GW – 028

Annual DP Report (Part 1 of 16)

2015

Navajo Refining Company
Artesia Refinery

2015 Annual Discharge Permit Report
Discharge Permit GW-028

March 2016

2015 ANNUAL DISCHARGE PERMIT REPORT
HOLLYFRONTIER NAVAJO REFINING LLC - 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 HollyFrontier Navajo Refining LLC (Navajo). The requirement specifies that an Annual Report be submitted to the Oil Conservation Division (OCD) by March 15 following the reporting (calendar) 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

A.1 Background Information 2012-2014

RO Reject Water Discharge

In August 2012, OCD renewed Navajo's Discharge Permit GW-028 to allow discharge of reverse osmosis (RO) reject fluids to the Artesia Refinery's (refinery) on-site farms/fields. One of the major conditions of the permit (Section 4.A) is to discontinue the discharge of the RO reject water to the farm fields within 36 months of the date the renewal permit was issued.

In November 2014, Navajo requested that Section 4.A. of Discharge Permit GW-028 be modified to allow for continued land application of the RO reject fluids 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 three permitted injection wells and limitations on effluent discharged to the City's publicly owned treatment works (POTW). OCD approved an extension of the deadline to the earlier of October 21, 2016, or installation and operability of the fourth injection well. The required engineering and planning studies necessary to allow for alternate disposal of effluent at the refinery are underway. These efforts are discussed in more detail below.

Injection Well WDW-4

One option considered by Navajo as an alternate disposal method for the RO reject fluids was installation of a fourth injection well (WDW-4). Navajo 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.

RO Reject Fields Investigation and Background Groundwater Investigation

Section 6.D of Discharge Permit GW-028 required a site investigation of the fields, which was performed throughout 2013. The Reverse Osmosis Reject Water Discharge Field Investigation Final Report for the investigation was completed and submitted on February 21, 2014. After discussion with Navajo and NMED, the OCD responded to the RO reject fields investigation report with a request that a formal background evaluation be performed. A work plan for the background evaluation was submitted to the NMED and OCD on July 8, 2014; both agencies gave approval of the background evaluation workplan with modifications/conditions on July 25, 2014. In July of 2014, Navajo began a background groundwater study to evaluate upgradient/crossgradient groundwater concentrations, and to potentially establish alternative standards for select constituents of concern (COCs), as appropriate, and to determine if in fact the discharge had impacted groundwater. Navajo utilized existing wells in the monitoring network and also installed two additional monitoring wells to complete the evaluation. The results of this investigation are discussed in Section A.2, 2015 Activities, below.

Selenium in Wastewater

In the fall of 2013, it was discovered that selenium concentrations in the refinery wastewater effluent exceeded the toxicity characteristic limit of 1.0 mg/L. To address this problem, Navajo met with OCD and NMED Hazardous Waste Bureau to discuss options. Navajo and OCD signed an Agreed Compliance Order (ACO) and Amendment (WQA-OCD-CO-2013-001 [the 2013 Order]) and a letter agreement with NMED to outline the path forward. The selenium concentration in the wastewater 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. Both treatment units were authorized in Discharge Permit GW-028 via notifications to OCD. In order to further comply with Section 4.A. of the permit and address selenium excursions, Navajo 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.

LNAPL Recovery

An upgraded light non-aqueous phase liquid (LNAPL) Recovery System Phase I 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 Navajo Wastewater Treatment Plant (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 November 2014, Navajo 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 Navajo 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 phase-separated hydrocarbon (PSH) skimming pumps continued to be operated throughout the remainder of 2014. See LNAPL Recovery (2015 Activities) below regarding options being evaluated by Navajo to address OSE concerns and allow recovery activities to resume.

A.2 2015 Activities

The refinery conducted normal operations for 2015. The refinery did not undergo any major expansions in regards to production capacity, though processing capacity has increased to 115,000 barrels per day (bpd). Navajo did make several modifications to the refining process to improve operability and reliability.

RO Reject Water Discharge

Agreed Compliance Order No. WQA-OCD-CO-2015-002

On March 13, 2015, Navajo notified OCD that they had discovered that the use of the temporary RO unit since 2011 had caused RO reject fluid discharges in excess of the 10,000 bpd limit. Following negotiations with OCD, Navajo entered into an ACO (No. WQA-OCD-CO-2015-002 [the 2015 Order]) with OCD on April 27, 2015. The requirements provided in the 2015 Order included submittal of a permit modification request to increase the daily discharge volume limit and monthly reporting to include:

- Daily discharge flow measurements for each RO unit and for all RO units together.
- Calculation of stipulated penalties, if any, required under Section III, Paragraph 2 of the Order.
- Results of the monthly discharge sample analysis results.
- Updates on any new developments related to the treatment and disposal of RO reject fluid at the facility.

Copies of the monthly reports submitted in compliance with the 2015 Order from May 2015 through January 2016 for the reporting periods of April through December 2015 are included Appendix B, Tab 3.

Discharge Permit Modification Request

In accordance with Paragraph 1 of Exhibit A to the 2015 Order, Navajo submitted a GW-028 discharge permit modification request on May 22, 2015. The requested modifications included updating the refinery processing capacity, operating a temporary RO unit at the refinery, and increasing the total maximum volume of RO reject fluids that can be applied to the surface of Navajo's discharge fields.

The OCD issued the final determination document for the GW-028 permit modification request on February 4, 2016, thereby terminating ACO No. WQA-OCD-CO-2015-002. In the final determination, OCD approved the requested changes to the GW-028 permit conditions, including an increase of the RO reject fluid discharge limit to 15,000 bpd. Additionally, the modified permit conditions include increasing the frequency of water quality sampling of the RO reject fluids to quarterly and the frequency of reporting to monthly. In addition, any exceedances of the 15,000 bpd limit must be reported weekly. The requirement that land application of RO reject fluids must cease on or before October 21, 2016, or when the proposed new Class I injection well is operationally capable of accepting this waste stream, whichever occurs first, remains.

Reverse Osmosis Reject Fields Hydrogeologic and Water Quality Evaluation

In response to the May 2015 permit modification request to increase the RO reject fluids volume, on June 3, 2015, OCD requested additional evaluation of the potential impacts to the underlying aquifer that may result from discharge of the RO reject stream to the designated discharge fields within the refinery property. In support of the GW-028 permit modification request and to address the June 3, 2015 OCD email, Navajo submitted a *Reverse Osmosis Reject Fields Hydrogeologic and Water Quality Evaluation* memo to the OCD on August 20, 2015. A subsequent revision to this memo was submitted to OCD on March 3, 2016, to provide corrections to the RO reject stream water quality results.

The objectives of the evaluation were to:

1) evaluate RO reject water quality using all of the available historical data, including discharge data from the temporary RO unit that was installed in 2011;

2) perform a statistical evaluation of the monitoring well groundwater quality;

3) to estimate mass loading rates for key water constituents to provide insight into the quantities being placed on the RO reject fields; and,

4) create simulations using a contaminant hydrogeologic model to estimate impacts to groundwater related to the RO reject fields.

The conclusions of this evaluation, as communicated to OCD in the August 20, 2015, and March 3, 2016 memos, are that the observed concentrations of water quality constituents in groundwater from wells within the RO reject discharge fields, mass loading estimates, and hydrogeochemical modeling indicate that the RO discharge system is not detrimental to the water quality beneath or downgradient of the fields. The findings of the evaluation furthermore indicate that the ongoing application of discharge waters has resulted in a system that has reached and maintained a steady-state condition, and therefore the concentrations of constituents are not increasing or adversely impacting groundwater. These findings are supported by the historical semiannual groundwater data presented in the 2015 *Annual Groundwater Report* submitted to the NMED and OCD on March 11, 2016; i.e., reported concentrations of water quality constituents for the six RO reject discharge field wells (MW-114, MW-115, MW-116, MW-117, MW-118, and MW-119) fluctuate through time but exhibit an overall stable to decreasing trend.

RO Reject Fields Investigation and Background Groundwater Investigation

During 2015, Navajo continued the background groundwater study that was initiated in 2013. Based on the approved work plan, the study utilized existing wells in the monitoring network and two additional newly-installed monitoring wells to complete the evaluation. A report summarizing the activities associated with the background groundwater study was submitted to OCD and NMED on September 2, 2015. The conclusions of the background groundwater evaluation were that, for the purpose of evaluating the potential need for abatement of groundwater beneath the RO reject fields beyond the Stage 1 investigation, the abatement standard comparison criteria should:

1) consist of the background upper tolerance limits (UTLs) for nine of the COCs; and

2) the abatement standard comparison criteria for the remaining COCs should consist of the NMED Water Quality Control Commission (WQCC) standards.

The *Reverse Osmosis Reject Water Discharge Field Investigation Final Report* submitted in 2014 was revised to include the findings from the September 2015 background groundwater study; a revised Final Report for the investigation was submitted to OCD on December 30, 2015. Based on the investigation and evaluation performed for the revised Final Report, it does not appear that discharge of the RO reject water to the fields impacted the underlying groundwater. The report also includes a recommendation that the six groundwater monitoring wells installed in the RO reject water discharge fields continue to be monitored on a semiannual basis.

Through 2015 and continuing into 2106, Navajo is engaging in discussions with OCD and NMED regarding the conclusions of the background groundwater investigation and the applicability of the results to refinery investigation efforts.

Injection Well WDW-4

Navajo submitted an application for a discharge permit for a proposed new injection well to be used for RO reject water (WDW-4) on November 7, 2014 and OCD notified Navajo that the application was administratively complete on April 23, 2015. On June 25, 2015, Navajo withdrew the OCD permit application for WDW-4 to allow for further technical review regarding well locations and injection zones to confirm sufficient injection capacity to meet the refinery's needs. Navajo continued to evaluate options for the underground injection, as well as other options for discharge of RO reject fluid, throughout 2015.

Selenium in Wastewater

A notification of a SeRT process upgrade was provided to OCD and approved in July of 2015. The conditions of the 2013 Order have been met and the ACO was terminated on November 6, 2015.

LNAPL Recovery

In 2015, the system recovered 2,869,078 gallons (68,311 barrels) of groundwater and 50,481 gallons (1,202 barrels) of PSH. Further details of the recovery system operation are discussed in Section 6 of the *2015 Annual Groundwater Report*, submitted to OCD and NMED on March 11, 2015.

On January 30, 2015, Navajo submitted a letter to the NMED and OCD describing the OSE's request to cease pumping groundwater and presenting the current status of the recovery system operation. A copy of the letter is provided in Appendix A of this report. The groundwater pumps in all of the recovery wells remained inactive throughout 2015, with the exception of the following recovery well groundwater pump activity: RW-20 throughout 2015, and RW-7 and RW-8R beginning on December 21, 2015. The PSH skimming pumps continued to be operated throughout 2015. Navajo is expeditiously seeking shallow water rights, and other options, to allow for full operation of the recovery system to resume.

B. SUMMARY OF DISCHARGE ACTIVITIES

Navajo's primary discharges are treated wastewater from the WWTP (WWTP effluent) and the RO reject. The WWTP effluent is discharged to Navajo'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 wastewater 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 2015 was 4,717,057 barrels.

2. POTW

The flow rates and volumes of treated wastewater discharged to the City of Artesia POTW are recorded daily. This record is included in Appendix B, Tab 2. The total transferred water volume for 2015 was 617,443 gallons, or 14,701 barrels.

Navajo continued to discharge the blow-down from the cooling tower to the POTW in 2015. The total volume discharged at a rate of 77 gpm is estimated to be 40,568,659 gallons, or 965,920 barrels.

3. Reverse Osmosis Reject

A secondary waste stream is the RO reject water which is land applied under OCD Discharge Permit GW-028 to on-site farms/fields. The RO process is fed by fresh groundwater provided by either the refinery's agricultural supply wells or purchased from the City of Artesia. The RO reject fluids contain concentrated salts, primarily chloride, fluoride, and sulfate, and elevated total dissolved solids (TDS). The stream is sampled semiannually as required by Section 4.B.1. of Discharge Permit GW-028, and was sampled monthly during April through December 2015 in accordance with the 2015 Order.

The RO reject fluid flow rate is continuously recorded with the process historian for the permanent RO units and on daily logs completed by operations personnel for the temporary RO unit. Based on the data from the process historian and on the logs, the total discharged RO reject water volume for 2015 was 176,776,194 gallons, or 4,208,957 barrels.

C. SUMMARY OF ALL LEAKS, SPILLS, AND RELEASES

The refinery had 3 spills that were reportable under Discharge Permit GW-028 in 2015. While this is one more spill than in 2014, it should be mentioned here that this demonstrates an overall improvement compared to previous years (2 spills in 2014; 4 spills in 2013, 7 spills 2012; 9 spills in 2011). The refinery aspires to continue improving going into 2016. Appendix C contains information about the spills.

1. April 12, 2015 – Wastewater Pipeline Release near the Evaporation Ponds Area

At approximately 10:30 a.m. on April 12, 2015, it was discovered that treated wastewater from the refinery was released 1,500 feet south of the inactive former Evaporation Ponds (EPs). The release is understood to have occurred due to a break in the pipeline that conveys the wastewater to injection wells east of the refinery. The OCD requested that a work plan be prepared describing delineation activities including soil and groundwater sampling in the area surrounding the pipeline break. The final work plan was submitted to the OCD on October 14, 2015. The OCD provided final comments to the work plan in an email to Navajo dated December 10, 2015. Delineation activities will take place (per the work plan and OCD's final comments) and a letter report submitted in 2016. The work plan, initial C-141 report, and OCD email are provided in Appendix C, Tab 1.

2. April 16, 2015 – Tank 815 Water and Diesel Mixture Release

At approximately 06:30 a.m. on April 16, 2015, an overflow of a water and diesel mixture from the water draw sump at Tank 815 was observed. The water draw valve was immediately closed upon discovery of the overflow, and a vacuum truck was used to recover free liquids from the area. Approximately 30 barrels of free liquid were recovered from the release area and the sump and was returned to the crude process. The exact volume of liquids released from the sump is unknown, but was reported as greater than 25 barrels based on the volume of liquid recovered. Navajo personnel verbally reported the release to the NMED HWB and the OCD on April 16, 2015. Written notification was provided to both agencies on April 21, 2015 using an initial C-141 report. In order to maintain appropriate cover for the NCL, the saturated soil in the vicinity of the release was excavated and placed into three covered, lined roll-off containers. Soil was excavated to a depth of no more than 12 inches below the ground surface. Once the excavation was completed, the area was backfilled with clean soil from an off-site source and graded to match the surrounding area. The excavated soil was disposed of off-site on August 14, 2015 as hazardous waste since the excavated soil was from within the NCL. A final C-141 release report and letter report summarizing the activities associated with the Tank 815 release were submitted to the NMED on January 28, 2016.

3. November 17, 2015 – Groundwater Expression into Eagle Draw

At approximately 11:40 a.m. on November 17, 2015, Navajo personnel observed dark liquids expressing through cracks in a concreted portion of the bank of Eagle Draw within the refinery. At that time there was no odor to the liquids seeping into Eagle Draw, but the water appeared to be dark and have particulate matter entrained in it. Immediately after the discovery of the liquid percolating into Eagle Draw, absorbents were applied in order to remove as much stained material as possible. Although there was no hydrocarbon odor in the liquid or sheen on the water in Eagle Draw, Navajo protectively placed oil absorbent booms downstream of the observed seepage locations. Upon OCD request, two surface water samples were collected on November 19, 2015, one near the seepage area and one downstream from the seepage area within the refinery fence line; for comparison purposes a groundwater sample was also collected from monitoring well MW-55, located across Eagle Draw from the area where the liquid was observed expressing through the concrete. The three samples were analyzed for total petroleum hydrocarbons (TPH) gasoline range organics (GRO), TPH diesel range organics (DRO), TPH motor oil range organics (ORO), benzene, toluene, ethylbenzene, and xylenes (BTEX), RCRA 8 dissolved metals, and general chemistry parameters. An event update report was submitted to the OCD on January 8, 2016 with documentation of the incident, sampling results, and screening standards used for comparison. Based on the sampling results and screening standard exceedances, it is believed that impacted groundwater being monitored through implementation of the Facility Wide Ground Water Monitoring Program (FWGWMP) is similar to the seepage liquid. The COCs measured in the surface water samples appear to be consistent generally with results of recent FWGWMP events for the adjacent wells and recovery trenches. Additional actions recommended by Navajo in the final release report included weekly inspections of the seepage area for the month of January 2016 to visually examine for additional

releases of liquid and potential sheens on surface water in Eagle Draw, apply absorbents to recover/remove any seepage as needed, ensure that booms are ready and serviceable to put into use in surface waters in Eagle Draw as needed, take and record water level elevations in RW-17 A and RW-17G on a weekly basis during the month of January 2016 in order to evaluate fluctuations in levels in comparison to weather, operate RW-7 and RW-8 consistently during the month of January 2016 in order to reduce groundwater elevations, and repair the concrete fissures as possible in this specific locale of Eagle Draw. Navajo is continuing to record water level elevations at these locations beyond the recommended timeframe of January 2016 and will continue until expression of liquids into Eagle Draw is no longer observed.

D. SUMMARY OF NEW GROUNDWATER CONTAMINATION

New groundwater contamination and changes in existing constituents are discussed in Section 7 of the *2015 Annual Groundwater Report* submitted to OCD and NMED on March 11, 2016. The conclusions of that report relevant to groundwater contamination are listed below:

- The PSH plume shapes were modified based on diminishing PSH thicknesses and the disappearance of PSH in wells at the North Refinery Area, South Refinery Area, and field east of the refinery.

- Groundwater concentrations of organic constituents have generally remained stable, although increasing trends were noted in specific areas. The overall shapes of the constituent plumes remain similar to previous years, although slight changes were observed primarily due to slight variations in COC concentrations near the Critical Groundwater Screening Level (CGWSL) through time and fluctuations in PSH presence at thicknesses above and below 0.03 feet in multiple wells that dictated when wells could be sampled.

- Although the background groundwater evaluation has been completed and statistical evaluation confirmed that some of the inorganic COCs are present above the WQCC standards or EPA Maximum Contaminant Levels (MCLs), alternative screening levels have not yet been approved for those COCs. It should be noted however, that many of the concentrations of inorganic COCs (manganese, chloride, fluoride, nitrate/nitrite, sulfate, TDS) depicted as "exceedances" in this report may actually be similar to and reflective of background groundwater concentrations.

- The PSH recovery system continued to operate throughout 2015, although for most of the year only the PSH pumps were in use and the groundwater pumps were not operated. Diminishing PSH recovery was observed in each successive quarter in 2015 correlating with declining PSH thickness measured in the subsurface, likely due to elevated groundwater levels. This, in conjunction with lack of drawdown by the groundwater pumps, contribute to reduced PSH recovery.

Appendices

Appendix A

Recovery System Status Letter

HOLLYFRONTIER.

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 aquifer. 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
Navajo Refining Company, LLC

c: Robert Combs, NRC
Pamela R. Krueger, ARCADIS

Appendix B

Refinery Discharges

B.1 Treated Wastewater to Injection Wells

HOLLYFRONTIER.

May 6, 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
7008 1300 0001 9164 2626

RE: 2015 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 2015 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 first quarter, the average injection pressure for all three wells was 1382 psig and the average flows were 124 gpm for WDW-1, 114 gpm for WDW-2 and 121 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 January 1, 2015 to March 31, 2015. We have disposed a total of 1,133,233 barrels of fluid into the three wells during the first quarter of 2015. The volume per well is:

- 382,907 barrels into WDW-1
- 353,460 barrels into WDW-2
- 376,866 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.

Enc.

Electronic cc (w/enc.): R Combs, M Schultz, A Strange
Environmental File: Injection Wells/Reports C-115 & Quarterly/2015/1st quarter/2015-5-6 1st QTR Inj Rpt for Wells WDW-1,2,3

Navajo Refining Company, L.L.C.

2015 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

	Average Pressure (psig)	Maximum Pressure (psig)	Minimum Pressure (psig)	Average Flow (gpm)	Maximum Flow (gpm)	Minimum Flow (gpm)	Average Annular Pressure Av (psig)	Maximum Annular Pressure Mx (psig)	Minimum Annular Pressure Mn (psig)	Average Volume (bpd)	Maximum Volume (bpd)	Minimum Volume (bpd)	Volume (barrels)	TOTAL CUMULATIVE Volume (barrels)
WDW-1													**Previous Quarter**	35,971,987
Jan-15	1,393	1,400	1,375	125	130	122	241	334	163	4,286	4,457	4,183	132,986	36,104,973
Feb-15	1,383	1,400	1,215	124	128	103	464	775	167	4,251	4,389	3,531	118,968	36,223,941
Mar-15	1,383	1,400	1,300	123	129	107	298	383	157	4,217	4,423	3,669	130,953	36,354,894
WDW-2													**Previous Quarter**	22,911,958
Jan-15	1,393	1,400	1,375	115	119	111	673	1,327	247	3,943	4,080	3,806	122,685	23,034,643
Feb-15	1,383	1,400	1,218	113	118	66	550	761	392	3,874	4,046	2,263	108,867	23,143,510
Mar-15	1,383	1,400	1,300	114	119	96	407	666	283	3,909	4,080	3,291	121,908	23,265,417
WDW-3													**Previous Quarter**	13,112,055
Jan-15	1,384	1,390	1,360	124	130	112	731	799	637	4,251	4,457	3,840	131,758	13,243,813
Feb-15	1,362	1,390	1,136	116	131	16	849	1,024	685	3,977	4,491	549	111,941	13,355,754
Mar-15	1,374	1,390	1,298	125	133	103	664	821	456	4,286	4,560	3,531	133,167	13,488,921
													Total Injected fluids:	73,109,232

Navajo Refining Company, L.L.C.

2015 FIRST QUARTER WEEKLY WAMS LEVEL TABLE

	1/5/15	1/12/15	1/22/15	1/26/15	2/5/15	2/12/15	2/19/15	2/25/15	3/5/15	3/11/15	3/17/15	3/26/15		
WDW -1[1]	145	145	145	145	145	145	145	145	145	145	145	145		
WDW-2[1]	100	100	100	100	100	100	100	100	100	100	100	100		
WDW-3[1]	200	200	200	200	200	200	200	200	200	200	253	255		
				Comments:										

[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

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

March 25, 2015

Dan Crawford

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

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

Dear Dan Crawford:

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

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Case Narrative

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

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:
Allyl alcohol
t-amyl ethyl ether
Bis(2-chloroethyl)sulfide
Bromoacetone
Chloral hydrate
1-chlorobutane
1-chlorohexane
2-chloroethanol
Crotonaldehyde
Cis-1,4-Dichloro-2butene
1,3-Dichloro-2-propanol
1,2,3,4-Depoxybutane
Ethanol
Ethylene oxide
Malonitrile
Methanol
Methyl acrylate
2-Nitropropane
Paraldehyde
Pentafluorobenzene
2-Pentanone
2-picoline
1-propanol
2-propanol
Propargyl alcohol
Beta-propiolactone
n-propylamine

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

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

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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

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

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1502959-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 2/23/2015 8:30:00 AM
Received Date: 2/24/2015 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.13	1.68	H	pH units	1	3/3/2015 3:37:29 PM	R24621
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	240	20		mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
Total Alkalinity (as CaCO3)	240	20		mg/L CaCO3	1	3/3/2015 3:37:29 PM	R24621
SPECIFIC GRAVITY						Analyst: **JRR**	
Specific Gravity	1.002	0			1	3/5/2015 12:07:00 PM	R24648
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	3710	200	*	mg/L	1	2/27/2015 8:17:00 AM	17895

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

Qualifiers:

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J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date:
Lab ID: 1502959-002
Matrix: TRIP BLANK
Received Date: 2/24/2015 8:00:00 AM

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

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Qualifiers:

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J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date:
Lab ID: 1502959-002
Matrix: TRIP BLANK
Received Date: 2/24/2015 8:00:00 AM

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

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Qualifiers:

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J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: TRIP BLANK
Project: Quarterly WDW-1, 2, &3 Inj Well
Collection Date:
Lab ID: 1502959-002
Matrix: TRIP BLANK
Received Date: 2/24/2015 8:00:00 AM

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

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R24502**	RunNo: **24502**
Prep Date:	Analysis Date: **2/24/2015**	SeqNo: **721446** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R24502**	RunNo: **24502**
Prep Date:	Analysis Date: **2/24/2015**	SeqNo: **721447** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.54	0.10	0.5000	0	108	90	110			
Chloride	4.8	0.50	5.000	0	95.3	90	110			
Nitrogen, Nitrite (As N)	0.95	0.10	1.000	0	95.4	90	110			
Bromide	2.5	0.10	2.500	0	99.1	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	100	90	110			
Sulfate	9.8	0.50	10.00	0	97.6	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **736964** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetonitrile	ND	0.50								
Allyl chloride	ND	0.50								
Chloroprene	ND	0.50								
Ethyl methacrylate	ND	0.50								
Isobutanol	ND	0.50								
Methacrylonitrile	ND	0.50								
Methyl ethyl ketone	ND	2.5								
Methyl isobutyl ketone	ND	2.5								
Methyl methacrylate	ND	0.50								
Propionitrile	ND	0.50								
Benzene	ND	0.50								
Toluene	ND	0.50								
Ethylbenzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
1,2-Dibromoethane (EDB)	ND	0.50								
Acetone	ND	2.5								
Bromodichloromethane	ND	0.50								
Bromoform	ND	0.50								
Bromomethane	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	0.50								
Chloroethane	ND	0.50								
Chloroform	ND	0.50								
Chloromethane	ND	0.50								
cis-1,2-DCE	ND	0.50								
cis-1,3-Dichloropropene	ND	0.50								
1,2-Dibromo-3-chloropropane	ND	0.50								
Dibromochloromethane	ND	0.50								
Dibromomethane	ND	0.50								
1,2-Dichlorobenzene	ND	0.50								
1,4-Dichlorobenzene	ND	0.50								
Dichlorodifluoromethane	ND	0.50								
1,1-Dichloroethane	ND	0.50								
1,1-Dichloroethene	ND	0.50								
1,2-Dichloropropane	ND	0.50								
1,3-Dichloropropane	ND	0.50								
2,2-Dichloropropane	ND	0.50								
1,1-Dichloropropene	ND	0.50								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **736964** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	0.50								
Methylene Chloride	ND	2.5								
Styrene	ND	0.50								
1,1,1,2-Tetrachloroethane	ND	0.50								
1,1,2,2-Tetrachloroethane	ND	0.50								
Tetrachloroethene (PCE)	ND	0.50								
trans-1,2-DCE	ND	0.50								
trans-1,3-Dichloropropene	ND	0.50								
1,1,1-Trichloroethane	ND	0.50								
1,1,2-Trichloroethane	ND	0.50								
Trichloroethene (TCE)	ND	0.50								
Trichlorofluoromethane	ND	0.50								
1,2,3-Trichloropropane	ND	0.50								
Vinyl chloride	ND	0.50								
mp-Xylenes	ND	1.0								
o-Xylene	ND	0.50								
Acrolein	ND	0.50								
Acrylonitrile	ND	0.50								
Bromochloromethane	ND	0.50								
Iodomethane	ND	0.50								
trans-1,4-Dichloro-2-butene	ND	0.50								
Vinyl acetate	ND	0.50								

Sample ID **LCS-R24992**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **736965** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	9.8		10.00	0	98.4	80	120			
Toluene	10		10.00	0	99.8	80	120			
Ethylbenzene	10		10.00	0	101	80	120			
Chlorobenzene	9.8		10.00	0	98.5	80	120			
1,1-Dichloroethene	9.2		10.00	0	91.7	80	120			
Tetrachloroethene (PCE)	9.8		10.00	0	98.4	80	120			
Trichloroethene (TCE)	9.6		10.00	0	96.1	80	120			
o-Xylene	10		10.00	0	104	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/2/2015**	SeqNo: **736968** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acetophenone	ND	10								
1-Methylnaphthalene	ND	10								
2,3,4,6-Tetrachlorophenol	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2,4-Dichlorophenol	ND	10								
2,4-Dimethylphenol	ND	10								
2,4-Dinitrophenol	ND	10								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3,3'-Dichlorobenzidine	ND	10								
3-Nitroaniline	ND	10								
4,6-Dinitro-2-methylphenol	ND	10								
4-Bromophenyl phenyl ether	ND	10								
4-Chloro-3-methylphenol	ND	5.0								
4-Chloroaniline	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Anthracene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benz(a)anthracene	ND	0.10								
Benzo(a)pyrene	ND	0.10								
Benzo(b)fluoranthene	ND	0.10								
Benzo(k)fluoranthene	ND	0.10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	5.0								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/2/2015**	SeqNo: **736968** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chrysene	ND	0.10								
Dibenz(a,h)anthracene	ND	0.10								
Dibenzofuran	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	1.0								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Isophorone	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	1.0								
Phenol	ND	5.0								
Pyrene	ND	10								
1,2,4,5-Tetrachlorobenzene	ND	10								

Sample ID **LCS-R24992**	SampType: **LCS**	TestCode: **EPA 8270C: Semivolatiles/Mod**
Client ID: **LCSW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/2/2015**	SeqNo: **736969** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	5.6		5.000	0	112	49	134			
2-Chlorophenol	4.7		5.000	0	94.8	50	131			
4-Chloro-3-methylphenol	4.2		5.000	0	83.0	42	139			
4-Nitrophenol	2.8		5.000	0	56.8	19	137			
Acenaphthene	5.3		5.000	0	106	36	122			
Bis(2-ethylhexyl)phthalate	5.4		5.000	0	109	43	142			
N-Nitrosodi-n-propylamine	5.3		5.000	0	107	46	135			
Pentachlorophenol	4.0		5.000	0	79.4	22	138			
Phenol	4.1		5.000	0	81.2	45	134			
Pyrene	6.2		5.000	0	123	45	138			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-17887**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **17887**	RunNo: **24523**
Prep Date: **2/25/2015**	Analysis Date: **2/26/2015**	SeqNo: **722178** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-17887**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **17887**	RunNo: **24523**
Prep Date: **2/25/2015**	Analysis Date: **2/26/2015**	SeqNo: **722179** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	0	102	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-18037**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**							
Client ID: **PBW**	Batch ID: **18037**	RunNo: **24714**							
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728042**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID **LCS-18037**	SampType: **LCS**	TestCode: **MERCURY, TCLP**							
Client ID: **LCSW**	Batch ID: **18037**	RunNo: **24714**							
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728043**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	105	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-18024**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **18024**	RunNo: **24683**
Prep Date: **3/6/2015**	Analysis Date: **3/7/2015**	SeqNo: **727309** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Antimony	ND	0.050								
Arsenic	ND	0.020								
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Selenium	ND	0.050								
Silver	ND	0.0050								
Thallium	ND	0.050								
Vanadium	ND	0.050								
Zinc	ND	0.020								

Sample ID **LCS-18024**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **18024**	RunNo: **24683**
Prep Date: **3/6/2015**	Analysis Date: **3/7/2015**	SeqNo: **727310** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.48	0.020	0.5000	0	95.4	80	120			
Antimony	0.52	0.050	0.5000	0	104	80	120			
Arsenic	0.47	0.020	0.5000	0	93.5	80	120			
Barium	0.49	0.020	0.5000	0	97.1	80	120			
Beryllium	0.50	0.0030	0.5000	0	99.1	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.49	0.0060	0.5000	0	97.8	80	120			
Cobalt	0.49	0.0060	0.5000	0	97.4	80	120			
Copper	0.52	0.0060	0.5000	0	105	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.48	0.0050	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	98.6	80	120			
Nickel	0.49	0.010	0.5000	0	98.6	80	120			
Selenium	0.49	0.050	0.5000	0	98.0	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **LCS-18024**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **18024**	RunNo: **24683**
Prep Date: **3/6/2015**	Analysis Date: **3/7/2015**	SeqNo: **727310** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.48	0.050	0.5000	0	97.0	80	120			
Vanadium	0.49	0.050	0.5000	0	98.2	80	120			
Zinc	0.48	0.020	0.5000	0	95.1	80	120			

Sample ID **1502959-001BMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **WDW-1,2,&3 Effluen**	Batch ID: **18050**	RunNo: **24731**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728505** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	76	1.0	50.00	25.84	101	75	125			
Potassium	84	1.0	50.00	34.66	98.8	75	125			

Sample ID **1502959-001BMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Metals**
Client ID: **WDW-1,2,&3 Effluen**	Batch ID: **18050**	RunNo: **24731**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728506** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	75	1.0	50.00	25.84	98.6	75	125	1.52	20	
Potassium	86	1.0	50.00	34.66	102	75	125	1.89	20	

Sample ID **MB-18050**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Metals**
Client ID: **PBW**	Batch ID: **18050**	RunNo: **24731**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728508** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS-18050**	SampType: **LCS**	TestCode: **EPA 6010B: Total Metals**
Client ID: **LCSW**	Batch ID: **18050**	RunNo: **24731**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728509** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	57	1.0	50.00	0	113	80	120			
Magnesium	56	1.0	50.00	0	113	80	120			
Potassium	53	1.0	50.00	0	105	80	120			
Sodium	58	1.0	50.00	0	116	80	120			

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **CYANIDE, Reactive**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/5/2015**	SeqNo: **736973** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	ND	1.00								

Sample ID **LCS-R24992**	SampType: **LCS**	TestCode: **CYANIDE, Reactive**
Client ID: **LCSW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/5/2015**	SeqNo: **736974** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide, Reactive	0.480		0.5000	0	96.0	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-R24992**	SampType: **MBLK**	TestCode: **SULFIDE, Reactive**
Client ID: **PBW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **736976** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	ND	1.0								

Sample ID **LCS-R24992**	SampType: **LCS**	TestCode: **SULFIDE, Reactive**
Client ID: **LCSW**	Batch ID: **R24992**	RunNo: **24992**
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **736977** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Reactive Sulfide	0.20		0.2000	0	100	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R24621**	RunNo: **24621**							
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **725674**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R24621**	RunNo: **24621**							
Prep Date:	Analysis Date: **3/3/2015**	SeqNo: **725675**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	99.2	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
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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
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **1502959-001ADUP**	SampType: **DUP**	TestCode: **Specific Gravity**							
Client ID: **WDW-1,2,&3 Effluen**	Batch ID: **R24648**	RunNo: **24648**							
Prep Date:	Analysis Date: **3/5/2015**	SeqNo: **726439**	Units:						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	0.9999	0						0.220	20	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502959**

25-Mar-15

Client: Navajo Refining Company

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

Sample ID **MB-17895**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **17895**	RunNo: **24545**
Prep Date: **2/25/2015**	Analysis Date: **2/27/2015**	SeqNo: **722782** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-17895**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **17895**	RunNo: **24545**
Prep Date: **2/25/2015**	Analysis Date: **2/27/2015**	SeqNo: **722783** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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: 1502959 RcptNo: 1

Received by/date: AG 02/24/15

Logged By: Ashley Gallegos 2/24/2015 8:00:00 AM AG

Completed By: Ashley Gallegos 2/24/2015 9:49:07 AM AG

Reviewed By: CS 02/24/15

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	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 ☑	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 ☐
10. VOA vials have zero headspace?	Yes ☑	No ☑	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 3 (<2 or >12 unless noted)

Adjusted? N/A

Checked by: JM

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refining Co.	Turn-Around Time: ☐ Standar ☐ **Rush**
	Project Name: Quarterly WDW-1, 2, & 3 Inj Well
Mailing Address: P.O. Box 159 Artesia,	Project #: P.O. # 167796
NM 88211-0159	
Phone #: 575-748-3311	
email or Fax#: 575-746-5451	Project Manager: Dan Crawford
QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation)	Sampler:
☐ Other ☐ EDD (Type)	On Ice: ☒ Yes ☐ No
	Sample Temperature: 1.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1502959	Analysis Request: Specific Gravity,HCO3, CO3, Cl, SO4, TDS, pH, cond.,Fl, Cation/anion bal., Br, Eh/40	VOCs/SW-846 Method 8260C (see attached list 'VOCs')	SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')	R,C,I/40 CFR part 261	Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')	Ca, K, Mg, Na/40 CFR 136.3	TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
2/23/15	0830	Liquid	WDW-1, 2, & 3 Effluent	3	Neat/H2SO4	-001	X						X
2/23/15	0830	Liquid	WDW-1, 2, & 3 Effluent	1	HNO3						X	X	
2/23/15	0830	Liquid	WDW-1, 2, & 3 Effluent	3	HCL			X					
2/23/15	0830	Liquid	WDW-1, 2, & 3 Effluent	2	Neat				X				
2/23/15	0830	Liquid	WDW-1, 2, & 3 Effluent	2	Neat					X			
2/23/15	0830	Liquid	Trip Blank	2	Neat	-002		X					
2/23/15	0830	Liquid	Temperature Blank	1	Neat	-0							

Date: 2/23/15	Time: 0930	Relinquished by: Elizabeth Salsberry Elizabeth Salsberry	Received by:	Date: 02/24/15	Time: 0800
Date:	Time:	Relinquished by:	Received by:	Date:	Time:

Remarks: Report these results separately from all other Chain of Custody kits provided.

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

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

Injection Well Quarterly Sample Details Attachment

HOLLYFRONTIER
The HollyFrontier Companies

Project Name	WDW-1,2, & 3 Qrtly Inj Well
Samplers Name	Elizabeth Salsberry
Samplers Affiliation	Navajo Refining Co. LLC
Start Date and Time	2/23/2015 @ 08:25
End Date and Time	2/23/2015 @ 08:35

Sample Type	
Grab	☑
Time Weighted Composite	☐
Flow Weighted Composite	☐

Parts / Sample Intervals	One

Physical Property	
Solid	☐
Liquid	☑
Sludge	☐

Type of Sampler	Directly to sample jars

Outfall / Sample Location: Waste water effluent pumps to injection wells.

☐ P-849 sample point (first from east)
☑ P-854 sample point (second from east)
☐ P-856 sample point (third from east)
☐ P-857 sample point (fourth from east)

				Preservatives								
Container	Size	Material	# of Containers	Neat (None)	HCL	HNO3	H2SO4	NaOH	Na2S2O3	NaHSO4	Other	Analysis and/or Method Requested
1			3	X			X					Specific Gravity,HCO3, CO3, Cl, SO4, TDS, pH, cond.,Fl, Cation/anion bal., Br, Eh/40 CFR 136.3
2			1			X						VOCs/SW-846 Method 8260C (see attached list 'VOCs')
3			3		X							SVOCs/SW-846 Method 8270D (see attached list 'SVOCs')
4			2	X								R,C,I/40 CFR part 261
5			2	X								Metals/SW-846 Mthd 6010, 7470 (see attached list 'Metals')
6			2	X								Ca, K, Mg, Na/40 CFR 136.3
7			1	X								TCLP Metals, only /40 CFR Part 261/ SW-846 Method 1311
8												
9												
10												

Field Data (Weather, Observations, Etc): 2/23/2015 08:35 Tmp. 19.4, Humidity 100%, Wind Dir. NNE, Wind Speed 11.5 mph, Conditions light snow

Date and Time:

Field Temp. 95.6°F Field pH 6.86

Storage Method	
Ice	☑
Refrigerated	☐
Other	☐

Shipping Media	
Ice	☑
Other	☐

Classification	Analyte name[1]	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		

** dilute elements only if necessary

[1] 23 TAL Metals

HOLLYFRONTIER.

July 15, 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
7015 0640 0006 9944 5666

RE: 2015 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 2015 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 1377 psig and the average flows were 127 gpm for WDW-1, 116 gpm for WDW-2 and 125 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 April 1, 2015 to June 30, 2015. We have disposed a total of 1,150,921 barrels of fluid into the three wells during the second quarter of 2015. The volume per well is:

- 397,034 barrels into WDW-1
- 364,011 barrels into WDW-2
- 389,876 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.

Enc.

Electronic cc (w/enc.): R Combs, M Schultz, S Denton
Environmental File: Injection Wells/Reports C-115 & Quarterly/2015/2nd quarter/2015-7-15 2nd QTR Inj. Rpt. for Wells WDW-1,2,3

Navajo Refining Company, L.L.C.

2015 SECOND QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

	Average Pressure (psig)	Maximum Pressure (psig)	Minimum Pressure (psig)	Average Flow (gpm)	Maximum Flow (gpm)	Minimum Flow (gpm)	Average Annular Pressure Av (psig)	Maximum Annular Pressure Mx (psig)	Minimum Annular Pressure Mn (psig)	Average Volume (bpd)	Maximum Volume (bpd)	Minimum Volume (bpd)	Volume (barrels)	TOTAL CUMULATIVE Volume (barrels)
WDW-1													**Previous Quarter**	36,354,894
Apr-15	1,350	1,400	1,075	121	132	85	426	845	225	4,149	4,526	2,914	124,457	36,479,351
May-15	1,393	1,400	1,273	130	132	116	298	793	173	4,457	4,526	3,977	138,167	36,617,518
Jun-15	1,398	1,400	1,375	130	132	127	446	864	230	4,457	4,526	4,354	133,710	36,751,228
WDW-2													**Previous Quarter**	23,265,417
Apr-15	1,365	1,400	1,245	112	122	76	280	717	241	3,840	4,183	2,606	115,200	23,380,617
May-15	1,389	1,400	1,194	117	121	61	248	274	225	4,011	4,149	2,091	124,341	23,504,958
Jun-15	1,400	1,400	1,391	121	183	105	249	266	239	4,149	6,274	3,600	124,470	23,629,428
WDW-3													**Previous Quarter**	13,488,921
Apr-15	1,364	1,390	1,300	126	138	106	593	1,026	464	4,320	4,731	3,634	129,600	13,618,521
May-15	1,359	1,390	1,098	121	137	4	526	919	259	4,149	4,697	137	128,619	13,747,140
Jun-15	1,379	1,390	1,149	128	137	20	685	931	307	4,389	4,697	686	131,657	13,878,797
													Total Injected fluids:	74,259,453

Navajo Refining Company, L.L.C.

2015 SECOND QUARTER WEEKLY WAMS LEVEL TABLE

	4/1/15	4/7/15	4/14/15	4/22/15	4/30/15	5/4/15	5/11/15	5/19/15	5/29/15	6/1/15	6/8/15	6/15/15	6/22/15	6/29/15
WDW -1[1]	145	145	145	145	145	145	100**	75**	100	100	100	100	100	100
WDW-2[1]	100	100	100	100	100	100	100	100	100	100	100	100	100	100
WDW-3[1]	255	225*	225	225	225	255	290	150***	160	160	160	245	260	285
				Comments:										

[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

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

June 16, 2015

Micki Schultz
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 746-5281
FAX

RE: Quarterly WDW-1, 2, &3 Inj Well OrderNo.: 1505504

Dear Micki Schultz:

Hall Environmental Analysis Laboratory received 2 sample(s) on 5/12/2015 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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#: **1505504**
Date: **6/16/2015**

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well

The following compounds were also scanned for by NIST library search and not detected. The detection level for these compounds would be ~10ppb:
Allyl alcohol
t-amyl ethyl ether
Bis(2-chloroethyl)sulfide
Bromoacetone
Chloral hydrate
1-chlorobutane
1-chlorohexane
2-chloroethanol
Crotonaldehyde
Cis-1,4-Dichloro-2butene
1,3-Dichloro-2-propanol
1,2,3,4-Depoxybutane
Ethanol
Ethylene oxide
Malonitrile
Methanol
Methyl acrylate
2-Nitropropane
Paraldehyde
Pentafluorobenzene
2-Pentanone
2-picoline
1-propanol
2-propanol
Propargyl alcohol
Beta-propiolactone
n-propylamine

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1505504-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 5/11/2015 8:20:00 AM
Received Date: 5/12/2015 8:56:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **LGT**	
Fluoride	11	0.15	1.0	*	mg/L	10	5/12/2015 9:30:50 PM	R26148
Chloride	550	2.2	50		mg/L	100	5/12/2015 9:43:14 PM	R26148
Nitrogen, Nitrite (As N)	0.32	0.10	1.0	J	mg/L	10	5/12/2015 9:30:50 PM	R26148
Bromide	2.2	0.26	1.0		mg/L	10	5/12/2015 9:30:50 PM	R26148
Nitrogen, Nitrate (As N)	0.80	0.064	1.0	J	mg/L	10	5/12/2015 9:30:50 PM	R26148
Phosphorus, Orthophosphate (As P)	ND	0.75	5.0		mg/L	10	5/12/2015 9:30:50 PM	R26148
Sulfate	2600	8.2	50		mg/L	100	5/12/2015 9:43:14 PM	R26148
EPA METHOD 7470: MERCURY							Analyst: **MED**	
Mercury	ND	0.000059	0.00020		mg/L	1	5/14/2015 2:31:19 PM	19224
MERCURY, TCLP							Analyst: **MED**	
Mercury	0.0012	0.00075	0.020	J	mg/L	1	5/27/2015 3:12:30 PM	19406
EPA METHOD 6010B: TCLP METALS							Analyst: **ELS**	
Arsenic	0.049	0.011	5.0	J	mg/L	1	5/27/2015 10:03:57 AM	19377
Barium	0.051	0.00060	100	J	mg/L	1	5/27/2015 10:03:57 AM	19377
Cadmium	ND	0.00090	1.0		mg/L	1	5/27/2015 10:03:57 AM	19377
Chromium	0.016	0.0014	5.0	J	mg/L	1	5/27/2015 10:03:57 AM	19377
Lead	0.0015	0.0013	5.0	J	mg/L	1	5/27/2015 10:03:57 AM	19377
Selenium	0.13	0.019	1.0	J	mg/L	1	5/27/2015 10:03:57 AM	19377
Silver	ND	0.0013	5.0		mg/L	1	5/27/2015 10:03:57 AM	19377
EPA 6010B: TOTAL METALS							Analyst: **ELS**	
Aluminum	0.48	0.0038	0.020		mg/L	1	5/27/2015 9:51:20 AM	19377
Antimony	ND	0.015	0.050		mg/L	1	5/27/2015 9:51:20 AM	19377
Arsenic	0.042	0.018	0.020		mg/L	1	5/27/2015 9:51:20 AM	19377
Barium	0.010	0.00098	0.020	J	mg/L	1	5/27/2015 9:51:20 AM	19377
Beryllium	ND	0.00046	0.0030		mg/L	1	5/27/2015 9:51:20 AM	19377
Cadmium	ND	0.00071	0.0020		mg/L	1	5/27/2015 9:51:20 AM	19377
Calcium	51	0.063	1.0		mg/L	1	5/27/2015 9:51:20 AM	19377
Chromium	ND	0.0015	0.0060		mg/L	1	5/27/2015 9:51:20 AM	19377
Cobalt	0.0026	0.0021	0.0060	J	mg/L	1	5/27/2015 9:51:20 AM	19377
Copper	0.0051	0.0039	0.0060	J	mg/L	1	5/27/2015 9:51:20 AM	19377
Iron	0.33	0.0079	0.050		mg/L	1	5/27/2015 9:51:20 AM	19377
Lead	ND	0.0023	0.0050		mg/L	1	5/27/2015 9:51:20 AM	19377
Magnesium	19	0.062	1.0		mg/L	1	5/27/2015 9:51:20 AM	19377
Manganese	0.10	0.0012	0.0020		mg/L	1	5/27/2015 9:51:20 AM	19377
Nickel	0.011	0.0060	0.010		mg/L	1	5/27/2015 9:51:20 AM	19377
Potassium	62	0.13	1.0		mg/L	1	5/27/2015 9:51:20 AM	19377
Selenium	0.13	0.017	0.050		mg/L	1	5/27/2015 9:51:20 AM	19377

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1505504-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 5/11/2015 8:20:00 AM
Received Date: 5/12/2015 8:56:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA 6010B: TOTAL METALS							Analyst: **ELS**	
Silver	ND	0.0013	0.0050		mg/L	1	5/27/2015 9:51:20 AM	19377
Sodium	1400	10	20		mg/L	20	5/27/2015 10:17:24 AM	19377
Thallium	ND	0.010	0.050		mg/L	1	5/27/2015 9:51:20 AM	19377
Vanadium	0.0078	0.0018	0.050	J	mg/L	1	5/27/2015 9:51:20 AM	19377
Zinc	0.030	0.0020	0.020		mg/L	1	5/27/2015 9:51:20 AM	19377
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**	
Acetonitrile	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Allyl chloride	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Chloroprene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Cyclohexane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Diethyl ether	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Diisopropyl ether	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Epichlorohydrin	ND	5.0	5.0		µg/L	1	5/22/2015	R26752
Ethyl acetate	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Ethyl methacrylate	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Ethyl tert-butyl ether	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Freon-113	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Isobutanol	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Isopropyl acetate	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Methacrylonitrile	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Methyl acetate	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Methyl ethyl ketone	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Methyl isobutyl ketone	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Methyl methacrylate	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Methylcyclohexane	ND	1.0	1.0		µg/L	1	5/22/2015	R26752
n-Amyl acetate	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
n-Hexane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Nitrobenzene	ND	5.0	5.0		µg/L	1	5/22/2015	R26752
Pentachloroethane	ND	5.0	5.0		µg/L	1	5/22/2015	R26752
p-isopropyltoluene	0.83	0.50	0.50		µg/L	1	5/22/2015	R26752
Propionitrile	7.3	2.5	2.5		µg/L	1	5/22/2015	R26752
Tetrahydrofuran	1.3	0.50	0.50		µg/L	1	5/22/2015	R26752
Benzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Toluene	0.66	0.50	0.50		µg/L	1	5/22/2015	R26752
Ethylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Methyl tert-butyl ether (MTBE)	ND	10	10		µg/L	1	5/22/2015	R26752
1,2,4-Trimethylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,3,5-Trimethylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2-Dichloroethane (EDC)	ND	0.50	0.50		µg/L	1	5/22/2015	R26752

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Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1505504-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 5/11/2015 8:20:00 AM
Received Date: 5/12/2015 8:56:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**	
1,2-Dibromoethane (EDB)	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Naphthalene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Acetone	10	2.5	2.5		µg/L	1	5/22/2015	R26752
Bromobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Bromodichloromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Bromoform	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Bromomethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Carbon disulfide	1.0	0.50	0.50		µg/L	1	5/22/2015	R26752
Carbon Tetrachloride	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Chlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Chloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Chloroform	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Chloromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
2-Chlorotoluene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
4-Chlorotoluene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
cis-1,2-DCE	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
cis-1,3-Dichloropropene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2-Dibromo-3-chloropropane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Dibromochloromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Dibromomethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2-Dichlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,3-Dichlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,4-Dichlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Dichlorodifluoromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1-Dichloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1-Dichloroethene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2-Dichloropropane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,3-Dichloropropane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
2,2-Dichloropropane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1-Dichloropropene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Hexachlorobutadiene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
2-Hexanone	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Isopropylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Methylene Chloride	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
n-Butylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
n-Propylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
sec-Butylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Styrene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
tert-Butylbenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752

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Qualifiers:

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

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: 5/11/2015 8:20:00 AM
Lab ID: 1505504-001 **Matrix:** AQUEOUS **Received Date:** 5/12/2015 8:56:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **SUB**	
1,1,1,2-Tetrachloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1,2,2-Tetrachloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Tetrachloroethene (PCE)	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
trans-1,2-DCE	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
trans-1,3-Dichloropropene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2,3-Trichlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2,4-Trichlorobenzene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1,1-Trichloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,1,2-Trichloroethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Trichloroethene (TCE)	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Trichlorofluoromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,2,3-Trichloropropane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Vinyl chloride	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
mp-Xylenes	ND	1.0	1.0		µg/L	1	5/22/2015	R26752
o-Xylene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
tert-Amyl methyl ether	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
tert-Butyl alcohol	ND	5.0	5.0		µg/L	1	5/22/2015	R26752
Acrolein	ND	2.5	2.5		µg/L	1	5/22/2015	R26752
Acrylonitrile	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Bromochloromethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
2-Chloroethyl vinyl ether	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Iodomethane	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
trans-1,4-Dichloro-2-butene	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
Vinyl acetate	ND	0.50	0.50		µg/L	1	5/22/2015	R26752
1,4-Dioxane	ND	20	20		µg/L	1	5/22/2015	R26752
Surr: 1,2-Dichlorobenzene-d4	111		70-130		%REC	1	5/22/2015	R26752
Surr: 4-Bromofluorobenzene	106	0	70-130		%REC	1	5/22/2015	R26752
Surr: Toluene-d8	104	0	70-130		%REC	1	5/22/2015	R26752
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**	
1,1-Biphenyl	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
Atrazine	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
Benzaldehyde	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
Caprolactam	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
N-Nitroso-di-n-butylamine	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
Acetophenone	ND	10	10		µg/L	1	5/21/2015	R26752
1-Methylnaphthalene	ND	10	10		µg/L	1	5/21/2015	R26752
2,3,4,6-Tetrachlorophenol	ND	10	10		µg/L	1	5/21/2015	R26752
2,4,5-Trichlorophenol	ND	10	10		µg/L	1	5/21/2015	R26752
2,4,6-Trichlorophenol	ND	10	10		µg/L	1	5/21/2015	R26752

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Quarterly WDW-1, 2, &3 Inj Well
Lab ID: 1505504-001 **Matrix:** AQUEOUS

Client Sample ID: WDW-1,2,&3 Effluent
Collection Date: 5/11/2015 8:20:00 AM
Received Date: 5/12/2015 8:56:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA 8270C: SEMIVOLATILES/MOD							Analyst: **SUB**	
2,4-Dichlorophenol	ND	10	10		µg/L	1	5/21/2015	R26752
2,4-Dimethylphenol	ND	10	10		µg/L	1	5/21/2015	R26752
2,4-Dinitrophenol	ND	10	10		µg/L	1	5/21/2015	R26752
2,4-Dinitrotoluene	ND	10	10		µg/L	1	5/21/2015	R26752
2,6-Dinitrotoluene	ND	10	10		µg/L	1	5/21/2015	R26752
2-Chloronaphthalene	ND	10	10		µg/L	1	5/21/2015	R26752
2-Chlorophenol	ND	10	10		µg/L	1	5/21/2015	R26752
2-Methylnaphthalene	ND	10	10		µg/L	1	5/21/2015	R26752
2-Methylphenol	ND	10	10		µg/L	1	5/21/2015	R26752
2-Nitroaniline	ND	10	10		µg/L	1	5/21/2015	R26752
2-Nitrophenol	ND	10	10		µg/L	1	5/21/2015	R26752
3,3'-Dichlorobenzidine	ND	10	10		µg/L	1	5/21/2015	R26752
3-Nitroaniline	ND	10	10		µg/L	1	5/21/2015	R26752
4,6-Dinitro-2-methylphenol	ND	10	10		µg/L	1	5/21/2015	R26752
4-Bromophenyl phenyl ether	ND	10	10		µg/L	1	5/21/2015	R26752
4-Chloro-3-methylphenol	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
4-Chloroaniline	ND	10	10		µg/L	1	5/21/2015	R26752
4-Chlorophenyl phenyl ether	ND	10	10		µg/L	1	5/21/2015	R26752
4-Nitroaniline	ND	10	10		µg/L	1	5/21/2015	R26752
4-Nitrophenol	ND	10	10		µg/L	1	5/21/2015	R26752
Acenaphthene	ND	10	10		µg/L	1	5/21/2015	R26752
Acenaphthylene	ND	10	10		µg/L	1	5/21/2015	R26752
Anthracene	ND	10	10		µg/L	1	5/21/2015	R26752
Benzo(g,h,i)perylene	ND	10	10		µg/L	1	5/21/2015	R26752
Benz(a)anthracene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Benzo(a)pyrene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Benzo(b)fluoranthene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Benzo(k)fluoranthene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Bis(2-chloroethoxy)methane	ND	10	10		µg/L	1	5/21/2015	R26752
Bis(2-chloroethyl)ether	ND	10	10		µg/L	1	5/21/2015	R26752
Bis(2-chloroisopropyl)ether	ND	10	10		µg/L	1	5/21/2015	R26752
Bis(2-ethylhexyl)phthalate	ND	5.0	5.0		µg/L	1	5/21/2015	R26752
Butyl benzyl phthalate	ND	10	10		µg/L	1	5/21/2015	R26752
Carbazole	ND	10	10		µg/L	1	5/21/2015	R26752
Chrysene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Dibenz(a,h)anthracene	ND	0.10	0.10		µg/L	1	5/21/2015	R26752
Dibenzofuran	ND	10	10		µg/L	1	5/21/2015	R26752
Diethyl phthalate	ND	10	10		µg/L	1	5/21/2015	R26752
Dimethyl phthalate	ND	10	10		µg/L	1	5/21/2015	R26752

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R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
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