では、多年はからからに						The second second	September 1				

Field Temp. 113 \*\*

Field pH 6.88

Fleigi Data (Weather, Observations, Etc); 6/11/2014 08:51 Tmp. 72.0, Humidity 68%, Wind Dir. SE, Wind Speed 8.1 mph, Conditions Overcast Date and Time.

Shipping Media.



January 22, 2015

Mr. Carl Chavez, CHMM
NM Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, NM 87505-5472

Certified Mail/Return Receipt 7014 1200 0000 1832 3280

RE: 2014 4th Quarter Injection Report for Wells WDW-1, WDW-2 and WDW-3, Navajo Refining Company, L.L.C.

Dear Mr. Chavez,

Enclosed, please find the fourth quarter 2014 sampling results for fluids injected into WDW-1, WDW-2 and WDW-3 and a spread sheet showing various volumes and pressures as required under Permit Condition 2.I.1, Quarterly Reports.

Over the fourth quarter, the average injection pressure for all three wells was 1345 psig and the average flows were 111 gpm for WDW-1, 113 gpm for WDW-2 and 128 gpm for WDW-3. There were no significant losses from the glycol expansion tanks Well Annulus Monitoring System (WAMS). The quarterly effluent analyses indicated parameters are within permit limits.

This report covers the period from October 1, 2014 to December 31, 2014. We have disposed a total of 1,088,093 barrels of fluid into the three wells during the fourth quarter of 2014. The volume per well is:

- 350,826 barrels into WDW-1
- 360,020 barrels into WDW-2
- 377,247 barrels into WDW-3

This report is signed and certified in accordance with WQCC section 5101.G. If there are any questions, please call me at 575-748-3311.

Respectfully,

Robert O'Brien

Vice-President & Refinery Manager Navajo Refining Company, L.L.C.

AKDISin

Enc.

Electronic cc (w/enc.): Environmental File:

R Combs, M Schultz, A Strange

Injection Wells/Reports C-115 & Quarterly/2014/4th quarter/2015-1-22 4th QTR Inj Rpt for Wells WDW-1,2,3

# 2014 FOURTH QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

							Average	Maximum	Minimum					TOTAL
	Average	Maximum	Minimum	Average	Maximum	Minimum	Annular	Annular	Annular	Average	Maximum	Minimum		CUMULATIVE
	Pressure	Pressure	Pressure	Flow	Flow	Flow	Pressure	Pressure	Pressure	Volume	Volume	Volume	Volume	Volume
	(bsig)	(bsig)	(bsig)	(dbm)	(mdb)	(mdb)	Av (psig)	Mx (psig)	Mn (psig)	(pdq)	(pdq)	(pdq)	(barrels)	(barrels)
WDW-1												Previ	Previous Quarter	35,589,080
Oct-14	1,341	1,350	1,310	93	125	29	360	569	203	3,189	4,286	2,297	99,503	35,688,583
Nov-14	1,356	1,375	1,300	122	128	112	305	380	193	4,183	4,389	3,840	125,348	35,813,931
Dec-14	1,346	1,380	1,244	118	269	94	285	402	156	4,046	9,223	3,223	125,975	35,939,906
WDW-2					i i				0			Previ	Previous Quarter	22,558,499
Oct-14	1,341	1,350	1,306	119	126	110	298	366	256	4,080	4,320	3,771	127,175	22,685,674
Nov-14	1,353	1,375	1,300	115	123	105	515	1,617	253	3,943	4,217	3,600	118,739	22,804,413
Dec-14	1,347	1,380	1,255	107	117	83	808	1,492	256	3,669	4,011	2,846	114,106	22,918,519
WDW-3			100000000000000000000000000000000000000							14	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW	Previ	Previous Quarter	12,735,189
Oct-14	1,341	1,350	1,063	122	144	0	784	938	331	4,183	4,937	0	129,877	12,865,066
Nov-14	1,342	1,375	1,205	124	139	94	847	1,002	929	4,251	4,766	1,851	127,146	12,992,212
Dec-14	1,340	1,373	1,258	138	127	82	206	799	616	4,731	4,354	2,811	120,224	13,112,436
												Total Inje	Total Injected fluids:	71,970,861

## 2014 FOURTH QUARTER WEEKLY WAMS LEVEL TABLE

WDW-11         145         200         200         200         200         200         200		10/8/14	10/13/14	10/21/14	10/27/02	11/4/14	11/10/14	11/10/14   12/22/14   12/29/14   12/9/14   12/15/14   12/22/14   12/29/14	11/24/14	12/1/14	12/9/14	12/15/14	12/22/14	12/29/14
1         145														
100   100	WDW -11	145	145	145	145	145	145	145	145	145	145	145	145	145
100   100														
145   145   145   145   145   200   200   200   200   200   200   Comments:	WDW-21	100	100	100	100	100	100	100	100	100	100	100	100	100
145   145   145   145   145   200   200   200   200   200   200   Comments:					1									
Comments:	WDW-31	145	145	145	145	145	145	145	200	200	200	200	200	200
Comments:														
Comments:														
					Comm	ents:			*					

¹ Graduated tank gauged weekly in the field. Reading is in gallons. WDW-1 is Mewbourne WDW-2 is Chukka WDW-3 is Gaines



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

December 09, 2014

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.: 1411288

Dear Dan Crawford:

Hall Environmental Analysis Laboratory received 2 sample(s) on 11/7/2014 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued December 08, 2014

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> 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



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#:

1411288

Date:

12/9/2014

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  $\sim 10$ ppb:

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 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS	91/1101901/		14010240 11		Analys	st: LGP
Fluoride	5.3	0.50	* mg/L	5	11/7/2014 11:52:12 P	M R22427
Chloride	330	25	mg/L	50	11/19/2014 12:14:33 /	AM R22629
Nitrogen, Nitrite (As N)	ND	0.50	mg/L	5	11/7/2014 11:52:12 P	M R22427
Bromide	0.68	0.50	mg/L	5	11/7/2014 11:52:12 P	M R22427
Nitrogen, Nitrate (As N)	1.3	0.50	mg/L	5	11/7/2014 11:52:12 P	M R22427
Phosphorus, Orthophosphate (As P)	ND	2.5	mg/L	5	11/7/2014 11:52:12 P	M R22427
Sulfate	1300	25	mg/L	50	11/19/2014 12:14:33 /	AM R22629
EPA METHOD 7470: MERCURY					Analys	st: MMD
Mercury	ND	0.00020	mg/L	. 1	11/13/2014 11:05:18	AM 16357
MERCURY, TCLP					Analys	st: MMD
Mercury	ND	0.020	mg/L	1	11/13/2014 2:54:22 P	M 16358
EPA METHOD 6010B: TCLP METALS					Analys	st: ELS
Arsenic	ND	0.20	mg/L	1	11/12/2014 11:08:39	AM 16345
Barium	ND	0.10	mg/L	. 1	11/12/2014 11:08:39	AM 16345
Cadmium	ND	0.10	mg/L	1	11/12/2014 11:08:39 /	AM 16345
Chromium	ND	0.10	mg/L	1	11/12/2014 11:08:39 /	AM 16345
Lead	ND	0.10	mg/L	1	11/12/2014 11:08:39 /	AM 16345
Selenium	ND	0.20	mg/L	1	11/12/2014 11:08:39 /	AM 16345
Silver	ND	0.10	mg/L	1	11/12/2014 11:08:39 /	AM 16345
EPA 6010B: TOTAL METALS					Analys	st: ELS
Aluminum	0.48	0.020	mg/L	1	11/12/2014 11:06:42	AM 16345
Antimony	ND	0.050	mg/L	1	11/12/2014 11:06:42	AM 16345
Arsenic	0.050	0.020	mg/L	1	11/12/2014 11:06:42	AM 16345
Barium	ND	0.020	mg/L	1	11/12/2014 11:06:42	AM 16345
Beryllium	ND	0.0030	mg/L	1	11/12/2014 11:06:42	AM 16345
Cadmium	ND	0.0020	mg/L	1	11/12/2014 11:06:42	AM 16345
Calcium	50	1.0	mg/L	1	11/12/2014 11:06:42	AM 16345
Chromium	ND	0.0060	mg/L	1	11/12/2014 11:06:42	AM 16345
Cobalt	ND	0.0060	mg/L	1	11/12/2014 11:06:42	AM 16345
Copper	0.0092	0.0060	mg/L	1	11/12/2014 11:06:42	AM 16345
Iron	0.86	0.050	mg/L	1	11/12/2014 11:06:42	AM 16345
Lead	ND	0.0050	mg/L	1	11/12/2014 11:06:42	AM 16345
Magnesium	17	1.0	mg/L	1	11/12/2014 11:06:42	AM 16345
Manganese	0.10	0.0020	mg/L	1	11/12/2014 11:06:42	AM 16345
Nickel	0.010	0.010	mg/L	1	11/12/2014 11:06:42	
Potassium	22	1.0	mg/L	1	11/12/2014 11:06:42	AM 16345
Selenium	0.058	0.050	mg/L	1	11/12/2014 11:06:42	AM 16345

Matrix: AQUEOUS

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

### 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

Page 2 of 28

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Matrix: AQUEOUS

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL C	Qual Units	DF	Date Analyzed	Batch
EPA 6010B: TOTAL METALS					Anal	yst: ELS
Silver	ND	0.0050	mg/L	1	11/12/2014 11:06:42	AM 16345
Sodium	ND	1.0	mg/L	1	11/12/2014 11:06:42	AM 16345
Thallium	ND	0.050	mg/L	1	11/12/2014 11:06:42	AM 16345
Vanadium	ND	0.050	mg/L	1	11/12/2014 11:06:42	AM 16345
Zinc	0.049	0.020	mg/L	1	11/12/2014 11:06:42	AM 16345
EPA METHOD 8260B: VOLATILES					Anal	yst: SUB
Acetonitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Allyl chloride	ND	0.500	μg/L	. 1	11/13/2014	R22819
Chloroprene	ND	0.500	μg/L	1	11/13/2014	R22819
Cyclohexane	ND	0.500	μg/L	1	11/13/2014	R22819
Diethyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Diisopropyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Epichlorohydrin	ND	5.00	μg/L	1	11/13/2014	R22819
Ethyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
Ethyl methacrylate	ND	0.500	μg/L	1	11/13/2014	R22819
Ethyl tert-butyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Freon-113	ND	0.500	μg/L	1	11/13/2014	R22819
Isobutanol	ND	50.0	μg/L	1	11/13/2014	R22819
Isopropyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
Methacrylonitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Methyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
Methyl ethyl ketone	2.82	2.50	μg/L	1	11/13/2014	R22819
Methyl isobutyl ketone	ND	2.50	μg/L	1	11/13/2014	R22819
Methyl methacrylate	ND	0.500	μg/L	1	11/13/2014	R22819
Methylcyclohexane	ND	1.00	μg/L	1	11/13/2014	R22819
n-Amyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
n-Hexane	ND	0.500	μg/L	.1	11/13/2014	R22819
Nitrobenzene	ND	5.00	μg/L	1	11/13/2014	R22819
Pentachloroethane	ND	5.00	μg/L	1	11/13/2014	R22819
p-isopropyltoluene	ND	0.500	μg/L	- 1	11/13/2014	R22819
Propionitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Tetrahydrofuran	ND	0.500	μg/L	1	11/13/2014	R22819
Benzene	ND	0.500	μg/L	1	11/13/2014	R22819
Toluene	ND	0.500	µg/L	1	11/13/2014	R22819
Ethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
Methyl tert-butyl ether (MTBE)	ND	10.0	μg/L	1	11/13/2014	R22819
1,2,4-Trimethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
1,3,5-Trimethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
1,2-Dichloroethane (EDC)	ND	0.500	μg/L	1	11/13/2014	R22819

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### Qualifiers:

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- 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 3 of 28

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Received Date: 11/7/2014 9:20:00 AM

nalyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ana	lyst: SUB
1,2-Dibromoethane (EDB)	ND	0.500	μg/L	1	11/13/2014	R2281
Naphthalene	ND	0.500	µg/L	1	11/13/2014	R2281
Acetone	47.2	2.50	μg/L	- 1	11/13/2014	R2281
Bromobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Bromodichloromethane	ND	0.500	μg/L	1	11/13/2014	R2281
Bromoform	ND	0.500	µg/L	1	11/13/2014	R2281
Bromomethane	ND	0.500	μg/L	1	11/13/2014	R2281
Carbon disulfide	0.930	0.500	μg/L	1	11/13/2014	R2281
Carbon Tetrachloride	ND	0.500	μg/L	1	11/13/2014	R2281
Chlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Chloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
Chloroform	ND	0.500	μg/L	1	11/13/2014	R2281
Chloromethane	ND	0.500	μg/L	1	11/13/2014	R2281
2-Chlorotoluene	ND	0.500	μg/L	1	11/13/2014	R2281
4-Chlorotoluene	ND	0.500	μg/L	1	11/13/2014	R2281
cis-1,2-DCE	ND	0.500	μg/L	1	11/13/2014	R2281
cis-1,3-Dichloropropene	ND	0.500	'µg/L	1	11/13/2014	R2281
1,2-Dibromo-3-chloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
Dibromochloromethane	ND	0.500	μg/L	1	11/13/2014	R2281
Dibromomethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,2-Dichlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
1,3-Dichlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
1,4-Dichlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Dichlorodifluoromethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloroethene	ND	0.500	μg/L	1	11/13/2014	R2281
1,2-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
1,3-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
2,2-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloropropene	ND	0.500	μg/L	1	11/13/2014	R2281
Hexachlorobutadiene	ND	0.500	μg/L	1	11/13/2014	R2281
2-Hexanone	ND	0.500	μg/L	1	11/13/2014	R2281
Isopropylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Methylene Chloride	ND	2.50	μg/L	1	11/13/2014	R2281
n-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
n-Propylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
sec-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Styrene	ND	0.500	μg/L	1	11/13/2014	R22819
tert-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819

Matrix: AQUEOUS

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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 LimitP Sample pH greater than 2.
- RL Reporting Detection Limit

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Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Matrix: AQUEOUS Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyze	ed	Batch
EPA METHOD 8260B: VOLATILES	L					Analyst:	SUB
1,1,1,2-Tetrachloroethane	ND	0.500	μg/L	1	11/13/2014		R22819
1,1,2,2-Tetrachloroethane	ND	0.500	μg/L	1	11/13/2014		R22819
Tetrachloroethene (PCE)	ND	0.500	μg/L	1	11/13/2014		R22819
trans-1,2-DCE	ND	0.500	μg/L	1	11/13/2014		R22819
trans-1,3-Dichloropropene	ND	0.500	μg/L	- 1	11/13/2014		R22819
1,2,3-Trichlorobenzene	ND	0.500	μg/L	1	11/13/2014		R22819
1,2,4-Trichlorobenzene	ND	0.500	μg/L	1	11/13/2014		R2281
1,1,1-Trichloroethane	ND	0.500	μg/L	1	11/13/2014		R22819
1,1,2-Trichloroethane	ND	0.500	μg/L	1	11/13/2014		R2281
Trichloroethene (TCE)	ND	0.500	μg/L	1	11/13/2014		R22819
Trichlorofluoromethane	ND	0.500	μg/L	1	11/13/2014		R22819
1,2,3-Trichloropropane	ND	0.500	μg/L	1	11/13/2014		R22819
Vinyl chloride	ND	0.500	μg/L	1	11/13/2014		R22819
Xylenes, Total	ND	1.00	μg/L	1	11/13/2014		R22819
mp-Xylenes	ND	1.00	μg/L	1	11/13/2014		R22819
o-Xylene	ND	0.500	μg/L	1	11/13/2014		R2281
tert-Amyl methyl ether	ND	0.500	μg/L	1	11/13/2014		R2281
tert-Butyl alcohol	46.8	0.500	μg/L	1	11/13/2014		R2281
Acrolein	ND	0.500	µg/L	1	11/13/2014		R2281
Acrylonitrile	ND	10.0	μg/L	1	11/13/2014		R2281
Bromochloromethane	ND	0.500	μg/L	1	11/13/2014		R2281
2-Chloroethyl vinyl ether	ND	0.500	μg/L	1	11/13/2014		R2281
Iodomethane	ND	0.500	μg/L	1	11/13/2014		R22819
trans-1,4-Dichloro-2-butene	ND	0.500	μg/L	1	11/13/2014		R22819
Vinyl acetate	ND	0.500	μg/L	1	11/13/2014		R22819
1,4-Dioxane	ND	20.0	μg/L	1	11/13/2014		R22819
Surr: 1,2-Dichlorobenzene-d4	108	70-130	%REC	1	11/13/2014		R22819
Surr: 4-Bromofluorobenzene	101	70-130	%REC	1	11/13/2014		R22819
Surr: Toluene-d8	99.2	70-130	%REC	1	11/13/2014		R22819
EPA 8270C: SEMIVOLATILES/MOD						Analyst:	SUB
1,1-Biphenyl	ND	5.0	μg/L	1	11/14/2014		R22918
Atrazine	ND	5.0	μg/L	1	11/14/2014		R22918
Benzaldehyde	ND	5.0	μg/L	1	11/14/2014		R22918
Caprolactam	ND	5.0	μg/L	1	11/14/2014		R22918
N-Nitroso-di-n-butylamine	ND	5.0	μg/L	1	11/14/2014		R22918
Acetophenone	ND	10	μg/L	1	11/14/2014		R22918
1-Methylnaphthalene	ND	10	µg/L	1	11/14/2014		R22918
2,3,4,6-Tetrachlorophenol	ND	10	μg/L	1	11/14/2014		R22918
2,4,5-Trichlorophenol	ND	10	μg/L	1	11/14/2014		R22918

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Page 5 of 28

- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Matrix: AQUEOUS

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analy	zed	Batch
EPA 8270C: SEMIVOLATILES/MOD						Analyst:	SUB
2,4,6-Trichlorophenol	ND	10	μg/L	1	11/14/2014		R22918
2,4-Dichlorophenol	ND	10	μg/L	1	11/14/2014		R22918
2,4-Dimethylphenol	ND	10	μg/L	1	11/14/2014		R2291
2,4-Dinitrophenol	ND	10	μg/L	1	11/14/2014		R2291
2,4-Dinitrotoluene	ND	10	μg/L	1	11/14/2014		R2291
2,6-Dinitrotoluene	ND	10	μg/L	1	11/14/2014		R2291
2-Chloronaphthalene	ND	10	μg/L	1	11/14/2014		R2291
2-Chlorophenol	ND	10	μg/L	1	11/14/2014		R2291
2-Methylnaphthalene	ND	10	μg/L	1	11/14/2014		R2291
2-Methylphenol	ND	10	μg/L	1	11/14/2014		R2291
2-Nitroaniline	ND	10	μg/L	1	11/14/2014		R2291
2-Nitrophenol	ND	10	µg/L	1	11/14/2014		R2291
3,3'-Dichlorobenzidine	ND	10	μg/L	1	11/14/2014		R2291
3-Nitroaniline	ND	10	μg/L	1	11/14/2014		R2291
4,6-Dinitro-2-methylphenol	ND	10	μg/L	1	11/14/2014		R2291
4-Bromophenyl phenyl ether	ND	10	μg/L	1	11/14/2014		R2291
4-Chloro-3-methylphenol	ND	5.0	μg/L	1	11/14/2014		R2291
4-Chloroaniline	ND	10	µg/L	1	11/14/2014		R2291
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	11/14/2014		R2291
4-Nitroaniline	ND	10	μg/L	1	11/14/2014		R2291
4-Nitrophenol	ND	10	μg/L	1	11/14/2014		R2291
Acenaphthene	ND	10	μg/L	1	11/14/2014		R2291
Acenaphthylene	ND	10	μg/L	1	11/14/2014		R2291
Anthracene	ND	10	μg/L	1	11/14/2014		R2291
Benzo(g,h,i)perylene	ND	10	μg/L	1	11/14/2014		R2291
Benz(a)anthracene	ND	0.10	μg/L	1	11/14/2014		R2291
Benzo(a)pyrene	ND	0.10	μg/L	1	11/14/2014		R2291
Benzo(b)fluoranthene	ND	0.10	μg/L	1	11/14/2014		R2291
Benzo(k)fluoranthene	ND	0.10	μg/L	1	11/14/2014		R2291
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	11/14/2014		R2291
Bis(2-chloroethyl)ether	ND	10	μg/L	1	11/14/2014		R2291
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	11/14/2014		R2291
Bis(2-ethylhexyl)phthalate	ND	5.0	μg/L	1	11/14/2014		R2291
Butyl benzyl phthalate	ND	10	μg/L	1	11/14/2014		R2291
Carbazole	ND	10	μg/L	- 1	11/14/2014		R2291
Chrysene	ND	0.10	μg/L	1	11/14/2014		R2291
Dibenz(a,h)anthracene	ND	0.10	μg/L	1	11/14/2014		R2291
Dibenzofuran	ND	10	μg/L	1	11/14/2014		R2291
Diethyl phthalate	ND	10	μg/L	1	11/14/2014		R2291

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- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Matrix: AQUEOUS

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyze	ed	Batch
EPA 8270C: SEMIVOLATILES/MOD				94,5		= = <del>5</del> \100	Analyst:	SUB
Dimethyl phthalate	ND	10		μg/L	1	11/14/2014		R22918
Di-n-butyl phthalate	ND	10		μg/L	1	11/14/2014		R22918
Di-n-octyl phthalate	ND	10		μg/L	1	11/14/2014		R22918
Fluoranthene	ND	10		μg/L	1	11/14/2014		R22918
Fluorene	ND	10		μg/L	1	11/14/2014		R22918
Hexachlorobenzene	ND	1.0		μg/L	1	11/14/2014		R22918
Hexachlorobutadiene	ND	10		μg/L	1	11/14/2014		R22918
Hexachlorocyclopentadiene	ND	10		μg/L	1	11/14/2014		R22918
Hexachloroethane	ND	10		μg/L	1	11/14/2014		R22918
Indeno(1,2,3-cd)pyrene	ND	5.0		μg/L	1	11/14/2014		R22918
Isophorone	ND	10		µg/L	1	11/14/2014		R22918
Naphthalene	ND	10		μg/L	1	11/14/2014		R22918
Nitrobenzene	ND	10		μg/L	1	11/14/2014		R22918
N-Nitrosodi-n-propylamine	ND	10		μg/L	1	11/14/2014		R22918
N-Nitrosodiphenylamine	ND	2.0		μg/L	1	11/14/2014		R22918
Pentachlorophenol	ND	10		μg/L	1	11/14/2014		R22918
Phenanthrene	ND	10		μg/L	1	11/14/2014		R22918
Phenol	ND	5.0		μg/L	1	11/14/2014		R22918
Pyrene	ND	10		μg/L	1	11/14/2014		R22918
o-Toluidine	ND	5.0		μg/L	1	11/14/2014		R22918
Pyridine	ND	5.0		μg/L	1	11/14/2014		R22918
1,2,4,5-Tetrachlorobenzene	ND	10		μg/L	1	11/14/2014		R22918
Surr: 2,4,6-Tribromophenol	131	10-123	S	%REC	1	11/14/2014		R22918
Surr: 2-Fluorobiphenyl	88.8	19-130		%REC	1	11/14/2014		R22918
Surr: 2-Fluorophenol	82.4	21-110		%REC	1	11/14/2014		R22918
Surr: Nitrobenzene-d5	86.4	25-130		%REC	1	11/14/2014		R22918
Surr: Phenol-d5	90.8	10-125		%REC	1	11/14/2014		R22918
Surr: Terphenyl-d14	35.6	33-141		%REC	1	11/14/2014		R22918
CORROSIVITY							Analyst:	SUB
pH	7.51			pH Units	1	11/13/2014		R22918
<b>IGNITABILITY METHOD 1010</b>							Analyst:	SUB
Ignitability	>200	0		°F	1	11/18/2014		R22918
CYANIDE, REACTIVE							Analyst:	SUB
Cyanide, Reactive	ND	1.00		mg/L	1	11/18/2014		R22918
SULFIDE, REACTIVE							Analyst:	SUB
Reactive Sulfide	ND	1.0		mg/L	1	11/21/2014		R22918
SM2510B: SPECIFIC CONDUCTANCE							Analyst:	JRR

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 7 of 28
- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 11/6/2014 10:30:00 AM

Lab ID: 1411288-001

Matrix: AQUEOUS

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
SM2510B: SPECIFIC CONDUCTANC	E				Analys	t: JRR
Conductivity	3500	0.010	µmhos/cm	1	11/11/2014 1:35:05 PM	R22485
SM2320B: ALKALINITY					Analys	t: JRR
Bicarbonate (As CaCO3)	320	20	mg/L CaCO3	1	11/11/2014 1:35:05 PM	R22485
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	11/11/2014 1:35:05 PM	R2248
Total Alkalinity (as CaCO3)	320	20	mg/L CaCO3	1	11/11/2014 1:35:05 PM	1 R2248
SPECIFIC GRAVITY			7		Analys	t: JRR
Specific Gravity	1.001	0		1	11/20/2014 2:11:00 PM	/ R22669
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analys	t: KS
Total Dissolved Solids	2380	100	* mg/L	1	11/12/2014 1:18:00 PM	16340

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 greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 1411288-002

Matrix: TRIP BLANK

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL (	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Ar	nalyst: SUB
Acetonitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Allyl chloride	ND	0.500	μg/L	1	11/13/2014	R22819
Chloroprene	ND	0.500	μg/L	1	11/13/2014	R22819
Cyclohexane	ND	0.500	µg/L	1	11/13/2014	R22819
Diethyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Diisopropyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Epichlorohydrin	ND	5.00	μg/L	1	11/13/2014	R22819
Ethyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
Ethyl methacrylate	ND	0.500	μg/L	1	11/13/2014	R22819
Ethyl tert-butyl ether	ND	0.500	μg/L	1	11/13/2014	R22819
Freon-113	ND	0.500	μg/L	1	11/13/2014	R22819
Isobutanol	ND	50.0	µg/L	1	11/13/2014	R22819
Isopropyl acetate	ND	0.500	μg/L	1	11/13/2014	R22819
Methacrylonitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Methyl acetate	ND	0.500	µg/L	1	11/13/2014	R22819
Methyl ethyl ketone	ND	2.50	μg/L	1	11/13/2014	R22819
Methyl isobutyl ketone	ND	2.50	μg/L	1	11/13/2014	R22819
Methyl methacrylate	ND	0.500	µg/L	1	11/13/2014	R22819
Methylcyclohexane	ND	1.00	μg/L	1	11/13/2014	R22819
n-Amyl acetate	ND	0.500	μg/L	1	11/13/2014	R2281
n-Hexane	ND	0.500	μg/L	1	11/13/2014	R2281
Nitrobenzene	ND	5.00	μg/L	1	11/13/2014	R22819
Pentachloroethane	ND	5.00	μg/L	1	11/13/2014	R22819
p-isopropyltoluene	ND	0.500	μg/L	1	11/13/2014	R22819
Propionitrile	ND	0.500	μg/L	1	11/13/2014	R22819
Tetrahydrofuran	ND	0.500	μg/L	1	11/13/2014	R22819
Benzene	ND	0.500	μg/L	1	11/13/2014	R22819
Toluene	ND	0.500	μg/L	1	11/13/2014	R22819
Ethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
Methyl tert-butyl ether (MTBE)	ND	10.0	μg/L	1	11/13/2014	R22819
1,2,4-Trimethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
1,3,5-Trimethylbenzene	ND	0.500	μg/L	1	11/13/2014	R22819
1,2-Dichloroethane (EDC)	ND	0.500	μg/L	1	11/13/2014	R22819
1,2-Dibromoethane (EDB)	ND	0.500	μg/L	1	11/13/2014	R22819
Naphthalene	ND	0.500	μg/L	1	11/13/2014	R22819
Acetone	5.30	2.50	μg/L	1	11/13/2014	R22819
Bromobenzene	ND	0.500	μg/L	1	11/13/2014	R22819
Bromodichloromethane	ND	0.500	μg/L	1	11/13/2014	R22819
Bromoform	ND	0.500	μg/L	1	11/13/2014	R22819

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
  - e Reporting Limit Page 9 of 28
- P Sample pH greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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:

1411288-002

Matrix: TRIP BLANK

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES	,-11-12-1			15. (4	Ar	nalyst: SUB
Bromomethane	ND	0.500	μg/L	1	11/13/2014	R2281
Carbon disulfide	ND	0.500	μg/L	1	11/13/2014	R2281
Carbon Tetrachloride	ND	0.500	μg/L	1	11/13/2014	R2281
Chlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Chloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
Chloroform	ND	0.500	μg/L	1	11/13/2014	R2281
Chloromethane	ND	0.500	μg/L	1	11/13/2014	R2281
2-Chlorotoluene	ND	0.500	μg/L	1	11/13/2014	R2281
4-Chlorotoluene	ND	0.500	μg/L	1	11/13/2014	R2281
cis-1,2-DCE	ND	0.500	μg/L	1	11/13/2014	R2281
cis-1,3-Dichloropropene	ND	0.500	μg/L	1	11/13/2014	R2281
1,2-Dibromo-3-chloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
Dibromochloromethane	ND	0.500	μg/L	1	11/13/2014	R2281
Dibromomethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,2-Dichlorobenzene	ND	0.500	μg/L	- 1	11/13/2014	R2281
1,3-Dichlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
1,4-Dichlorobenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Dichlorodifluoromethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloroethene	ND	0.500	μg/L	1	11/13/2014	R2281
1,2-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
1,3-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
2,2-Dichloropropane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1-Dichloropropene	ND	0.500	μg/L	1	11/13/2014	R2281
Hexachlorobutadiene	ND	0.500	μg/L	1	11/13/2014	R2281
2-Hexanone	ND	0.500	μg/L	1	11/13/2014	R2281
Isopropylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Methylene Chloride	ND	2.50	μg/L	1	11/13/2014	R2281
n-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
n-Propylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
sec-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
Styrene	ND	0.500	μg/L	1	11/13/2014	R2281
tert-Butylbenzene	ND	0.500	μg/L	1	11/13/2014	R2281
1,1,1,2-Tetrachloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
1,1,2,2-Tetrachloroethane	ND	0.500	μg/L	1	11/13/2014	R2281
Tetrachloroethene (PCE)	ND	0.500	μg/L	1	11/13/2014	R2281
trans-1,2-DCE	ND	0.500	μg/L	1	11/13/2014	R2281
trans-1,3-Dichloropropene	ND	0.500	μg/L	. 1	11/13/2014	R2281
1,2,3-Trichlorobenzene	ND	0.500	μg/L	- 1	11/13/2014	R2281

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 greater than 2.
- RL Reporting Detection Limit

### Lab Order 1411288

Date Reported: 12/9/2014

### 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: 1411288-002

Matrix: TRIP BLANK

Received Date: 11/7/2014 9:20:00 AM

Analyses	Result	RL Qua	l Units	DF	Date Analyze	d	Batch
EPA METHOD 8260B: VOLATILES	-					Analyst:	SUB
1,2,4-Trichlorobenzene	ND	0.500	μg/L	1	11/13/2014		R22819
1,1,1-Trichloroethane	ND	0.500	μg/L	1	11/13/2014		R22819
1,1,2-Trichloroethane	ND	0.500	μg/L	1	11/13/2014		R22819
Trichloroethene (TCE)	ND	0.500	μg/L	1	11/13/2014		R22819
Trichlorofluoromethane	ND	0.500	μg/L	1	11/13/2014		R22819
1,2,3-Trichloropropane	ND	0.500	μg/L	1	11/13/2014		R22819
Vinyl chloride	ND	0.500	μg/L	1	11/13/2014		R22819
Xylenes, Total	ND	1.00	μg/L	1	11/13/2014		R22819
mp-Xylenes	ND	1.00	μg/L	1	11/13/2014		R22819
o-Xylene	ND	0.500	μg/L	1	11/13/2014		R22819
tert-Amyl methyl ether	ND	0.500	μg/L	1	11/13/2014		R22819
tert-Butyl alcohol	ND	0.500	µg/L	1	11/13/2014		R22819
Acrolein	ND	0.500	μg/L	1.	11/13/2014		R22819
Acrylonitrile	ND	10.0	μg/L	1	11/13/2014		R22819
Bromochloromethane	ND	0.500	µg/L	1	11/13/2014		R22819
2-Chloroethyl vinyl ether	ND	0.500	μg/L	1	11/13/2014		R22819
Iodomethane	ND	0.500	μg/L	1	11/13/2014		R22819
trans-1,4-Dichloro-2-butene	ND	0.500	μg/L	1	11/13/2014		R22819
Vinyl acetate	ND	0.500	µg/L	1	11/13/2014		R22819
1,4-Dioxane	ND	20.0	μg/L	1	11/13/2014		R22819
Surr: 1,2-Dichlorobenzene-d4	102	70-130	%REC	1	11/13/2014		R22819
Surr: 4-Bromofluorobenzene	94.4	70-130	%REC	1	11/13/2014		R22819
Surr: Toluene-d8	96.4	70-130	%REC	1	11/13/2014		R22819

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 greater than 2.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#: 1411288

09-Dec-14

Client: Project:

Navajo Refining Company

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB	Samp	Гуре: МЕ	BLK	Tes	tCode: EPA Me	thod 300.0: Anic	ons		
Client ID: PBW	Batc	h ID: R2	2427	F	RunNo: 22427				
Prep Date:	Analysis [	Date: 11	1/7/2014		SeqNo: <b>661019</b>	Units: mg	/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC Lowl	Limit HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10	- 1.1-118-2-1-	C TO A WANTED	÷ .			9 E- 19	
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			101			V	
Sample ID LCS	Samp	Гуре: LC	s	Tes	tCode: EPA Me	thod 300.0: Anic	ons		
Client ID: LCSW	Batc	h ID: R2	2427	F	RunNo: 22427				
Prep Date:	Analysis F	late: 1	1/7/2014		Sealor 661020	Units: ma	п		

Client ID: LCSW	Batc	h ID: R2	2427	F	RunNo: 2	2427				
Prep Date:	Analysis [	Date: 11	1/7/2014		SeqNo: 6	61020	Units: mg/L	8		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.47	0.10	0.5000	0	93.8	66.6	112			
Nitrogen, Nitrite (As N)	0.90	0.10	1.000	0	90.2	67.5	109			
Bromide	2.3	0.10	2.500	0	92.8	82.8	103			
Nitrogen, Nitrate (As N)	2.3	0.10	2.500	0	93.3	84	109			
Phosphorus, Orthophosphate (As P	4.6	0.50	5.000	0	91.7	68.8	109			

	-									
Sample ID MB	Samp <sup>-</sup>	ype: MI	BLK	Tes	tCode: E	PA Method	300.0: Anion:	S		
Client ID: PBW	Batc	n ID: R2	2427	F	RunNo: 2	22427				
Prep Date:	Analysis [	)ate: 1	1/7/2014	5	SeqNo: 6	61041	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
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								

Sample ID LCS	SampT	ype: LC	s	Tes	tCode: E	PA Method	300.0: Anions	S		
Client ID: LCSW	Batcl	n ID: R2	2427	F	RunNo: 2	2427				
Prep Date:	Analysis D	ate: 11	1/7/2014	8	SeqNo: 6	61042	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.48	0.10	0.5000	0	96.6	66.6	112			
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	94.0	67.5	109			
Bromide	2.4	0.10	2.500	0	96.4	82.8	103			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.1	84	109			
Phosphorus, Orthophosphate (As P	4.7	0.50	5.000	0	94.8	68.8	109			

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- Analyte detected below quantitation limits J
- 0 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
- H Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
- Sample pH greater than 2.
- Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB SampType: MBLK TestCode: EPA Method 300.0: Anions Client ID: **PBW** Batch ID: R22629 RunNo: 22629 Prep Date: Analysis Date: 11/18/2014 SeqNo: 667493 Units: mg/L Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Chloride ND 0.50 Sulfate ND 0.50

Sample ID	LCS	SampT	ype: LC	S	Tes	tCode: El	PA Method	300.0: Anion	S		
Client ID:	LCSW	Batch	ID: R2	2629	F	RunNo: 2	2629				
Prep Date:		Analysis D	ate: 1	1/18/2014	S	SeqNo: 6	67494	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		4.6	0.50	5.000	0	91.7	90	110			
Sulfate		9.5	0.50	10.00	0	95.2	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 greater than 2.
- RL Reporting Detection Limit

Page 13 of 28

### Hall Environmental Analysis Laboratory, Inc.

WO#: 1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22819	Samp1	ype: ME	BLK	Tes	tCode: E	PA Method	8260B: VOLATILES
Client ID: PBW	Batcl	n ID: R2	2819	F	RunNo: 2	2819	
Prep Date:	Analysis E	)ate: 1	1/13/2014	\$	SeqNo: 6	73562	Units: µg/L
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit %RPD RPDLimit Qual
Acetonitrile	ND	0.500			-0.5		
Allyl chloride	ND	0.500					
Chloroprene	ND	0.500					
Cyclohexane	ND	0.500					
Diethyl ether	ND	0.500					
Diisopropyl ether	ND	0.500					
Epichlorohydrin	ND	0.500					
Ethyl acetate	ND	0.500					
Ethyl methacrylate	ND	0.500					
Ethyl tert-butyl ether	ND	0.500					
Freon-113	ND	0.500					
Isobutanol	ND	0.500					
Isopropyl acetate	ND	0.500					
Methacrylonitrile	ND	0.500					
Methyl acetate	ND	0.500					
Methyl ethyl ketone	ND	2.50					
Methyl isobutyl ketone	ND	2.50					
Methyl methacrylate	ND	0.500					
Methylcyclohexane	ND	0.500					
n-Amyl acetate	ND	0.500					
n-Hexane	ND	0.500					
Nitrobenzene	ND	0.500					
Pentachloroethane	ND	0.500					
p-isopropyltoluene	ND	0.500					
Propionitrile	ND	0.500					
Tetrahydrofuran	ND	0.500					
Benzene	ND	0.500					
Toluene	ND	0.500					
Ethylbenzene	ND	0.500					
Methyl tert-butyl ether (MTBE)	ND	0.500					
1,2,4-Trimethylbenzene	ND	0.500					
1,3,5-Trimethylbenzene	ND	0.500					
1,2-Dichloroethane (EDC)	ND	0.500					
1,2-Dibromoethane (EDB)	ND	0.500					
Naphthalene	ND	0.500					
Acetone	ND ND	2.50					
Bromobenzene							
	ND	0.500					
Bromodichloromethane	ND	0.500					
Bromoform	ND	0.500					

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDImit 0
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND

Reporting Detection Limit

Sample pH greater than 2.

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22819	SampT	ype: MBLK		TestCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	n ID: R22819		RunNo: 2	2819				
Prep Date:	Analysis D	ate: 11/13/2	014	SeqNo: 6	73562	Units: µg/L			
Analyte	Result	PQL SPK	value SPK Ref	Val %REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Bromomethane	ND	0.500			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
Carbon disulfide	ND	0.500							
Carbon Tetrachloride	ND	0.500							
Chlorobenzene	ND	0.500							
Chloroethane	ND	0.500							
Chloroform	ND	0.500							
Chloromethane	ND	0.500							
2-Chlorotoluene	ND	0.500							
4-Chlorotoluene	ND	0.500							
cis-1,2-DCE	ND	0.500							
cis-1,3-Dichloropropene	ND	0.500							
1,2-Dibromo-3-chloropropane	ND	0.500							
Dibromochloromethane	ND	0.500							
Dibromomethane	ND	0.500							
1,2-Dichlorobenzene	ND	0.500							
1,3-Dichlorobenzene	ND	0.500							
1,4-Dichlorobenzene	ND	0.500							
Dichlorodifluoromethane	ND	0.500							
1,1-Dichloroethane	ND	0.500							
1,1-Dichloroethene	ND	0.500							
1,2-Dichloropropane	ND	0.500							
1,3-Dichloropropane	ND	0.500							
2,2-Dichloropropane	ND	0.500							
1,1-Dichloropropene	ND	0.500							
Hexachlorobutadiene	ND	0.500							
2-Hexanone	ND	0.500							
Isopropylbenzene	ND	0.500							
Methylene Chloride	ND	2.50							
n-Butylbenzene	ND	0.500							
n-Propylbenzene	ND	0.500							
sec-Butylbenzene	ND	0.500							
Styrene	ND	0.500							
tert-Butylbenzene	ND	0.500							
1,1,1,2-Tetrachloroethane	ND	0.500							
1,1,2,2-Tetrachloroethane	ND	0.500							
Tetrachloroethene (PCE)	ND	0.500							
trans-1,2-DCE	ND	0.500							
trans-1,3-Dichloropropene	ND								
1,2,3-Trichlorobenzene	ND	0.500							
1,2,3-Midiloropenzene	ND	0.500							

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22819	SampT	уре: МВІ	LK	Tes	tCode: El	PA Method	8260B: VOLA	ATILES		
Client ID: PBW	Batch	h ID: R22	819	F	RunNo: 2	2819				
Prep Date:	Analysis D	Date: 11/	13/2014	8	SeqNo: 6	73562	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	0.500								7.
1,1,1-Trichloroethane	ND	0.500								
1,1,2-Trichloroethane	ND	0.500								
Trichloroethene (TCE)	ND	0.500								
Trichlorofluoromethane	ND	0.500								
1,2,3-Trichloropropane	ND	0.500								
Vinyl chloride	ND	0.500								
Xylenes, Total	ND	1.00								
mp-Xylenes	ND	1.00								
o-Xylene	ND	0.500								
tert-Amyl methyl ether	ND	0.500								
tert-Butyl alcohol	ND	0.500								
Acrolein	ND	0.500								
Acrylonitrile	ND	0.500								
Bromochloromethane	ND	0.500								
2-Chloroethyl vinyl ether	ND	0.500								
Iodomethane	ND	0.500								
trans-1,4-Dichloro-2-butene	ND	0.500								
Vinyl acetate	ND	0.500								
1,4-Dioxane	ND	0.500								
Surr: 1,2-Dichloroethane-d4	0		10.00		0	70	130			S
Surr: 4-Bromofluorobenzene	0		10.00		0	70	130			S
Surr: Toluene-d8	0		10.00		0	70	130			S

Sample ID LCS-R22819	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES			
Client ID: LCSW	Batch	ID: R2	22819	F	RunNo: 2	2819					
Prep Date:	Analysis D	ate: 1	1/13/2014	8	SeqNo: 6	73563	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	9.77		10.00	0	97.7	80	120		- STREET, CO.		
Toluene	10.0		10.00	0	100	80	120				
Ethylbenzene	10.0		10.00	0	100	80	120				
Chlorobenzene	9.99		10.00	0	99.9	80	120				
1,1-Dichloroethene	9.57		10.00	0	95.7	80	120				
Trichloroethene (TCE)	9.91		10.00	0	99.1	80	120				
o-Xylene	10.6		10.00	0	106	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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22918	SampTyp	e: MBLK	Tes	tCode: El	PA 8270C:	Semivolatiles/Mod		
Client ID: PBW	Batch II	D: <b>R22918</b>	F	RunNo: 2	2918			*
Prep Date:	Analysis Date	e: 11/14/2014	5	SeqNo: 6	76667	Units: µg/L		
Analyte	Result F	PQL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit %R	PD RPDLimit	Qual
Acetophenone	ND	10		10000			-	
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				(4)		
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						
CaludZUIE	ND	10						

### 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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22918	SampT	ype: MB	LK	Tes	tCode: E	PA 8270C:	Semivolatile	s/Mod		
Client ID: PBW	Batch	n ID: R2	2918	F	RunNo: 2	2918				
Prep Date:	Analysis D	Date: 11	/14/2014	8	SeqNo: 6	76667	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chrysene	ND	0.10					51			
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								
sophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodiphenylamine	ND	2.0								
Pentachlorophenol	ND	10								
Phenanthrene	ND	1.0								
Phenol	ND	5.0								
Pyrene	ND	10								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID LCS-R22918	SampType:	LCS	Tes	Code: El	PA 8270C:	Semivolatiles	/Mod		
Client ID: LCSW	Batch ID:	R22918	. F	RunNo: 2	2918				
Prep Date:	Analysis Date:	11/14/2014		SeqNo: 6	76668	Units: µg/L			
Analyte	Result PQ	_ SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	5.4	5.000	0	108	49	134			
2-Chlorophenol	4.8	5.000	0	96.4	50	131			
4-Chloro-3-methylphenol	5.8	5.000	0	115	42	139			
4-Nitrophenol	3.9	5.000	0	78.4	19	137			
Acenaphthene	5.3	5.000	0	105	36	122			
Bis(2-ethylhexyl)phthalate	6.0	5.000	0	120	43	142			
N-Nitrosodi-n-propylamine	5.1	5.000	0	102	46	135			
Pentachlorophenol	4.8	5.000	0	95.2	22	138			
Phenol	4.4	5.000	0	88.0	45	134			
Pyrene	5.9	5.000	0	117	45	138			

### Qualifiers:

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

  - Sample pH greater than 2.

Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-16357

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID:

PBW

Batch ID: 16357

RunNo: 22512

SeqNo: 664165

Units: mg/L

Prep Date: 11/12/2014 Analyte

Analysis Date: 11/13/2014

Qual

Mercury

Result PQL

SPK value SPK Ref Val %REC LowLimit

HighLimit

**RPDLimit** 

ND 0.00020

SampType: LCS

TestCode: EPA Method 7470: Mercury

%RPD

Client ID: LCSW Batch ID: 16357

RunNo: 22512

Units: mg/L

Prep Date: 11/12/2014

Sample ID LCS-16357

Analysis Date: 11/13/2014

SeqNo: 664166

HighLimit

%RPD **RPDLimit** 

Qual

Analyte

PQL SPK value SPK Ref Val %REC 0.005000

97.5

80

Mercury

Result 0.0049 0.00020

LowLimit

120

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Sample pH greater than 2.
- Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-16358

SampType: MBLK

TestCode: MERCURY, TCLP

Client ID: **PBW** 

Batch ID: 16358

RunNo: 22521

Units: mg/L

Prep Date: 11/12/2014

Analysis Date: 11/13/2014

SeqNo: 664178

Analyte

Result PQL

SPK value SPK Ref Val %REC LowLimit

Qual

Mercury

0.020 ND

HighLimit

%RPD

TestCode: MERCURY, TCLP

**RPDLimit** 

SampType: LCS

Client ID: LCSW Prep Date: 11/12/2014

Sample ID LCS-16358

Batch ID: 16358

RunNo: 22521

Units: mg/L

Analysis Date: 11/13/2014

SeqNo: 664179 SPK value SPK Ref Val %REC

HighLimit

%RPD **RPDLimit** 

Qual

Analyte Mercury

0.005000

97.5

80

0.020 ND

120

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- 0 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
- H Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND Sample pH greater than 2.
- Reporting Detection Limit RL

P

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-16345	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	6010B: TCLF	Metals		
Client ID: PBW	Batch	1D: 16	345	F	RunNo: 2	2489				
Prep Date: 11/11/2014	Analysis D	ate: 11	1/12/2014	8	SeqNo: 6	63247	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	111100-11-11-11-11							
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
.ead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID LCS-16345	Sampl	Type: LC	s	Tes						
Client ID: LCSW	Batcl	h ID: 16	345	F	RunNo: 2	2489				
Prep Date: 11/11/2014	Analysis D	)ate: 11	1/12/2014	8	SeqNo: 6	63248	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	103	80	120			
Barium	ND	100	0.5000	0	98.9	80	120			
Cadmium	ND	1.0	0.5000	0	99.2	80	120			
Chromium	ND	5.0	0.5000	0	98.1	80	120			
Lead	ND	5.0	0.5000	0	95.2	80	120			
Selenium	ND	1.0	0.5000	0	97.9	80	120			
Silver	ND	5.0	0.1000	0	90 9	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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-16345	Samp	Туре: МЕ	BLK	Tes	tCode: E	PA 6010B:	Total Metals			
Client ID: PBW	Bato	h ID: 16:	345	F	RunNo: 2	2489				
Prep Date: 11/11/2014	4 Analysis	Date: 11	/12/2014	8	SeqNo: 6	63203	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020							7	
Antimony	ND	0.050								
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								
Thallium	ND	0.050								
Vanadium	ND	0.050								
Zinc	ND	0.020								

Sample ID LCS-16345	Samp	Type: LC	s	Tes	tCode: El	PA 6010B:					
Client ID: LCSW	Batch ID: 16345			RunNo: 22489							
Prep Date: 11/11/2014	Analysis	Date: 1	1/12/2014	S	SeqNo: 6	63204	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	103	80	120				
Antimony	0.50	0.050	0.5000	0	99.3	80	120				
Arsenic	0.52	0.020	0.5000	0	103	80	120				
Barium	0.49	0.020	0.5000	0	98.9	80	120				
Beryllium	0.52	0.0030	0.5000	0	104	80	120				
Cadmium	0.50	0.0020	0.5000	0	99.2	80	120				
Calcium	51	1.0	50.00	0	102	80	120				
Chromium	0.49	0.0060	0.5000	0	98.1	80	120				
Cobalt	0.48	0.0060	0.5000	0	95.9	80	120				
Copper	0.50	0.0060	0.5000	0	100	80	120				
Iron	0.49	0.050	0.5000	0	98.8	80	120				
Lead	0.48	0.0050	0.5000	0	95.2	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 greater than 2.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID LCS-16345	Samp	Type: LC	s	Tes	tCode: E					
Client ID: LCSW	Batch ID: 16345 Analysis Date: 11/12/2014			RunNo: 22489						
Prep Date: 11/11/2014				SeqNo: 663204			Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	100	80	120			-
Manganese	0.49	0.0020	0.5000	0	97.2	80	120			
Nickel	0.48	0.010	0.5000	0	95.5	80	120			
Potassium	47	1.0	50.00	0	94.6	80	120			
Selenium	0.49	0.050	0.5000	0	97.9	80	120			
Silver	0.10	0.0050	0.1000	0	99.9	80	120			
Thallium	0.48	0.050	0.5000	0	96.1	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			
Zinc	0.49	0.020	0.5000	0	98.0	80	120			

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.

Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22918

SampType: MBLK

TestCode: CYANIDE, Reactive

Client ID: **PBW** 

Batch ID: R22918

RunNo: 22918

Prep Date:

Analysis Date: 11/18/2014

SeqNo: 677093

Analyte

PQL

Units: mg/L HighLimit

Cyanide, Reactive

Result

SampType: LCS

TestCode: CYANIDE, Reactive

Client ID: LCSW

Sample ID LCS-R22918

Batch ID: R22918

RunNo: 22918

Prep Date:

Analysis Date: 11/18/2014

SeqNo: 677094

Units: mg/L

Analyte

SPK value SPK Ref Val %REC

HighLimit

%RPD **RPDLimit** 

**RPDLimit** 

%RPD

Cyanide, Reactive

106

Qual

0.532

0.5000

0

SPK value SPK Ref Val %REC LowLimit

80

120

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

0 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

Holding times for preparation or analysis exceeded H

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

Reporting Detection Limit RL

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

Client:

Navajo Refining Company

Project:

Quarterly WDW-1, 2, &3 Inj Well

Sample ID MB-R22918

SampType: MBLK

TestCode: SULFIDE, Reactive

Client ID:

**PBW** 

Batch ID: R22918

RunNo: 22918

Analysis Date: 11/21/2014

Prep Date:

SeqNo: 677096

Units: mg/L

Analyte

Result PQL 1.0

SampType: LCS

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit**  Qual

Reactive Sulfide

ND

TestCode: SULFIDE, Reactive

Client ID: LCSW

Sample ID LCS-R22918

Batch ID: R22918

RunNo: 22918

Analysis Date: 11/21/2014

SeqNo: 677097

Units: mg/L

Analyte Result

SPK value SPK Ref Val %REC PQL

90.0

LowLimit

%RPD

**RPDLimit** 

Qual

Reactive Sulfide

Prep Date:

0.2000

0.18

70

HighLimit 130

### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- RSD is greater than RSDIimit 0 RPD outside accepted recovery limits R
- S Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded H
- Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- Reporting Detection Limit RL

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1411288

09-Dec-14

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: R22485

RunNo: 22485

Prep Date:

Analysis Date: 11/11/2014

SeqNo: 663098

Units: mg/L CaCO3

Analyte

Result

PQL ND 20 SPK value SPK Ref Val %REC LowLimit HighLimit

**RPDLimit** %RPD

Qual

Total Alkalinity (as CaCO3)

TestCode: SM2320B: Alkalinity

Sample ID Ics-1

SampType: LCS

RunNo: 22485

Client ID: Prep Date:

LCSW

Batch ID: R22485

SeqNo: 663099

Units: mg/L CaCO3

Analyte

Result

Analysis Date: 11/11/2014 POL SPK value SPK Ref Val

%REC

LowLimit

HighLimit

**RPDLimit** 

Total Alkalinity (as CaCO3)

79

20 80.00 0 99.3 90

110

%RPD

Qual

Sample ID mb-2

SampType: MBLK Batch ID: R22485

TestCode: SM2320B: Alkalinity

RunNo: 22485

Client ID: Prep Date:

Analysis Date: 11/11/2014

ND

Result

Result

80

SeqNo: 663121

Units: mg/L CaCO3

%RPD

Analyte Total Alkalinity (as CaCO3) PQL

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

**RPDLimit** 

Qual

Sample ID Ics-2

SampType: LCS

TestCode: SM2320B: Alkalinity

Prep Date:

Client ID: LCSW

PBW

Batch ID: R22485

PQL

80.00

RunNo: 22485

SeqNo: 663122

Units: mg/L CaCO3

**RPDLimit** Qual

Analyte Total Alkalinity (as CaCO3)

Analysis Date: 11/11/2014

20

SPK value SPK Ref Val

0

%REC LowLimit 99.5

90

HighLimit 110

### Qualifiers:

E

- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

- Value above quantitation range J Analyte detected below quantitation limits

- В
  - Holding times for preparation or analysis exceeded
  - Sample pH greater than 2.
  - Reporting Detection Limit
- Analyte detected in the associated Method Blank
  - ND
    - Not Detected at the Reporting Limit Page 26 of 28