# GW - 001

# INVESTIGATION REPORT BACKGROUND CONCENTRATION



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July 30, 2013

John E. Kieling, Chief New Mexico Environment Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Bldg 1 Santa Fe, NM 87505

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RE: Response to Disapproval Investigation Report Background Concentrations (July 2012) Western Refining Southwest, Inc., Bloomfield Refinery EPA ID# NMD089416416 HWB-WRB-12-005

Dear Mr. Kieling:

Western Refining Southwest, Inc., Bloomfield Refinery (Western) has prepared the following responses to your comments (dated May 8, 2013) received on the above referenced investigation report.

#### NMED Comment 1

In NMED's November 19, 2010 Notice of Disapproval (NOD) letter for the Investigation Work Plan for Determination of Background Concentrations, Western was required to collect additional background samples to provide sufficient representation of the variability of the soils across the site because the initial proposed sampling grid was too small. In the Report, Western expanded their proposed sampling grid and collected additional soil samples in the vicinity of the background monitoring wells; one monitoring well was located directly adjacent to the proposed background sampling grid and the location of the other monitoring well is in the far eastern portion of the refinery property. Western states that the lithology and soil type are similar across the entire site; however, it is still not clear as to whether the background samples are capturing natural variation in background metal concentrations across the site. In addition, the sampling locations may not have yielded independent samples due to their close proximity. Failure to characterize the full extent of soil variability is conservative from a regulatory standpoint but may ultimately cause Western to retain metals as potential contaminants that may be reflective of natural background. This potential failure to capture the full range of background concentrations does not prevent Western from moving forward with field work and analyses, but Western may be required to expand upon the background dataset at some time in the future.

Western Response 1: None required.

#### **NMED Comment 2**

In Section 3.1 (Soil Boring, Monitoring Well Installation and Sample Calculation), page 7, paragraph 2, Western states that "other soil samples collected at the background monitoring well locations [i.e., BCK-9 (54-56'), BCK-10 (5-6'), and BCK-10 (40-42')] were inadvertently not analyzed for [total petroleum hydrocarbons (TPH)]." Western must ensure all required analytes and chemical parameters are analyzed for each sampling investigation and reported in all future reports. In addition, all field personnel involved in future investigations must be aware of analytical requirements proposed in approved work plans and directions provided in NMED's letters. No response required.

Western Response 2: None required.

#### NMED Comment 3

In Section 4.1 (Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment), BCK-9, page 12, paragraph 2, Western states, "[a] stiff clay was logged from 54 feet to 59 feet bgs, with gravel in the sample from 58 to 59 feet. The gravel interval continued from 59 feet to 73.5 where a clay/shale was encountered that continued to the termination depth of 79 feet." All numerical values must be defined with units of measure in this Report and all future reports and work plans.

**Western Response 3**: The text in Sections 2.3.2, 3.1, 3.4, 4.1, and 4.2 has been revised to include units each time a depth appears and units of measure will be included in all future reports.

#### NMED Comment 4

In Section 5.1 (Soil Background Concentrations), page 18, paragraph 2, Western replaced arsenic and fluoride non-detect results with one-half the sample quantitation limit (SQL) which is depicted in Table 3 (Soil Analytical Results and Statistical Summary), and substituted these values in the 95% upper tolerance limit (UTL) calculations. The report indicates that this methodology is consistent with EPA's most recent guidance (EPA, 2009); however, this is not an acceptable method for processing non-detects. The most current EPA guidance (EPA, 2010) states "that the detection limit (DL)/2 method (with non-detects replaced by DL/2) does not perform well (e.g., Singh, Maichle, and Lee (EPA 2006)) even when the percentage of non- detects is only 5% - 10%. It is strongly suggested to avoid the use of DL/2 method for estimation and hypothesis testing approaches used in various environmental applications." NMED recommends regression on order statistics (ROS), where "a regression line is fit to the normal scores of the order statistics for the uncensored observations and then to fill in values extrapolated from the straight line for the observations below the detection limit." In addition, NMED does not recommend using the DL/2 method for risk assessments. Revise Table 3 by utilizing the ROS method to calculate the 95% UTL. Discuss the revised results in the appropriate sections of the revised Report.

#### References:

- EPA 2010, Singh, A, Maichle, R.W. and N. Armbya. ProUCL Version 4.1 User Guide Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. EPA/600/R-07/041.
- EPA 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. EPA/530/R-09/007.
- EPA 2006, Singh, A., Maichle, R.W. and S. Lee 2006. On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations. EPA/600/R-06/022.

**Western Response 4:** The non-detect results were substituted with values produced with the ROS method and the UTLs recalculated with the revised values. The results are presented in a revised Table 3 and Section 5 was revised to discuss the use the ROS methodology instead of ½ of the SQL. Revised ProUCL output sheets are included in Appendix H.

#### NMED Comment 5

In Section 5.1 (Soil Background Concentrations), page 19, paragraph 2 describes how the "j- flagged" data was not utilized to calculate the 95% UTL. Data which are qualified as "J" are estimated values with an undetermined bias. The impact of a "J" validation code has minimal impact on data usability. These estimated values (estimated high or low) must be treated for statistical purposes as valid measurements. Revise Table 3 (Soil Analytical Results and Statistical Summary) to calculate the 95% UTL for mercury and molybdenum and discuss the results in the appropriate sections of the Report. J-qualified data must be considered valuable measurements for all future reports and assessments.

**Western Response 5:** The statistical evaluation was revised to include the use of J-qualified data for mercury and molybdenum as directed by NMED. As a point of clarification, J-qualified data was used to the calculated the 95% UTL for arsenic, beryllium, boron, and fluoride in the initial submittal. As was explained in Section 5.1, a UTL was not initially calculated for mercury and molybdenum because almost all of the results were estimated values, thus potentially decreasing the validity of any calculated background concentration.

#### NMED Comment 6

In Section 5.1 (Soil Background Concentrations), page 19, paragraph 3, Western stated that the software program ProUCL Version 4.00.05 was used to calculate the 95% UTL. Since the Report was submitted in July 2012, ProUCL Version 4.1 (2010) should have been utilized. ProUCL Version 4.1 has had several updates and additions that may affect the UTL calculations, although it is unlikely that use of the most current version would significantly affect the results of the UTL calculations. Use ProUCL Version 4.1 to recalculate the 95% UTL in Table 3 (Soil Analytical Results and Statistical Summary) and

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resubmit the revised table. In addition, discuss the results in the appropriate sections of the Report and in future reports, utilize the most currently available version of ProUCL.

**Western Response 6:** As directed by NMED, Western has redone all of the calculations using ProUCL version 4.1. As anticipated by both Western and NMED, substituting the ProUCL 4.00.05 version with version 4.1 resulted in no changes to any of the report results.

A revised Table 3 is provided; however no revisions were necessary based on the actions taken in response to this comment.

#### NMED Comment 7

The following comments are for Table 3 (Soil Analytical Results and Statistical Summary).

- a. In Table 3, the maximum SQL for arsenic (5.0 milligrams per kilogram, mg/kg) is fairly elevated compared to the NMED residential risk-based screening level (3.9 mg/kg). In future sampling events, NMED recommends that the selected analytical laboratory's methods be reviewed to ensure that the method chosen will be sufficient to detect concentrations below the screening levels.
- b. In Table 3, the 95% UTLs are higher than the maximum detected concentrations for many analytes (e.g., aluminum, arsenic, chromium, cobalt, copper, fluoride, iron, manganese, nickel, vanadium, and zinc). While it is statistically possible for UTLs to be greater than the maximum detected concentrations, the values used for background comparison must not be greater than the maximum detected concentrations. In instances where the statistically-based UTL is greater than the maximum detected concentration must be used as the background reference value. Revise the table accordingly.
- c. In Table 3, there were eight detected observations greater than the SQL out of eighteen samples collected for chloride but summary statistics and the 95% UTL were not calculated. There are sufficient numbers of detected observations to calculate a background comparison value. Revise the table and Appendix H (Statistical Evaluation) to include a 95% UTL for chloride.
- d. In Table 3, the SQL does not match the reporting limit or the detection limit. Explain why either limit is used as the SQL and include a footnote summarizing the reasoning in the revised table.
- e. In Table 3, the column labeled "Boron," in the row labeled "Minimum SQL" the value 0.1 mg/kg is reported. In the SQL column, the minimum SQL reported is 0.14 mg/kg. Review the table to ensure that all values are reported correctly.
- f. A separate table was not provided in the Report to summarize the final background comparison values that were used for point-by-point comparisons. While Table 3 displays the summary statistics and calculated 95% UTLs, there is no listing of the final values chosen as the background comparison values. Include an additional table in the Report that summarizes the final background comparison values that were selected and utilized for site-to-background comparisons.

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#### Western Response 7:

- a. As noted by NMED, the maximum SQL for arsenic in Table 3 is 5.0 mg/kg, which is higher than the NMED residential risk-based screening level of 3.9 mg/kg. NMED recommended that in future sampling events "the selected analytical laboratory's methods be reviewed to ensure that the method chosen will be sufficient to detect concentrations below the screening levels." A review of the laboratory data for this sampling event indicates that the detection limits for arsenic were actually much lower [e.g., 0.31 mg/kg for sample BK-10 (5-6')] than the residential risk-based screening level of 3.9 mg/kg. Sample <u>quantitation</u> limits (SQLs) are most always higher than the associated <u>detection</u> limits. The SQL values were included in Table 3, as this is required pursuant to Section VIII.H. of the July 27, 2007 NMED Order.
- b. Table 3 has been revised to include a new row that shows the "site background concentration" that is based on the lower of the maximum detected concentration and the 95% UTL. A footnote is included to explain whether a particular value is based on the maximum detected concentration or the 95% UTL. In fact, all of the values are based on maximum detected concentrations. There are a few constituents for which outliers were identified and for these constituents the background concentration is based on the maximum detected value after removal of the outlier values.
- c. Pursuant to NMED's direction, a 95% UTL was calculated for chloride. However, it should be noted that the ProUCL software (Version 4.1) issued several warnings that the resulting value may not be reliable due to the low number of detected results. The ROS substitution method was used for the non-detect values. The results are presented in the revised Table 3 and Appendix H.
- d. The SQL as presented in Table 3 is based on the laboratory's reporting detection limit as it is shown in the laboratory analytical reports. The RL acronym is shown in the laboratory Qualifiers as the "Reporting Detection Limit" but this is not the analytical method detection limit. In fact, the Reporting Detection Limit is actually the sample specific quantitation limit, thus this value is shown in Table 3 as the sample quantitation limit (SQL).

A review of the SQLs provided in the original Table 3 indicates that the reported SQL values for a number of the constituents (e.g., barium, beryllium, boron, chromium, and cobalt) does not match the Reporting Detection Limit shown in the associated laboratory analytical reports. It appears that the incorrect values are analytical method detection limits and these have been replaced by the laboratory Reporting Detection Limits or SQLs.

- e. This was a rounding error in the table and the formatting has been revised to address this comment.
- f. Because all of the information used to select the "final background comparison values" is already included in Table 3, a new row was added to Table 3 to indicate the "Site Background Concentration" instead of creating a new table. We believe this will facilitate understanding the data and process used to select the final background comparison values.

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#### NMED Comment 8

Figures 3 (Background Monitoring Well Locations) and 9 (Background Soil Sample Locations) depict the sample locations for the background monitoring wells and background sample grid for eight of the ten background soil sample locations. Revise Figure 9 to include the background soil sample grid and background sample location BCK-9 (MW-BCK1).

**Western Response 8:** Figure 9 has been revised as directed; the location of BK-9 (MW-BCK-1) has been added to this figure.

#### NMED Comment 9

In Appendix B (Survey Data), Exhibit "B", Point 5117, the "Descriptor" column describes "3-8 APPROX". Explain why "APPROX" is listed with 3-8.

**Western Response 9:** Soil boring 3-8 as shown on Figure 9 is associated with *SWMU No. 3 Underground Piping Currently in Use*, and thus was a part of the Group 8 investigation activities. This boring was located within a well traveled roadway by Operations and facility maintenance personnel. The field marker for the boring location was off-set following the sampling activities so that the roadway could be restored quickly. Field measurements from the off-set marking allowed the boring to be surveyed correctly. The use of "APPROX" was an acronym used by the surveyor to indicate that the survey point was based on the off-set measurements from the marker placed in the field. Western personnel accompanied the surveyors during all surveying activities to ensure that the exact sample locations were located correctly. Therefore, the use of "APPROX" is for no reason intended to reflect any variance of accuracy of the surveyed sample locations.

#### NMED Comment 10

In Appendix D (Boring Logs), Sheet 4 of 4 is missing for Well BK-10 (MW-BCK-2). Provide the missing page with the revised Report.

Western Response 10: The missing page as been added to the revised report.

#### NMED Comment 11

The following comments are for Appendix F (Quality Assurance/Quality Control Review).

- a. In Table A-2 (Qualified Data) in the Comments column, "Qualified" is misspelled in several of the comments.
- b. In Table A-3 (Field Duplicate Summary), the table summarizes the inorganic sample results and relative percent difference (RPD) calculations. Explain why RPD calculations are reported for chloride, fluoride, and sulfate when the BK-7 (0-0.5') sample and field duplicate results are reported as non-detect.

**Western Response 11:** The following responses are for Appendix F (Quality Assurance/Quality Control Review).

- a. A revised Table A-2 with corrected spelling is included in the updated report.
- b. This is obviously a typographical error and the values reported for chloride, fluoride, and sulfate have been replaced by "NC." The revised Table A-3 is included in the revised report.

#### NMED Comment 12

The Investigation Report Background Concentrations does not include the proposed methodology that will be applied during the site-to-background comparisons. For future assessments, ensure that the site-to-background comparisons and statistical tests that will be utilized during the site-attribution analyses are consistent with the methodologies outlined in the most current NMED guidance "Risk Assessment Guidance for Site Investigations and Remediation."

#### Western Response 12: None required.

You will please find enclosed two hard copies and one CD of the revised report. In addition, an electronic version of the revised report (redline strikeout format) is enclosed that identifies where changes to the body of the report. As discussed above, changes were also made to Table 3, Figure 9, and Appendices F and H. If you have questions regarding the above responses or the enclosures, please contact me at (505) 632-4171.

Sincerely,

Mames R. Schmaltz Health, Safety, Environmental, and Regulatory Director Western Refining Southwest, Inc., Bloomfield Terminal

cc: Neelam Dhawan – NMED HWB Leona Tsinnajinnie – NMED HWB Carl Chavez - NMOCD Allen Hains – Western Refining El Paso Kelly Robinson – Western Refining Bloomfield



BLOOMFIELD LOGISTICS

## INVESTIGATION REPORT BACKGROUND CONCENTRATIONS

Bloomfield Refinery Western Refining Southwest, Inc. #50 Rd 4990 Bloomfield, New Mexico 87413

> July 2012 (Revised July 2013)

> > James R. Schmaltz Health, Safety, Environmental, and Regulatory Director Western Refining Southwest, Inc. Bloomfield Terminal

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# List of Acronyms

American Petroleum Institute (API) areas of concern (AOCs) benzene, toluene, ethylbenzene, and xylene (BTEX) below ground surface (bgs) Code of Federal Regulations (CFR) Environmental Protection Agency (EPA) global positioning system (GPS) hollow-stem auguring (HSA) investigation derived waste (IDW) liquefied petroleum gas (LPG). maximum contaminant level (MCL) monitoring well (MW) New Mexico Administrative Code (NMAC) New Mexico Environment Department (NMED) Resource Conservation and Recovery Act (RCRA) overburden drilling with excentric drilling (ODEX) photoionization detector (PID) polyvinyl chloride (PVC) recovery well (RW) separate phase hydrocarbon (SPH) Solid Waste Management Units (SWMUs) total petroleum hydrocarbon (TPH) unified soil classification system (USCS) United States Department of Agriculture (USDA) volatile organic constituent (VOC) upper tolerance limit (UTL) Water Quality Control Commission (WQCC) Western Regional Climate Center (WRCC)

# **Executive Summary**

The Bloomfield Refinery, which is located in the Four Corners Area of New Mexico, has been in operation since the late 1950s. Past inspections by State and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs).

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company and Giant Industries Arizona, Inc. for the Bloomfield Refinery, this environmental site investigation was completed to support development of site-specific background concentrations for inorganic constituents.

The investigation activities included collection and analysis of soil and groundwater samples for inorganic constituents beginning on January 24, 2012 and continuing through June 14, 2012. This included the completion of eight shallow soil borings and two deep soil borings, which were completed as permanent background monitoring wells. Twenty soil samples and two groundwater samples (excluding additional quality assurance samples) were collected for analysis of inorganic constituents. One soil sample was analyzed for organic constituents to confirm the selected background locations were not in areas with historical impacts.

Constituents were detected at sufficient concentrations and frequencies in soil to support development of site-specific background concentrations based on the 95<sup>%</sup> upper tolerance limit (UTL) for aluminum, arsenic, barium, beryllium, boron, chloride, chromium, cobalt, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, vanadium, and zinc. Either all or the vast majority of soil samples analyzed for antimony, cadmium, cyanide, selenium, silver, thallium, and uranium did not contain these constituents at concentrations above the detection limit and thus background concentrations were not developed for these constituents. Only summary statistics are presented for sulfate because the analytical results are highly varied with many low estimated concentrations reported while other results are very high and outside the laboratory calibration range.

Groundwater results for the first sampling event are presented, but no statistical evaluation is possible at this time. After a sufficient number of samples have been collected, the results will be evaluated pursuant to Section VIII.H. of the Order.

# Section 1 Introduction

The Bloomfield Refinery is located immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The physical address is #50 Road 4990, Bloomfield, New Mexico 87413. The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Bloomfield Refinery is currently owned by San Juan Refining Company, a New Mexico corporation, and operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc., an Arizona corporation. The Bloomfield Refinery had an approximate refining capacity of 18,000 barrels per day. Various process units operated at the facility, included crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and liquefied petroleum gas (LPG).

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. The purpose of this background investigation is to establish site-specific background concentrations for inorganic constituents that are naturally occurring in soils and groundwater. This Investigation Report has been prepared to describe the sample collection and analyses methods that were used to support development of site-specific background concentrations pursuant to Section VIII.H. of the Order. The evaluation of the analytical data, which has been completed in accordance with the Order, is presented, including the calculation of UTLs where appropriate.

# Section 2 Background

This section presents background information for the areas chosen from which to collect background samples, including a review of historical waste management activities.

## 2.1 Soil Sample Locations

The area targeted for collection of soil samples to establish background concentrations is located on the far southeastern portion of the refinery property so as to avoid any potential for current or historical impacts from refinery operations. The selected area is located south of the Regional Transportation office, which is located south the County Rd 4990 and east of Wooten Rd. (Figure 2). There is no current commercial or industrial activity in this area and no historical commercial or industrial activities are known to have occurred in this area. The proposed sample collection area is located on a separate tract of land owned by Western, just south of the Refinery property.

## 2.2 Groundwater Sample Locations

The areas targeted for collection of groundwater samples to establish background concentrations are located at the far eastern portion of the refinery property and south of the refinery property on a separate tract of land owned by San Juan Refining Company. This separate tract covers approximately 32.4 acres and is located approximately 200 feet south of the southernmost evaporation pond (Figure 3). These areas were selected because they are anticipated to be up-gradient of the refinery operations and as such groundwater samples collected from these areas will not be affected by any current or historical refinery operations. There is no current commercial or industrial activity in this area and no known historical commercial or industrial activities are known to have occurred in these areas with the exception of a single gas well. The southernmost location for a background monitoring well is approximately 700 feet southwest of the gas well, which should place it beyond any potential impacts from operations near the gas well.

## 2.3 Site Conditions

The conditions at the site, including surface and subsurface conditions that could affect the fate and transport of any contaminants, are discussed below. This information is based on recent visual observations and historical subsurface investigations.

#### 2.3.1 Surface Conditions

Regionally, the surface topography slopes toward the floodplain of the San Juan River, which runs along the northern boundary of the refinery complex. To the south of the refinery, the drainage is generally to the northwest. North of the refinery complex, across the San Juan River, surface water flows in a southeasterly direction toward the San Juan River. The active portion of the refinery property, where the process units and storage tanks are located, is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The refinery sits on an alluvial floodplain terrace deposit and there is a steep bluff (approx. drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery, which collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery and background soil sample collection area. A minor drainage feature is located on the eastern portion of the refinery, where the Landfill Pond (SWMU No. 9) was located and there are several steep arroyos along the northern refinery boundary that primarily capture only local surface water flows and minor groundwater discharges. The southernmost proposed location for a background monitoring well is situated along a northwest/southeast trending topographic high, which is higher in elevation than any of the other refinery property. Moving off this topographic high toward the refinery, the slope is predominantly to the northeast where surface runoff would feed the arroyo than runs along the eastern portion of the refinery property. The proposed location for the background monitoring well to the east is near an arroyo that runs along the eastern portion of the refinery property. The land surface at the proposed location for collection of background soil samples slopes north/northeast and feeds into the larger arroyo that runs along the east portion of the refinery property.

The land surface is characterized by sparse shrubby vegetation, which is adapted to the arid conditions. Bare soil is exposed in many areas, consisting of a loam in the upper five inches and a clay loam to a depth of 60 inches (USDA, 2010).

The prevailing wind direction for the area is from the east as measured at the nearby Farmington, New Mexico airport (WRCC, 2011). The Farmington airport is located approximately 17 miles west of the refinery and both locations are along the east-west trending San Juan River Valley. The soil sample collection locations discussed in Sections 3.1 and 4.1

are located southeast of the refinery process area and thus are in a generally upwind location from potential on-site air emission sources.

#### 2.3.2 Subsurface Conditions

Numerous soil borings and monitoring wells have been completed across the refinery property during previous site investigations and installation of the slurry wall, which runs along the northern and western refinery boundary. Based on the available site-specific and regional subsurface information, the site is underlain by the Quaternary Jackson Lake terrace deposits, which unconformably overlie the Tertiary Nacimiento Formation. The Recent eolian deposits are predominantly silt and fine to medium grained sand that is poorly sorted. The thickness of the eolian deposits has not been determined as the underlying Jackson Lake deposits similarly are composed of silt and fine grained sand and there is no clear demarcation between the two deposits. The Jackson Lake deposits consist of fine grained sand, silt and clay that grades to coarse sand, gravel and cobble size material closer to the contact with the Nacimiento Formation. The Jackson Lake Formation is over 40 feet thick near the southeast portion of the refinery operations area and generally thins to the northwest toward the San Juan River. In the locations of background wells, which are on the far eastern margins of the refinery property and on the separate tract to the south, the Jackson Lake deposits are over 70 feet thick. The Nacimiento Formation is primarily composed of fine grained materials (e.g., carbonaceous mudstone/claystone with interbedded sandstones) with a reported local thickness of approximately 570 feet (Groundwater Technology Inc., 1994).

A review of the vadose zone materials as examined in the numerous soil borings located across the refinery property indicates a similar lithology (e.g., color, mineralogical composition, and grain size) above the horizon within the Jackson Lake Formation where there is a marked increase in grain size with the introduction of gravel and cobble sized material. The vadose zone above the gravel and cobble is composed predominantly of silt and fine to medium grained sand with minor portions of clay sized material. Across the site, there are minor variations in the percentages of the various sized fractions but it is commonly a difficult field judgment whether to classify a particular sample as sandy silt or silty sand, with some minor portion of clay present in most samples. The sand and silt sized grains are predominantly composed of quartz.

Within the deeper interval that includes the gravel and cobble sized material, the matrix is similar to the finer grained material discussed above. While the gravel and cobble materials are composed of both quartz and igneous rocks of various compositions, the finer grained matrix

material will have the dominant influence on contaminant fate and transport through this interval. Also, the finer grained matrix material would represent the potential exposure medium in this deeper interval and not the gravel and cobble sized fraction, thus any evaluation of background constituent concentrations should be performed on the finer grained matrix material.

A review of the soil survey information (see Appendix A) also shows similar lithology within the upper five feet (USDA, 2010). The Doak soil map unit is described as a loam from 0 feet -0.5feet and a clay loam from 0.5 feet – 5.0 feet. The Avalon soil map unit is described as a loam from 0.5 feet – 5.0 feet and a gravelly loam from 5.0 feet – 5.33 feet. As shown on the soil survey map included in Appendix A, the same soil map unit (Doak-Avalon association) occurs across most of the refinery complex (USDA, 2010). The area from which the background samples were collected is within this same soil association (i.e., DN). Based on the actual soils samples observed in the soil borings completed the areas represented by the Doak-Avalon association (DN) and Haplargids-Blackston-Torriorthents complex (HA), there are not sufficient differences to denote distinct lithologic units in the vadose zone in these areas and the background soil samples collected from the "DN" area should also be representative of the areas shown on page 8 of Appendix A as HA. The two sample depths as discussed in Section 4.1 were selected based on the chemical soil properties reported in Appendix A, which show a slight variation with depth for the Doak-Avalon association soils. The slight difference appears to be related to leaching of soluble constituents (e.g., calcium carbonate) from the surface soils (e.g., 0 feet - 0.5 feet) and precipitation in deeper intervals (e.g., 18-24").

Figures 4 and 5 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions with the addition of the new background wells. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented as Figure 6 and shows the groundwater predominantly flowing to the northwest. The saturated thickness of the shallow aquifer within the Jackson Lake Formation is greatest near and along the Hammond Irrigation Ditch and other potential sources of recharge (e.g., the raw water ponds), and decreases to the southeast in the up-gradient portions of the refinery property.

Previous site investigations have identified and delineated on-site impacts to groundwater from historical site operations, which are down-gradient of the locations selected for the two new

background monitoring wells. Figure 7 shows the distribution of SPH in the subsurface based on the apparent thickness of SPH measured in on-site monitoring wells. Dissolved-phase impacts are depicted on Figure 8.

# Section 3 Scope of Activities

## 3.1 Soil Boring, Monitoring Well Installation and Sample Collection

Pursuant to Section VIII. H. of the Order, an investigation of soils and groundwater was conducted to determine the concentration of naturally occurring constituents (i.e., background concentrations). To accomplish this objective, soil borings and monitoring wells were installed at areas that have not been affected by on-site operations or any other commercial/industrial operations (Figures 2 and 3).

Eight two-foot soil borings (BK-1 through BK-8) were completed with samples collected from depths of 0 feet - 0.5 feet and 1.5 feet - 2.0 feet (Figure 9). In addition, soil samples were collected from depths of five feet below ground surface (bgs) and at the top of saturation in the two soil borings (BK-9 and BK-10) drilled for the background monitoring wells to verify the monitoring wells were drilled at locations without evidence of historical impacts (Figure 3). The soil samples were all analyzed for inorganic constituents and the 5 feet - 5.5 feet sample collected at BK-9 was also analyzed for total petroleum hydrocarbons (TPH). The other soil samples collected at the background monitoring well locations [i.e., BCK-9 (54-56'), BCK-10 (5-6'), and BCK-10 (40-42')] were inadvertently not analyzed for TPH and this is the only instance of a deviation from the approved Investigation Work Plan.

Two monitoring wells (MW-BCK1 and MW-BCK2) were drilled and completed as background monitoring wells to the south and east of the refinery. Groundwater samples were collected and analyzed for inorganic constituents, which may be naturally occurring.

## 3.2 Background Information Research

Documents containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of the Background Concentrations Investigation Work Plan (Western, 2010). The previously collected data provides valuable information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater.

### 3.3 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings and monitoring wells were contained and characterized. Because the soils were all collected from within areas that were purposely selected to not have any impacts, the characterization is based on the actual soil sample analyses.

The sample analyses for the background soil samples indicate that the samples were collected from locations without any historical environmental impacts and thus the soils are "clean" and suitable to reuse on-site. All purged groundwater and decontamination water (approximately 17 gallons) was disposed in the refinery wastewater treatment system upstream of the American Petroleum Institute (API) Separator.

#### 3.4 Surveys

Known site features and/or site survey grid markers were used as references to locate each boring as part of the field documentation prior to surveying the location. The boring locations were measured to the nearest foot and locations were placed on a scaled map. In addition, a hand held global positioning system (GPS) receiver was used to record the coordinates of each soil boring. These coordinates were recorded on the field boring logs. The soil boring locations were subsequently surveyed by a registered surveyor.

The horizontal coordinates and elevation of each boring, the top of each monitoring well casing (north side), and the ground surface at each monitoring well location; and the locations of all other pertinent structures were determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). The surveys were conducted in accordance with Sections 500.1 through 500.12 of the Regulations and Rules of the Board of Registration for Professional Engineers and Surveyors Minimum Standards for Surveying in New Mexico. Horizontal positions were measured to the nearest 0.1-foot, and vertical elevations were measured to the nearest 0.01-foot. The survey data is included in Appendix B.

# Section 4 Field Investigation Results

This section provides a summary the installation of soil borings, field screening of soils, and collection of soil samples for analysis. This is followed by a description of the installation of permanent monitoring wells, collection of groundwater samples, and a description of groundwater conditions.

## 4.1 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment

This subsection provides a description of background soil investigation. This includes soil field screening results, soil sampling intervals and methods for collection of soil samples in background sampling locations.

The shallow two-foot soil borings were completed with a hand auger. The two deep soil borings were drilled using the hollow-stem auguring (HSA) method and it was necessary to switch to the overburden drilling-excentric drilling (ODEX) drilling method to complete MW-BCK1. The drilling equipment was decontaminated between each borehole, as described in Appendix C.

Discrete soil samples were collected for laboratory analyses at the following intervals:

- 0 feet 0.5 feet (all two-foot borings);
- 1.5 feet 2 feet (all two-foot borings);
- From five feet bgs (the two deep borings);
- A discrete lithologic interval (BK-9 54 feet 56 feet); and
- The interval just above saturation (the two deep borings).

The installation of soil borings and collection of soil samples is discussed below in numerical order. A description of the field screening and soil sampling procedures are presented in Appendix C – Field Methods. Copies of the boring logs are provided in Appendix D. In addition to being included on the soil boring logs, the soil vapor (i.e., headspace) screening results are summarized in Table 1. The locations of the soil borings appear on Figures 3 and 9.

#### <u>BCK-1</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt,

some minor very fine sand, loose to compact. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-2</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. The lithology is described as silt, some minor very fine sand, loose to compact. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-3</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor very fine sand, loose to compact. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-4</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. The lithology is described as clayey silt from 0 feet - 0.5 feet that grades to silt, with some minor very fine sand, loose to compact below 0.5 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-5</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet -0.5 feet and 1.5 feet -2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt,

some minor very fine sand, loose. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-6</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. The lithology is described as silt, some minor very fine sand, loose. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-7</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor very fine sand, loose. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-8</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 feet - 0.5 feet and 1.5 feet – 2 feet. The lithology is described as silt, some minor very fine sand, loose. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

#### <u>BCK-9</u>

On January 24, 2012 the drilling rig was set up on location BCK-9 and drilled to a depth of 59 feet using hollow stem augers. A soil sample was collected using split-spoon samplers at a predetermined depth of 5 feet - 5.5 feet. A second sample was collected from a depth of 54 feet - 56 feet as the sample representative of the zone just above saturation. This interval was at the top of a damp clay. Drilling stopped for the day at a depth of 70.5 feet. On January 25<sup>th</sup> drilling continued to a depth of 72 feet where drilling conditions became difficult and it was determined

that the rig would be required to switch over to air rotary/ODEX. On January 31st, ODEX casing was ran to 70 feet. On February 1, 2012, the drilling resumed using air rotary/ODEX. The borehole was drilled to the termination depth of 79 feet, where it was completed as a permanent monitoring well, as discussed below in Section 4.2.

No odors were observed and no elevated readings with a photoionization detector (PID) were recorded throughout the entire boring. The lithology near the land surface was recorded as silty very fine grained sand, which continued to a depth of six feet, where a fine sand was encountered from six to seven feet. A one foot interval of sandy clay extended from seven feet to eight feet. Fine sand was encountered from eight feet to 27.75 feet bgs. A silty clay layer was logged from 27.75 feet to 30 feet bgs, where it graded to a clayey silt. The clayey silt extended from 30 feet to 34 feet and then graded to a silty sand that continued until 54 feet bgs. A stiff clay was logged from 54 feet to 59 feet bgs, with gravel in the sample from 58 feet to 59 feet. The gravel interval continued from 59 feet to 73.5 feet where a clay/shale was encountered that continued to the termination depth of 79 feet. The top of the Nacimiento Formation was logged at 73.5 feet bgs. The interval just above the top of the Nacimiento Formation (73 feet - 73.5 feet) was described as moist to saturated.

#### <u>BCK-10</u>

On February 7, 2012 the drilling rig was set up on location BCK-10 and drilled to a depth of 42 feet using hollow stem augers before there was a mechanical failure on the rig. The rig was repaired and drilling resumed the next day. Drilling continued to a depth of 45 feet where the boring was temporarily halted to determine if water was present at this depth. No groundwater was measured at the bottom of the boring and drilling resumed on February 13, 2012. The drilling continued to a depth of 60 feet, where the boring was completed as a permanent monitoring well, as discussed below in Section 4.2.

No odors were observed and no elevated readings with a PID were recorded throughout the entire boring. The lithology near the land surface was recorded as silt with very fine grained sand, which continued to a depth of six feet, where a sandy gravel was encountered from six feet to ten feet. A soil sample was collected from a pre-determined depth of 5 feet - 6 feet. No sample was recovered for the depth interval of ten feet to 12 feet. A silty sandy clay was logged from 12 feet to 14 feet, which graded to a silty clay that extended to 18 feet. A four foot thick clayey silt was present from 18 feet to 22 feet and then graded back to a silty clay that

continued to 26 feet. A compact/cemented silty sand was logged from 26 feet to 32 feet. Clayey silt extended from 32 feet to 42 feet, where the sand content increased and water appeared to be present. A soil sample was collected from a depth of 40 feet - 42 feet as the depth interval representative of the zone just above saturation. The clayey silt/sand continued to a depth of 45 feet and then graded to a silty sand, which continued to the termination depth of 60 feet. No distinct zone of saturation was logged in the well during drilling; however, the outside of the core from the 42 feet - 44 feet interval appeared to be wet. The Nacimiento Formation was not encountered before reaching the termination depth of 60 feet.

### 4.2 Monitoring Well Construction and Groundwater Sampling

This section describes the methods and details of monitoring well construction and the collection of groundwater samples. The description includes the dates of well construction. The wells and groundwater samples are discussed in numerical order of the associated soil borings. Copies of the boring and well construction logs are provided in Appendix D. The well development and purging procedures and groundwater sample collection procedures are discussed in Appendix C. The locations of the monitoring wells and borings from which groundwater samples were collected appear on Figure 3.

#### <u>MW-BCK1 (BK-9)</u>

On January 24, 2012 the drilling rig was set up on location BCK-9 and drilled to a depth of 59 feet using hollow stem augers. Drilling stopped for the day at a depth of 70.5 feet. On January 25<sup>th</sup> drilling continued to a depth of 72 feet where drilling conditions became difficult and it was determined that the rig would be required to switched over to air rotary/ODEX. On January 31st, ODEX casing was ran to 70 feet. On February 1, 2012, the drilling resumed using air rotary/ODEX. The borehole was drilled to the termination depth of 79 feet, where it was completed as a permanent monitoring well. There were no indications of any impacts throughout the depth of the boring and no distinct zones of saturation were observed. As shown on the well construction log for MW-BCK1, the Nacimiento Formation was encountered at 73.5 feet bgs and consists of very dense clay/shale.

In order to accommodate the screen placement the borehole was advanced to a depth of 79 feet bgs. On February 1, 2012, slotted (0.01 inch) 2-inch rigid PVC well screen was placed near the bottom of the boring and extended for 15 feet (75 feet to 60 feet) to ensure that the well would be open to any saturated intervals above the Nacimiento. The 10/20 sand filter pack was

installed to 58 feet bgs. As the sand was installed in the well bore the ODEX casing was removed. Approximately five feet of bentonite was placed over the filter pack and hydrated. On February 2, 2012 an annular grout was installed to within two feet of the ground surface and allowed to cure for a minimum of 24 hours. On February 7, 2012, the surface pad and protective aluminum cover were installed. The surface completion consists of stickup completion, which includes a protective aluminum enclosure with cap that was secured in a concrete pad measuring 4-feet by 4-feet wide by 6-inches thick. The concrete pad was wire reinforced. The aluminum protective casing extended 4 feet above the top surface of the concrete pad.

Four-inch diameter steel bollards were installed 6 inches from each corner of the concrete pad. The bollards were installed two feet below grade and extended three feet above grade. The bollards were installed vertically level and extend the same height. The holes for the bollards were dug by hand with the diameter of the borehole measured a minimum of 6-inches. Each bollard was cemented into the ground with the cement extending from the bottom of the hole to the surface. The bollard was filled with cement. Each bollard was pretreated to remove rust, primed, and painted with two coats of safety-yellow paint.

Groundwater samples were collected at MW-BCK1 on June 14, 2012. The water samples were collected following the procedures discussed in Appendix C.

#### MW-BCK2 (BCK-10)

On February 7, 2012 the drilling rig was set up on location BCK-10 and drilled to a depth of 42 feet using hollow stem augers before there was a mechanical failure on the rig. The rig was repaired and drilling resumed the next day. Drilling continued to a depth of 45 feet where the boring was temporarily halt to determine if water was present at this depth. No groundwater was measured at the bottom of the boring and drilling resumed on February 13, 2012. The drilling continued to a depth of 60 feet, where the boring was completed as a permanent monitoring well. The Nacimiento Formation was not encountered at the termination depth of 60 feet and no obvious zones of saturation were observed.

On February 13, 2012, a two-inch diameter, slotted (0.01 inch) rigid PVC well screen was placed at the bottom of the well and extended for 20 feet (60 feet to 40 feet) to help ensure that any possible zones of saturation would be in communication with the well. Rigid Schedule 40 PVC with threads was utilized for the well casing. A 8-inch sand bed was placed at the bottom

of the well bore. The 10/20 sand filter pack was installed to three feet over the top of the well screen. As the sand was installed in the well bore the hollow stem augers were removed. Two feet of bentonite was placed over the filter pack and hydrated. On February 14, 2012 an annular grout was installed to within two feet of the ground surface and allowed to cure for a minimum of 24 hours. Subsequently, the surface pad and protective aluminum cover were installed. The surface completion consists of stickup completion, which includes a protective aluminum enclosure with cap that was secured in a concrete pad measuring 4-feet by 4-feet wide by 6-inches thick. The concrete pad was wire reinforced. The aluminum protective casing extended 4 feet above the top surface of the concrete pad.

Four-inch diameter steel bollards were installed 6 inches from each corner of the concrete pad. The bollards were installed two feet below grade and extended three feet above grade. The bollards were installed vertically level and extend the same height. The holes for the bollards were dug by hand with the diameter of the borehole measured a minimum of 6-inches. Each bollard was cemented into the ground with the cement extending from the bottom of the hole to the surface. The bollard was filled with cement. Each bollard was pretreated to remove rust, primed, and painted with two coats of safety-yellow paint.

Groundwater samples were collected at MW-BCK2 on June 14, 2012. The well was first purged and the water samples collected following the procedures discussed in Appendix C.

#### 4.3 Groundwater Conditions

The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented in Figure 6 and shows the groundwater predominantly flowing to the northwest. The potentiometric surface at the site is consistent with the regional gradient in that movement is toward to the San Juan River, which is a location of regional groundwater discharge. The installation of the slurry wall and collection wells/French drain along the western and northern boundary of the refinery controls the flow of groundwater in this area.

The depth to water measured in the area of the new background monitoring wells varies from approximately 77 feet near MW-BCK1 to 26 feet at MW-BCK2 (Table 2). There is also a significant difference between the top of casing elevations at the two locations (Table 2). The

saturated thickness in the water table aquifer as measured in on-site wells varies from zero feet in the southern and eastern portions of the refinery to a maximum of approximately eight feet along the northern portion of the refinery. The saturated thickness in the new background wells is estimated to be only one foot or less at MW-BCK1. The saturated thickness at MW-BCK2, where the top of Nacimiento Formation does not appear to have been encountered, is over 30 feet based on fluid level measurements. However, during the drilling of MW-BCK2 there was no indication of saturation in any of the sediments encountered and it is unlikely there is water movement throughout this 30 foot plus "saturated" interval. When purging water from MW-BCK2 for sample collection, water recovered very slowly to the well, which is not indicative of a fully saturated 30 foot plus interval.

# Section 5 Background Analytical Results and Summary Statistics

The analytical results for the background soil and the initial round of background groundwater samples are discussed below. Pursuant to Section VIII.H of the Order the following summary statistics have been determined for each constituent for soils:

- 1. Number of detects;
- 2. Total number of samples;
- 3. Frequency of detection;
- 4. Minimum detected concentration;
- 5. Maximum detected concentration;
- 6. Minimum sample quantitation limit (SQL);
- 7. Maximum SQL;
- 8. Arithmetic mean;
- 9. Median;
- 10. Standard deviation; and
- 11. Coefficient of variation.

#### 5.1 Soil Background Concentrations

As discussed above in Section 4.1, 16 soil samples were collected from the upper two feet and two additional samples were collected from a depth of five feet. A review of the soil boring information in Section 4.1 indicates that all of these soil samples are of similar lithology and that the analytical results can be evaluated together as a single population for purposes of establishing background concentrations for near surface soils at the Bloomfield refinery. The three deeper soil samples collected from borings BK-9 and BK-10, which were completed to facilitate installation of monitoring wells, appear to have different lithologies with a stiff clay present in BK-9 (54-56') and a clayey silt present in BK-10 (40-42'). The three deeper soil samples are not included the "background" data set discussed below. The analytical results are included in Table 3.

The soil samples were analyzed for the constituents listed below using the specified analytical methods.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020

Analyte	Analytical Method
Beryllium	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Iron	SW-846 method 6010/6020
Lead	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Molybdenum	SW-846 method 6010/6020
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Zinc	SW-846 method 6010/6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

In addition to the constituents list above, sample BK-9 (5-5.5') was analyzed for TPH by SW-846 method 8015. The results for all three fractions (gasoline range, diesel range, and motor oil range) were non-detect, indicating a lack of petroleum hydrocarbon impacts to soils in the vicinity of background monitoring well MW-BCK1.

The inorganic analytical results are summarized in Table 3 and the analytical data reports are provided in Appendix E. Data validation is included in Appendix F. The summary statistics as listed above are presented in Table 3, along with the 95% upper tolerance limit (UTL) for aluminum, arsenic, barium, beryllium, boron, chloride, chromium, cobalt, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, vanadium, and zinc. Arsenic had one result that was non-detect and this result was replaced with a value determined using the Regression on Order Statistic (ROS) methodology. Chloride had ten results that were non-detect and substitute values were developed using the ROS methodology. Fluoride and mercury each had two results that were non-detect and these sample results were replaced with values derived

with the ROS methodology. The ROS methodology uses an ordinary least squares regression line fit to the normal scores of the ordered statistics for the uncensored (detected results) observations and then values are extrapolated from the straight line for the observations below the detection limit (EPA, 2010).

Either all or the vast majority of soil samples analyzed for antimony, cadmium, cyanide, selenium, silver, thallium, and uranium did not contain these constituents at concentrations above the detection limit and thus background concentrations (i.e., 95% UTL) were not developed for these constituents. Only summary statistics are presented for sulfate because the analytical results are highly varied with many low estimated concentrations reported while other results are very high and outside the laboratory calibration range.

Prior to calculation of the 95% UTL, each data set was evaluated using EPA's statistical software program ProUCL Version 4.1.00 to determine if there are any potential outliers and to determine the distribution of the data (e.g., normal vs. lognormal). The check for outliers was performed using graphic methods (e.g., box plots and Q-Q plots) and Dixon's outlier test. An explanation of the Dixon's outlier test performed by the ProUCL software is provided in Appendix G. Barium, boron, mercury, and molybdenum were the only constituents found to potentially have any outliers and for which outliers were removed. The two upper values of 760 and 480 mg/kg were removed from the data set prior to evaluating the distribution of the data and calculating the 95% UTL for barium. The maximum value of 12 mg/kg was removed from the mercury data set. The highest two values of 0.9 mg/kg and 0.7 mg/kg were removed from the molybdenum data set. Box plots and the results of the Dixon's outlier tests are included in Appendix H.

The distribution of the data was checked using histograms and normal probability plots, both of which are presented in Appendix H for each constituent. All of the data subject to a statistical evaluation is normally distributed as shown on the probability plots with the exception of barium, chloride and fluoride, which are lognormally distributed.

The 95% UTL ( $\alpha$  = .05 & 95% coverage) was calculated using the ProUCL software (version 4.1.00) and the output data sheets for each constituent are included in Appendix H. For normally distributed data sets, an upper (1 –  $\alpha$ ) % tolerance limit with tolerance or coverage

coefficient = p (that is providing coverage to at least p% proportion of observations) is given by the following equation (EPA, 2010).

#### UTL = mean + (K x standard deviation)

Here, K = K ( $n, \alpha, p$ ) is the tolerance factor and depends upon the sample size, n, confidence coefficient =  $(1 - \alpha)$ , and the coverage proportion = p. The UTL given by the above equation represents a  $(1 - \alpha)$ % confidence interval for the  $p^{th}$  percentile of the underlying normal distributions. The values of the tolerance factor, K, have been tabulated extensively in the various statistical books (e.g., Hahn and Meeker 1991). Those K values are based upon noncentral t-distributions. In the ProUCL 4.1 software package, the values of K for samples of sizes  $\leq$  30, as given in Hahn and Meeker, have been directly programmed. For a 95% confidence coefficient, 95% coverage, and sample sizes of 18, 17, and 16 samples, the values for K are 2.453, 2.486, and 2.524, respectively.

The procedure to compute UTLs for lognormally distributed data sets is similar to that for normally distributed data sets (EPA, 2010). First, the sample mean,  $\overline{y}$ , and standard deviation (*sd*), *s<sub>y</sub>*, of the log-transformed data are computed. An upper  $(1 - \alpha)$ % tolerance limit with tolerance or coverage coefficient = *p* (that is, providing coverage to at least *p*% proportion of observations) is given by the following equation.

 $\mathsf{UTL} = \exp(\overline{y} + K * s_y)$ 

Note that, just as for the normal distribution, the UTL given by the above equation represents a  $(1 - \alpha)$ % confidence interval for the  $p^{th}$  percentile of the lognormal distribution. The *K* factor used to compute the lognormal UTL is the same as the one used to compute the normal UTL. The resulting values for the 95<sup>%</sup> UTL, as calculated with the ProUCL software, are summarized in Table 3.

## 5.2 Groundwater Background Concentrations

As discussed above in Section 4.2, two groundwater samples were collected from new background monitoring wells MW-BCK1 and MW-BKC2 on June 14, 2012. The groundwater samples were analyzed for the constituents listed below using the specified analytical methods. Metals results analyzed by methods 200.7 and 200.8 are reported for both total and dissolved concentrations.

Analyte	Analytical Method
Aluminum	EPA method 200.7
Antimony	EPA method 200.8
Arsenic	EPA method 200.8
Barium	EPA method 200.7
Beryllium	EPA method 200.7
Boron	EPA method 200.7
Cadmium	EPA method 200.7
Chromium	EPA method 200.7
Cobalt	EPA method 200.7
Copper	EPA method 200.7
Cyanide	SW-846 method 335.4/335.2 mod
Iron	EPA method 200.7
Lead	EPA method 200.8
Manganese	EPA method 200.7
Mercury	EPA method 245.1
Molybdenum	EPA method 200.7
Nickel	EPA method 200.7
Selenium	EPA method 200.8
Silver	EPA method 200.7
Thallium	EPA method 200.8
Vanadium	EPA method 200.7
Uranium	EPA method 200.8
Zinc	EPA method 200.7
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Calcium	EPA method 200.7
Magnesium	EPA method 200.7
Sodium	EPA method 200.7
Potassium	EPA method 200.7
Nitrate/nitrite	EPA method 300.0

The analytical results are summarized in Table 4. The field measured parameters are presented in Table 5. As this is the first sampling event for background groundwater, no statistical analysis of the data is possible at this time. After a sufficient number of samples have been collected, then the groundwater data will be evaluated pursuant to Section VIII.H. of the Order.

# Section 6 References

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### **Tables**

 TABLE 1

 Background Soil Boring Samples - Vapor Screening Results

 Bloomfield Refinery - Bloomfield, New Mexico

Sample										
Interval Depth	BK-1	BK-2	BK-3	BK-4	BK-5	BK-6	BK-7	BK-8	BK-9	BK-10
0-2'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-4'									0.0	0.0
4 – 6'									0.0	0.0
6 – 8'									0.0	0.0
8 –10'									0.0	NR
10 – 12'									0.0	0.0
12 – 14'									0.0	0.0
14 – 16'									0.0	0.0
16 – 18'									0.0	0.0
$\frac{18-20'}{20-22'}$									0.0 0.0	0.0 0.0
20 - 22 22 - 24'									0.0	0.0
22 - 24 24 - 26'									0.0	0.0
24 - 26									0.0	0.0
28 - 30'									0.0	0.0
30 - 32'									0.0	0.0
30 - 32							-		0.0	0.0
34 - 36'							ł	1	0.0	0.0
36 - 38'									0.0	0.0
38 - 40'									0.0	0.0
40 - 42'									0.0	0.0
42 - 44'									0.0	0.0
44 - 46'									0.0	0.0
46 - 48'									0.0	0.0
48 - 50'									0.0	0.0
50 - 52'									0.0	0.0
52 - 54'									0.0	0.0
54 - 56'									0.0	0.0
56 - 58'									0.0	0.0
58 - 60'									0.0	0.0
60 - 62'									0.0	0.0
62 - 64'									0.0	
64 - 66'									0.0	
66 - 68'									0.0	
68 - 70'									0.0	
70 - 72'									NM	
72 - 74'									NM	
74 - 76'									NM	
76 - 78'							ļ	ļ	NM	
78 - 79' JNITS - PPM									NM	

UNITS - PPM

NM - not measured, switched to ODEX drilling

## TABLE 2Water Level MeasurementsBloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Measuring Point Elevation (amsl)	Total Well Depth	Product	Depth To Water (ft below TOC)	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-BCK1	4/2/2012	5620.14	NM	NPP	77.07	5543.07	NPP
MW-BCK1	6/14/2012	5620.14	80.50	NPP	77.04	5543.10	NPP
MW-BCK2	4/2/2012	5517.80	46.97	NPP	25.81	5491.99	NPP
MW-BCK2	6/14/2012	5517.80	46.96	NPP	26.17	5491.63	NPP

NM = Not Measured

NPP = No Product Present amsl = above mean sea level ft = feet TOC = top of casing NWP = No Water Present

### Table 3 Soil Analytical Results and Statistical Summary Background Investigation Western Refining Southwest - Bloomfield Refinery

ClientSampID	Alumi	num	Δ	Antimon	v		Ar	senic			Barium		R	eryllium	n		Boron		C	admiun	n			Chloride		
· · · · · · · · · · · · · · · · · · ·	Result	SQL	Result	Flag	·	Result		Result <sup>2</sup>	SQL	Result	nat. log	SQL		Flag		Result Fla		SQL	Result	Flag		Result	Flag	Result <sup>2</sup>	nat. log	SOL
	20000	1500	< 2.5	U	2.5	2.8	Tidg	2.8	2.50	160	5.1	0.50	0.55	Tidg	0.15	6.7	6.7	4.0	0.034	J	0.1	<7.5	U	5.15	1.64	7.5
	17000	1500	< 5.0	Ŭ	5	1.9	J	1.9	5.00	260	5.6	1.00	0.56		0.30	8	8	4.0	< 0.20	Ŭ	0.2	14	-	14	2.64	7.5
	14000	1500	< 2.5	U	2.5	1.4	J	1.4	2.50	94	4.5	0.20	0.42		0.15	5.4	5.4	2.0	0.04	J	0.1	<7.5	U	7.58	2.03	7.5
	26000	3000	< 2.5	U	2.5	3		3	2.50	250	5.5	1.00	0.64		0.15	8.2	8.2	4.0	< 0.10	U	0.1	<7.5	U	0.05	-3.00	7.5
BK-3 (0-0.5')	23000	1500	< 2.5	U	2.5	3.1		3.1	2.50	93	4.5	0.20	0.61		0.15	8.2	8.2	4.0	< 0.10	U	0.1	17		17	2.83	7.5
	11000	1500	< 2.5	U	2.5	3		3	2.50	140	4.9	0.50	0.38		0.15	12	see footnote 1	2.0	< 0.10	U	0.1	420		420	6.04	30
	17000	1500	0.54	J	2.5	2.4	J	2.4	2.50	96	4.6	0.20	0.48		0.15	5	5	2.0	< 0.10	U	0.1	<7.5	U	0.15	-1.90	7.5
	17000	1500	< 2.5	U	2.5	2.6		2.6	2.50	160	5.1	0.50	0.42		0.15	5.1	5.1	2.0	< 0.10	U	0.1	13	L	13	2.56	7.5
	18000	1500	< 2.5	U	2.5	2.6		2.6	2.50	140	4.9	0.50	0.53		0.15	6.4	6.4	4.0	< 0.10	U	0.1	<7.5	U	0.31	-1.17	7.5
	15000	1500	< 2.5 < 2.5	U	2.5	2.2	J	2.2	2.50	390	6.0	1.00	0.52		0.15	7.4	7.4	4.0	< 0.10 0.028	U	0.1	170		170	5.14	7.5
	12000 15000	1500 1500	< 2.5	UU	2.5 2.5	1.9 2.7	J	1.9 2.7	2.50 2.50	98 150	4.6 5.0	0.20	0.4 0.47		0.15	4.2 5.5	5.5	2.0 2.0	< 0.10	J U	0.1	<7.5 <7.5	UU	0.57 0.95	-0.56 -0.05	7.5 7.5
	12000	1500	< 2.5	U	2.5	3.2		3.2	2.50	140	4.9	0.50	0.47		0.15	4.3	4.3	2.0	< 0.10	U	0.1	<7.5	U	1.51	0.41	7.5
· · · · · · · · · · · · · · · · · · ·	17000	1500	< 2.5	U	2.5	2.5		2.5	2.50	760	see footnote 1	2.00	0.51		0.15	6.4	6.4	4.0	< 0.10	U	0.1	<7.5	U	2.32	0.84	7.5
BK-8 (0-0.5')	9700	600	< 2.5	U	2.5	1.6	J	1.6	2.50	150	5.0	0.50	0.33		0.15	4	4	2.0	< 0.10	U	0.1	<7.5	U	3.48	1.25	7.5
	20000	1500	< 2.5	Ŭ	2.5	2.9		2.9	2.50	480	see footnote 1	1.00	0.67		0.15	9.9	9.9	2.0	< 0.10	Ŭ	0.1	540		540	6.29	30
BK-9 (5-5.5')	6600	600	< 2.5	U	2.5	1.5	J	1.5	2.50	250	5.5	1.00	0.24		0.15	4.1	4.1	2.0	< 0.10	Ŭ	0.1	260		260	5.56	30
BK-10 (5-6')	7900	1500	1.1	J	5	<5	U	2.4	5.00	150	5.0	0.50	0.25	J	0.30	3.8 、	3.8	4.0	0.065	J	0.2	210		210	5.35	30
Number of Detects	10		2			17				10			10			10	10		4			0				
Total Number of samples	18									18			18			18	18		4			8	+			
	18		18		+	18				18			18			18	18		18			18	$\left  \right $			
Frequency of Detection (%)	100		11			94				100			100			100	100		22			44				
	6,600		0.54			1.4				93			0.24			3.8	3.8		0.028J			13.0				
	26,000		1.1			3.2				760			0.67			12.0	9.9		0.065J		_	540.0				
Minimum SQL		600			2.5				2.5			0.20			0.15			2.0			0.1					7.5
Maximum SQL		3,000			5.0				5.0			2.00			0.30			4.0			0.2					30.0
	15,456		NC			NC		2.4		NC	5.1		0.47			6.4	6.0		NC			NC			2.0	
Median	16,000		NC			NC		2.6		NC	5.0		0.48			6.0	5.5		NC			NC			1.8	
Standard Deviation	5,089		NC			NC		0.6		NC	0.4		0.12			2.3	1.8		NC			NC			2.8	
Coefficient of Variation (%)	33		NC			NC		23.2		NC	8.2		26.27			35.4	30.1		NC			NC			141.5	
95 % Upper Tolerance Limit (UTL)	27,940		NC			NC		3.8		NC	6.1		0.77			NC	10.5		NC			NC			8.9	
											442.9														7,500.0	]
Site Background Concentration	26,00	no <sup>3</sup>		NC				3.2 <sup>3</sup>			390 <sup>4</sup>			0.67 <sup>3</sup>			9.9 <sup>4</sup>			NC				540 <sup>3</sup>		
	20,00	50		NC				5.2			390			0.07			3.5			NC				540		
Deep Soil Samples																										
	10,000	1500	2.1	J	2.5	< 2.5	U		2.50	720		2.00	0.23		0.15	< 2.0 l	1	2.0	0.10		0.1	NR				
	36,000	3000	< 5.0	U	5.0	2.7	J		5.00	52		0.20	1.2		0.30	3.8 、		4.0	< 0.20	U	0.2	2.5				1.5
BK-10 (40-42')	20,000	1500	< 13	U	13.0	< 13	U		13.00	24		0.50	0.96		0.75	< 10 l	J	10.0	< 0.50	U	0.5	<30				30
<ul> <li>95 % UTL = mean + (K x standard deviation)</li> <li>K for sample size of 18 = 2.453</li> <li>K for sample size of 17 = 2.486</li> <li>K for sample size of 16 = 2.524</li> <li>units - milligrams per kilogram</li> <li>Sample Quantitation Limit (SQL)</li> <li>U - non-detect</li> <li>J - estimated concentration, concentration above method detection limit but less than SQL</li> <li>E - value above quantitation range</li> <li>Not applicable (NA)</li> <li>Not calculated (NC)</li> <li>Not reported (NR)</li> <li>1 - value removed as outlier</li> <li>2 - nondect values replaced using regression on order statistics (ROS)</li> <li>3 - final background concentration based on maximum detected concentration</li> </ul>																										

### Table 3 Soil Analytical Results and Statistical Summary Background Investigation Western Refining Southwest - Bloomfield Refinery

ClientSampID	Chro	omium	Cob			oper		Cyanide				Fluoride			Iro			ad	Manga				Mercury	1	ļ	,	bdenum	
	Result	SQL	Result		Result	SQL	Result	Flag	SQL	Result	Flag	Result <sup>2</sup>				SQL	Result	SQL	Result	SQL	Result	Flag	Result <sup>2</sup>	SQL	Result	Flag	result <sup>1</sup>	SQL
BK-1 (0-0.5')	7.8	0.30	4.4	0.30	8.1	0.30	<0.3	U	0.3	0.94	J	0.94	-0.06	1.5	18000	500	2.9	0.25	260	0.98	0.012	J	0.012	0.033	0.36	J	0.36	0.4
BK-1 (1.5-2.0')	8.4	0.60	5.3	0.60	8.7	0.60	<0.3	U	0.3	11		11	2.40	1.5		500	3.2	0.50	280	1	0.018	J	0.018	0.033		J se	ee footnote 1	0.8
BK-2 (0-0.5')	6.1	0.30	3.4	0.30	5.4	0.30	<0.3	U	0.3	< 1.5	U	0.65	-0.43	1.5		500	2.8	0.25	270	0.97	0.0095	J	0.0095	0.033	0.28	J	0.28	0.4
BK-2 (1.5-2.0')	9.3	0.30	4.8	0.30	8.8	0.30	<0.3	U	0.3	8.6		8.6	2.15	1.5		500	2.4	0.25	290	1	0.016	J	0.016	0.033		J	0.37	0.4
BK-3 (0-0.5')	8.5	0.30	4.1	0.30	6.7	0.30	<0.3	U	0.3	1.6		1.6	0.47	1.5		490	2.4	0.25	240	0.97	0.011	J	0.011	0.033	0.33	J	0.33	0.4
BK-3 (1.5-2.0')	5.2	0.30	2.9	0.30	5.3	0.30	<0.3	U	0.3	7.5		7.5	2.01	6		200	1.2	0.25	130	0.98	0.12	J	see footnote 1	0.033	0.31	J	0.31	0.4
BK-4 (0-0.5')	6.8	0.30	3.2	0.30	5.1	0.30	<0.3	U	0.3	0.73	J	0.73	-0.31	1.5	13,000	480	1.7	0.25	200	0.95	0.011	J	0.011	0.033	0.28	J	0.28	0.4
BK-4 (1.5-2.0')	6.1	0.30	3.9	0.30	6.5	0.30	<0.3	U	0.3	6.5		6.5	1.87	1.5		480	2.2	0.25	280	0.96	0.014	J	0.014	0.033	0.24	J	0.24	0.4
BK-5 (0-0.5')	7.5	0.30	4.1	0.30	6.5	0.30	<0.3	U	0.3	0.49	J	0.49	-0.71	1.5		500	2.4	0.25	290	1	0.013	J	0.013	0.033	0.25	J	0.25	0.4
BK-5 (1.5-2.0')	7.9	0.30	4.8	0.30	7.8	0.30	< 0.3	U	0.3	5		5	1.61	1.5		480	3.2	0.25	290	0.95	0.015	J	0.015	0.033	0.37	J	0.37	0.4
BK-6 (0-0.5')	5.7	0.30	3.2	0.30	4.6	0.30	< 0.3	U	0.3	0.79	J	0.79	-0.24	1.5		500	2.5	0.25	250	0.97	0.0078	J	0.0078	0.033	0.27	J	0.27	0.4
BK-6 (1.5-2.0')	6.5	0.30	3.9	0.30	7.2	0.30	< 0.3	U	0.3	5.7		5.7	1.74	1.5		480	2.2	0.25	210	0.97	0.0016	J	0.0016	0.033	0.28	J	0.28	0.4
BK-7 (0-0.5')	5.8	0.30	3.2	0.30	5.5	0.30	< 0.3	U	0.3	< 1.5	U	1.15	0.14	1.5		490	2.4	0.25	200	0.98	0.012	J	0.012	0.033		J	0.27	0.4
BK-7 (1.5-2.0')	7.5	0.30	4.4	0.30	7.5	0.30	< 0.3	U	0.3	2.9		2.9	1.06	1.5		490	2.8	0.25	260	0.99	0.013	J	0.013	0.033	0.31	J	0.31	0.4
BK-8 (0-0.5')	4.6	0.30	2.7	0.30	4	0.30	< 0.3	U	0.3	0.85	J	0.85	-0.16	1.5		200	2.3	0.25	180	1	0.0089	J	0.0089	0.033	0.22	J	0.22	0.4
BK-8 (1.5-2.0')	8.3	0.30	4.1	0.30	5.2	0.30	< 0.3	U	0.3	12		12	2.48	6	13,000	480	1.4	0.25	360	0.96	< 0.033		0.0093	0.033	0.9	S	ee footnote 1	0.4
BK-9 (5-5.5') BK-10 (5-6')	3.5	0.30	2.1	0.30	2.3 3.5	0.30	< 0.3	U	0.3	3.7	<u> </u>	3.7	1.31	0.3	6,500	200 500	1.7	0.25	160		0.0063	J	0.0063	0.033	0.42		0.42	0.4
סר- וט (ט-ט)	4.6	0.60	2.6	0.60	3.5	0.60	<0.3	U	0.3	3		3	1.10	0.3	9,100	500	2.6	0.50	180	0.48	<0.033	U	0.013	0.033	0.33	J	0.33	υ.Ծ
Number of Detects	18		18		18		0			16		16			18		18		18		16				18			1
Total Number of samples	18		18		18		18			18		18			18		18		18		18			1	18			
Frequency of Detection (%)	100		100		100		0			89		89			100		100		100	1	89		1	1	100			<u> </u>
Minimum Detected Conc.					2.3		NA					0.5					1.2								0.22			<u> </u>
Maximum Detected Conc.	3.5		2.1					-		0.5				-	6,500				130.0		0.0016	-			-			───
	9.3		5.3	-	8.8		NA			12.0		12.0		-	19,000		3.2		360.0		0.120				0.90			──
Minimum SQL		0.300		0.3		0.3			0.3					0.3		200		0.2		0.5				0.033				0.400
Maximum SQL		0.6		0.6		0.6			0.3					6.0		500		0.5		1.0				0.033				0.800
Arithmetic Mean	6.7		3.7		6.0		NC			NC			0.91		13,539		2.4		240.6		NC		0.0113		NC		0.306	
Median	6.7		3.9		6.0		NC			NC			1.08		13,000		2.4		255.0		NC		0.0120		NC		0.295	
Standard Deviation	1.6		0.9		1.8		NC			NC			1.08		3,811		0.6		57.7		NC		0.0039		NC		0.05	
Coefficient of Variation (%)	23.9		23.2		30.0		NC			NC			118.52		28		23.9		24.0		NC	1	34.5498		NC		17.9	1
95 % Upper Tolerance Limit (UTL)	10.6		5.9		10.5		NC			NC			3.57	1	22,887		3.7		382		NC		0.0208		NC		0.44	├───
	10.0		0.0		10.0		NO			no			35.4	-	22,001		0.1		002				0.0200				0.44	<u> </u>
													55.4															
	0	.3 <sup>3</sup>	5.3	3	0	8 <sup>3</sup>		NO				12.0 <sup>3</sup>			40.00	o <sup>3</sup>		2 <sup>3</sup>	360	3			0.018 <sup>4</sup>			0	.42 4	
Site Background Concentration	9	.3	5.3	3 -	8.	8-		NC				12.0 *			19,00	J0 -	3.	2*	360	) -			0.018			U	.42	
Deve Octi Octobri																												
Deep Soil Samples					•															•								
BK-9 (73-73.5)	49	0.30	6.1	0.3	19	0.30	< 0.30	-	0.3	0.85	J			1.5	NR		1.4	0.50	NR		< 0.033	U		0.033	4.0			0.4
BK-9 (54-56')	13	0.60	7.4	0.6	12	0.60	< 0.50		0.3	3.9				0.3	31,000	1000	3.2	0.50	350	1	0.0082	J		0.033	0.96			0.8
BK-10 (40-42')	11	1.50	4.5	1.5	8.8	1.50	< 0.30	U	0.3	< 6.0	U			6.0	14,000	500	2.4	0.98	90	0.5	< 0.033	U		0.033	< 2.0	U		2.0
95 % UTL = mean + (K x standard deviation) K for sample size of 18 = 2.453 K for sample size of 17 = 2.486																												
K for sample size of 16 = 2.524 units - milligrams per kilogram Sample Quantitation Limit (SQL)																												
U - non-detect J - estimated concentration, concentration above method detection limit but less than SQL																												
E - value above quantitation range Not applicable (NA)																												
Not calculated (NC) Not reported (NR) 1 - value removed as outlier																												
2 - nondect values replaced using regression on order statistics (ROS)																												
<ul><li>3 - final background concentration based on maximum detected concentration</li><li>4 - final background concentration based on maximum</li></ul>																												
detected concentration with outliers removed																												

detected concentration with outliers removed

#### Table 3 Soil Analytical Results and Statistical Summary Background Investigation Western Refining Southwest - Bloomfield Refinery

ClientSampID	Nic			Sulfate	-		eleniun			Silver			nallium			ranium		Vanad	-	Zir	-
	Result	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	SQL	Result	SQL
BK-1 (0-0.5')	6.7	0.50	2.1	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.6	J	5	24	2.50	26	2.50
BK-1 (1.5-2.0')	7.4	1.00	17		7.5	< 5.0	U	5	< 0.50	U	0.5	< 5.0	U	5	< 10	U	10	30	5.00	28	5.00
BK-2 (0-0.5')	4.8	0.50	2.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1	J	5	17	2.50	20	2.50
BK-2 (1.5-2.0')	7.6	0.50	17		7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	29	2.50	30	2.50
BK-3 (0-0.5')	6	0.50	5.8	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1.4	J	5	25	2.50	26	2.50
BK-3 (1.5-2.0')	4.2	0.50	7,600.0	E	30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	17	2.50	14	2.50
BK-4 (0-0.5')	4.9	0.50	1.7	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1.1	J	5	20	2.50	21	2.50
BK-4 (1.5-2.0')	5.2	0.50	3.6	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	23	2.50	20	2.50
BK-5 (0-0.5')	6.1	0.50	4.0	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.84	J	5	23	2.50	25	2.50
BK-5 (1.5-2.0')	6.8	0.50	28.0		7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	27	2.50	29	2.50
BK-6 (0-0.5')	4.5	0.50	1.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.68	J	5	19	2.50	19	2.50
BK-6 (1.5-2.0')	5.9	0.50	7.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	22	2.50	21	2.50
BK-7 (0-0.5')	4.6	0.50	<7.5	U	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.48	J	5	19	2.50	19	2.50
BK-7 (1.5-2.0') BK-8 (0-0.5')	6.6 3.7	0.50	10.0 4.0		7.5 7.5	< 2.5 < 2.5	U U	2.5 2.5	< 0.25 < 0.25	U U	0.25	< 2.5 < 2.5	U U	2.5 2.5	< 5.0 < 5.0	U U	5 5	24 15	2.50 2.50	24 15	2.50 2.50
BK-8 (1.5-2.0')	5.4	0.50	4.0	J E	30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	24	2.50	21	2.50
BK-9 (5-5.5')	3	0.50	330.0	L	30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	11	2.50	12	2.50
BK-9 (5-5:5) BK-10 (5-6')	3.8	1.00	2,300.0		30	1.1	0	2.5	< 0.25	U	0.25	< 2.5	U	2.5	<10	U	10	15	5.00	12	5.00
	5.0	1.00	2,300.0		30	1.1	J	5	<0.5	0	0.5	<0	0	5	<10	0	10	10	5.00	10	5.00
Number of Detects	18		17.0			1			0			0			7			18		18	1
Total Number of samples	18		18.0			18			18			18			18			18		18	1
Frequency of Detection (%)	100		94.4			5.6			0.0			0.0			38.9			100		100	
Minimum Detected Conc.	3.0		1.4			NA			NA			NA			0.5			11.0		12.0	
Maximum Detected Conc.	7.6		10,000.0			NA			NA			NA								30.0	<u> </u>
Minimum SQL	7.0	0.5	10,000.0			NA		0.5	NA			INA		0.5	1.4			30.0	0.5	30.0	
		0.5			7.5			2.5			0.3			2.5			5.0		2.5		2.5
Maximum SQL		1.0			30.0			5.0			0.5			5.0			10.0		5.0		5.0
Arithmetic Mean	5.4		1196.1			NC			NC			NC			NC			21.3		21.4	
Median	5.3		7.4			NC			NC			NC			NC			22.5		21.0	1
Standard Deviation	1.3		2945.7			NC			NC			NC			NC			5.1		5.2	1
Coefficient of Variation (%)	24.5		246.3			NC			NC			NC			NC			24.0		24.4	
95 % Upper Tolerance Limit (UTL)	8.6		NC			NC			NC			NC			NC			33.9		34.3	
	<b>L</b>		I		1	1			8	1	11		1		8						
Site Background Concentration	7.6	6 <sup>3</sup>		NC			NC			NC			NC			NC		30.0	0 <sup>3</sup>	30.	0 <sup>3</sup>
Deep Soil Samples																					
		<u> </u>							0.05		0.05			0.5	5.0	-	-	05	0.50		0.50
BK-9 (73-73.5)	12	0.5	NR			< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	5.6		5	35	2.50	27	2.50
BK-9 (54-56')	8.5	1	250		30	< 5.0	U	5	< 0.50	U	0.5	< 5.0	U	5	< 25	U	25	33	5.00	46	5.00
BK-10 (40-42') 95 % UTL = mean + (K x standard deviation) K for sample size of 18 = 2.453 K for sample size of 17 = 2.486 K for sample size of 16 = 2.524 units - milligrams per kilogram Sample Quantitation Limit (SQL) U - non-detect	6.7	2.5	210		30	< 13	U	13.0	< 1.3	U	1.3	< 13	U	13.0	4	J	25	28	13.00	36	13
J - estimated concentration, concentration above detection limit but less than SQL E - value above quantitation range Not applicable (NA) Not calculated (NC) Not reported (NR)	e method																				

value removed as outlier
 nondect values replaced using regression on order

statistics (ROS)

3 - final background concentration based on maximum

detected concentration

4 - final background concentration based on maximum

detected concentration with outliers removed

	MW-BCK1	MW-BCK2
Sample Date>	6/14/2012	6/14/2012
General Water Quality Parameters (mg	/l)	
Bicarbonate (As CaCO3)	150	110
Carbonate (As CaCO3)	< 2.0	< 2.0
Chloride	35	21
Fluoride	0.25	< 2.0
Nitrate+Nitrite as N	< 1.0	< 2.0
Sulfate	4100	7900
Total Alkalinity (as CaCO3)	150	110
Total Dissolved Solids	4470	12700
Dissolved Metals (mg/l)		
Aluminum	0.11	3.8
Antimony	< 0.0010	< 0.0050
Arsenic	0.0014	0.0027
Barium	0.022	0.035
Beryllium	< 0.0020	< 0.0020
Boron	0.23	0.67
Cadmium	< 0.0020	< 0.0020
Calcium	420	390
Chromium	< 0.0060	< 0.0060
Cobalt	< 0.0060	0.0068
Copper	< 0.0060	< 0.0060
Iron	0.10	0.94
Lead	< 0.0010	< 0.0050
Magnesium	64	47
Manganese	0.39	1.1
Molybdenum	0.026	0.024
Nickel	< 0.010	< 0.010
Potassium	4.4	18
Selenium	0.0069	0.0079
Silver	< 0.0050	< 0.0050
Sodium	950	3700
Thallium	< 0.0010	< 0.0050
Uranium	0.012	< 0.0050
Vanadium	< 0.050	< 0.050
Zinc	0.012	0.030

# TABLE 4Groundwater Analytical Results SummaryBloomfield Refinery - Bloomfield, New Mexico

	MW-BCK1	MW-BCK2
Sample Date>	6/14/2012	6/14/2012
Total Metals (mg/l)		
Aluminum	31	33
Antimony	< 0.0025	< 0.0025
Arsenic	0.0084	0.0047
Barium	0.28	0.12
Beryllium	0.0020	0.0023
Boron	0.19	0.60
Cadmium	< 0.0020	< 0.0020
Chromium	0.032	0.025
Cobalt	0.029	0.019
Copper	0.050	0.010
Cyanide	< 0.01	< 0.01
Iron	41	29
Lead	0.033	0.025
Magnesium	67	52
Manganese	1.4	1.9
Mercury	< 0.0010	< 0.0010
Molybdenum	0.019	0.017
Nickel	0.032	0.015
Selenium	0.0060	0.0041
Silver	< 0.0050	< 0.0050
Thallium	< 0.0025	< 0.0025
Uranium	0.014	0.0040
Vanadium	< 0.050	< 0.050
Zinc	0.12	0.089

# TABLE 4Groundwater Analytical Results SummaryBloomfield Refinery - Bloomfield, New Mexico

TABLE 5
Groundwater Field Measurements
Bloomfield Refinery - Bloomfield, New Mexico

Well	Date	Well Volume	Temp (degrees F)	Specific Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	TDS (ppm)	Purge Volume (calculated / actual - gallons)
MW-BCK1	6/14/2012	0	61.1 61.0	5040 4766	1.81 3.07	8.05 7.66	-67.4 -80.8	3919.5 3724.5	2.3 /3.0 *
		2	60.5	4737	2.5	7.61	-73.2	3724.5	
		0	60.3	12492	2.39	8.09	13.4	9867	
		1	59.8	12353	1.89	7.98	-41.2	9802	
MW-BCK2	6/14/2012	2	59.8	12354	2.15	7.97	-120.1	9815	10.2/14 *
		3	59.9	12366	1.77	7.99	-128.1	9815	
		4	59.9	12325	1.85	7.97	-132.3	9776	

\* - very slow recovery, well purged dry for sampling

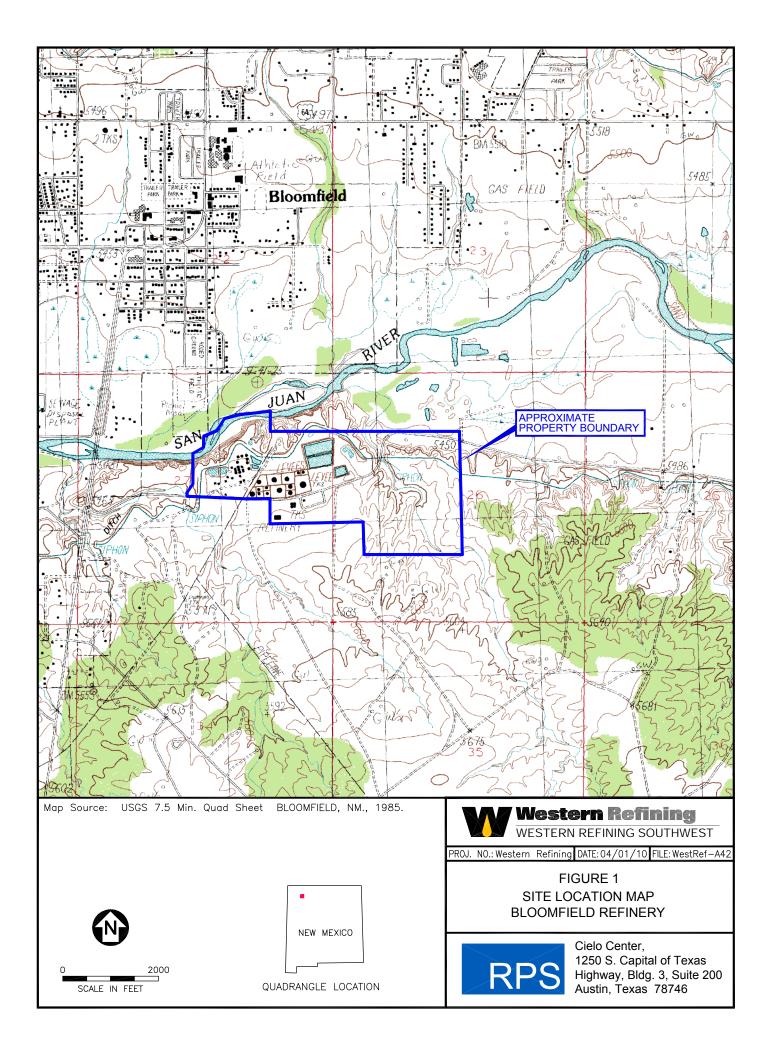
F = Fahrenheit

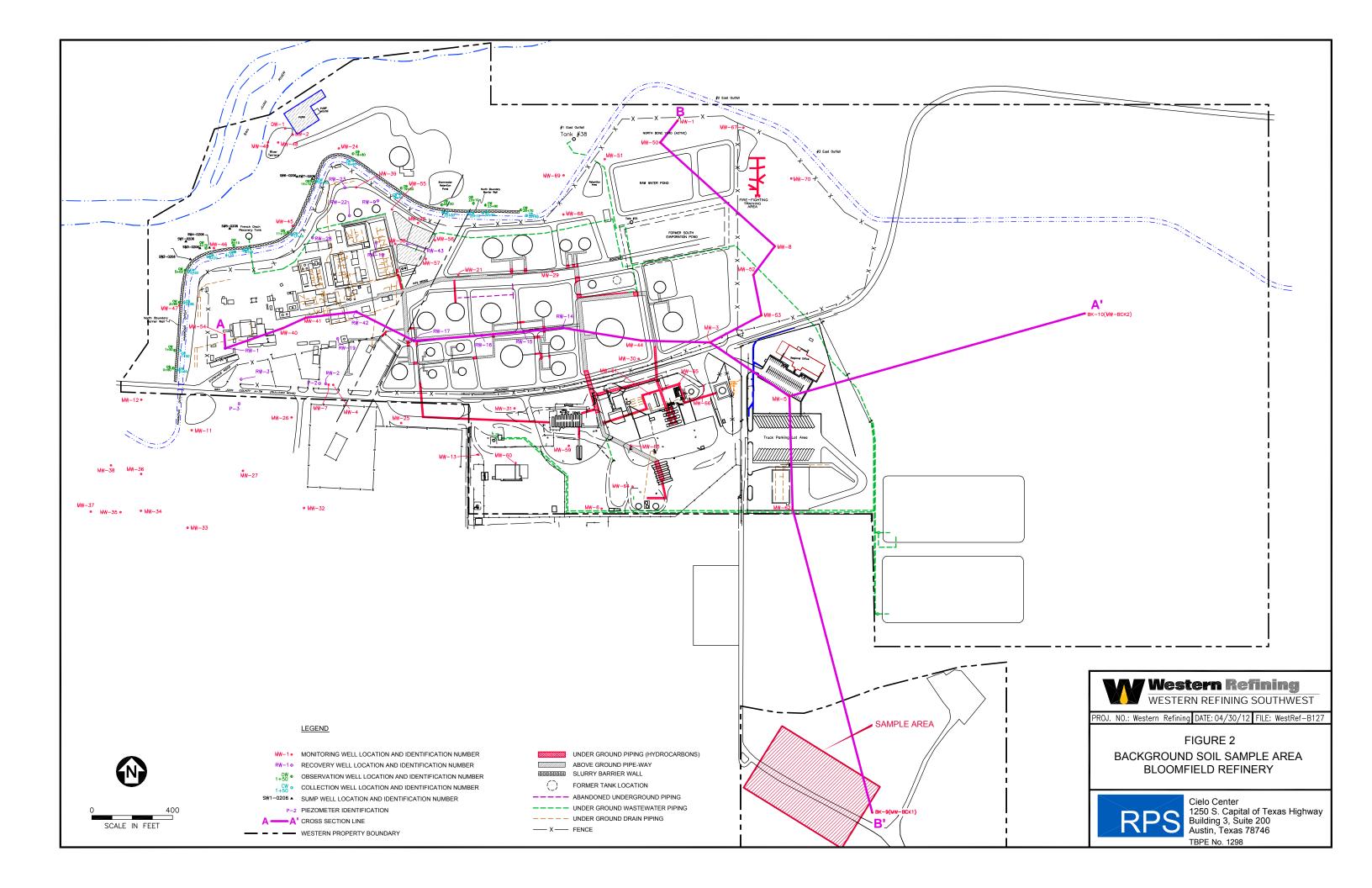
uS/cm = microsiemens per centimeter

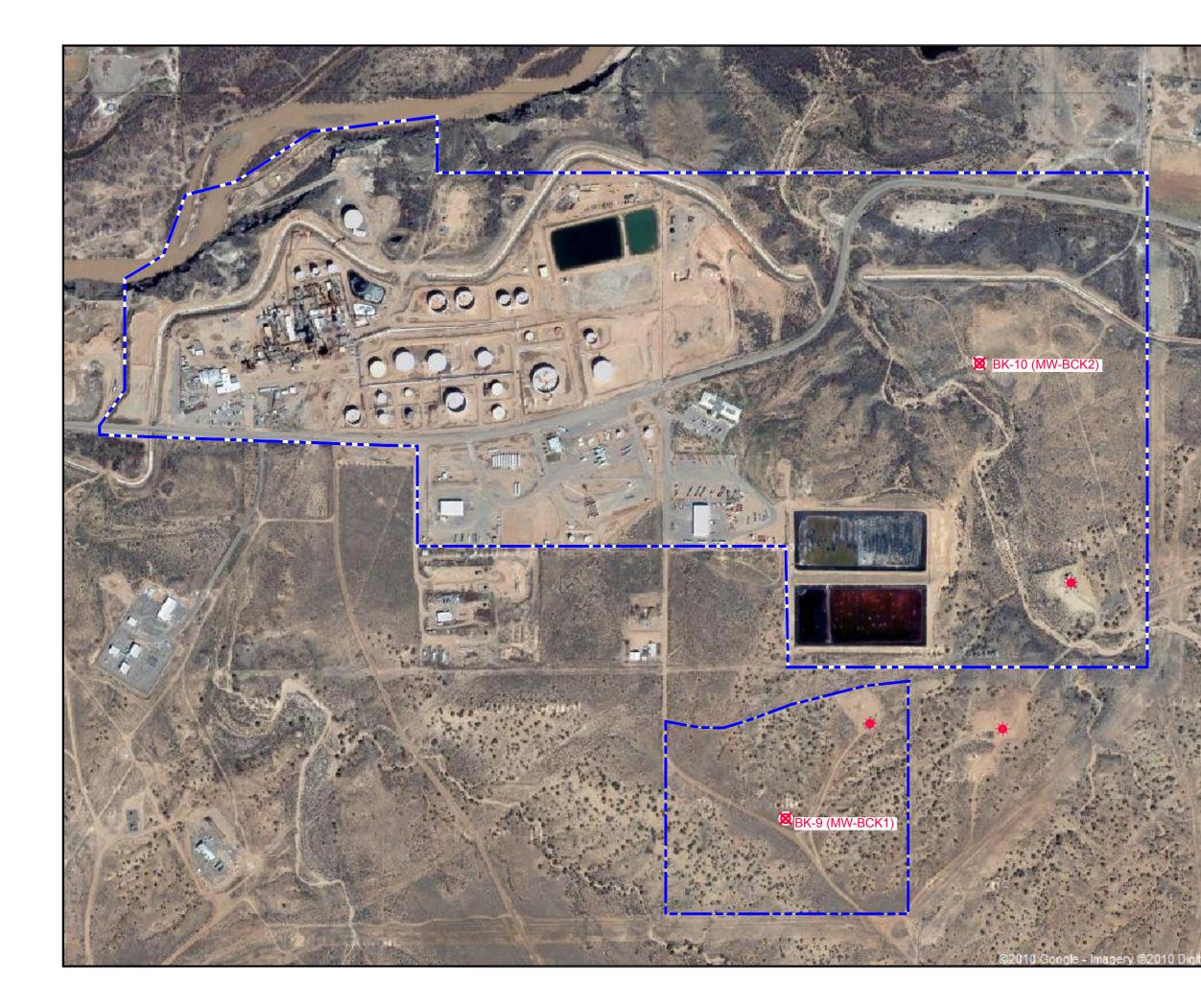
mg/L = milligrams per liter

ppm = parts per million

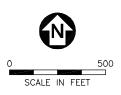
### **Figures**











#### LEGEND



BK-9 (MW-BCK1) X PROPOSED BACKGROUND MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

GAS WELL LOCATION

WESTERN PROPERTY BOUNDARY

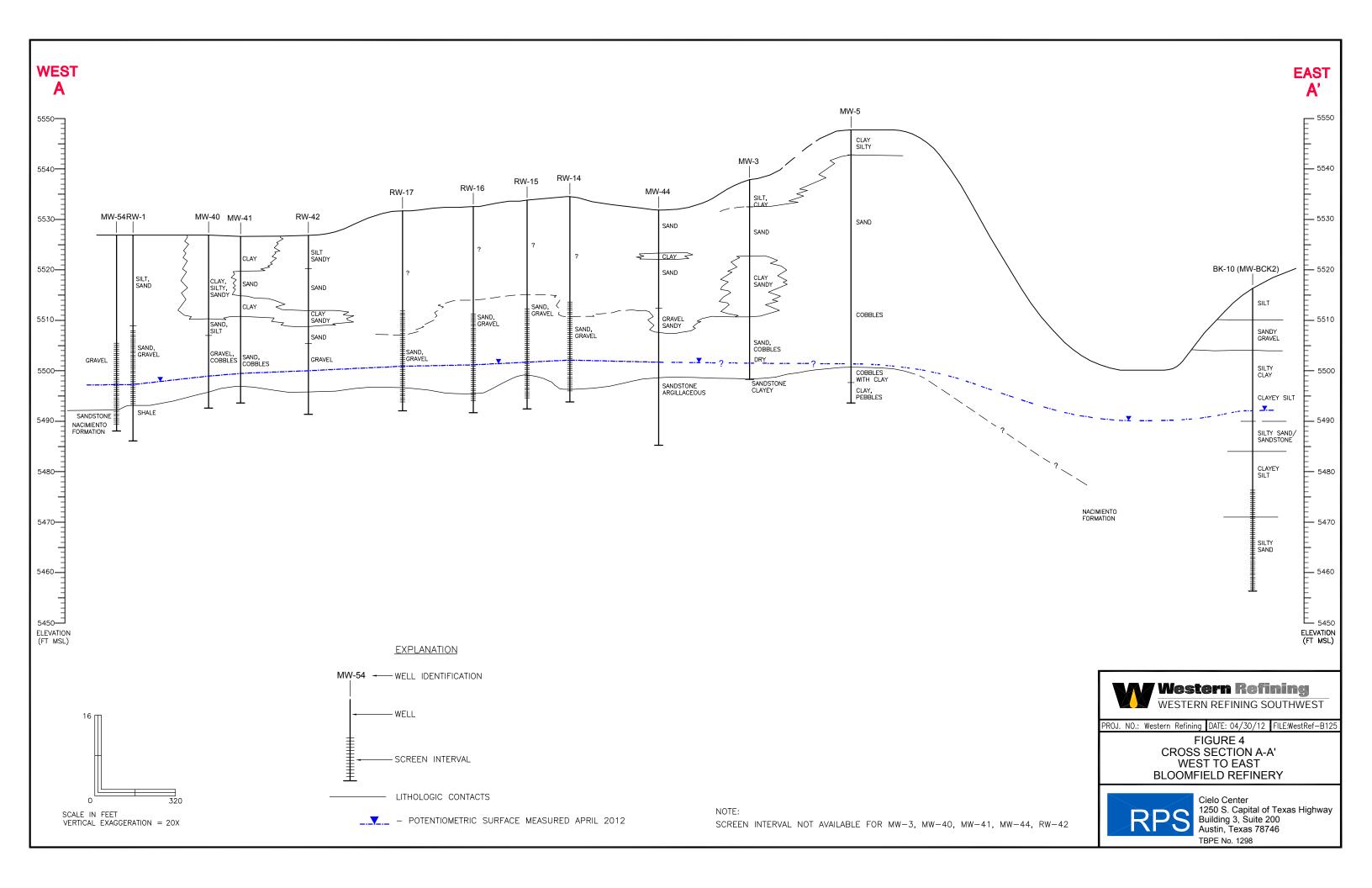


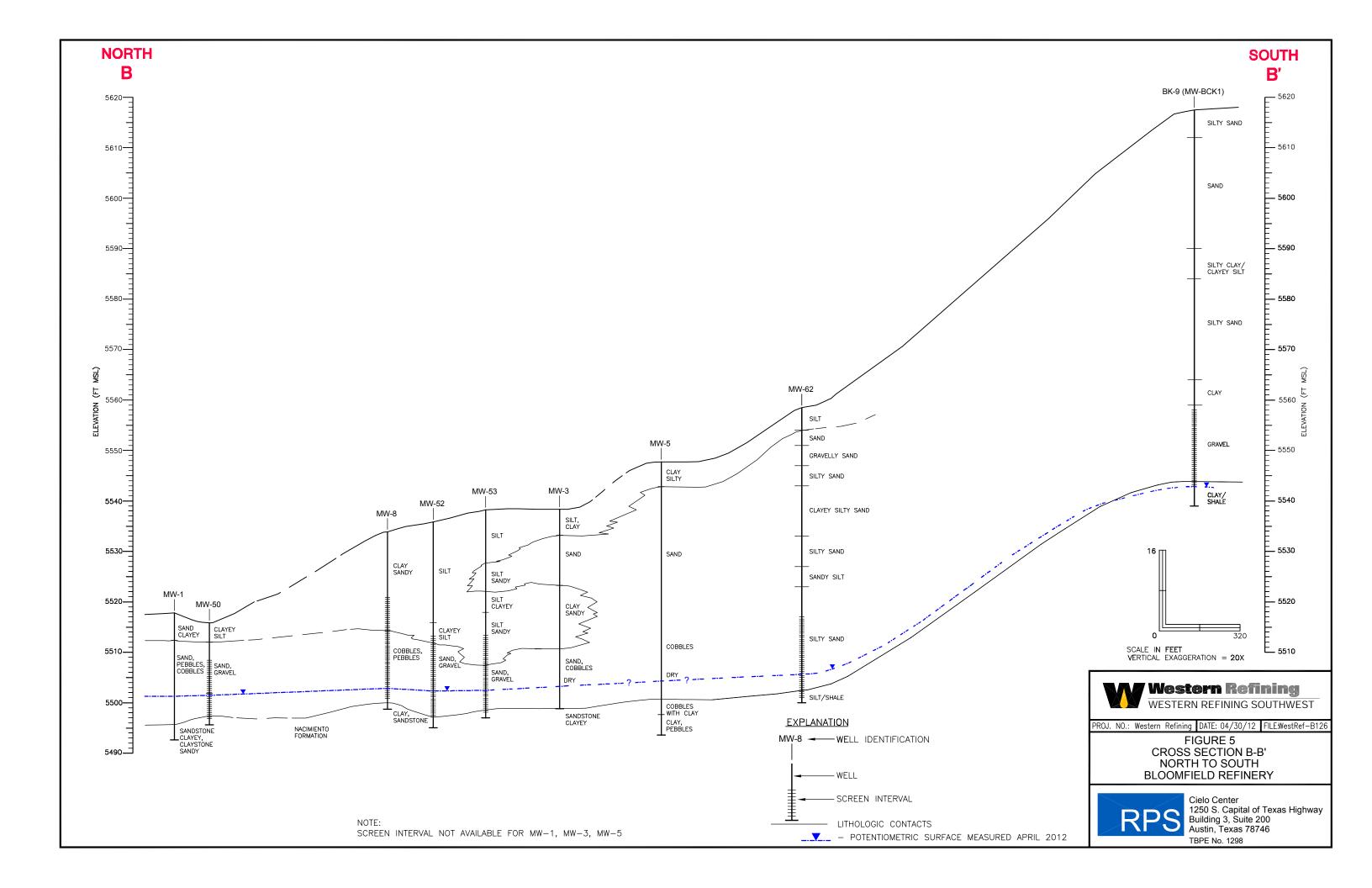
PROJ. NO.: Western Refining DATE: 04/17/12 FILE: WestRefB123

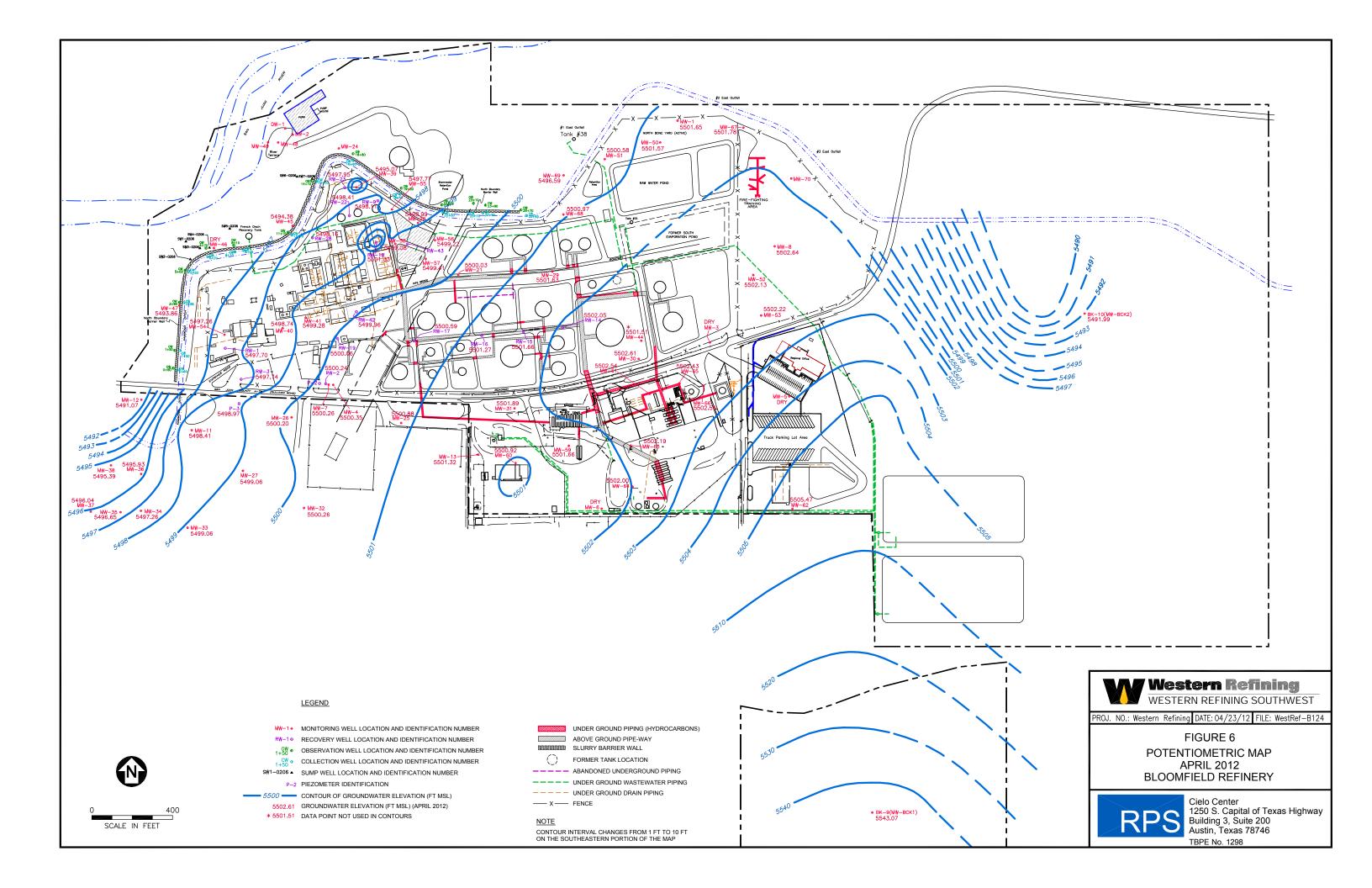
FIGURE 3 BACKGROUND MONITORING WELL LOCATIONS BLOOMFIELD REFINERY

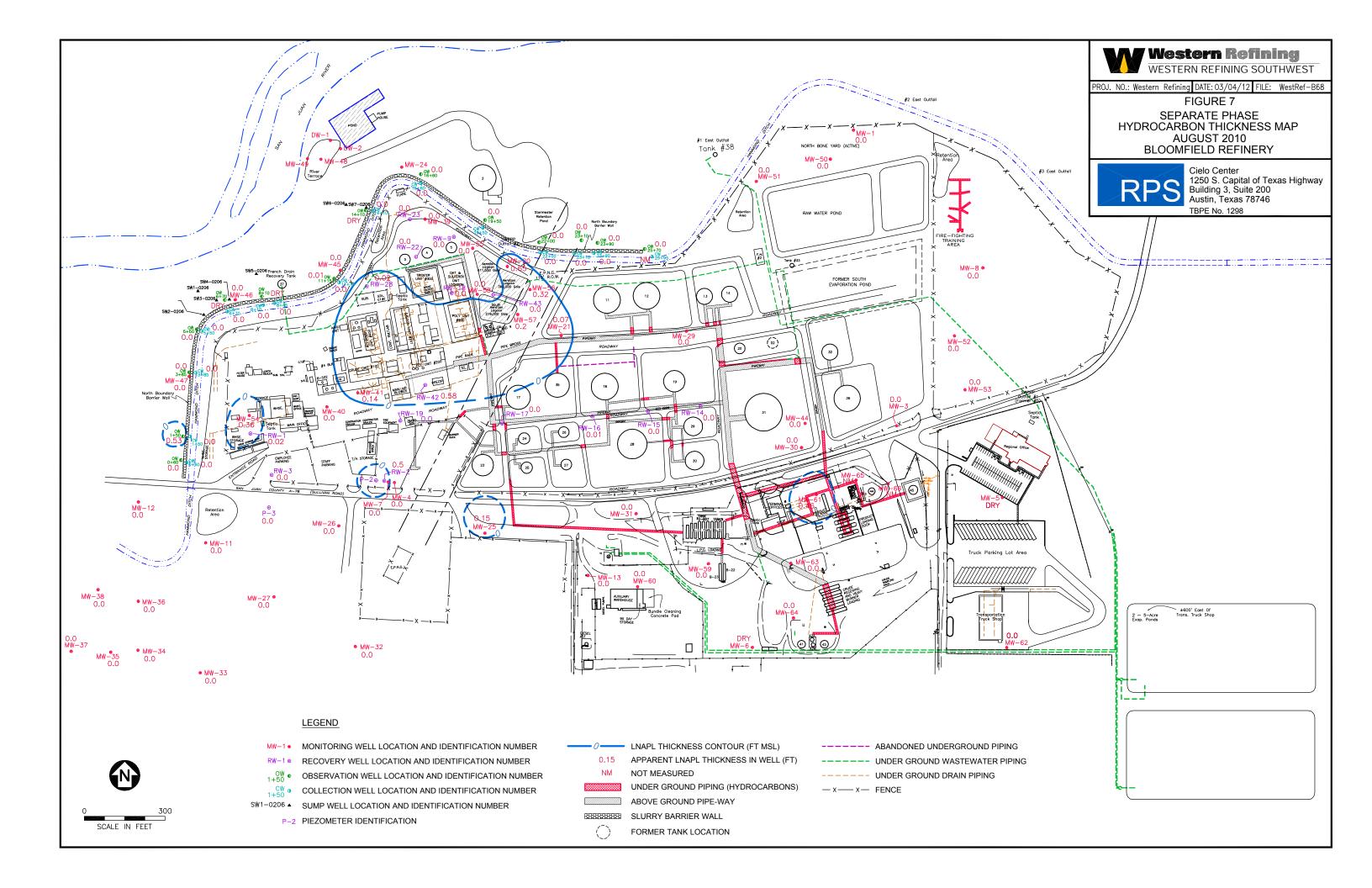


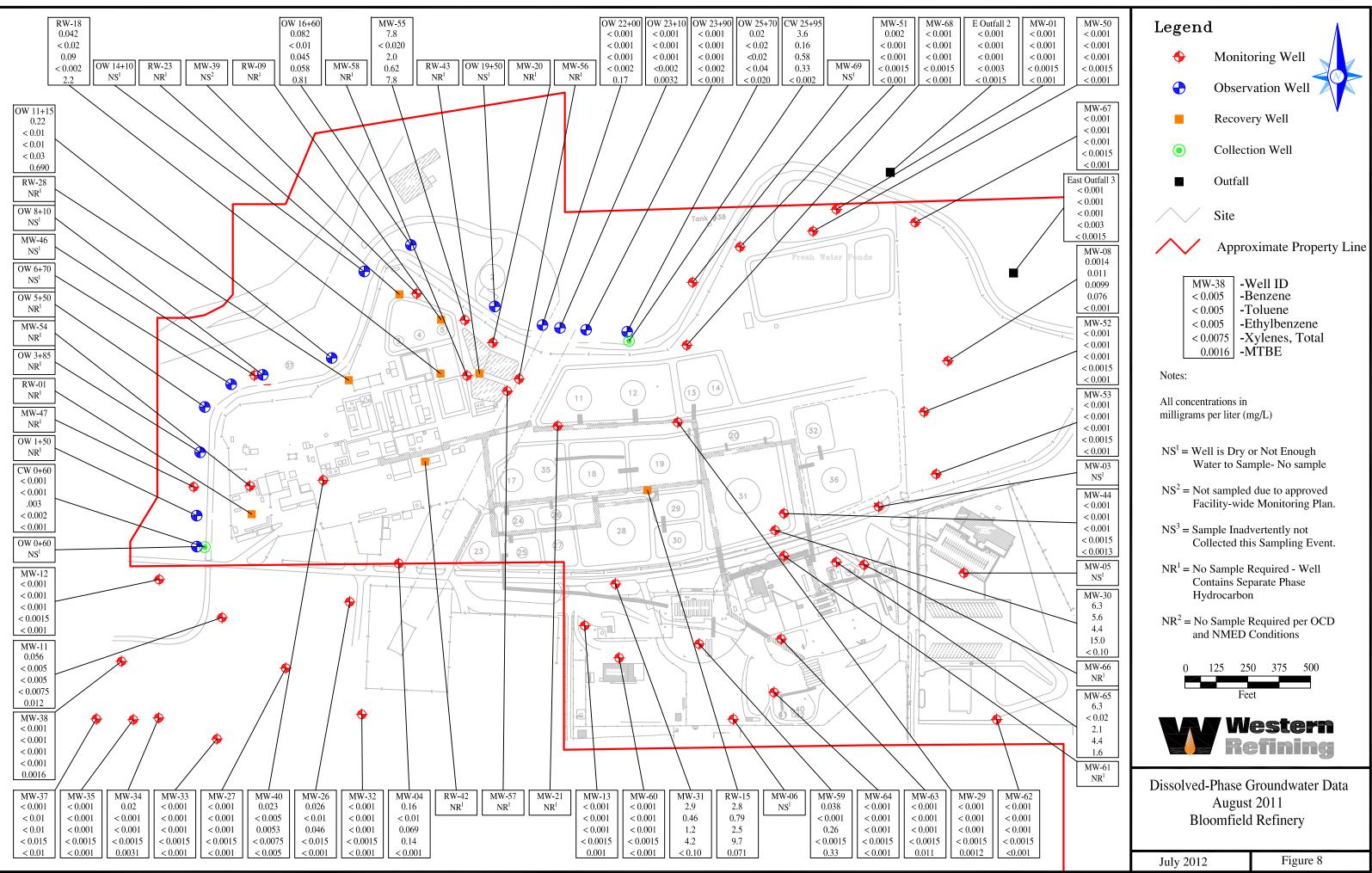
Cielo Center 1250 S. Capital of Texas Highway Building 3, Suite 200 Austin, Texas 78746 TBPE No. 1298

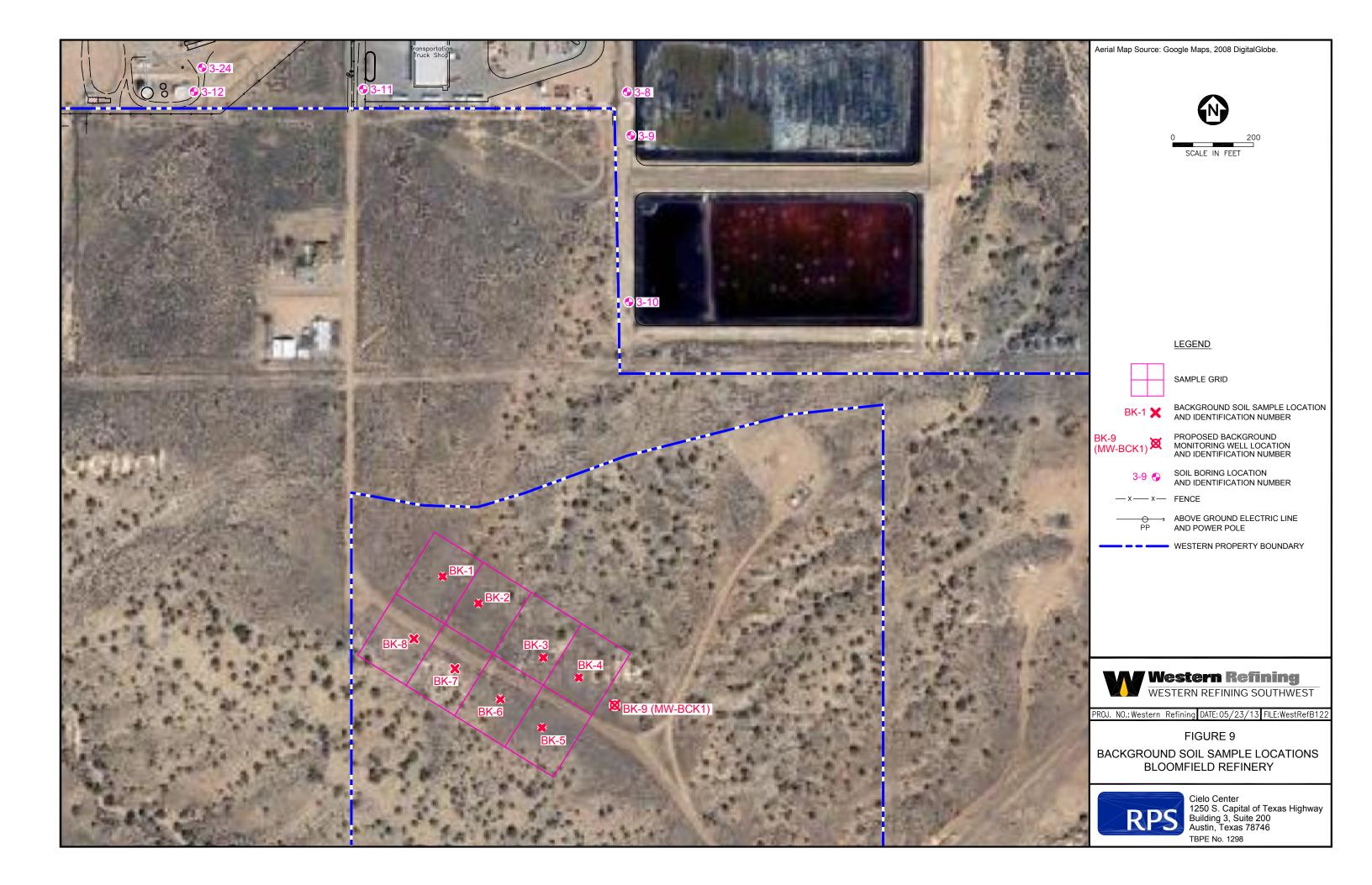












### Appendix A

Soils Data



United States Department of Agriculture



Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

### Custom Soil Resource Report for San Juan County, New Mexico, Eastern Part

**Bloomfield Refinery Soils Report** 



### Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app? agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/ state\_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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### **How Soil Surveys Are Made**

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soillandscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

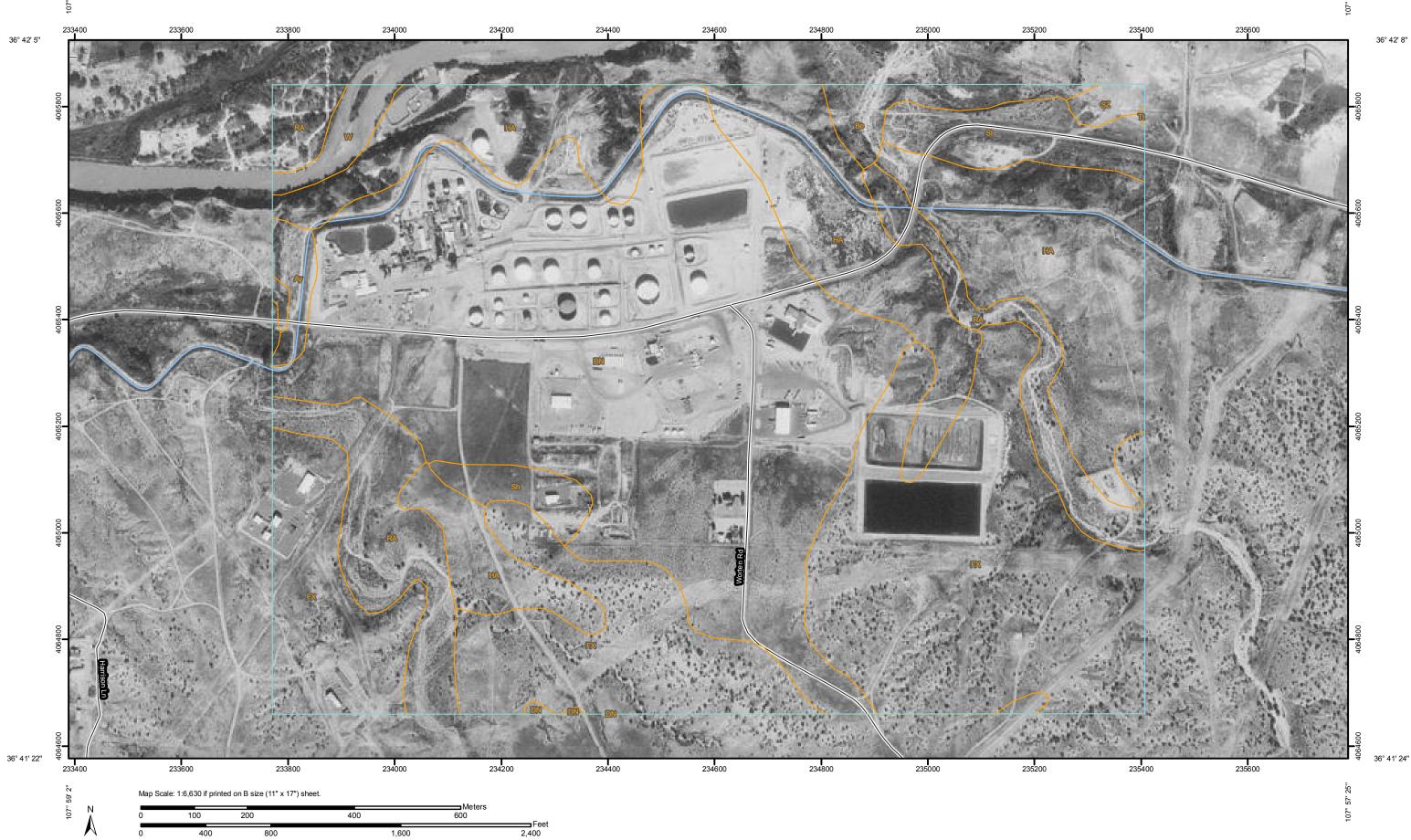
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

### Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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### Custom Soil Resource Report Soil Map (Soil Map - San Juan County, NM, Eastern Part)



57' 27"

	MAP L	EGEND		MAP INFORMATION
Area of Interest (A	OI)	۵	Very Stony Spot	Map Scale: 1:6,630 if printed on B size (11" × 17") sheet.
	f Interest (AOI)	¥	Wet Spot	The soil surveys that comprise your AOI were mapped at 1:63,360
Soils Soil Mc	ap Units	•	Other	
	•	Special	Line Features	Please rely on the bar scale on each map sheet for accurate map
Special Point Fe Blowou		$\sim$	Gully	measurements.
0		1.1.1	Short Steep Slope	Source of Map: Natural Resources Conservation Service
		~-	Other	Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov Coordinate System: UTM Zone 13N NAD83
X Clay S		Political F	eatures	
•	Depression	•	Cities	This product is generated from the USDA-NRCS certified data as
🗙 Gravel	Pit	Water Fea	itures	the version date(s) listed below.
Gravell	ly Spot		Oceans	Soil Survey Area: San Juan County, New Mexico, Eastern Par
Δ     Δ	I	$\sim$	Streams and Canals	Survey Area Data: Version 10, Sep 23, 2009
🚶 🛛 Lava F	low	Transport		Date(s) aerial images were photographed: 10/9/1997
Marsh علد	or swamp	+++	Rails	Date(s) aenai images were photographed. 10/9/1997
🛠 Mine o	r Quarry	~	Interstate Highways	The orthophoto or other base map on which the soil lines were
Miscell	aneous Water	$\sim$	US Routes	compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifti
erenn	nial Water	~~	Major Roads	of map unit boundaries may be evident.
V Rock C	Dutcrop	$\sim$	Local Roads	
+ Saline	Spot			
Sandy	Spot			
🕳 Severe	ly Eroded Spot			
Sinkho	le			
3 Slide o	r Slip			
ø Sodic S	Spot			
🛎 Spoil A	rea			
Stony Sto	Spot			

## Map Unit Legend (Soil Map - San Juan County, NM, Eastern Part)

San Juan County, New Mexico, Eastern Part (NM618)										
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI							
Ay	Avalon loam, 0 to 3 percent slopes	3.8	0.8%							
Be	Beebe loamy sand	6.7	1.4%							
DN	Doak-Avalon association, gently sloping	168.8	35.4%							
FX	Fruitland-Persayo-Sheppard complex, hilly	134.6	28.2%							
HA	Haplargids-Blackston-Torriorthents complex, very steep	100.7	21.1%							
RA	Riverwash	37.8	7.9%							
Sh	Shiprock loamy fine sand, 0 to 2 percent slopes	5.5	1.1%							
St	Stumble loamy sand, 0 to 3 percent slopes	12.4	2.6%							
SZ	Stumble-Slickspots complex, gently sloping	2.1	0.4%							
Tt	Turley clay loam, wet, 0 to 2 percent slopes	0.1	0.0%							
W	Lakes, rivers, reservoirs	4.4	0.9%							
Totals for Area of Inter	est	477.0	100.0%							

## Map Unit Descriptions (Soil Map - San Juan County, NM, Eastern Part)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used.

Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

### San Juan County, New Mexico, Eastern Part

#### Ay—Avalon loam, 0 to 3 percent slopes

#### Map Unit Setting

*Elevation:* 5,600 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

Avalon and similar soils: 90 percent

#### **Description of Avalon**

#### Setting

Landform: Mesas Landform position (three-dimensional): Talf Down-slope shape: Convex Across-slope shape: Convex Parent material: Eolian deposits over slope alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.8 inches)

#### Interpretive groups

Land capability classification (irrigated): 2e Land capability (nonirrigated): 7e Ecological site: Limy (R035XB003NM)

#### **Typical profile**

0 to 18 inches: Loam 18 to 60 inches: Sandy clay loam 60 to 64 inches: Gravelly sandy loam

#### Be—Beebe loamy sand

Map Unit Setting Elevation: 4,800 to 6,000 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### **Map Unit Composition**

Beebe and similar soils: 90 percent

#### **Description of Beebe**

#### Setting

Landform: Flood plains Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Stream alluvium derived from igneous and sedimentary rock

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 3.6 inches)

#### Interpretive groups

Land capability classification (irrigated): 4e Land capability (nonirrigated): 7e Ecological site: Sandy (R035XB002NM)

#### **Typical profile**

0 to 6 inches: Loamy sand 6 to 81 inches: Sand

#### DN—Doak-Avalon association, gently sloping

#### Map Unit Setting

*Elevation:* 5,600 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

Doak and similar soils: 50 percent Avalon and similar soils: 35 percent

#### **Description of Doak**

#### Setting

Landform: Fan remnants, mesas, stream terraces Landform position (three-dimensional): Tread, talf Down-slope shape: Convex, linear Across-slope shape: Convex, linear Parent material: Alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.1 inches)

#### Interpretive groups

Land capability classification (irrigated): 2e Land capability (nonirrigated): 7e Ecological site: Loamy (R035XB001NM)

#### **Typical profile**

0 to 5 inches: Loam 5 to 43 inches: Clay loam 43 to 60 inches: Clay loam

#### **Description of Avalon**

#### Setting

Landform: Fan remnants, mesas, stream terraces Landform position (three-dimensional): Tread, talf Down-slope shape: Convex, linear Across-slope shape: Convex, linear Parent material: Eolian deposits over alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0

Available water capacity: High (about 9.7 inches)

#### Interpretive groups

Land capability classification (irrigated): 3e Land capability (nonirrigated): 7e Ecological site: Limy (R035XB003NM)

#### **Typical profile**

0 to 14 inches: Loam 14 to 60 inches: Loam 60 to 64 inches: Gravelly loam

#### FX—Fruitland-Persayo-Sheppard complex, hilly

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

*Fruitland and similar soils:* 40 percent *Persayo and similar soils:* 30 percent *Sheppard and similar soils:* 25 percent

#### **Description of Fruitland**

#### Setting

Landform: Alluvial fans, stream terraces Landform position (three-dimensional): Riser, rise Down-slope shape: Linear Across-slope shape: Linear Parent material: Slope alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 5 to 30 percent Depth to restrictive feature: More than 80 inches Drainage class: Well drained Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr) Depth to water table: More than 80 inches Frequency of flooding: None Frequency of ponding: None Calcium carbonate, maximum content: 10 percent Gypsum, maximum content: 1 percent Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm) Sodium adsorption ratio, maximum: 2.0 Available water capacity: Moderate (about 7.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 4e Land capability (nonirrigated): 7e Ecological site: Sandy (R035XB002NM)

#### **Typical profile**

0 to 4 inches: Sandy loam 4 to 60 inches: Fine sandy loam

#### **Description of Persayo**

#### Setting

Landform: Breaks, hills, ridges Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope Landform position (three-dimensional): Side slope, nose slope, head slope, crest Down-slope shape: Convex Across-slope shape: Convex Parent material: Residuum weathered from shale

#### **Properties and qualities**

Slope: 5 to 30 percent
Depth to restrictive feature: 5 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.9 inches)

#### Interpretive groups

Land capability (nonirrigated): 7e Ecological site: Shale Hills (R035XA130NM)

#### **Typical profile**

0 to 18 inches: Clay loam 18 to 20 inches: Bedrock

#### **Description of Sheppard**

#### Setting

Landform: Dunes Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Eolian deposits over mixed alluvium

#### **Properties and qualities**

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water capacity: Low (about 4.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 4e Land capability (nonirrigated): 7e Ecological site: Deep Sand (R035XB007NM)

#### **Typical profile**

0 to 4 inches: Loamy fine sand 4 to 60 inches: Loamy fine sand

#### HA—Haplargids-Blackston-Torriorthents complex, very steep

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

Haplargids and similar soils: 45 percent Blackston and similar soils: 30 percent Torriorthents and similar soils: 20 percent

#### **Description of Haplargids**

#### Setting

Landform: Escarpments Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Mixed alluvium

#### **Properties and qualities**

Slope: 8 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.3 inches)

#### Interpretive groups

Land capability (nonirrigated): 7e Ecological site: Loamy (R035XB001NM)

#### **Typical profile**

0 to 7 inches: Cobbly sandy loam 7 to 26 inches: Cobbly sandy clay loam 26 to 60 inches: Cobbly sandy clay loam

#### **Description of Blackston**

#### Setting

Landform: Escarpments Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Mixed alluvium

#### **Properties and qualities**

Slope: 8 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

#### Interpretive groups

Land capability (nonirrigated): 7e Ecological site: Limy (R035XB003NM)

#### **Typical profile**

0 to 11 inches: Gravelly loam 11 to 26 inches: Very gravelly loam 26 to 60 inches: Very gravelly sand

#### **Description of Torriorthents**

#### Setting

Landform: Escarpments Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Mixed alluvium

#### **Properties and qualities**

Slope: 8 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0 Available water capacity: Very low (about 2.2 inches)

#### Interpretive groups

Land capability (nonirrigated): 7e Ecological site: Hills (R042XB027NM)

#### **Typical profile**

0 to 3 inches: Cobbly loam 3 to 15 inches: Cobbly clay loam 15 to 60 inches: Bedrock

### RA—Riverwash

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

*Riverwash, clayey:* 35 percent *Riverwash, sandy:* 35 percent *Riverwash, gravelly:* 30 percent

#### **Description of Riverwash, Sandy**

#### Setting

Landform: Flood plains Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Stream alluvium derived from igneous and sedimentary rock

#### **Properties and qualities**

Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 2.9 inches)

#### Interpretive groups

Land capability (nonirrigated): 8w

#### **Typical profile**

0 to 6 inches: Sand 6 to 60 inches: Stratified coarse sand to sandy loam

#### **Description of Riverwash, Clayey**

#### Setting

Landform: Flood plains Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Stream alluvium derived from igneous and sedimentary rock

#### **Properties and qualities**

Slope: 0 to 1 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Available water capacity: Low (about 6.0 inches)

#### Interpretive groups

Land capability (nonirrigated): 8w

#### **Typical profile**

0 to 6 inches: Clay 6 to 60 inches: Clay

#### **Description of Riverwash, Gravelly**

#### Setting

Landform: Flood plains Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Stream alluvium derived from igneous and sedimentary rock

#### **Properties and qualities**

Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 1.9 inches)

### Interpretive groups

Land capability (nonirrigated): 8w

#### **Typical profile**

0 to 6 inches: Gravelly sand 6 to 60 inches: Stratified extremely gravelly coarse sand to gravelly sand

## Sh—Shiprock loamy fine sand, 0 to 2 percent slopes

#### Map Unit Setting

*Elevation:* 5,600 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

Shiprock and similar soils: 85 percent

#### **Description of Shiprock**

#### Setting

Landform: Mesas Landform position (three-dimensional): Talf Down-slope shape: Convex Across-slope shape: Convex Parent material: Eolian deposits over alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 0 to 2 percent Depth to restrictive feature: More than 80 inches Drainage class: Well drained Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr) Depth to water table: More than 80 inches Frequency of flooding: None Frequency of ponding: None Calcium carbonate, maximum content: 2 percent Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm) Available water capacity: Moderate (about 6.3 inches)

#### Interpretive groups

Land capability classification (irrigated): 3e Land capability (nonirrigated): 7e Ecological site: Deep Sand (R035XB007NM)

#### **Typical profile**

0 to 10 inches: Loamy fine sand 10 to 60 inches: Fine sandy loam

## St—Stumble loamy sand, 0 to 3 percent slopes

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet

*Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### **Map Unit Composition**

Stumble and similar soils: 90 percent Fruitland and similar soils: 10 percent

#### **Description of Stumble**

#### Setting

Landform: Dunes Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Eolian deposits derived from sandstone

#### **Properties and qualities**

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

### Interpretive groups

Land capability classification (irrigated): 4e Land capability (nonirrigated): 7e Ecological site: Sandy (R035XB002NM)

## **Typical profile**

0 to 5 inches: Loamy sand 5 to 29 inches: Loamy sand 29 to 49 inches: Gravelly loamy sand 49 to 81 inches: Loamy sand

#### **Description of Fruitland**

#### Setting

Landform: Alluvial fans Landform position (three-dimensional): Rise Down-slope shape: Linear Across-slope shape: Linear Parent material: Fan alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

*Frequency of flooding:* None *Frequency of ponding:* None *Calcium carbonate, maximum content:* 10 percent *Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm) *Available water capacity:* Moderate (about 7.5 inches)

#### Interpretive groups

Land capability classification (irrigated): 2e Land capability (nonirrigated): 7e Ecological site: Loamy (R035XB001NM)

#### **Typical profile**

0 to 8 inches: Loam 8 to 60 inches: Fine sandy loam

### SZ—Stumble-Slickspots complex, gently sloping

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

*Stumble and similar soils:* 70 percent *Slickspots:* 20 percent

#### **Description of Stumble**

#### Setting

Landform: Dunes Landform position (three-dimensional): Side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Eolian deposits derived from sandstone

#### **Properties and qualities**

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 7e Ecological site: Sandy (R035XB002NM)

#### **Typical profile**

0 to 4 inches: Loamy sand 4 to 60 inches: Loamy sand

#### **Description of Slickspots**

#### Setting

Landform: Alluvial fans Landform position (three-dimensional): Rise Down-slope shape: Linear Across-slope shape: Linear Parent material: Eolian deposits derived from sandstone

#### **Properties and qualities**

Slope: 0 to 5 percent
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0

#### Interpretive groups

Land capability (nonirrigated): 8w

#### **Typical profile**

0 to 2 inches: Clay 2 to 60 inches: Clay

## Tt—Turley clay loam, wet, 0 to 2 percent slopes

#### Map Unit Setting

*Elevation:* 4,800 to 6,000 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### Map Unit Composition

Turley variant and similar soils: 90 percent

#### **Description of Turley Variant**

#### Setting

Landform: Alluvial fans Landform position (three-dimensional): Rise Down-slope shape: Linear Across-slope shape: Linear Parent material: Fan alluvium derived from sandstone and shale

#### **Properties and qualities**

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 2w Land capability (nonirrigated): 6w Ecological site: Clayey (R035XB004NM)

#### **Typical profile**

0 to 9 inches: Clay loam 9 to 60 inches: Clay loam

#### W—Lakes, rivers, reservoirs

#### **Map Unit Setting**

*Elevation:* 4,800 to 6,400 feet *Mean annual precipitation:* 6 to 10 inches *Mean annual air temperature:* 51 to 55 degrees F *Frost-free period:* 140 to 160 days

#### **Map Unit Composition**

Water: 95 percent

#### **Description of Water**

#### Setting

Landform: Channels Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear

# Soil Information for All Uses

# **Soil Reports**

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

# **Soil Chemical Properties**

This folder contains a collection of tabular reports that present soil chemical properties. The reports (tables) include all selected map units and components for each map unit. Soil chemical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

# Chemical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

*Cation-exchange capacity* is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

*Effective cation-exchange capacity* refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

*Soil reaction* is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Calcium carbonate* equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

*Gypsum* is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

		Chemical Soil Pr	operties– San Ju	an County, New M	exico, Eastern Pa	art		
Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	meq/100g	pН	Pct	Pct	mmhos/cm	
Ay—Avalon loam, 0 to 3 percent slopes								
Avalon	0-18	9.8-15	—	7.9-8.4	1-5	0-2	2.0-8.0	0
	18-60	11-23	_	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	_	7.9-8.4	15-20	0-2	2.0-8.0	0
Be—Beebe loamy sand								
Beebe	0-6	3.1-7.4	—	7.4-8.4	0-1	0	2.0-4.0	0
	6-81	0.8-7.4	_	7.4-8.4	0-1	0	2.0-4.0	0
DN—Doak-Avalon association, gently sloping								
Doak	0-5	11-19	—	7.4-8.4	0-5	0	0.0-2.0	0
	5-43	15-23	—	7.4-9.0	1-10	0	2.0-4.0	0
	43-60	15-23	_	7.9-9.0	5-10	0-2	2.0-4.0	0-2
Avalon	0-14	11-15	_	7.9-8.4	0-5	0	2.0-8.0	0
	14-60	11-23	_	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	_	7.9-8.4	15-20	0-2	2.0-8.0	0-2
FX—Fruitland-Persayo-Sheppard complex, hilly								
Fruitland	0-4	4.1-7.6	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
	4-60	3.1-12	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
Persayo	0-18	18-23	—	7.9-9.0	0-2	0-2	0.0-8.0	0-2
	18-20	_	_	_	-	_	—	_
Sheppard	0-4	2.5-5.4	—	7.9-8.4	0	0	0.0-2.0	0
	4-60	2.5-5.4	_	7.9-8.4	0	0	0.0-2.0	0

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part											
Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio			
	In	meq/100g	meq/100g	pН	Pct	Pct	mmhos/cm				
HA—Haplargids-Blackston- Torriorthents complex, very steep											
Haplargids	0-7	7.0-14	-	7.4-8.4	0	0	0.0-4.0	0			
	7-26	13-23	—	7.4-8.4	0-5	0	0.0-4.0	0			
	26-60	13-18	-	7.4-8.4	1-10	0	0.0-4.0	0			
Blackston	0-11	11-18	-	7.9-8.4	0-2	0	0.0-2.0	0			
	11-26	9.8-17	-	7.9-8.4	10-20	0	4.0-8.0	0			
	26-60	0.0-4.6	_	7.9-8.4	15-30	0	4.0-8.0	0			
Torriorthents	0-3	11-17	-	7.4-8.4	0-2	0-2	0.0-4.0	0			
	3-15	5.7-19	—	7.4-8.4	0-2	0-2	0.0-4.0	0-2			
	15-60	—	—	—	—	—	—	—			
RA—Riverwash											
Riverwash, clayey	0-6	—	—	—	—	—	—	—			
	6-60	_	-	-	—	—	_	—			
Riverwash, sandy	0-6	_	-	-	_	—	_	—			
	6-60	_	_	_	_	—	_	—			
Riverwash, gravelly	0-6	_	-	<u> </u>	-	_	_	_			
	6-60	—	_	-	-	_	—	—			
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes											
Shiprock	0-10	8.1-11	_	7.4-8.4	0-2	0	0.0-2.0	0			
	10-60	7.0-13	_	7.4-9.0	0-2	0	0.0-4.0	0			

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part											
Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio			
	In	meq/100g	meq/100g	pН	Pct	Pct	mmhos/cm				
St—Stumble loamy sand, 0 to 3 percent slopes											
Stumble	0-5	0.0-7.4	—	7.9-8.4	0-2	0	0.0-2.0	0			
	5-29	0.0-7.4	—	7.9-9.0	0-2	0	0.0-2.0	0			
	29-49	0.0-3.1	—	7.9-9.0	0-2	0	0.0-2.0	0			
	49-81	0.0-5.7	_	7.9-9.0	0-2	0	0.0-2.0	0			
Fruitland	0-8	5.7-16	—	7.4-8.4	5-10	0	0.0-4.0	0			
	8-60	3.1-12	_	7.4-8.4	5-10	0	0.0-4.0	0			
SZ—Stumble-Slickspots complex, gently sloping											
Stumble	0-4	0.0-7.4	_	7.9-8.4	0-1	0	0.0-2.0	0			
	4-60	0.0-7.4	_	7.9-9.0	0-1	0	0.0-2.0	0			
Slickspots	0-2	_	_	7.9-9.6	0	0	0.0-8.0	2-6			
	2-60	_	_	7.9-9.6	0	0	8.0-16.0	4-12			
Tt—Turley clay loam, wet, 0 to 2 percent slopes											
Turley variant	0-9	14-22	_	7.4-8.4	1-5	0-2	2.0-4.0	0-2			
	9-60	14-22	_	7.4-8.4	1-5	0-2	2.0-4.0	0-2			
W—Lakes, rivers, reservoirs											
Water	_	_	_	<u> </u>	<b>_</b>	_	_	_			

# **Soil Physical Properties**

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

# Physical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Silt* as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility* refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrinkswell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

*Erosion factors* are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor Kw* indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

*Erosion factor Kf* indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Wind erodibility groups* are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

*Wind erodibility index* is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

#### Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

	Physical Soil Properties– San Juan County, New Mexico, Eastern Part													
Map symbol	Depth	Sand	Silt	Clay	Moist	Saturated	Available	Linear	Organic	Eros	ion fa	ctors	Wind	Wind
and soil name					bulk density	hydraulic conductivity	water capacity	extensibility	matter	Kw	Kf	т	erodibility group	erodibility index
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
Ay—Avalon loam, 0 to 3 percent slopes														
Avalon	0-18	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.0-1.0	.43	.43	3	4L	86
	18-60	-56-	-18-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-67-	-23-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			
Be—Beebe loamy sand														
Beebe	0-6	-84-	- 9-	5- 8- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.20	.20	5	2	134
	6-81	-93-	- 2-	1- 6- 10	1.45-1.55	141.14	0.03-0.08	0.0-2.9	0.0-0.5	.17	.17			
DN—Doak- Avalon association, gently sloping														
Doak	0-5	-42-	-37-	15-21- 27	1.20-1.30	4.23-14.11	0.15-0.17	0.0-2.9	0.5-0.6	.37	.37	5	5	56
	5-43	-34-	-37-	25-30- 35	1.45-1.55	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
	43-60	-34-	-37-	25-30- 35	1.40-1.50	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
Avalon	0-14	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.5-1.0	.43	.43	3	4L	86
	14-60	-38-	-36-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-46-	-44-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			

				Physic	al Soil Pro	perties– San Jua	n County, New	/ Mexico, Eastern	Part					
Map symbol	Depth	Sand	Silt	Clay	Moist	Saturated	Available	Linear	Organic	Eros	ion fa	actors	Wind	Wind
and soil name					bulk density	hydraulic conductivity	water capacity	extensibility	matter	Kw	Kf	т	erodibility group	erodibility index
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
FX—Fruitland- Persayo- Sheppard complex, hilly														
Fruitland	0-4	-69-	-24-	5- 8- 10	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.6-0.8	.28	.28	5	3	86
	4-60	-68-	-21-	5-12- 18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			
Persayo	0-18	-35-	-34-	27-31- 35	1.35-1.45	1.41-4.23	0.15-0.17	3.0-5.9	0.5-1.0	.37	.37	1	8	0
	18-20	—	-	—	_	0.00-1.41	_	-	_					
Sheppard	0-4	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15	5	2	134
	4-60	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
HA— Haplargids- Blackston- Torriorthents complex, very steep														
Haplargids	0-7	-66-	-19-	10-15- 20	1.45-1.55	14.11-42.34	0.08-0.10	0.0-2.9	0.0-0.5	.15	.28	4	4	86
	7-26	-55-	-17-	20-28- 35	1.35-1.45	4.23-14.11	0.11-0.13	0.0-2.9	0.0-0.5	.15	.28			
	26-60	-59-	-18-	20-24- 27	1.35-1.45	4.23-14.11	0.12-0.14	0.0-2.9	0.0-0.5	.20	.37			
Blackston	0-11	-42-	-38-	15-20- 25	1.45-1.55	4.23-14.11	0.11-0.14	0.0-2.9	0.5-1.0	.10	.17	3	8	0
	11-26	-42-	-38-	15-20- 25	1.35-1.45	4.23-14.11	0.07-0.10	0.0-2.9	0.0-0.5	.10	.28			
	26-60	-96-	- 2-	0- 3- 5	1.35-1.45	42.34-141.14	0.03-0.06	0.0-2.9	0.0-0.5	.10	.28			
Torriorthents	0-3	-42-	-38-	15-20- 25	1.40-1.50	4.23-14.11	0.12-0.14	0.0-2.9	0.6-0.8	.20	.37	1	6	48
	3-15	-34-	-37-	10-30- 30	1.40-1.50	1.41-42.34	0.10-0.20	0.0-2.9	0.0-0.5	.20	.32			
	15-60	_	_	_	_	0.00-1.40	_	_	_					

	Physical Soil Properties– San Juan County, New Mexico, Eastern Part													
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk	Saturated hydraulic	Available water	Linear extensibility	Organic matter	Eros	ion fa	ctors	Wind erodibility	Wind erodibility
and son name					density	conductivity	capacity	extensionity	matter	Kw	Kf	т	group	index
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
RA—Riverwash														
Riverwash, clayey	0-6	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.20	.20	5	4	86
	6-60	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.28	.32			
Riverwash, sandy	0-6	-98-	- 2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.10	.10	5	4	86
	6-60	-68-	-30-	0- 3- 5	1.65-1.75	42.34-141.14	0.04-0.06	0.0-2.9	0.0-0.1	.10	.10			
Riverwash, gravelly	0-6	-98-	- 2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.05	.10	5	4	86
	6-60	-93-	- 7-	0- 1- 1	1.65-1.75	42.34-141.14	0.02-0.03	0.0-2.9	0.0-0.1	.05	.10			
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes														
Shiprock	0-10	-83-	- 5-	10-13- 15	1.40-1.50	42.34-141.14	0.06-0.09	0.0-2.9	0.5-0.6	.20	.20	5	2	134
	10-60	-70-	-16-	10-14- 18	1.45-1.55	14.11-42.34	0.09-0.12	0.0-2.9	0.0-0.5	.28	.28			
St—Stumble loamy sand, 0 to 3 percent slopes														
Stumble	0-5	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	5-29	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
	29-49	-81-	-17-	0- 3- 5	1.45-1.55	42.34-141.14	0.04-0.06	0.0-2.9	0.0	.10	.24			
	49-81	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06	0.0-2.9	0.0	.15	.15			
Fruitland	0-8	-43-	-40-	10-18- 25	1.40-1.50	4.23-14.11	0.15-0.17	0.0-2.9	0.0-0.5	.37	.37	5	5	56
	8-60	-68-	-21-	5-12- 18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol	Depth	Sand	Silt	Clay	Moist	Saturated	Available	Linear	Organic	Eros	sion fa	actors	Wind	Wind
and soil name					bulk density	hydraulic conductivity	water capacity	extensibility	matter	Kw	Kf	т	erodibility group	erodibility index
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
SZ—Stumble- Slickspots complex, gently sloping														
Stumble	0-4	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	4-60	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
Slickspots	0-2	-32-	-31-	15-37- 45	1.45-1.55	0.00-0.42	-	-	0.5-1.0					
	2-60	-32-	-31-	15-37- 45	1.45-1.55	0.00-1.41	-	_	0.0-0.5					
Tt—Turley clay loam, wet, 0 to 2 percent slopes														
Turley variant	0-9	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32	5	4L	86
	9-60	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32			
W—Lakes, rivers, reservoirs														
Water	_	_	_	_	_	_	_	_	1_					

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United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/ United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

# **Appendix B**

**Survey Data** 



June 25, 2012

Western Refining Southwest, Inc. - Bloomfield Refinery P.O. Box 159 50 Road 4990 Bloomfield, NM 87413

5121139

ATTN: Kelly R. Robinson Environmental Engineer

RE: Monitoring Well Locations Soil Boring Locations

Dear Ms. Robinson,

I, Kurt R. Shepherd hereby state that I am a New Mexico Professional Surveyor (No. 11643) and that the license is in good standing with the State.

On March 6, 2012 I supervised the field surveys for the origin of the Horizontal and Vertical Control, derived from a NGS OPUS Solution supplied by US NGS/NOAA. The coordinate basis of the Horizontal Control is State Plane Coordinates New Mexico West Zone, (code 3003). The Vertical Ortho-metric height was computed in NAVD88 using Geoid09 datum.

The attached Exhibit "A" Monitoring Wells Data were field surveyed on March 6, 2012 and computed using the above mentioned control position. All Monitoring Well positions are inside a steel casing and located on the North side of the PVC riser. Horizontal positions are measured to the nearest 0.1-ft and vertical elevations are measured to the nearest 0.01-ft.

The attached Exhibit "B" Soil Boring Locations were field surveyed on March 6, 2012 and computed using the above mentioned control position. Elevations are at ground surface.

If you have any questions or need clarification, please contact me.

Respectfully,

SOUDER, MILLER & ASSOCIATES

Kuth. Shepherd

Kurt R. Shepherd, P.L.S. Senior Surveyor

Enclosures

KRS/sll (Revised)

# Western Refinery Soil Boring Location Surveyed on March 06, 2012 SPC NM West

# Exhibit "B"

Point Number	Northing	Easting	Elevation	Descriptor
5106	2070966.402	2683615.628	5614.922	ВК-4
5107	2071015.801	2683527.543	5612.432	BK-3
5108	2071150.441	2683367.214	5607.917	ВК-2
5109	2071217.062	2683278.259	5606.110	BK-1
5110	2071062.706	2683207.278	5606.292	ВК-8
5111	2070988.248	2683308.515	5611.983	BK-7
5112	2070912.500	2683421.432	5614.640	BK-6
5113	2070842.812	2683524.437	5617.175	BK-5
5114	2072425.083	2683081.565	5560.964	3-11
5115	2071897.657	2683739.859	5562.729	3-10
5116	2072310.152	2683744.750	5547.801	3-9
5117	2072417.960	2683735.525	5545.561	3-8 APPROX
5118	2072852.131	2683728.100	5536.475	3-7
5121	2073142.651	2683527.872	5543.408	3-6
5125	2073680.648	2683043.322	5534.518	3-5
5127	2074054.545	2683140.101	5526.477	3-26
5132	2074112.867	2683139.843	5525.539	3-27
5137	2074162.263	2683138.224	5524.698	3-28
5141	2073073.202	2682630.774	5538.805	3-21
5142	2073029.620	2682908.499	5542.550	3-23
5147	2072978.678	2682770.735	5541.845	3-22
5149	2072477.987	2682681.970	5554.045	3-24
5153	2072418.903	2682662.390	5551.741	3-12
5156	2072907.016	2682311.543	5538.456	3-19
5157	2072999.105	2682328.533	5538.291	3-20
5166	2072416.017	2682171.780	5553.305	3-13
5169	2072857.067	2682062.506	5537.287	3-18
5170	2072787.476	2681956.385	5537.936	3-14
5175	2072782.685	2681877.332	5537.478	3-15
5178	2072885.743	2681803.840	5534.936	3-17
5180	2072944.418	2681461.020	5531.205	3-16
5182	2073563.107	2681625.150	5523.124	3-25 j/
5185	2073477.156	2681915.466	5522.104	6-4 W
5187	2073807.200	2682138.079	5515.218	3-4 N
5195	2073820.002	2681031.127	5526.278	3-3
5197	2073642.845	2680626.731	5525.122	3-1



Western Refinery Monitoring Wells Surveyed on March 06, 2012 SPC NM West

# Exhibit "A"

Point Number	Northing	Easting	Elevation	Descriptor
5100	2073370.61	2684757.931	5517.800	BK-10 (MW-BCK2)
5101	2073370.88	2684757.863	5516.522	CONC
5102	2073372.58	2684757.867	5516.131	GS
5103	2070898.1	2683704.928	5620.140	BK-9 (MW-BCK1)
5104	2070898.28	2683705.031	5617.952	CONC
5105	2070899.74	2683705.705	5617.508	GS
5140	2074039.6	2683303.847	5527.96	MW-67
5139	2074039.91	2683304.31	5525.398	CONC
5138	2074041.14	2683305.488	5524.776	GS

# Legend

BK-9, BK-10 & MW67 = Top of casing

Conc = Concrete collar at monitoring well

GS = Ground surface at monitoring well

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# Appendix C

**Field Methods** 

# **Field Methods**

Pursuant to Section IV of the Order, an investigation of soils and groundwater was conducted to determine naturally occurring concentrations of constituents of concern. The field methods are described below and individual discussions are presented for the following activities:

- Drilling procedures;
- Soil screening;
- Decontamination procedures;
- Monitoring well development;
- Fluid level measurements;
- Purging of monitoring wells/groundwater sample collection;
- Sample collection and handling procedures;
- Vadose zone vapor sampling;
- Equipment calibration; and
- Management of investigation derived waste.

## Drilling Procedures

The soil borings were drilled using the hollow-stem auguring (HSA) method and ODEX, or a hand auger was used for shallow (two-foot) borings. Soil samples were collected continuously and logged by a qualified geologist in accordance with the Unified Soil Classification System (USCS) nomenclature. As shown on the boring logs, the data recorded included the lithologic interval, symbol, percent recovery, field screening results, and a sample description of the cuttings and core samples.

## Soil Screening

Samples obtained from the borings were screened in the field on 2-foot intervals for evidence of contaminants. Field screening results were recorded on the soil boring logs. Field screening results were used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds.

Visual screening included examining the soil samples for evidence of staining caused by petroleum-related compounds or other substances that may have caused staining of soils such as elemental sulfur or cyanide compounds. Headspace vapor screening was conducted and involved placing a soil sample in a plastic sealable bag allowing space for ambient air. The bag was sealed, labeled and then shaken gently to expose the soil to the air trapped in the container. The sealed bag was allowed to rest for a minimum of 5 minutes while the vapors equilibrated. Vapors present within the sample bag's headspace were then measured by

inserting the probe of a MiniRae 3000 portable volatile organic constituent (VOC) monitor in a small opening in the bag. The maximum value and the ambient air temperature were recorded on the field boring log for each sample. The screening results are presented in Table 1. Field screening results and any conditions that were considered to be capable of influencing the results of the field screening were recorded on the field logs.

# **Decontamination Procedures**

The drilling equipment (e.g., hollow-stem augers) was decontaminated between each borehole using a high pressure potable water wash. The sampling equipment coming in direct contact with the samples (e.g., hand augers and split-spoon samplers) were decontaminated using a brush, as necessary, to remove larger particulate matter followed by a rinse with potable water, wash with nonphosphate detergent, rinse with potable water, and double rinse with deionized water.

## Monitoring Well Development

Following monitoring well completion activities, the new monitoring wells (MW-BCK1 and MW-BCK2) were developed using mechanical surging. The surging motion drew filter pack fines and loosened sediment into the well casing, improving the water quality within the surrounding formation and filter pack.

The groundwater/sediment mixture discharged directly into a 55-gallon drum. A glass jar was used to capture a sample of the purge water every 15 minutes to monitor the improving clarity of the purge water. Development ceased once the purge water was relatively clear.

## Fluid Level Measurements

The depth to groundwater was measured prior to purging the wells of potentially stagnant groundwater. The measurements are presented in Table 2. A Keck KIR Interface Probe was used to measure fluid levels to 0.01 foot. The depth to the bottom of the wells was also recorded and the depth measured in MW-BCK2 was less than anticipated based on well construction information. This information is presented in Table 2.

## Purging of Monitoring Wells/Groundwater Sample Collection

Both wells were purged dry and allowed to recover prior to sample collection. The purge volumes, which would otherwise normally apply, are calculated as follows:

Volume (gallons) = water column thickness (ft) x  $3.14 ext{ x}$  radius of well casing<sup>2</sup> (ft) x 7.48 (gals/ft). The calculated purge volumes and actual volumes removed from each well are presented below. The removal volumes include water purged during well development.

Well (date)	Water Column Thickness (ft)	Calculated Purge Volume (gallons) – 3 Well Volumes	Actual Purge Volume (gallons)
MW-BCK1 (6/14/2012)	3.46	2.3	3.0
MW-BCK2 (6/14/2012)	20.79	10.2	14.0

Field measurements of groundwater stabilization parameters included pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature. These measurements are presented in Table 5. A disposable bailer was used to remove groundwater from the well during the purging procedures.

# Sample Collection and Handling Procedures

Soil samples were collected using split-spoon samplers or directly from the auger bucket for borings completed with a hand auger. The selected portion of the sample interval was placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. Three soil samples were collected for VOC analysis. An Encore® Sampler was used for collection of soil samples for low-level VOC analysis pursuant to EPA method 5035; the second sample aliquot (approximately 1 gram) was placed in a laboratory-prepared container with a methanol preservative; and the third sample aliquot was placed in an 8-ounce glass jar, which was filled to the top to minimize any head space.

Groundwater samples were collected with disposable bailers and immediately poured directly into clean laboratory supplied sample containers with the exception of samples collected for dissolved analyses. Samples specified for dissolved analyses were filtered in the field using a disposable 0.45 micron filter. A new filter and syringe enclosure were used for each sample. All samples were immediately placed into an ice chest with ice. The samples were maintained in the custody of the sampler until the chain-of-custody form was completed and the ice chest was sealed for shipment to the laboratory.

# Equipment Calibration

Soil vapor screening was conducted using a MiniRae 3000 portable VOC monitor. The instrument was calibrated at the beginning of each work day to a concentration of 100 ppm isobutylene.

The instruments used to measured groundwater stabilization parameters included a YSI 550A dissolved oxygen probe and an Ultrameter 6P made by the Myron L Company. The calibration solutions used at the beginning of each day are as follows:

- 4.0 pH solution;
- 7.0 pH solution;
- 10.0 pH solution;
- 1.413 mS/cm conductivity solution; and
- 220 for ORP.

There were no field conditions encountered during the sampling event that affected procedural or sample testing results.

## Management of Investigation Derived Waste

The decontamination water from the drilling equipment was collected on a mobile decon trailer and was subsequently placed in open top 55-gallon drums, which were sealed at the end of each work day. The decontamination water generated from sampling equipment was collected in buckets and placed in open top 55-gallon drums, which were sealed at the end of each work day. Purge water was also collected in a 55-gallon drum. The decon and purge water was disposed in the Refinery's wastewater treatment system up-stream of the API Separator. Soil cuttings were also placed into open top 55-gallon drums and were sealed when not in use. Each drum of soils was labeled and temporarily stored in a concrete curbed area pending waste characterization.

# Appendix D

**Boring Logs** 

# LOG OF BORING

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS Drilling Rig: NA Drilling Method: Hand Auger Sampling Method: Auger Bucket

 Total Depth: 2' bgl
 S

 Ground Water: Not Encountered
 F

 Elev., TOC (ft. msl): - E

 Elev., PAD (ft. msl): - E

 Elev., GL (ft. msl): 5606.110
 Site Coordinates:

 N 2071217.062
 E 2683278.259

Boring No.: BK-1 Start Date: 1/27/2012 1330 Finish Date: 1/27/2012 1345

		Sa	amp	lin	g				
Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0-								Ground Surface	0
2	0-0.5' 1.5-2'				0.0 46ºF 0.0 46ºF		100	Silt (ML) Very fine grain, loose to compact, damp, brown to light brown, no odor	2
4 6 8 10 12 14 14								Total Depth = 2' BGL	-4 -6 -8 -10 -12 -14 -14 -16
RF 12 Au	PS 50 S. Capi Istin, Texas	tal of	Texa	s Hw	y., Bld	g. 3, Su	ite 200	Sheet: <b>1 of 1</b> 512/347-75 512/347-82	588

# LOG OF BORING

RPS			LO
Client: Western Refining Southwest, Inc.	Total Depth: 2' bgl	Borir Start	
Site: Background Investigation, Bloomfield Refinery	Ground Water: Not E	Encountered	Finis
Job No.: UEC01318 - Bloomfield, NM	Elev., TOC (ft. msl):		
Geologist: Tracy Payne	Elev., PAD (ft. msl):		
Driller: RPS	Elev., GL (ft. msl): 5	607.917	
Drilling Rig: NA	Site Coordinates:		
Drilling Method: Hand Auger	N 2071150.441	<b>E</b> 2683367	.214
Sampling Method: Auger Bucket			
Comments: N 36º41.507' W 107º58.130'			
Sampling			

Boring No.: BK-2 Start Date: 1/27/2012 1400 Finish Date: 1/27/2012 1415

	Sampling								
Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0-	<del></del>		G/4oz/ 2J	,	0.0			Ground Surface	0
2			2J G/4oz/ 2J		46ºF 0.0 46ºF		100	Silt (ML) Very fine grain, loose to compact, damp, brown to light brown, no odor	2
4 6 10 12 14 14	25							Total Depth = 2' BGL	4 6 8 10 12 14
12   Au	50 S. Capi Istin, Texas	tal of s 787	Texas 46	s Hw	y., Bld	g. 3, Sui	ite 200	Sheet: 1 of 1         512/347-75           512/347-82	
·									

# LOG OF BORING

RPS	
Client: Western Refining Southwest, Inc.	Тс
Site: Background Investigation, Bloomfield Refinery	Gr
Job No.: UEC01318 - Bloomfield, NM	El
Geologist: Tracy Payne	El
Driller: RPS	El
Drilling Rig: NA	Si
Drilling Method: Hand Auger	
Sampling Method: Auger Bucket	
Comments: N 36º41.486' W 107º58.097'	

 Total Depth: 2' bgl
 S

 Ground Water: Not Encountered
 F

 Elev., TOC (ft. msl): - E

 Elev., PAD (ft. msl): 5612.432
 Site Coordinates:

 N 2071015.801
 E 2683527.543

Boring No.: BK-3 Start Date: 1/27/2012 1420 Finish Date: 1/27/2012 1435

		Sa	mp	lin	g				
Depth (ft.)	Sample Depth	Time Sample Type/ Containe/No. Saturation USCS Class Recovery (%) Recovery (%)		Sample Description	Depth (ft.)				
0_				,	0.0			Ground Surface	0
			G/4oz/ 2J G/4oz/ 2J		0.0 46°F 0.0 46°F		100	<b>Silt (ML)</b> Very fine grain, loose to compact, damp, brown to light brown, no odor	2
0 2 4 6 10 12 14 14								Total Depth = 2' BGL	
RF 12 Au	PS 50 S. Capi stin, Texas	tal of s 787	Texas 46	s Hw	y., Bld	g. 3, Sui	ite 200	Sheet:         1 of 1         512/347-758           512/347-82         512/347-82	

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS **Drilling Rig: NA** Drilling Method: Hand Auger Sampling Method: Auger Bucket

Total Depth: 2' bgl Ground Water: Not Encountered Elev., TOC (ft. msl): --Elev., PAD (ft. msl): --Elev., GL (ft. msl): 5614.922 Site Coordinates: N 2070966.402 E 2683615.628

Boring No.: BK-4 Start Date: 1/27/2012 1440 Finish Date: 1/27/2012 1450

	0	amp	, <u>(</u>	y					
Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		
			,				Ground Surface		+
<u>0</u> -0.5'	1440	2J		46ºF		100			F
	1115	G/4oz/		0.0		100	Silt (ML)	/	
<u></u> 1.5-2	1443	2J		46ºF					f
									-
									-
									-
									-
									Ŀ
									-
									-
	<u></u> 0-0.5'		0-0.5'       1440       G/40Z         1.5-2'       1445       G/40Z         2.J       J       J				Image: Constraint of the second se	Image: Second Surface       Ground Surface         Image: Second Surface       Clayey Silt (ML)         Very fine grain, compact, damp, brown, no odor         Silt (ML)         Very fine grain, loose, damp, brown to light brown, no odor         Silt (ML)         Very fine grain, loose, damp, brown to light brown, no odor         Total Depth = 2' BGL	Image: Do.5       1440       G/402       0.0       Ground Surface         Image: Do.5       1445       G/402       0.0       Clayey Silt (ML)         Image: Do.5       1445       G/402       0.0       Image: Do.5         Image: Do.5       1445       G/402       0.0       Image: Do.5       Image: Do.5         Image: Do.5       1445       G/402       0.0       Image: Do.5       Image: Do.5       Image: Do.5         Image: Do.5       1445       G/402       0.0       Image: Do.5       Image: Do.5 </td

R	P	S

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS **Drilling Rig: NA** Drilling Method: Hand Auger Sampling Method: Auger Bucket

Total Depth: 2' bgl Ground Water: Not Encountered Elev., TOC (ft. msl): --Elev., PAD (ft. msl): --Elev., GL (ft. msl): 5617.175 Site Coordinates: N 2070842.812 E 2683524.437

Boring No.: BK-5 Start Date: 1/27/2012 1455 Finish Date: 1/27/2012 1510

Co	mments:	N 36	6º41.4	56' N	N 107 <sup>9</sup>	<sup>2</sup> 58.099'				
		Sa	amp	olin	g					
Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		Depth (ft.)
0_	0-0.5	1500	G/4oz/	(	0.0			Ground Surface Silt (ML)		_0
			G/4oz/		46ºF 0.0		100	Very fine grain, loose, damp, brown to light brown, no odor		2
2 4 6 8 10			2J		46ºF			Total Depth = 2' BGL	1	-2 -4 -6 -10 -12 -12 -14
12										I I
16 	PS 50 S. Capi Istin, Texas	ital of s 787	Texa: 746	s Hw	y., Bld	g. 3, Su	ite 200		512/347-7588 512/347-8243 fa	ax

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS **Drilling Rig: NA** Drilling Method: Hand Auger Sampling Method: Auger Bucket

Total Depth: 2' bgl Ground Water: Not Encountered Elev., TOC (ft. msl): --Elev., PAD (ft. msl): --Elev., GL (ft. msl): 5614.640 Site Coordinates: N 2070912.500 E 2683421.432

Boring No.: BK-6 Start Date: 1/27/2012 1515 Finish Date: 1/27/2012 1525

Co	mments:	N 36	<sup>⁰</sup> 41.4	66' N	N 107	′º58.120	'			
		Sa	amp	lin	g					
Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		Depth (ft.)
0_	0-0.5'	4545		,	0.0			Ground Surface		_0
	<u></u>				46ºF 0.0 46ºF		100	Silt (ML) Very fine grain, loose, damp, brown to light brown, no odo		
2 4 6 8 10 12 14 14								Total Depth = 2' BGL		4 6 10 12 12
RF 12 Au	PS 50 S. Capi Istin, Texas	ital of s 787	Texa 46	s Hw	y., Bld	g. 3, Sui	ite 200	Sheet: 1 of 1	512/347-7588 512/347-8243 f	ax

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS **Drilling Rig: NA** Drilling Method: Hand Auger Sampling Method: Auger Bucket

Total Depth: 2' bgl Ground Water: Not Encountered Elev., TOC (ft. msl): --Elev., PAD (ft. msl): --Elev., GL (ft. msl): 5611.983 Site Coordinates: N 2070988.248 **E** 2683308.515

Boring No.: BK-7 Start Date: 1/27/2012 1525 Finish Date: 1/27/2012 1540

Co	mments:	N 36	6º41.4	80' \	N 107	<sup>⁰</sup> 58.143	•		
		Sa	amp	lin	g				
Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0_	0-0.5	1500	G/4oz/ 4J	,	0.0			Ground Surface	0
2	&Dup				46ºF 0.0 46ºF		100	<b>Silt (ML)</b> Very fine grain, loose, damp, brown to light brown, no odor	2
4 6 8 10 12 14 14								Total Depth = 2' BGL	-4 -4 -6 -8 -10 -12 -14 -14 -16
RF 12 Au	PS 50 S. Capi stin, Texas	ital of s 787	Texa: 46	s Hw	y., Bld	g. 3, Sui	te 200	Sheet: 1 of 1         512/347-75           512/347-82	

R	P	S

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: RPS **Drilling Rig: NA** Drilling Method: Hand Auger Sampling Method: Auger Bucket

Total Depth: 2' bgl Ground Water: Not Encountered Elev., TOC (ft. msl): --Elev., PAD (ft. msl): --Elev., GL (ft. msl): 5606.292 Site Coordinates: N 2071062.706 E 2683207.278

Boring No.: BK-8 Start Date: 1/27/2012 1550 Finish Date: 1/27/2012 1600

		Sa	amp	lin	g				
	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	
_						-		Ground Surface	-
			G/4oz/ 2J G/4oz/ 2J		0.0 46ºF 0.0		100	Silt (ML) Very fine grain, loose, damp, brown, becomes calcareous at 0.5' bgl and color becomes grayish brown	
	<u></u>		2J		46ºF			Total Depth = 2' BGL	=
									-
									-
									-
									-
									-
1	S								

### Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Not Encountered Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl Elev., TOC (ft. msl): 5517.800 Elev., PAD (ft. msl): 5516.522 Elev., GL (ft. msl): 5516.131 Site Coordinates: N 2073370.61 E 2684757.931

WELL CONSTRUCTION

Well No.: BK-10 (MW-BCK2) Start Date: 2/7/2012 1740 Finish Date: 2/13/2012 1400

		S	Sam	plin	ng								
Depth (ft.)	Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		Comple	etion Res	sults	
-2   0   2   4   1   1   1   1   1   1   1   1   1   1								Ground Surface Silt (ML)	L ctive Cover	o.			
2					0.0 33⁰F		100	Very fine grain, loose, dry, brown, no odor	Aluminum Protective Cover	)x'4x'4 - ba <sup>c</sup>			3orehole
4					0.0 33⁰F		90	Silt (ML) Similar to above	Alum	Steel Reinforced Concrete Pad - 4'x4'x6'		2" Sch. 40 PVC w/Threaded Joints <sup>–</sup>	8" Diameter Borehole
6	5- 6'		G/4oz/ 4J		0.0 33⁰F		80	Silt (ML) Similar to above, gravel at base		el Reinforceo		VC w/Three	8
	&Dup	)			0.0 33⁰F		10	Sandy Gravel (GW) Fine gravel sand in 1/2" to >3" size gravel, damp, gray, no odor		Stee		2" Sch. 40 F	
8					0.0 33⁰F		30	Sandy Gravel (GW) Similar to above		nite Grout <sup>–</sup>			
								No Recovery		Cement/Bentonite Grout			
12					0.0 33⁰F		95	Silt/Sand/Clay (CL) Very fine grain, compact to dense, dry/crumbly, light gray/tan		ŏ			
14								Silty Clay (CL) Similar to above, gray, no odor, very dense	1				
RPS 404 Aus	S Camp tin, Tex	Craft (as 78	Road 3746					Sheet: 1 of 4	·		512/347- 512/347-		x

### Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Not Encountered Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon Comments: N 36º41.873' W 107º57.845'

### Total Depth: 60' bgl Elev., TOC (ft. msl): 5517.800 Elev., PAD (ft. msl): 5516.522 Elev., GL (ft. msl): 5516.131 Site Coordinates: N 2073370.61 E 2684757.931

Well No.: BK-10 (MW-BCK2) Start Date: 2/7/2012 1740

WELL CONSTRUCTION

Finish Date: 2/13/2012 1400

		S	Sam	plin	g						
nepru (II.)	Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Completion Results		
					0.0 33ºF		80				
6					0.0 33ºF		80	Silty Clay (CL) Similar to above, gray, very dense, calcite crystals present	oints _	→	nite Grout
3					0.0 33ºF		60	<b>Clayey Silt (ML)</b> Very low plasticity, firm, dry, grayish brown, no odor	Threaded Jc		Cement/Rentonite Grout
					0.0 33ºF		80	Clayey Silt (ML) Similar to above, dry, firm	2" Sch. 40 PVC w/Threaded Joints		Ċ
TILLILL					0.0 35ºF		80	Silty CLay (CL) Low plasticity, very stiff/compact, dry, gray, no odor, calcite crystals	2" Sch		
LIIIIIIII					0.0 35ºF		90	Silty Clay (CL) Similar to above			
111111111					0.0 35ºF		70	Silty Sand/Sandstone (SP/SS) Very fine grain, compact to cemented, damp, greenish gray, no odor			
					0.0 39ºF		50	Silty Sand/Sandstone (SP/SS) Similar to above, no odor			
11111111					0.0 41ºF		50	Silty Sand/Sandstone (SP/SS) Similar to above, cemented, no odor, gray			
PS	S Camp							Sheet: 2 of 4		512/347-758	88

### Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Not Encountered Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl Elev., TOC (ft. msl): 5517.800 Elev., PAD (ft. msl): 5516.522 Elev., GL (ft. msl): 5516.131 Site Coordinates: N 2073370.61 E 2684757.931

Well No.: BK-10 (MW-BCK2) Start Date: 2/7/2012 1740

WELL CONSTRUCTION

Finish Date: 2/13/2012 1400

	1	S	Samj	plir	ng							
Ueptn (It.)	Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		Com	oletion Re	sults
3					0.0 41ºF		80	Clayey Silt (ML) Very low plasticity, firm, slightly cemented, dry, gray, no odor				
5					0.0 43ºF		80	Clayey Silt (ML) Similar to above	35'	ints _		ellets Cement/Rentonite Grout
7					0.0 41ºF		50	Clayey Silt (ML) Similar to above	37'	2" Sch. 40 PVC w/Threaded Joints w/Threaded Joints		Bentonite Pellets
					0.0 43ºF		50	Clayey Silt (ML) Similar to above, trace sand	401	2" Sch. 40 PVC w/T Screen w/Threaded Joints		Bentor
	40- 42'	1043	G/4oz/		0.0 43ºF		50	<b>Clayey Silt (ML)</b> Similar to above, trace sand, compact to cemented	40'	Screen		
					0.0 47ºF 0.0		50	<b>Clayey Silt/Sand (ML/SC)</b> Low plasticity, firm, damp, gray, no odor, core saturated outside, poorly cemented		Slotted 0.01"		
					0.0 47ºF 0.0 47ºF		25	Clayey Silt/Sand (ML/SC) Similar to above Silty Sand (SM) Fine grain, compact to poorly cemented,		Sch. 40 PVC (		
7					0.0 47ºF		75	damp, greenish gray, no odor Silty Sand (SM) Similar to above		2 "S		
9					0.0		50	Silty Sand (SM) Similar to above				
	Camp n, Tex		Road					Sheet: 3 of 4			512/347 512/347	-7588 -8243 fax

# WELL CONSTRUCTION

Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Not Encountered Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon

Total Depth: 60' bgl Elev., TOC (ft. msl): 5517.800 Elev., PAD (ft. msl): 5516.522 Elev., GL (ft. msl): 5516.131 Site Coordinates: N 2073370.61 E 2684757.931

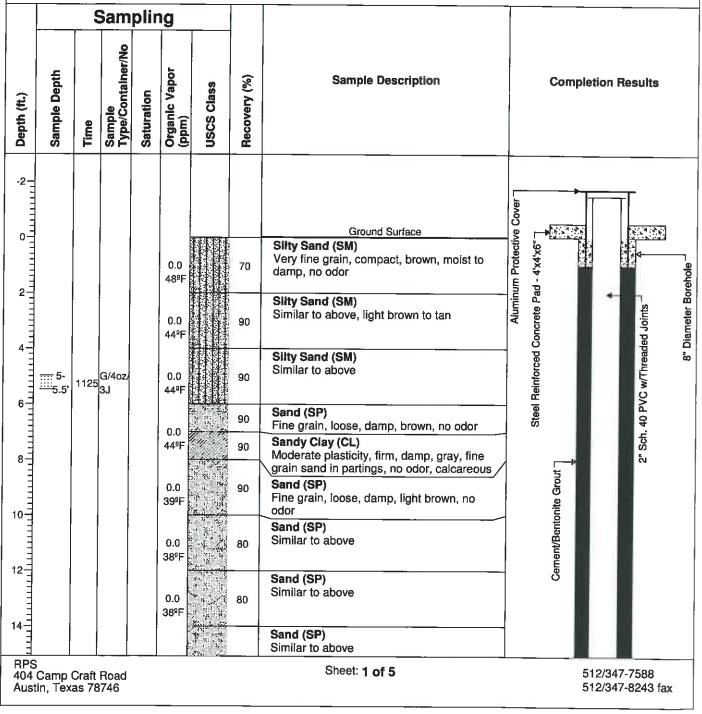
Well No.: BK-10 (MW-BCK2) Start Date: 2/7/2012 1740 Finish Date: 2/13/2012 1400

		S	Sam	plin	g					
Ueptn (π.)	Sample Depth	Sample Depth Time Sample Type/Container/No Saturation Organic Vapor (ppm)		USCS Class	Recovery (%)	Sample Description	Completion Results			
-					47ºF					
51					0.0 47ºF		50	Silty Sand (SM) Similar to above, fine grain, compact to poorly cemented, damp, greenish gray, no odor		k k k k k k k k k k k k k k k k k k k
j3					0.0 49ºF		50	Silty Sand (SM) Similar to above		10/20 Sieve Sand Filter Pack
5					0.0 49ºF		60	Silty Sand (SM) Similar to above, trace clayey sand	oints	
7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1					0.0 49ºF		60	Silty Sand (SM) Similar to above, trace clayey sand	/Threaded J	
9					0.0 49ºF		60	Silty Sand (SM) Similar to above	ල 40 PVC Slotted 0.01" Screen w/Threaded Joints <sup>–</sup>	
1								Total Depth = 60' BGL	C Slotted 0.0	8" Well Sump
3									2" Sch. 40 PV	o S
5									ŭ	
ا PS،								Sheet: 4 of 4		512/347-7588



Client: Western Refining Southwest, Inc.Total Depth: 79' bglStart Date: 1/24Site: Background Investigation, Bloomfield RefineryGround Water: Saturated @ 73.5' bglFinish Date: 2/Job No.: UEC01318 - Bloomfield, NMElev., TOC (ft. msl): 5620.140Finish Date: 2/Geologist: Tracy PayneElev., PAD (ft. msl): 5617.952Finish Date: 2/Driller: Enviro-Drill, Inc.Elev., GL (ft. msl): 5617.508Site Coordinates:Drilling Rig: CME 75Site Coordinates:NDrilling Method: Hollow Stem AugersN 2070898.1E 2683704.928Sampling Method: Split SpoonComments:Site Split S

Well No.: BK-9 (MW-BCK1) Start Date: 1/24/2012 1100 Finish Date: 2/1/2012 1425





Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Saturated @ 73.5' bgl Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon Comments:

Total Depth: 79' bgl Elev., TOC (ft. msl): 5620.140 Elev., PAD (ft. msl): 5617.952 Elev., GL (ft. msl): 5617.508 Site Coordinates: N 2070898.1 E 2683704.928

Well No.: BK-9 (MW-BCK1) Start Date: 1/24/2012 1100 Finish Date: 2/1/2012 1425

		S	Sam	plir	ng					
Depth (ft.)	Sample Depth	Sample Depth Time		Saturation	Organic Vapor (ppm)	Organic Vapor (ppm) USCS Class		Sample Description	Com	pletion Results
10					0.0 38ºF		90			
16					0.0 41⁰F		90	Sand (SP) Fine grain, loose, damp, light brown, no odor	kints –	nite Grout
18					0 <b>.0</b> 41≌F		80	Sand (SP) Similar to above	Threaded Jo	Cement/Bentonite Grout
20					0.0 41⁰F		90	Sand (SP) Similar to above	2" Sch. 40 PVC w/Threaded Joints	ŏ
22					0.0 45⁰F		90	Sand (SP) Similar to above	2" Sci	
24		:			0.0 45⁰F		90	Sand (SP) Similar to above		
					0. <b>0</b> 50ºF		90	Sand (SP) Similar to above		
28					0. <b>0</b> 50ºF		90	Silty Clay (CL) Low plasticity, firm, damp, brown, trace fine grain sand Silty Clay/Clayey Silt (CL)		
30					0.0 50ºF		90	Low to moderate plasticity, firm, damp, brown, trace fine grain sand Clayey Silt (ML) Low plasticity, firm to soft, brown, clay lense at base		
RPS 404	Camp ( in, Tex	Craft as 78	Road 746	1				Sheet: 2 of 5		512/347-7588 512/347-8243 fax



Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers	Total Depth: 79' bgl Ground Water: Saturated @ 73.5' bgl Elev., TOC (ft. msl): 5620.140 Elev., PAD (ft. msl): 5617.952 Elev., GL (ft. msl): 5617.508 Site Coordinates: N 2070898.1 E 2683704.928	Well No.: BK-9 (MW-BCK1) Start Date: 1/24/2012 1100 Finish Date: 2/1/2012 1425
Sampling Method: Split Spoon Comments:		2 12 2

		Ş	Sam	plir	ng						
Depth (ft.)	Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Com	pletion R	esults
33					0.0 53⁰F		90	Clayey Silt/Silt (ML) Similar to above, clay content decreases with depth, light brown			out
35					0.0 53ºF		70	Silty Sand (SM) Very fine grain, loose, brown, damp			Cement/Bentonite Grout
37					0.0 53ºF		90	Sand (SP) Very fine to medium grained, subrounded, loose to compact, brown to gray, no oodor, damp			Cement
39					0.0 53⁰F		80	Silty Sand (SM) Very fine grain, loose, brown, damp, no odor	oints _	-	
41					0.0 54ºF		90	Silty Sand (SM) Similar to above	2* Sch. 40 PVC w/Threaded Joints		
43					0.0 51⁰F		90	Silty Sand (SM) Similar to above	ch. 40 PVC v		
45					0.0 46º₣		90	Silty Sand (SM) Similar to above	2ª S		
47					0.0 46⁰F		90	Silty Sand (SM) Similar to above			
49-					0.0		90	Silty Sand (SM) Similar to above			
RPS 404 Aust	Camp ( in, Tex	Craft as 78	Road 746					Sheet: 3 of 5		512/347 512/347	-7588 -8243 fax



Well No.: BK-9 (MW-BCK1) Client: Western Refining Southwest, Inc. Total Depth: 79' bgl Start Date: 1/24/2012 1100 Site: Background Investigation, Bloomfield Refinery Ground Water: Saturated @ 73.5' bgl Finish Date: 2/1/2012 1425 Job No.: UEC01318 - Bloomfield, NM Elev., TOC (ft. msl): 5620.140 Geologist: Tracy Payne Elev., PAD (ft. msl): 5617.952 Driller: Enviro-Drill, Inc. Elev., GL (ft. msl); 5617.508 Drilling Rig: CME 75 Site Coordinates: Drilling Method: Hollow Stem Augers N 2070898.1 E 2683704.928 Sampling Method: Split Spoon Comments: - -----0 

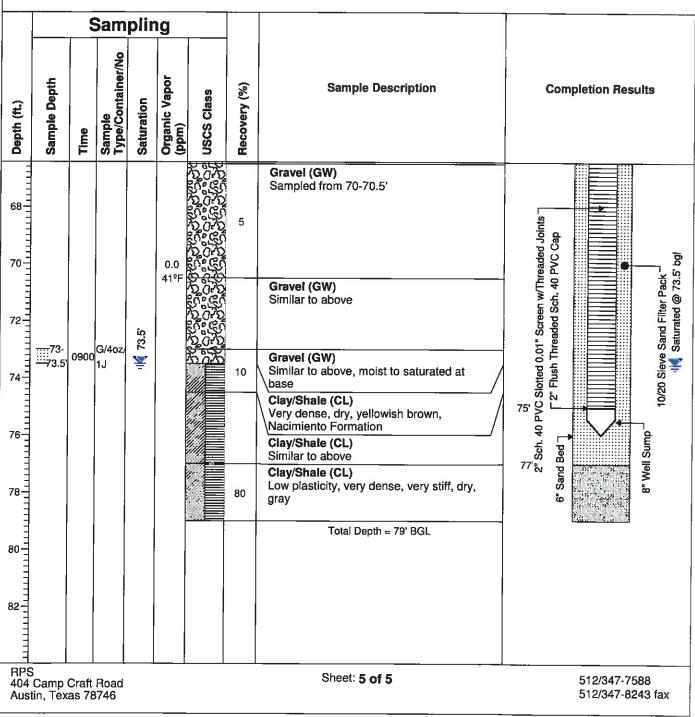
		5	Sam	plir	ng								
Depth (ft.)	Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description		Con	pletion Re	sults	
					44ºF							-	
51					0.0 43ºF		70	Silty Sand (SM) Very fine grain, loose, brown, damp, no odor, trace fine to medium grain subrounded sand		oints 7			
53-					0.0 43⁰F		70	Sifty Sand (SM) Similar to above	53'	2" Sch. 40 PVC w/Threaded Joints I Joints		Bentonite Pellets	
55	54- 56'		G/4oz/ 3J		0.0 44⁰F		95	Clay (CH) High plasticity, stiff, damp, dark brown		th. 40 PVC w ts		Bent	
57					0. <b>0</b> 44 <b>⁰F</b>		90	Clay (CH) Similar to above	58'	2" Sc Ireaded Join			
59-					0. <b>0</b> 44 <b>ºF</b> 0. <b>0</b>	10 ( 2010) 10 010	70 10	Clay/Gravel (CH/GW) Refusal with split spoon, gravel chips in spoon	50	'een w/T			ter Pack
					44ºF		10	Gravel (GW) Gravel chips in spoon	60'	" Sa			E D
61					0. <b>0</b> 42⁰F	5250 5250 52670 52670	10	Gravel (GW) Split spoon from 62-62.5' bgl		2" Sch. 40 PVC Slotted 0.01" Screen w/Threaded Joints			10/20 Sieve Sand Filter Pack
63					0. <b>0</b> 42ºF		10	Grave! (GW) Split spoon from 64-64.5' bgl		" Sch. 40 PV			- -
65					0.0 42ºF	5075 508 5075 5075	10	Gravel (GW) Split spoon from 66.0-66.5' bgl		ة» 			
RPS 404 Aust	Camp in, Tex	Craft as 78	Road 746					Sheet: 4 of 5		_	512/347-7 512/347-8		x



Client: Western Refining Southwest, Inc. Site: Background Investigation, Bloomfield Refinery Ground Water: Saturated @ 73.5' bgl Job No.: UEC01318 - Bloomfield, NM Geologist: Tracy Payne Driller: Enviro-Drill, Inc. Drilling Rig: CME 75 Drilling Method: Hollow Stem Augers Sampling Method: Split Spoon Comments:

Total Depth: 79' bgl Elev., TOC (ft. msl): 5620.140 Elev., PAD (ft. msl): 5617.952 Elev., GL (ft. msl): 5617.508 Site Coordinates: N 2070898.1 E 2683704.928

Well No.: BK-9 (MW-BCK1) Start Date: 1/24/2012 1100 Finish Date: 2/1/2012 1425



# Appendix E

**Analytical Data Reports** 



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

April 13, 2012

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: RCRA Background Investigation

OrderNo.: 1201809

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 3 sample(s) on 1/27/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 24, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <u>www.hallenvironmental.com</u> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

andy

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Analytical Report Lab Order 1201809 Date Reported: 4/13/2012

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

RCRA Background Investigation

Project:

Client Sample ID: BK-9 (5-5.5') Collection Date: 1/24/2012 11:25:00 AM Received Date: 1/27/2012 10:00:00 AM

Lab ID: 1201809-001	Matrix:	SOIL		Received D	ate: 1/27/20	012 10:00:00 AM
Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG	<b>GE ORGANICS</b>					Analyst: JMP
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	1/29/2012 10:34:45 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	1/29/2012 10:34:45 PM
Surr: DNOP	85.5	77.4-131		%REC	1	1/29/2012 10:34:45 PM
EPA METHOD 8015B: GASOLINE RA	ANGE					Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	1/30/2012 2:23:47 PM
Surr: BFB	96.4	69.7-121		%REC	1	1/30/2012 2:23:47 PM
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	3.7	0.30		mg/Kg	1	2/1/2012 6:28:23 AM
Chloride	260	30		mg/Kg	20	2/1/2012 7:20:37 AM
Sulfate	330	30		mg/Kg	20	2/1/2012 7:20:37 AM
EPA METHOD 7471: MERCURY						Analyst: <b>JLF</b>
Mercury	0.0063	0.033	J	mg/Kg	1	1/30/2012 3:22:38 PM
EPA METHOD 6010B: SOIL METALS	3					Analyst: ELS
Aluminum	6,600	600		mg/Kg	200	2/8/2012 6:45:33 AM
Antimony	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Arsenic	1.5	2.5	J	mg/Kg	1	2/7/2012 9:24:54 AM
Barium	250	1.0		mg/Kg	10	2/8/2012 10:20:06 AM
Beryllium	0.24	0.15		mg/Kg	1	2/7/2012 9:24:54 AM
Boron	4.1	2.0		mg/Kg	1	2/7/2012 9:24:54 AM
Cadmium	ND	0.10		mg/Kg	1	2/7/2012 9:24:54 AM
Chromium	3.5	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Cobalt	2.1	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Copper	2.3	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Iron	6,500	200		mg/Kg	200	2/8/2012 6:45:33 AM
Lead	1.7	0.25		mg/Kg	1	2/7/2012 9:24:54 AM
Manganese	160	1.0		mg/Kg	10	2/8/2012 10:20:06 AM
Molybdenum	0.42	0.40		mg/Kg	1	2/7/2012 9:24:54 AM
Nickel	3.0	0.50		mg/Kg	1	2/7/2012 9:24:54 AM
Selenium	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Silver	ND	0.25		mg/Kg	1	2/7/2012 9:24:54 AM
Thallium	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Uranium	ND	5.0		mg/Kg	1	2/7/2012 9:24:54 AM
Vanadium	11	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Zinc	12	2.5		mg/Kg	1	2/7/2012 9:24:54 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	
	S	Spike Recovery outside accepted recovery limits		Page 1 of 10

Analytical Report Lab Order 1201809 Date Reported: 4/13/2012

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-9 (54-56') Collection Date: 1/24/2012 3:00:00 PM **Project: RCRA** Background Investigation Lab ID: 1201809-002 Matrix: SOIL Received Date: 1/27/2012 10:00:00 AM Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride 3.9 0.30 mg/Kg 1 2/1/2012 7:38:02 AM Chloride 2.5 1.5 mg/Kg 1 2/1/2012 7:38:02 AM Sulfate mg/Kg 250 30 20 2/1/2012 7:55:27 AM **EPA METHOD 7471: MERCURY** Analyst: JLF 0.0082 0.033 mg/Kg 1 1/30/2012 3:27:58 PM Mercury J **EPA METHOD 6010B: SOIL METALS** Analyst: ELS 36,000 3,000 1000 2/10/2012 6:38:26 AM Aluminum mg/Kg Antimony ND 5.0 mg/Kg 2 2/8/2012 6:47:33 AM Arsenic 2.7 5.0 J mg/Kg 2 2/8/2012 6:47:33 AM mg/Kg 2 Barium 52 0.20 2/8/2012 6:47:33 AM Beryllium 1.2 0.30 mg/Kg 2 2/8/2012 6:47:33 AM 2 2/8/2012 6:47:33 AM Boron 3.8 4.0 J mg/Kg ND 2 Cadmium 0.20 mg/Kg 2/8/2012 6:47:33 AM mg/Kg Chromium 13 0.60 2 2/8/2012 6:47:33 AM Cobalt 7.4 0.60 mg/Kg 2 2/8/2012 6:47:33 AM Copper 12 0.60 mg/Kg 2 2/8/2012 6:47:33 AM Iron 31,000 1,000 mg/Kg 1000 3/18/2012 12:31:30 PM

Lead	3.2	0.50	mg/Kg	2	2/8/2012 6:47:33 AM
Manganese	350	1.0	mg/Kg	10	3/16/2012 8:40:02 AM
Molybdenum	0.96	0.80	mg/Kg	2	2/8/2012 6:47:33 AM
Nickel	8.5	1.0	mg/Kg	2	2/8/2012 6:47:33 AM
Selenium	ND	5.0	mg/Kg	2	2/8/2012 6:47:33 AM
Silver	ND	0.50	mg/Kg	2	2/8/2012 6:47:33 AM
Thallium	ND	5.0	mg/Kg	2	2/8/2012 6:47:33 AM
Uranium	ND	25	mg/Kg	5	2/10/2012 6:36:19 AM
Vanadium	33	5.0	mg/Kg	2	2/8/2012 6:47:33 AM
Zinc	46	5.0	mg/Kg	2	2/8/2012 6:47:33 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank		
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded		
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit		
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	<b>D</b>	
	S	Spike Recovery outside accepted recovery limits		Page 2 o	t 10	

Analytical Report Lab Order 1201809 Date Reported: 4/13/2012

1/30/2012 4:24:33 PM

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: MeOH Blank **Project:** RCRA Background Investigation **Collection Date:** Lab ID: 1201809-003 Matrix: MEOH BLAN Received Date: 1/27/2012 10:00:00 AM Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 8015B: GASOLINE RANGE** Analyst: RAA Gasoline Range Organics (GRO) ND 5.0 1 1/30/2012 4:24:33 PM mg/Kg

69.7-121

%REC

1

82.5

Qualifiers:	*/X

Surr: BFB

- \*/X Value exceeds Maximum Contaminant Level.E Value above quantitation range
- J Analyte detected below quantitation limits
- 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
- RL Reporting Detection Limit

#### CASE NARRATIVE

#### February 22, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 <u>www.anateklabs.com</u> FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1201809 Anatek Batch: 120131031

**Project Summary:** Two (2) soil samples were received on 1/31/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 1.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1201809-001C BK-9 (5-5.5')	120131031-001	EPA 335.4
1201809-002B BK-9 (54-56')	120131031-002	EPA 335.4

#### **QA/QC** Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

#### 1. Holding Time Requirements

No problems encountered.

#### 2. GC/MS Tune Requirements

N/A

#### 3. Calibration Requirements

No problems encountered.

#### 4. Surrogate Recovery Requirements

N/A.

#### 5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

#### 6. Method Blank Requirements

No problems encountered.

#### 7. Internal Standard(s) Response Requirements

N/A

#### 8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

John. Catt

Approved by:

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120131031
Address:	4901 HAWKINS NE SUITE D	Project Name:	1201809
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120131031-001 1201809-001C / BK-9 (5-5.5) Soil	,	Sampling Date Sampling Time Sample Locatio	1	/24/2012 I 1:25 AM	Date/Time Re	ceived 1/3	31/2012	12:00 PM
Parameter		Result	Units	PQL	Analysis Dat	te Analyst	Method	i	Qualifier
Cyanide		ND	mg/Kg	0.3	2/7/2012	CRW	EPA 335	.4	
%moisture		3.2	Percent		2/8/2012	CRW	%moistu	re	
Sample Number Client Sample ID Matrix Comments	120131031-002 1201809-002B / BK-9 (54-56) Soil	)	Sampling Date Sampling Time Sample Locatio	3	/24/2012 I :00 PM	Date/Time Re	ceived 1/3	31/2012	12:00 PM
Parameter		Result	Units	PQL	Analysis Dat	te Analyst	Method	1	Qualifier
Cyanide		ND	mg/Kg	0.3	2/7/2012	CRW	EPA 335	.4	
%moisture		15.7	Percent		2/8/2012	CRW	%moistu	re	

olu. Catt John Coddingtor, Lab Manager

MCL EPA's Maximum Contaminant Level

ND Not Detected

Authorized Signature

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cent2632; ID:WA00169; WA:C685; MT:Cent0095

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Address:	4901 HAWKINS NE SUITE D	Project Name:	1201809
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### **Analytical Results Report**

**Quality Control Data** 

Lab Control Sample									
Parameter	LCS Result	Units	LCS	Spike %l	Rec A	R %Rec	Prep	Date	Analysis Date
Cyanide	0.470	mg/kg	J 0	.5 94	1.0	30-120	2/7/	2012	2/7/2012
Matrix Spike									
Sample Number Parameter		Sample Result	MS Result	Units	MS	e %Rec	AR %Rec	Prep Date	n Analysia Dat
120131031-001 Cyanide		ND	14.2	mg/kg	<b>Spik</b> 12.9	-	60-140	-	•
Matrix Spike Duplicate									
Parameter	MSD Result	Units	MSD Spike	%Rec	%RP	AR D %RPI		p Date	Analysis Date
Cyanide	13.9	mg/kg	12.9	107.8	2.1	0-25		7/2012	2/7/2012
Method Blank									
Parameter		Re	sult	Units		PQL	Р	rep Date	Analysis Date
Cyanide		N	D	mg/Kg	1	0.3		2/7/2012	2/7/2012

AR Acceptable Range

ND Not Detected

PQL Practical Quantitation Limit

RPD Relative Percentage Difference

#### Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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### Login Report

Customer	ustomer Name: HALL ENVIRONMENTAL ANALYSIS LAB						Order II	D: 120131031		
		4901 H	IAWK	NS NE SUIT	ΓE D		Order Dat	e: 1/31/2012		
		ALBUC	QUER	QUE	N	A 87109				
Contact	Name:	ANDY	FREE	MAN		Pr	oject Name: 1201	809		
Con	nment:									
001	innone.									
Sample #:	1201310	31-001	Custo	mer Sample #	: 120	1809-001C / BK-9 (5-5.5)				
Recv'd:		Col	lector:			Date Collected:	1/24/2012			
Quantity:	1	Mat	trix:	Soil		Date Received:	1/31/2012 12:00:00 P			
Comment:										
Test					Lab	Method	Due Date	Priority		
%Moisture		~ 4			M	%moisture	2/10/2012	Normal (6-10 Days)		
	IOTALE	A			М	EPA 335.4	2/10/2012	Normal (6-10 Days)		
Sample #:	Sample #: 120131031-002 Customer Sample #: 1201809-002B / BK-9 (54-56)									
Recv'd:	✓	Col	lector:			Date Collected:	1/24/2012			
Quantity:	1	Mat	trix:	Soil		Date Received:	1/31/2012 12:00:00 P			
Comment:										
Test					Lab	Method	Due Date	Priority		
%Moisture					М	%moisture	2/10/2012	Normal (6-10 Days)		
CYANIDE 1	FOTAL EF	PA			M .	EPA 335.4	2/10/2012	Normal (6-10 Days)		
				SAMPLE	CON	DITION RECORD	I			
Sam	ples recei	ved in a d	cooler?				Yes			
Sam	ples recei	ved intac	t?				Yes			
What	t is the te	nperature	e inside	the cooler?			1.0			
Sam	ples recei	ved with	a COC?				Yes			
Sam	ples recei	ved withi	n holdin	g time?			Yes			
Are a	all sample	bottles p	roperly	preserved?			Yes			
Are \	/OC sam	ples free	of heads	space?			N/A			
Is the	ere a trip l	plank to a	ccompa	ny VOC sample	es?		N/A			
Labe	ls and ch	ain agree	?				Yes			

	Lemp or sumpres	3rd BD	2nd BD	Next BD	RUSH	Standard 🔲	TAT:	
JSE		Date: Time:	U	Received By:	Time	Date	Relinquished By:	Reli
FAX   EMAIL    ONLINE			-	Received By:	Time: J	Date:	nqhighed By:	Refinq
ITAL DESIRED:	BY BT	2 { い い SPE	DATE & TIME: 1-34/2	Received By: DATE	Time: 2;26 PM	Date: 1/27/2012	protected by UCA	S
	SHIPPED VIA: F	3	NUMBER OF CONTAINERS;	NUM				
nallenvironmental com. Please return all coolers and			PRESERVATIVES:	clude the j	KAGE. Please in	VEL 4 QA/QC PAC	PLEASE PROVIDE LEVEL 4 QA/QC PACKAGE. Please include the blue ice. Thank you.	5.10
		KS PRESENT:	ICE / ICE-PAC			)MMENTS;	SPECIAL INSTRUCTIONS / COMMENTS:	alei:
	TEMP: <u>(. 0</u> °c	LABS RECE	RECE NO HE					
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	1 TOTAL CYANIDE	1/24/2012 3:00:00 PM		40ZGU	ן   ו	K-9 (54-56')	2 1201809-002B BK-9 (54-56')	
	1 TOTAL CYANIDE	1/24/2012 11:25:00 AM	2	40ZGU		BK-9 (5-5.5')	1 '1201809-001C E	
ANALYTICAL COMMENTS			BOTTLE TYPE MATRIX	BO	LE D	CLIENT SAMPLE ID	ITEM SAMPLE	T
			-	.   .		r, ID 83843	CITY, STATE, ZIP: Moscow, ID 83843	Ħ
BMAIL:		ACCOUNT #				1282 Alturas Dr	ADDRESS: 1282 AI	1 8
FAX: (208) 882-9246	(208) 883-2839	PHONE	Inc.	Anatek Labs, Inc.	COMPANY:	Labs	SUB CONTRATOR: Anatek Labs	igi
120131 031 HALL Last 2/10/2012 1st SAMP 1/24/2012 1st RCVD 1/31/2012 1201809	1 08: 1	RECORD	CHAIN OF CUSTODY RECORD	CHAIN OF		IENTAL	HALL ANALYSIS LABORATORY	

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## **CYANIDE EXTRACTION BENCHSHEET SW 846**

### Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume		Chemist
1/31/12	120125012-1	10.0	ID.LI	240	250	247.	CAN
í	120126014-1	9.5	10.14	Į.		260	1
	120131027-1	91.8	10.04			27.1	
	-2	92.2	7.98			27.2	
	29-1	88.5	10.03			28.2	
	-2	88.9	10.18			27.6	
		87.7	9.98			28.6	
	<u>-4</u>	90.7	9,99	<u> </u>	<u> </u>	27.6	
	5	86.4	10.06	┟╴╎╺╾╸		28.8	
1	-6	91.2	10.12	<u> </u>		27.	
i	- · · · · · · · · · · · · · · · · · · ·	96.9	10.07	<u> </u>	· · · · · · · · · · · · · · · · · · ·	25.6	
- the	-8	94.8	10.1	7.50		26.1	- T
2/1/12		96.3	9.98	120	250	26.0	from
	-Z	<u>96.8</u> 97.1	10.04 10.08			25.7	
	-4	90.7	10.03 10.02			17.5	·
	-5	921	10.03		<u>_</u>	27.	·
		89.8	10.12			27.5	
	-7	95.1	10.02	┠──┤		26.2	
	-8	91.0	10.00	<u>}</u> ───		27.5	
	-9	91.4	10.00			27.4	
+	-10	91.1	10.02		•	27.4	
2/2/12	12013/030-11	91.9	10.02	250	250	27.	Čen
1	-12	93.5	10.00	}	1	26.7	1
	-13	93.4	10.06			26.6	
	-14	93.0	10.02			26.8	
	-15	92.8	10.01			26.9	
	-16	12.4	10.03			24.0	
	-17	97.0	10.19			25.3	
	-18	92.1	10.07			7.7.0	
	31-1	96.8	10.06			15.7	<u> </u>
<del></del>	-2	94.3	10.03			12.6	4-
2/6/12	120101021-1	87.8	10.02	150	7.50	28.4	CAN
	-2	95.5	10.05			26,0	
	- 7 - 4	90.6	9.97	<u>                                      </u>		27,7 26.8	
		93.0 87.4	10.04		·	16.8	
		15.8	10.00	<u>├── </u>		2000 60.0	
		701	10.05			219	
		78.2 96.3 85.7	10.01 10.03 9.99		<u> </u>	159	
	<u> </u>	85.7	699	∲ ···· - <u> </u> - ·· <b>─</b> ─		79.7	<u> </u>
	-10	95.6	998		<u> </u>	76.1	4
	120126025-1	67-2	10.01			26.8 25.0 28.0 24.0 31.9 25.9 29.2 26.2 37.2 37.2	<u>├</u> `}──
	170202028-1	91.0	10.02	<u> </u>		27.4	7-

N:\Bench Sheets\Cyanide Extraction Benchsheet.xls

### Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln:	M825-01	Exp: 1/4/2013
Free Cyanide MS/MSD/LCS Soln:	M824-05	Exp: 12/28/2012

Method requirements: All QC +/- 10% Equipment: Midi-vap Instrument: ALPCHEM FIA 3000 Absorbance: 570nm

	Sample ID	Matrix	Preserved	Preserved Sample Amount (mL)** I		Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120131031-1	Suil Con	Nally	SOML	25.7	Same		
2	- Ims			1			hml	
3	-lwo				4			
4	-613				×			
5	-BL				ł			
6	-2	<u> </u>			19.6		,	
7	30-4				17.5			
8	-5				17-1			
9	- b_				27.5			
10	-7	+	-		26.2	4		
11	120131030-8	Seil pan	NaOli	Fonl	27,5	Same		
12	-9				27,4	<u> </u>		
13	- 10			1	27.4			
14	-11				27-1			
15	-12				26.7			
16	- 13				26.6			
17	- 14			-	26.8			
18	-15				26.9			
19	-16				27.0		<u> </u>	
20	-17	l.	$\overline{\langle}$		26.3			

\* If soils this calculation is taken from cyanide extraction bench sheet.

\*\* If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
18 N H <sub>2</sub> SO <sub>4</sub>	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl <sub>2</sub>	A043-06

Analytical Reagents: Barbituric Acid Sodium Phosphate Chloramine-t Pyridine Reagent #: R038-13

R026-23 R048-09 R043-03

Analyst Initials/Date Analyzed: 2/ 7/12

N.\Bench Sheets\Total Cyanide EPA 335.4.x/s

Distillation Initials/Date Distilled: <u>IMJ 2/6/12</u>

File name: T:\DATA1\FLGW4\2012\EPA335.4\020712CM.RST Date: February 07, 2012 Operator: CRW

CANN 2/8/12

20206FIACNS

Peak	Cup	Name	Туре	Dil	Wt	Area	Calc.	(ppm)	
1	2	Sync	SYNC	1	1	5649722		0.999811	
	0	Carryover	CO	1	1	5578		0.003278	
2 3	0	Carryover	CO	1	ļ	-4335		0.001527	
B	Ó.	Baseline	RB	1	1	-1.538		0.002021	
5	2	Cal 1.00 $ppm$	C	1	1 1	5644961		0.998970	
6	2	Cal 1.00 ppm	C	1		5684558		1.005961	
7	2	Cal 1.00 ppm	Ċ	1		5671342		1.003628	
B 9	0 3	Baseline Cal 0.80 ppm	RB C	1		845 4469971		0.002442 0.791513	
10	3	Cal 0.80 ppm Cal 0.80 ppm	c	1		4539475		0.803785	
11	3	Cal 0.80 ppm	č	1		4521330		0.800581	
в	õ	Baseline	RB	1		-2089		0.001924	
13	4	Cal 0.50 ppm	C	1		2799128		0.496508	
14	4	Cal 0.50 ppm	C	1	1	2829918		0.501945	
15	4	Cal 0.50 ppm	C	1	1	2819781		0.500155	
B	0	Baseline	RB	1	1	-1936		0.001951	
17	5	Cal 0.05 ppm	C	.1	1	246194		0.045761	
18	5	Cal 0.05 ppm	Ċ	1	1	249332		0.046315	
19 B	5 0	Cal 0.05 ppm Baseline	C RB	1 1	1 1	256284 -1332		0.047542	
в 21	6	Cal 0.01 ppm	кв С	1. 1		46085		0.010430	
22	6	Cal 0.01 ppm	č	1	1	47002		0.010591	
23	6	Cal 0.01 ppm	č	i	i	43775		0.010022	
В	ō	Baseline	RB	1	1	-714		0.002167	
25	1	Blank	BLNK		1	-4787		0.001448	
26	7	ICV 0.25 ppm	ccv	ĺ	1	1469100		0.261678	
27	1	Blank	BLNK	1	1	-1123		0.002094	
в	0	Baseline	RB	1:	1	-1004		0.002115	
29	8	120131031-BL S	U	1	1	1431		0.002545	
30	9	+120131031-001	U	25.7	1	4217		0.078057	10
31 32	$\begin{array}{c} 10\\ 11 \end{array}$	120131031-001MS		2,5.7		3106466 1 3042568			FF (
32 33	12	120131031-001MS	UU	25. 1	1		3	13.864898 0.469785	
34	13	<b>120131031-105</b>	U	29.6		2538		0.081129	
35	14	• 120131030-004	U	27.5		-2146		0.052630	
36	15	•120131030-005	Ū	27.1	1	-2489		0.050221	
37	16	•120131030-006	U	27.5		-1456		0.055983	
38	17	•120131030-007	Ù	26.2		-4790		0.037909	
в	0	Baseline	RB	1	1	-2099		0.001922	
40	ĺ	Blank	BLNK		1	28		0.002298	
41	4	CCV 0.5 ppm	CCV	<u>1.</u>	1	2774054		0.492081	
42 B	1	Blank Read Baseline	BLNK RB	1		-632 -819		$0.002181 \\ 0.002148$	
44	0 18	+120131030-008	КБ Ü	27.5	1	-295		0.061617	
45	19	120131030-009	U	27.4	1	11932		0.120543	
46	20	•120131030-010	Ū	27.4	1	14931		0.135052	
47	21	•120131030-011	U	27.1	1	6211		0.091852	
48	22	•120131030-012	U	26.7	1	-3394		0.045218	
49	23	•120131030-013	U	26.6	1	-4544		0.039647	
50	24	•120131030-014	U	26.8	1	-2856		0.047930	
51	25	•120131030-015	U	26.9	1.	-3799		0.043630	
52 53	26	•120131030-016		27	1	-5851		0.034009	
B	27 0	•120131030-017 Baseline	U RB	25.3	1 1	-3846 -1522		0.040827 0.002024	
55	l	Blank	BLNK	1. 1	1	-3387		0.001695	
56	4	CCV 0.5 ppm	CCV	1	1	2875216		0.509942	
57	1	Blank	BLNK	1	1	3129		0.002845	
В	õ	Read Baseline	RB	ī	ī	7209		0.003566	
59	28	+120127027-001 W			1 :	1 541	8	0.003249	
60	29	120127027-001MS		Ţ				0.506876	
61	30	120127027-001MS				1 286438	1	0.508029	
62	31	•120127027-002	Ö	5		50381		0.055940	
63	32	•120127027-005	U	1	- 1		i.	0.003895	
64 65	33 34	T120202020-001 D 120202020-001MS		1		1. 83 2933980	r	0.002439	
66	35	120202020-001MS				1 296928	б	0.526551	
	9.00 Mar				<del></del> .		-	0.080001	

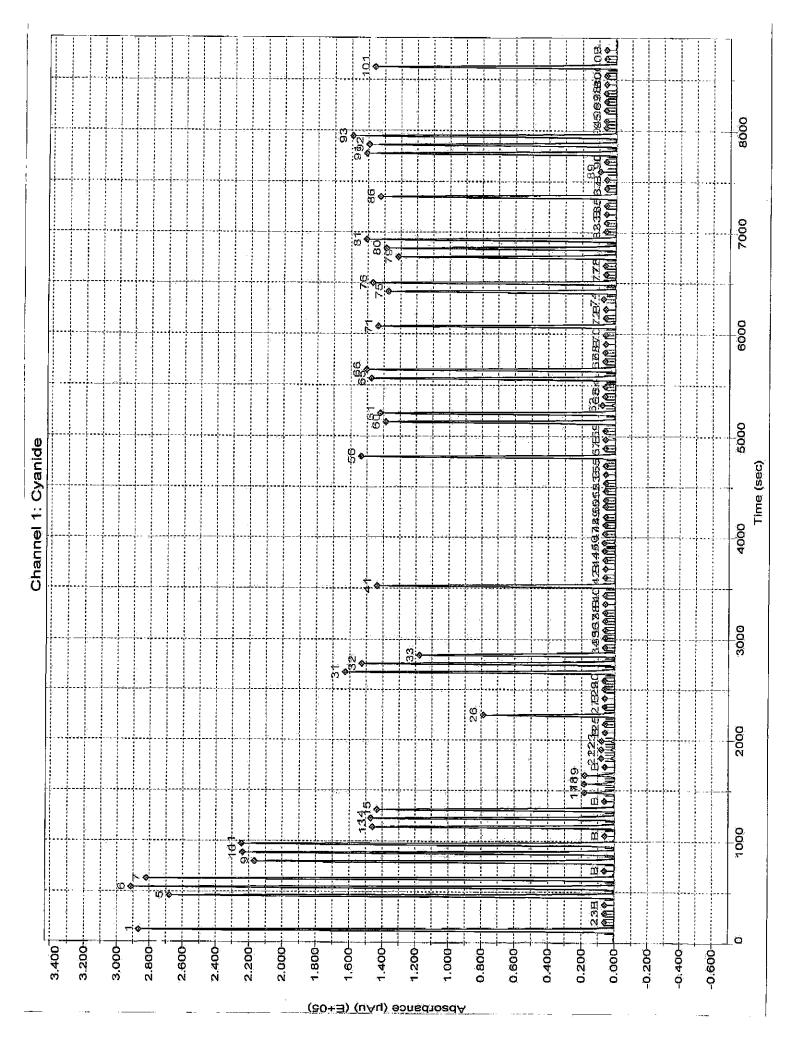
'ea k	Cup	Name	Type	Dil Wt	A	rea	Calc. (ppm)
7	36	120126041-001	υ	1	1	10276	0.004107
8	37	120126041-002	Ü	1	1	9194	0.003916
ś.	0	Baseline	RB	1	ì	1906	0.002629
0	1	Blank	BLNK	1	1	4062	0.003010
1 2	4	CCV 0.5 ppm	CCV	1	1	2861862	0.507585
2	1.	Blank	BLNK	<u>1</u>	1	486	0.002378
5	Ó.	Read Baseline	RB	1	1	-580	0.002190
4	38	120126041-003 R	WÜ	2	-1	12573	
5	39	120126041-003MS	U	2	1	2821370	1.000871
6	40	120126041-003MS	DU	2	1	2954754	1.047971
7	41	+120126025-BL RS	U	1	1	-6990	0.001059
8	42	+120126025-001	U	37.2	l	889	0.091127
9	43	120126025-001MS	U	37.2	1	2653172	17.511463
0	44	120126025-001MS	DÜ	37.2	1	2806458	18.518251
Э.	45	120126025-LCS	U	1	1	3032619	0.537733
2	46	120202028-001	Ū	27.4	1	-4046	0.043246
3.	47	RINSE	U	ľ	1	-5244	0.001367
	0	Baseline	RB	1	1	-1934	0.001951
5	1	Blank	BLNK	1	1	-4651	0.001471
6:	4	CCV 0.5 ppm	ccv	1	1	2936727	0.520803
7	1	Blank	BLNK	1	1	-2661	0.001823
	Ò	Read Easeline	RB	1	1	-282	0.002243
9	48	120131031-BL	U	1	1	20842	0.005973
Q.	49	120131031-001	U	25.7	1	6656	0.089123
1	50	120131031-001MS	U	25.7	1	3144390	14.326928
2	51	120131031-001MS	DU	25.7	1	3054986	13.921247
3	52	120131031-LCS	ប	1	1	3205898	0.568328
4	53		U	1	1	15323	0.004998
5	54		Ü,	1	1	12107	0.004430
6	55		U	1	1	12655	0.004527
7	56		Ū		1 1	9435	0.003959
8	57		U	1	1	5829	0.003322
	0	Baseline	RB	1	1	-726	0.002165
Ó Ó	1	Blank	BLNK	1	1 1	1683	0.002590
01	4	CCV 0.5 ppm	CCV	1	1	2958652	0.524674
02	1	Blank	BLNK	1	ï.	-3339	0.001703
5	0	Read Baseline	RB	1	1	-3849	0.001613

'eak	Cup	Flags
-	2	
r F	0	
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23	6	OL
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32	11					
33	12					
3:4	12 13					
35	14					
36 37	15 16					
3:7	16					
3:8 3. 1 0.	17	<b></b>				
≯. 100	0	BL				
11	1 4 0 18 19 20					
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14 15 16 17	18					
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18 19 30 31 32	22 23 24					
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53) 8	27 0	BL				
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57	1					
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38. 3	37 0	BL				
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12	1 0 38 39 40 41 42 43					
3 14 15 16 17		BL				
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18	42					
18 19 10	43					
30	44					
11	45					
11 12 13	46					
1-2-	47 .0	BL				
3 35 36 37 3 39	-1	. بد ب				
16	4					
17	1					
3	0	BL				
19	44 45 47 0 1 4 1 0 8 9					
¥0.	49					
11	50					
12	51					
2.5	52					
/ 44 }-드:	50					
26	55					
)0 )1 )2 )3 )4 )5 )6 )7	50 51 52 53 55 55 56					
18	57					
) 8 3	57 0 1	BL				
.00	1					

Peak	Cup	Flags
<b>-</b>		
101	4	
102	1	
В	0	BL

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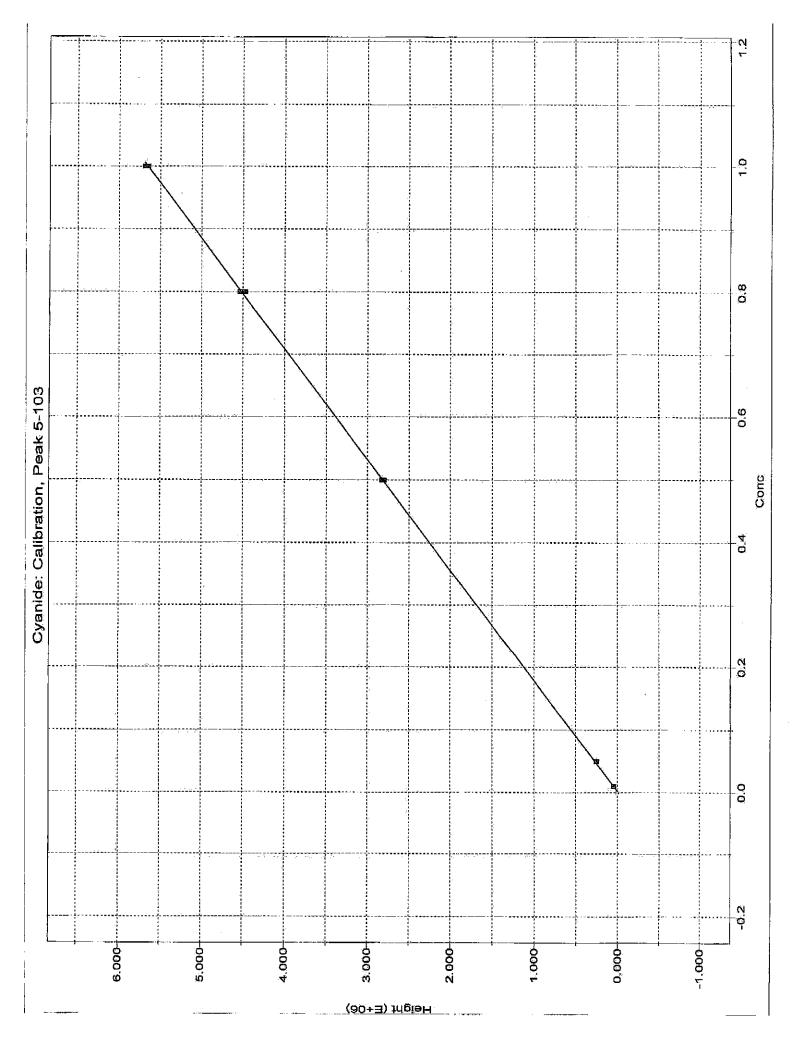


File name: T:\DATA1\FLOW4\2012\EPA335.4\020712CM.RST Date: February 07, 2012 Operator: CRW

*	Name	Conc	Area
<b>  * * * * * * * * *</b>	Cal 1.00 ppm Cal 1.00 ppm Cal 1.00 ppm Cal 0.80 ppm Cal 0.80 ppm Cal 0.80 ppm Cal 0.80 ppm Cal 0.50 ppm Cal 0.50 ppm Cal 0.50 ppm Cal 0.50 ppm Cal 0.50 ppm	1.000000 1.000000 1.000000 0.800000 0.800000 0.500000 0.500000 0.500000 0.500000 0.500000	5644961.000000 5684557.500000 5671341.500000 4469971.000000 4539475.000000 4521330.000000 2799128.250000 2829918.250000 2819781.250000 246194.078125
* * *	Cal 0.05 ppm Cal 0.05 ppm Cal 0.01 ppm Cal 0.01 ppm	0.050000 0.050000 0.010000 0.010000	249331.515625 256283.828125 46085.363281 47002.277344
*	Cal 0.01 ppm Calib Coef: y=bx+a a: (intercept)	0.010000 -1.2985e+04 5.6638e+06	43775.347656

b:	5.6638e+06
Corr Coef:	0.999964
Carryover:	0.0987%

No Drift Peaks



QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#:	1201809
	13-Apr-12

Client: Project:	Western I RCRA Ba	-									
Sample ID	MB-502	SampT	уре: М	BLK	Tes	tCode: E	PA Method	300.0: Anion	S		
Client ID:	PBS	Batcl	n ID: 50	2	F	RunNo: 6	99				
Prep Date:	1/31/2012	Analysis E	ate: 1	31/2012	S	SeqNo: 1	9902	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		ND	0.30								
Chloride		ND	1.5								
Sulfate		0.46	1.5								J
Sample ID	LCS-502	SampT	ype: LC	S	Tes	estCode: EPA Method 300.0: Anions					
Client ID:	LCSS	Batcl	n ID: 50	2	F	RunNo: 6	99				
Prep Date:	1/31/2012	Analysis E	ate: 1	31/2012	S	SeqNo: 1	9903	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		1.6	0.30	1.500	0	104	90	110			
Chloride		14	1.5	15.00	0	94.3	90	110			
Sulfate		29	1.5	30.00	0	97.2	90	110			
Sample ID	1201809-001BMS	SampT	уре: М	3	Tes	tCode: E	PA Method	300.0: Anion	IS		
Client ID:	BK-9 (5-5.5')	Batcl	n ID: 50	2	F	RunNo: 6	99				
Prep Date:	1/31/2012	Analysis E	)ate: 2/	1/2012	S	SeqNo: 1	9949	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		4.4	0.30	1.500	3.737	47.5	18.1	130			
Sample ID	1201809-001BMSI	<b>)</b> Samp1	ype: M	SD	Tes	tCode: E	PA Method	300.0: Anion	IS		
Client ID:	BK-9 (5-5.5')	Batcl	n ID: <b>50</b>	2	F	RunNo: 6	99				
Prep Date:	1/31/2012	Analysis E	)ate: 2/	1/2012	S	SeqNo: 1	9951	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		4.5	0.30	1.500	3.737	51.0	18.1	130	1.19	20	

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

# QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

WO#:	1201809
	13-Apr-12

	n Refining S Background									
Sample ID MB-478	TestCode: EPA Method 8015B: Diesel Range Organics									
Client ID: PBS	Batch	n ID: 47	8	F	RunNo: 6	35				
Prep Date: 1/28/2012	Analysis Date: 1/29/2012			SeqNo: 17941			Units: <b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.5		10.00		84.6	77.4	131			
Sample ID LCS-478	SampT	ype: LC	S	Tes	tCode: El	PA Method	8015B: Dies	el Range C	Organics	
Client ID: LCSS	Batch	ID: 47	8	F	RunNo: 6	35				
Prep Date: 1/28/2012	Analysis D	ate: 1/	29/2012	S	SeqNo: 1	7942	Units: mg/k	ζg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	56	10	50.00	0	113	62.7	139			
Surr: DNOP	4.5		5.000		90.4	77.4	131			

#### Qualifiers:

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- R RPD 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
- RL Reporting Detection Limit

WO#:	1201809	

13-Apr-12
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Client: Project:		Refining S ackground									
Sample ID	MB-476	SampT	ype: ME	BLK	Test	tCode: El	PA Method	8015B: Gaso	oline Rang	e	
Client ID:	PBS	Batch	n ID: 47	6	R	lunNo: 6	61				
Prep Date:	1/27/2012	Analysis D	ate: 1/	30/2012	S	eqNo: 1	8848	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Rang Surr: BFB	e Organics (GRO)	ND 880	5.0	1,000		88.2	69.7	121			
Sample ID	LCS-476	SampT	ype: LC	S	Test	tCode: El	PA Method	8015B: Gaso	oline Rang	е	
Client ID: LCSS Batch ID: 476					R	unNo: 6	61				
Prep Date:	1/27/2012	Analysis D	ate: 1/	30/2012	S	eqNo: 1	8852	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
-	e Organics (GRO)	32	5.0	25.00	0	126	86.4	132			
Surr: BFB		1,000		1,000		102	69.7	121			
Sample ID	1201809-001AMS	SampT	ype: <b>MS</b>	3	Test	tCode: El	PA Method	8015B: Gaso	oline Rang	е	
Client ID:	BK-9 (5-5.5')	Batch	n ID: 47	6	RunNo: 661						
Prep Date:	1/27/2012	Analysis D	ate: 1/	30/2012	S	eqNo: 1	8853	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Rang	e Organics (GRO)	31	5.0	24.78	0	127	85.4	147			
Surr: BFB		1,000		991.1		105	69.7	121			
Sample ID	1201809-001AMS	D SampT	ype: MS	SD	Test	tCode: El	PA Method	8015B: Gaso	oline Rang	e	
Client ID:	BK-9 (5-5.5')	Batch	n ID: 47	6	R	unNo: 6	61				
Prep Date:	1/27/2012	Analysis D	ate: 1/	30/2012	S	eqNo: 1	8854	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
-	e Organics (GRO)	31	4.9	24.53	0	125	85.4	147	2.58	19.2	
Surr: BFB		990		981.4		101	69.7	121	0	0	

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1201809
	13-Apr-12

Client: Project:	Western I RCRA Ba	-										
Sample ID	MB-489	SampT	уре: М	BLK	Tes	tCode: E	PA Method	7471: Mercu	ry			
Client ID:	PBS	Batcl	h ID: 48	9	F	RunNo: 6	52					
Prep Date:	1/30/2012	Analysis E	Date: 1	/30/2012	5	SeqNo: 1	8714	Units: mg/k	٢g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		ND	0.033									
Sample ID	LCS-489	SampT	ype: LC	cs	Tes	tCode: E	PA Method	7471: Mercu	ry			
Client ID:	LCSS Batch ID: 489			9	F	RunNo: 6	52					
Prep Date:	1/30/2012	Analysis D	Date: 1	/30/2012	S	SeqNo: 1	8715	Units: mg/k	٢g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.18	0.033	0.1667	0	108	80	120				
Sample ID	1201809-001BMS	SampT	ype: M	S	Tes	tCode: E	PA Method	30 120 od 7471: Mercury				
Client ID:	BK-9 (5-5.5')	Batcl	h ID: 48	9	F	RunNo: 6	52					
Prep Date:	1/30/2012	Analysis D	Date: 1	/30/2012	S	SeqNo: 1	8717	Units: mg/k	٨g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.18	0.033	0.1665	0.006308	102	75	125				
Sample ID	1201809-001BMS	Samp1	ype: M	SD	Tes	tCode: E	PA Method	7471: Mercu	ry			
Client ID:	BK-9 (5-5.5')	Batcl	h ID: 48	9	F	RunNo: 6	52					
Prep Date:	1/30/2012	Analysis D	Date: 1	/30/2012	5	SeqNo: 1	8718	Units: mg/h	٢g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.17	0.033	0.1663	0.006308	101	75	125	1.75	20		

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

**Client:** Western Refining Southwest, Inc. **Project: RCRA** Background Investigation

0	8	0								
Sample ID MB-514	SampT	ype: MBL	.ĸ	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID: PBS	Batch	h ID: 514		F	RunNo: 808					
Prep Date: 1/31/2012	Analysis D	Date: 2/7/	2012	S	SeqNo: 2	3089	Units: mg/k	(g		
Analyte	Result	PQL S	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	3.0								J
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	ND	2.0								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Cobalt	ND	0.30								
Copper	0.054	0.30								J
Iron	1.1	1.0								
Lead	ND	0.25								
Manganese	ND	0.10								
Molybdenum	ND	0.40								
Nickel	0.093	0.50								J
Selenium	1.0	2.5								J
Silver	ND	0.25								
Thallium	ND	2.5								
Uranium	ND	5.0								
Vanadium	ND	2.5								
Zinc	ND	2.5								
Sample ID LCS-514	SamoT	ype: LCS		Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID: LCSS		n ID: 514			RunNo: 8					
								-		
Prep Date: 1/31/2012	Analysis E	Date: 2/7/	2012	ę	SeqNo: 2	3090	Units: mg/k	g		
Analyte	Result	PQL S	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.5570	110	80	120			
Antimony	24	2.5	25.00	0	96.4	80	120			
	<b>0</b> -			•	~~ -					

0

0

0

0

0

0

0

0

0

0

0.05450

1.128

98.7

97.1

103

97.6

96.7

95.7

95.7

98.0

99.2

96.8

95.9

99.6

80

80

80

80

80

80

80

80

80

80

80

80

120

120

120

120

120

120

120

120

120

120

120

120

Arsenic

Barium

Boron

Beryllium

Cadmium

Chromium

Cobalt

Copper

Iron

Lead

Manganese

Molybdenum

\*/X Value exceeds Maximum Contaminant Level.

25

24

26

24

24

24

24

25

26

24

24

25

2.5

0.10

0.15

2.0

0.10

0.30

0.30

0.30

1.0

0.25

0.10

0.40

25.00

25.00

25.00

25.00

25.00

25.00

25.00

25.00

25.00

25.00

25.00

25.00

Е Value above quantitation range

Analyte detected below quantitation limits J

R RPD outside accepted recovery limits В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit В

WO#: 1201809 13-Apr-12

WO#: **1201809** 

13-Apr-12

Client: Project:		Refining S ackground									
Sample ID	LCS-514	Samp	Type: LC	S	Tes	tCode: E	PA Method	6010B: Soil	Metals		
Client ID:	LCSS	Batc	h ID: 51	4	F	RunNo: 8	808				
Prep Date:	1/31/2012	Analysis [					eqNo: 23090 Units: mg/Kg		(a		
								-	-		Qual
Analyte Nickel		Result 24	PQL 0.50	25.00	SPK Ref Val 0.09300	%REC 94.5	LowLimit 80	HighLimit 120	%RPD	RPDLimit	Qual
Selenium		24	2.5	25.00	1.014	89.5	80	120			
Silver		4.8	0.25	5.000	0	96.5	80	120			
Thallium		4.0 24	2.5	25.00	0	96.7	80	120			
Uranium		24 25	5.0	25.00	0	98.6	80	120			
Vanadium		25 25	2.5	25.00	0	102	80	120			
Zinc		23 24	2.5	25.00	0	96.0	80	120			
ZIIIC		24	2.5	23.00	0	90.0	00	120			
Sample ID	1201809-001BMS	Samp	Гуре: М	6	Tes	tCode: E	PA Method	6010B: Soil	Metals		
Client ID:	BK-9 (5-5.5')	Batc	h ID: 51	4	F	RunNo: 8	808				
Prep Date:	Date: 1/31/2012 Analysis Date: 2/7/2012				ç	SeqNo: 2	3094	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		11	2.5	24.89	0	43.8	75	125			S
Arsenic		23	2.5	24.89	1.491	87.5	75	125			
Beryllium		22	0.15	24.89	0.2370	86.9	75	125			
Boron		26	2.0	24.89	4.078	89.3	75	125			
Cadmium		21	0.10	24.89	0	83.5	75	125			
Chromium		24	0.30	24.89	3.460	82.5	75	125			
Cobalt		22	0.30	24.89	2.095	78.5	75	125			
Copper		24	0.30	24.89	2.287	88.0	75	125			
Lead		21	0.25	24.89	1.663	78.0	75	125			
Molybdenum		20	0.40	24.89	0.4185	78.8	75	125			
Nickel		22	0.50	24.89	2.968	77.4	75	125			
Selenium		19	2.5	24.89	0	77.6	75	125			
Silver		4.2	0.25	4.978	0	84.4	75	125			
Thallium		10	2.5	24.89	0	40.7	75	125			S
Uranium		21	5.0	24.89	0	86.3	75	125			-
Vanadium		35	2.5	24.89	11.33	96.5	75	125			
Zinc		31	2.5	24.89	11.58	79.3	75	125			
Sample ID	1201809-001BMSI	D Samp]	Гуре: МS	SD	Tes	tCode <sup>.</sup> F	PA Method	6010B: Soil	Metals		
	BK-9 (5-5.5')		h ID: 51			RunNo: 8					
Prep Date:	1/31/2012	Analysis E				SeqNo: 2		Units: mg/k	(a		
•	1/31/2012							•	•		
Analyte		Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		10	2.5	24.81	0	41.0	75	125	6.88	20	S
Arsenic		22	2.5	24.81	1.491	82.9	75	125	5.37	20	
Beryllium		21	0.15	24.81	0.2370	84.8	75	125	2.76	20	
Boron		26	2.0	24.81	4.078	87.5	75	125	1.94	20	
Cadmium		20 23	0.10 0.30	24.81 24.81	0 3.460	81.1 79.4	75 75	125 125	3.27 3.45	20 20	
Chromium											

\*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD 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

RL Reporting Detection Limit

WO#: **1201809** 

13-Apr-12

#### Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	1201809-001BMS	TestCode: EPA Method 6010B: Soil Metals									
Client ID:	BK-9 (5-5.5')	Batch	n ID: 514	4	F	unNo: 8	08				
Prep Date:	1/31/2012	Analysis D	ate: 2/	7/2012	S	eqNo: 2	3095	Units: mg/k	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt		21	0.30	24.81	2.095	75.5	75	125	3.77	20	
Copper		24	0.30	24.81	2.287	86.7	75	125	1.70	20	
Lead		20	0.25	24.81	1.663	73.8	75	125	5.40	20	S
Molybdenum		19	0.40	24.81	0.4185	75.6	75	125	4.38	20	
Nickel		21	0.50	24.81	2.968	74.3	75	125	3.77	20	S
Selenium		18	2.5	24.81	0	74.1	75	125	4.97	20	S
Silver		4.0	0.25	4.963	0	81.3	75	125	4.01	20	
Thallium		11	2.5	24.81	0	42.5	75	125	3.98	20	S
Uranium		20	5.0	24.81	0	81.1	75	125	6.48	20	
Vanadium		34	2.5	24.81	11.33	91.5	75	125	3.75	20	
Zinc		30	2.5	24.81	11.58	73.7	75	125	4.73	20	S
Sample ID	MB-1105	SampT	уре: <b>МЕ</b>	BLK	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	PBS	Batch	n ID: 11	05	F	unNo: 1	507				
Prep Date:	3/15/2012	Analysis D	ate: 3/	16/2012	S	eqNo: 4	2441	Units: mg/k	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron		ND	1.0								
Manganese		ND	0.10								
Sample ID	LCS-1105	SampT	ype: LC	S	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	LCSS	Batch	n ID: 11	05	F	unNo: 1	507				
Prep Date:	3/15/2012	Analysis D	ate: 3/	16/2012	S	eqNo: 4	2442	Units: mg/k	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
		26	1.0	25.00	0	105	80	120			
Iron		20	1.0	20.00	0	105	00	120			

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- R RPD 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
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.con

### Sample Log-In Check List

Clier	nt Name:	Western Refining Southw	est, Inc Bloomfield	Work Or	der Nu	umber:	r: 1201809	
Rec	eived by/date	AAG1/27/12						
Logg	ged By:	Michelle Garcia	1/27/2012 10:00:00 A	AM		-1Y	Nitrell Consin Nitrell Consin	
Corr	pleted By:	Michelle Garcia	1/27/2012 1:06:36 PI	М		-1r	Mitule Concin	
Rev	ewed By:	In 1/27/2012						
<u>Cha</u>	in of Cust	ody						
1.	Were seals i	ntact?		Yes		No 🗌	Not Present 🗹	
2.	Is Chain of C	Custody complete?		Yes	<b>v</b> 1	No 🗌	Not Present	
3.	How was the	sample delivered?		<u>UPS</u>				
<u>Log</u>	<u>In</u>							
4.	Coolers are	present? (see 19. for coole	specific information)	Yes	<b>V</b> 1	No 🗆	) NA 🗌	
5.	Was an atte	mpt made to cool the samp	les?	Yes	<b>V</b> 1	No 🗆		
6.	Were all san	nples received at a tempera	ture of >0° C to 6.0°C	Yes	<b>v</b> 1	No 🗀		
7.	Sample(s) in	proper container(s)?		Yes	<b>v</b> 1	No 🗆		
8.	Sufficient sa	mple volume for indicated t	est(s)?	Yes	<b>V</b> 1	No 🗌	]	
9.	Are samples	(except VOA and ONG) pr	operly preserved?	Yes	<b>V</b> 1	No 🗌	]	
10.	Was preserv	ative added to bottles?		Yes		No 🗹		
11.	VOA vials ha	ave zero headspace?		Yes		No 🗆	No VOA Vials 🗹	
12.	Were any sa	mple containers received b	roken?	Yes		No 🔽		
		vork match bottle labels? pancies on chain of custody	)	Yes	<b>V</b> N	No 🗌	# of preserved bottles checked for pH:	
14.	Are matrices	correctly identified on Cha	in of Custody?	Yes	<b>v</b> N	No 🗆	(<2 or >12 unle	ss noted)
15.	Is it clear wh	at analyses were requested	1?	Yes	<b>V</b> N	No 🗆	Adjusted?	
		ding times able to be met? customer for authorization.)		Yes	<b>V</b> N	10 🗆	] Checked by	
		ing (if applicable)					Checked by:	
		otified of all discrepancies v	with this order?	Yes		10 🗌		
17.								
		Notified:	Date:	•	. —			
	By Who Begard		Via:	eMa		Phone	ne 🔄 Fax 📋 In Person	
	Regard	ng: nstructions:						

18, Additional remarks:

#### 19. Cooler Information

	Cooler No	Temp ℃	Condition	Seal Intact	Seal No	Seal Date	Signed By
[	1	1.2	Good	Yes			

Page 1 of 1

HALL ENVIRONMENTAL HALL ENVIRONMENTAL ANALYSIS LABORATORY www.hallenvironmental.com kins NE - Albuquerque, NM 87109 845-3975 Fax 505-345-4107 Analysis Request	8081 Pesticides / 8082 PCB's <del>8260B (VOR)</del> <del>8270 (Semi-VOR)</del> TPH - DEO, NEO, E <b>EE</b> TPH - CRO, NEO, E			the aucule the list,
HALL ENVIRON ANALYSIS LABO www.hallenvironmental.com 4901 Hawkins NE - Albuquerque, NM 7 Tel. 505-345-3975 Fax 505-345-41	(Gas/Diesel) B3106 (Gas/Diesel) TPH (Method 8015B (Gas/Diesel) EDB (Method 504.1) 8310 (PUA or PAH)			Time Remarks: Time See a Hach ad Sweet for a weller to a more legter and the secont as notice of this possibility. Any sub-contracted data will be dearly notated on the analytical report.
Time:	BTEX + MTBE + TPH (Gas only) BTEX + MTBE + TMB's (8021) BTEX + MTBE + TMB's (8021)			Date Time Remarks: Date Time Seco
Turm-Around X Standarc Project Nam Project #:	Project Manager:	(3) 4 vz Jub	JK I VIAL MCOH	Received by: Received by: Received by:
Client: Western Refinite Servicest Inc. Client: Western Refinite Servicest Inc. Blocutifield Refinered Mailing Address: 50 Road 4990 Blocutifield Ninn 87401	Concernent     Concernent       Cavac Package:     Cavac Package:       Cavac Package:     Cavac Package:			Date     Time:     Received by:       Date:     Time:     Received by:       Date:     Time:     Received by:       Date:     Time:     Received by:       If necessary, samples submitted to Hall Environmental may be subcontracted to other accredition     Received by:

#### METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
- Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
- Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

### GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved &
	total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved &
	total)

### SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride_	SW-846 method 300

For Soi and Grounderaty ples (Dis: Totals

Includes Sott Sort Samples eł GW Samples (both drssoled at total analysis

For Groundre Sau ONIL



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

April 13, 2012

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: RCRA Background Investigation

OrderNo.: 1201885

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 18 sample(s) on 1/31/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 23, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <u>www.hallenvironmental.com</u> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

andy

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

#### Hall Environmental Analysis Laboratory, Inc.

Uranium

Zinc

Vanadium

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-1 (0-0.5') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 1:30:00 PM 1201885-001 Received Date: 1/31/2012 9:30:00 AM Lab ID: Matrix: SOIL Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride 0.94 1.5 J mg/Kg 5 2/1/2012 2:01:03 PM Chloride ND 7.5 mg/Kg 5 2/1/2012 2:01:03 PM Sulfate 2.1 7.5 J mg/Kg 5 2/1/2012 2:01:03 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 0.012 0.033 1 2/2/2012 10:11:04 AM Mercury J mg/kg **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 20,000 1,500 mg/Kg 500 2/10/2012 6:44:06 AM Antimony ND 2.5 mg/Kg 1 2/8/2012 8:08:33 AM Arsenic 2.5 mg/Kg 2.8 1 2/8/2012 8:08:33 AM Barium 160 0.50 mg/Kg 5 2/10/2012 6:42:08 AM Beryllium 0.55 0.15 mg/Kg 1 2/8/2012 8:08:33 AM 2/8/2012 8:10:41 AM 6.7 4.0 mg/Kg 2 Boron Cadmium 0.034 0.10 J mg/Kg 1 2/8/2012 8:08:33 AM Chromium 7.8 0.30 mg/Kg 1 2/8/2012 8:08:33 AM Cobalt 4.4 0.30 mg/Kg 1 2/8/2012 8:08:33 AM Copper 8.1 0.30 mg/Kg 1 2/8/2012 8:08:33 AM 18,000 500 Iron mg/Kg 500 3/18/2012 12:35:55 PM Lead 2.9 0.25 2/8/2012 8:08:33 AM mg/Kg 1 Manganese 260 0.98 mg/Kg 10 3/16/2012 8:44:21 AM Molybdenum 0.40 2/8/2012 8:08:33 AM 0.36 J mg/Kg 1 Nickel 6.7 0.50 mg/Kg 2/8/2012 8:08:33 AM 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 8:08:33 AM Silver 0.25 mg/Kg 2/8/2012 8:08:33 AM ND 1 Thallium ND 2.5 mg/Kg 1 2/8/2012 8:08:33 AM

0.60

24

26

5.0

2.5

2.5

J

mg/Kg

mg/Kg

mg/Kg

1

1

1

2/8/2012 8:08:33 AM

2/8/2012 8:08:33 AM

2/8/2012 8:08:33 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
F	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 1 of

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

RCRA Background Investigation

Project:

Client Sample ID: BK-1 (1.5-2.0') Collection Date: 1/27/2012 1:34:00 PM Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-002	Matrix: S	SOIL		Received Date: 1/31/2012 9:30:00 AM			
Analyses	Result	RL Q	Qual	Units	DF	Date Analyzed	
EPA METHOD 300.0: ANIONS						Analyst: BRM	
Fluoride	11	1.5		mg/Kg	5	2/1/2012 2:35:52 PM	
Chloride	14	7.5		mg/Kg	5	2/1/2012 2:35:52 PM	
Sulfate	17	7.5		mg/Kg	5	2/1/2012 2:35:52 PM	
EPA METHOD 7471: MERCURY						Analyst: ELS	
Mercury	0.018	0.033	J	mg/kg	1	2/2/2012 10:16:27 AM	
EPA METHOD 6010B: SOIL METALS	;					Analyst: ELS	
Aluminum	17,000	1,500		mg/Kg	500	2/10/2012 6:54:33 AM	
Antimony	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Arsenic	1.9	5.0	J	mg/Kg	2	2/8/2012 8:19:16 AM	
Barium	260	1.0		mg/Kg	10	2/13/2012 7:24:14 AM	
Beryllium	0.56	0.30		mg/Kg	2	2/8/2012 8:19:16 AM	
Boron	8.0	4.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Cadmium	ND	0.20		mg/Kg	2	2/8/2012 8:19:16 AM	
Chromium	8.4	0.60		mg/Kg	2	2/8/2012 8:19:16 AM	
Cobalt	5.3	0.60		mg/Kg	2	2/8/2012 8:19:16 AM	
Copper	8.7	0.60		mg/Kg	2	2/8/2012 8:19:16 AM	
Iron	18,000	500		mg/Kg	500	3/18/2012 12:38:04 PM	
Lead	3.2	0.50		mg/Kg	2	2/8/2012 8:19:16 AM	
Manganese	280	1.0		mg/Kg	10	3/16/2012 8:59:36 AM	
Molybdenum	0.70	0.80	J	mg/Kg	2	2/8/2012 8:19:16 AM	
Nickel	7.4	1.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Selenium	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Silver	ND	0.50		mg/Kg	2	2/8/2012 8:19:16 AM	
Thallium	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Uranium	ND	10		mg/Kg	2	2/8/2012 8:19:16 AM	
Vanadium	30	5.0		mg/Kg	2	2/8/2012 8:19:16 AM	
Zinc	28	5.0		mg/Kg	2	2/8/2012 8:19:16 AM	

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 2 of 31

#### Hall Environmental Analysis Laboratory, Inc.

Uranium

Zinc

Vanadium

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-2 (0-0.5') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 2:05:00 PM 1201885-003 Received Date: 1/31/2012 9:30:00 AM Lab ID: Matrix: SOIL Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride ND 1.5 mg/Kg 5 2/1/2012 3:45:29 PM Chloride ND 7.5 mg/Kg 5 2/1/2012 3:45:29 PM Sulfate 2.4 7.5 J mg/Kg 5 2/1/2012 3:45:29 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 0.0095 0.033 1 2/2/2012 10:18:12 AM Mercury J mg/kg **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 14,000 1,500 mg/Kg 500 2/10/2012 6:56:35 AM Antimony ND 2.5 mg/Kg 1 2/8/2012 8:37:17 AM Arsenic 2.5 J mg/Kg 1.4 1 2/8/2012 8:37:17 AM 2/8/2012 8:39:28 AM Barium 94 0.20 mg/Kg 2 Beryllium 0.42 0.15 mg/Kg 1 2/8/2012 8:37:17 AM 5.4 2.0 mg/Kg 1 2/8/2012 8:37:17 AM Boron Cadmium 0.040 0.10 J mg/Kg 1 2/8/2012 8:37:17 AM Chromium 6.1 0.30 mg/Kg 1 2/8/2012 8:37:17 AM Cobalt 3.4 0.30 mg/Kg 1 2/8/2012 8:37:17 AM Copper 5.4 0.30 mg/Kg 1 2/8/2012 8:37:17 AM 13,000 500 Iron mg/Kg 500 3/18/2012 12:40:09 PM Lead 2.8 0.25 2/8/2012 8:37:17 AM mg/Kg 1 Manganese 270 0.97 mg/Kg 10 3/16/2012 9:09:46 AM Molybdenum 0.28 0.40 J mg/Kg 1 2/8/2012 8:37:17 AM Nickel 4.8 0.50 mg/Kg 2/8/2012 8:37:17 AM 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 8:37:17 AM Silver 0.25 mg/Kg 2/8/2012 8:37:17 AM ND 1 Thallium ND 2.5 mg/Kg 1 2/8/2012 8:37:17 AM

1.0

17

20

5.0

2.5

2.5

J

mg/Kg

mg/Kg

mg/Kg

1

1

1

2/8/2012 8:37:17 AM

2/8/2012 8:37:17 AM

2/8/2012 8:37:17 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank	
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded	
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		Page 3	of 31

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

RCRA Background Investigation

Project:

Client Sample ID: BK-2 (1.5-2.0') Collection Date: 1/27/2012 2:10:00 PM Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-004	Matrix: S	SOIL	Received	<b>Received Date:</b> 1/31/2012 9:30:00 AM			
Analyses	Result	RL Q	ual Units	DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: BRM		
Fluoride	8.6	1.5	mg/Kg	5	2/1/2012 4:20:17 PM		
Chloride	ND	7.5	mg/Kg	5	2/1/2012 4:20:17 PM		
Sulfate	17	7.5	mg/Kg	5	2/1/2012 4:20:17 PM		
EPA METHOD 7471: MERCURY					Analyst: ELS		
Mercury	0.016	0.033	J mg/kg	1	2/2/2012 10:19:59 AM		
EPA METHOD 6010B: SOIL METALS	;				Analyst: ELS		
Aluminum	26,000	3,000	mg/Kg	1000	2/13/2012 7:29:38 AM		
Antimony	ND	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		
Arsenic	3.0	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		
Barium	250	1.0	mg/Kg	10	2/13/2012 7:26:06 AM		
Beryllium	0.64	0.15	mg/Kg	1	2/8/2012 8:41:38 AM		
Boron	8.2	4.0	mg/Kg	2	2/8/2012 8:43:43 AM		
Cadmium	ND	0.10	mg/Kg	1	2/8/2012 8:41:38 AM		
Chromium	9.3	0.30	mg/Kg	1	2/8/2012 8:41:38 AM		
Cobalt	4.8	0.30	mg/Kg	1	2/8/2012 8:41:38 AM		
Copper	8.8	0.30	mg/Kg	1	2/8/2012 8:41:38 AM		
Iron	19,000	500	mg/Kg	500	3/18/2012 12:42:13 PM		
Lead	2.4	0.25	mg/Kg	1	2/8/2012 8:41:38 AM		
Manganese	290	1.0	mg/Kg	10	3/16/2012 9:13:50 AM		
Molybdenum	0.37	0.40	J mg/Kg	1	2/8/2012 8:41:38 AM		
Nickel	7.6	0.50	mg/Kg	1	2/8/2012 8:41:38 AM		
Selenium	ND	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		
Silver	ND	0.25	mg/Kg	1	2/8/2012 8:41:38 AM		
Thallium	ND	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		
Uranium	ND	5.0	mg/Kg	1	2/8/2012 8:41:38 AM		
Vanadium	29	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		
Zinc	30	2.5	mg/Kg	1	2/8/2012 8:41:38 AM		

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method	Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis e	exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	D 4 604
	S	Spike Recovery outside accepted recovery limits			Page 4 of 31

### Hall Environmental Analysis Laboratory, Inc.

-

**Project:** 

Lab ID:

Analyses

1201885-005

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-3 (0-0.5') RCRA Background Investigation Collection Date: 1/27/2012 2:30:00 PM **Received Date:** 1/31/2012 9:30:00 AM Matrix: SOIL Result **RL** Qual Units DF Date Analyzed

5			•			·
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	1.6	1.5		mg/Kg	5	2/1/2012 4:55:06 PM
Chloride	17	7.5		mg/Kg	5	2/1/2012 4:55:06 PM
Sulfate	5.8	7.5	J	mg/Kg	5	2/1/2012 4:55:06 PM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.011	0.033	J	mg/kg	1	2/2/2012 10:21:44 AM
EPA METHOD 6010B: SOIL METALS						Analyst: ELS
Aluminum	23,000	1,500		mg/Kg	500	2/10/2012 7:12:47 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Arsenic	3.1	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Barium	93	0.20		mg/Kg	2	2/8/2012 8:48:12 AM
Beryllium	0.61	0.15		mg/Kg	1	2/8/2012 8:45:57 AM
Boron	8.2	4.0		mg/Kg	2	2/8/2012 8:48:12 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 8:45:57 AM
Chromium	8.5	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Cobalt	4.1	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Copper	6.7	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Iron	15,000	490		mg/Kg	500	3/16/2012 9:27:35 AM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 8:45:57 AM
Manganese	240	0.97		mg/Kg	10	3/16/2012 9:17:55 AM
Molybdenum	0.33	0.40	J	mg/Kg	1	2/8/2012 8:45:57 AM
Nickel	6.0	0.50		mg/Kg	1	2/8/2012 8:45:57 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:45:57 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Uranium	1.4	5.0	J	mg/Kg	1	2/8/2012 8:45:57 AM
Vanadium	25	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Zinc	26	2.5		mg/Kg	1	2/8/2012 8:45:57 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
F	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 5 of 31

#### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-3 (1.5-2.0') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 2:35:00 PM Lab ID: 1201885-006 Matrix: SOIL Received Date: 1/31/2012 9:30:00 AM Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM 2/1/2012 6:22:09 PM Fluoride 7.5 6.0 20 mg/Kg Chloride 420 30 mg/Kg 20 2/1/2012 6:22:09 PM Sulfate 7,600 30 Е mg/Kg 20 2/1/2012 6:22:09 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 2/2/2012 10:23:29 AM Mercury 0.012 0.033 J mg/kg 1 **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 11,000 1,500 mg/Kg 500 2/10/2012 7:18:34 AM Antimony ND 2.5 mg/Kg 1 2/8/2012 8:50:10 AM Arsenic 2.5 mg/Kg 3.0 1 2/8/2012 8:50:10 AM Barium 140 0.50 mg/Kg 5 2/10/2012 7:16:26 AM Beryllium 0.38 0.15 mg/Kg 1 2/8/2012 8:50:10 AM 12 2.0 mg/Kg 2/8/2012 8:50:10 AM Boron 1 Cadmium ND 0.10 mg/Kg 1 2/8/2012 8:50:10 AM Chromium 5.2 0.30 mg/Kg 1 2/8/2012 8:50:10 AM Cobalt 2.9 0.30 mg/Kg 1 2/8/2012 8:50:10 AM Copper 5.3 0.30 mg/Kg 1 2/8/2012 8:50:10 AM 8,400 200 Iron mg/Kg 200 3/16/2012 9:31:59 AM 0.25 2/8/2012 8:50:10 AM Lead 1.2 mg/Kg 1 Manganese 130 0.98 mg/Kg 10 3/16/2012 9:29:53 AM Molybdenum 0.31 0.40 J mg/Kg 1 2/8/2012 8:50:10 AM 4.2 0.50 mg/Kg 2/8/2012 8:50:10 AM Nickel 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 8:50:10 AM Silver 0.25 ND mg/Kg 1 2/8/2012 8:50:10 AM Thallium ND 2.5 mg/Kg 2/8/2012 8:50:10 AM 1 Uranium ND 5.0 mg/Kg 1 2/8/2012 8:50:10 AM Vanadium 17 2.5 mg/Kg 1 2/8/2012 8:50:10 AM Zinc 14 2.5 mg/Kg 1 2/8/2012 8:50:10 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 6 of 3

#### Hall Environmental Analysis Laboratory, Inc.

Uranium

Zinc

Vanadium

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-4 (0-0.5') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 2:40:00 PM Received Date: 1/31/2012 9:30:00 AM Lab ID: 1201885-007 Matrix: SOIL Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride 0.73 1.5 J 5 2/1/2012 7:14:23 PM mg/Kg Chloride ND 7.5 mg/Kg 5 2/1/2012 7:14:23 PM Sulfate 1.7 7.5 J mg/Kg 5 2/1/2012 7:14:23 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 2/2/2012 10:28:45 AM Mercury 0.011 0.033 J mg/kg 1 **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 17,000 1,500 mg/Kg 500 2/10/2012 7:20:34 AM Antimony 0.54 2.5 J mg/Kg 1 2/8/2012 9:04:21 AM Arsenic 2.5 J mg/Kg 2.4 1 2/8/2012 9:04:21 AM Barium 96 0.20 mg/Kg 2 2/8/2012 9:06:31 AM Beryllium 0.48 0.15 mg/Kg 1 2/8/2012 9:04:21 AM 2.0 mg/Kg 1 2/8/2012 9:04:21 AM Boron 5.0 Cadmium ND 0.10 mg/Kg 1 2/8/2012 9:04:21 AM Chromium 6.8 0.30 mg/Kg 1 2/8/2012 9:04:21 AM Cobalt 3.2 0.30 mg/Kg 1 2/8/2012 9:04:21 AM Copper 5.1 0.30 mg/Kg 1 2/8/2012 9:04:21 AM 480 3/16/2012 9:43:16 AM Iron 13,000 mg/Kg 500 1.7 0.25 2/8/2012 9:04:21 AM Lead mg/Kg 1 Manganese 200 0.95 mg/Kg 10 3/16/2012 9:41:20 AM Molybdenum 0.40 0.28 J mg/Kg 1 2/8/2012 9:04:21 AM Nickel 0.50 mg/Kg 2/8/2012 9:04:21 AM 4.9 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 9:04:21 AM Silver 0.25 2/8/2012 9:04:21 AM ND mg/Kg 1 Thallium ND 2.5 mg/Kg 1 2/8/2012 9:04:21 AM

1.1

20

21

5.0

2.5

2.5

J

mg/Kg

mg/Kg

mg/Kg

1

1

1

2/8/2012 9:04:21 AM

2/8/2012 9:04:21 AM

2/8/2012 9:04:21 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank	
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded	
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
R	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		Page 7 of	t 31

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

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Client Sample ID: BK-4 (1.5-2.0') Collection Date: 1/27/2012 2:45:00 PM Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-008	Matrix: S	SOIL		Received D	ate: 1/31/20	012 9:30:00 AM
Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	6.5	1.5		mg/Kg	5	2/1/2012 7:49:12 PM
Chloride	13	7.5		mg/Kg	5	2/1/2012 7:49:12 PM
Sulfate	3.6	7.5	J	mg/Kg	5	2/1/2012 7:49:12 PM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.014	0.033	J	mg/kg	1	2/2/2012 10:30:30 AM
EPA METHOD 6010B: SOIL METALS	i					Analyst: ELS
Aluminum	17,000	1,500		mg/Kg	500	2/10/2012 7:24:39 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Arsenic	2.6	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Barium	160	0.50		mg/Kg	5	2/10/2012 7:22:34 AM
Beryllium	0.42	0.15		mg/Kg	1	2/8/2012 9:08:43 AM
Boron	5.1	2.0		mg/Kg	1	2/8/2012 9:08:43 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:08:43 AM
Chromium	6.1	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Cobalt	3.9	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Copper	6.5	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Iron	14,000	480		mg/Kg	500	3/16/2012 9:47:30 AM
Lead	2.2	0.25		mg/Kg	1	2/8/2012 9:08:43 AM
Manganese	280	0.96		mg/Kg	10	3/16/2012 9:45:28 AM
Molybdenum	0.24	0.40	J	mg/Kg	1	2/8/2012 9:08:43 AM
Nickel	5.2	0.50		mg/Kg	1	2/8/2012 9:08:43 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:08:43 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:08:43 AM
Vanadium	23	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Zinc	20	2.5		mg/Kg	1	2/8/2012 9:08:43 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method	Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis ex	kceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits			Page 8 of 31

#### Hall Environmental Analysis Laboratory, Inc.

Zinc

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-5 (0-0.5') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 3:00:00 PM 1201885-009 Received Date: 1/31/2012 9:30:00 AM Lab ID: Matrix: SOIL Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride 0.49 1.5 J mg/Kg 5 2/1/2012 8:24:02 PM Chloride ND 7.5 mg/Kg 5 2/1/2012 8:24:02 PM Sulfate 4.0 7.5 J mg/Kg 5 2/1/2012 8:24:02 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 0.033 1 2/2/2012 10:32:16 AM Mercury 0.013 J mg/kg **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 18,000 1,500 mg/Kg 500 2/13/2012 7:33:40 AM Antimony ND 2.5 mg/Kg 1 2/8/2012 9:13:14 AM Arsenic 2.5 mg/Kg 2.6 1 2/8/2012 9:13:14 AM Barium 140 0.50 mg/Kg 5 2/10/2012 7:26:42 AM Beryllium 0.53 0.15 mg/Kg 1 2/8/2012 9:13:14 AM 6.4 4.0 mg/Kg 2 2/8/2012 9:15:27 AM Boron Cadmium ND 0.10 mg/Kg 1 2/8/2012 9:13:14 AM Chromium 7.5 0.30 mg/Kg 1 2/8/2012 9:13:14 AM Cobalt 4.1 0.30 mg/Kg 1 2/8/2012 9:13:14 AM Copper 6.5 0.30 mg/Kg 1 2/8/2012 9:13:14 AM 18,000 500 3/16/2012 9:51:34 AM Iron mg/Kg 500 Lead 2.4 0.25 2/8/2012 9:13:14 AM mg/Kg 1 Manganese 290 1.0 mg/Kg 10 3/16/2012 9:49:43 AM Molybdenum 0.25 0.40 J mg/Kg 1 2/8/2012 9:13:14 AM Nickel 6.1 0.50 mg/Kg 2/8/2012 9:13:14 AM 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 9:13:14 AM 0.25 Silver mg/Kg 2/8/2012 9:13:14 AM ND 1 Thallium ND 2.5 mg/Kg 1 2/8/2012 9:13:14 AM Uranium 0.84 5.0 J mg/Kg 1 2/8/2012 9:13:14 AM Vanadium 23 2.5 mg/Kg 1 2/8/2012 9:13:14 AM

25

2.5

mg/Kg

1

2/8/2012 9:13:14 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method E	Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis ex	ceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		ł	Page 9 of 31

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Client Sample ID: BK-5 (1.5-2.0') Collection Date: 1/27/2012 3:05:00 PM Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-010	Matrix: S	SOIL		Received D	ate: 1/31/20	012 9:30:00 AM
Analyses	Result	RL Q	)ual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	5.0	1.5		mg/Kg	5	2/1/2012 8:58:52 PM
Chloride	170	7.5		mg/Kg	5	2/1/2012 8:58:52 PM
Sulfate	28	7.5		mg/Kg	5	2/1/2012 8:58:52 PM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.015	0.033	J	mg/kg	1	2/2/2012 10:34:02 AM
EPA METHOD 6010B: SOIL METALS	;					Analyst: ELS
Aluminum	15,000	1,500		mg/Kg	500	2/13/2012 7:35:43 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Arsenic	2.2	2.5	J	mg/Kg	1	2/8/2012 9:17:26 AM
Barium	390	1.0		mg/Kg	10	2/10/2012 7:40:15 AM
Beryllium	0.52	0.15		mg/Kg	1	2/8/2012 9:17:26 AM
Boron	7.4	4.0		mg/Kg	2	2/8/2012 9:19:32 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:17:26 AM
Chromium	7.9	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Cobalt	4.8	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Copper	7.8	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Iron	18,000	480		mg/Kg	500	3/16/2012 10:03:39 AM
Lead	3.2	0.25		mg/Kg	1	2/8/2012 9:17:26 AM
Manganese	290	0.95		mg/Kg	10	3/16/2012 10:01:46 AM
Molybdenum	0.37	0.40	J	mg/Kg	1	2/8/2012 9:17:26 AM
Nickel	6.8	0.50		mg/Kg	1	2/8/2012 9:17:26 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:17:26 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:17:26 AM
Vanadium	27	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Zinc	29	2.5		mg/Kg	1	2/8/2012 9:17:26 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank	
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded	
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		Page 10 c	of 31

2/8/2012 9:22:01 AM

#### Hall Environmental Analysis Laboratory, Inc.

Silver

Zinc

Thallium

Uranium

Vanadium

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-6 (0-0.5') **Project: RCRA** Background Investigation Collection Date: 1/27/2012 3:15:00 PM Received Date: 1/31/2012 9:30:00 AM Lab ID: 1201885-011 Matrix: SOIL Analyses Result **RL** Qual Units DF **Date Analyzed EPA METHOD 300.0: ANIONS** Analyst: BRM Fluoride 0.79 1.5 J mg/Kg 5 2/1/2012 9:33:40 PM Chloride ND 7.5 mg/Kg 5 2/1/2012 9:33:40 PM Sulfate 1.4 7.5 J mg/Kg 5 2/1/2012 9:33:40 PM **EPA METHOD 7471: MERCURY** Analyst: ELS 0.033 1 2/2/2012 10:35:49 AM Mercury 0.0078 J mg/kg **EPA METHOD 6010B: SOIL METALS** Analyst: ELS Aluminum 12,000 1,500 mg/Kg 500 2/13/2012 7:37:43 AM Antimony ND 2.5 mg/Kg 1 2/8/2012 9:22:01 AM Arsenic 2.5 J mg/Kg 1.9 1 2/8/2012 9:22:01 AM Barium 98 0.20 mg/Kg 2 2/8/2012 9:39:12 AM Beryllium 0.40 0.15 mg/Kg 1 2/8/2012 9:22:01 AM 4.2 2.0 mg/Kg 1 2/8/2012 9:22:01 AM Boron Cadmium 0.028 0.10 J mg/Kg 1 2/8/2012 9:22:01 AM Chromium 5.7 0.30 mg/Kg 1 2/8/2012 9:22:01 AM Cobalt 3.2 0.30 mg/Kg 1 2/8/2012 9:22:01 AM Copper 4.6 0.30 mg/Kg 1 2/8/2012 9:22:01 AM 12,000 500 3/18/2012 12:44:17 PM Iron mg/Kg 500 Lead 2.5 0.25 2/8/2012 9:22:01 AM mg/Kg 1 Manganese 250 0.97 mg/Kg 10 3/16/2012 10:08:06 AM Molybdenum 0.27 0.40 2/8/2012 9:22:01 AM J mg/Kg 1 Nickel 4.5 0.50 mg/Kg 2/8/2012 9:22:01 AM 1 Selenium ND 2.5 mg/Kg 1 2/8/2012 9:22:01 AM

0.25

2.5

5.0

2.5

2.5

J

ND

ND

0.68

19

19

mg/Kg

mg/Kg

mg/Kg

mg/Kg

mg/Kg

1

1

1

1

1

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 11 of 31

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

RCRA Background Investigation

Project:

Client Sample ID: BK-6 (1.5-2.0') Collection Date: 1/27/2012 3:20:00 PM Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-012	Matrix: S	SOIL		Received D	ate: 1/31/20	012 9:30:00 AM
Analyses	Result	RL Q	ual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	5.7	1.5		mg/Kg	5	2/1/2012 10:43:18 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 10:43:18 PM
Sulfate	7.4	7.5	J	mg/Kg	5	2/1/2012 10:43:18 PM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.016	0.033	J	mg/kg	1	2/2/2012 10:37:36 AM
EPA METHOD 6010B: SOIL METALS						Analyst: ELS
Aluminum	15,000	1,500		mg/Kg	500	2/13/2012 7:49:17 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Arsenic	2.7	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Barium	150	0.50		mg/Kg	5	2/10/2012 7:49:54 AM
Beryllium	0.47	0.15		mg/Kg	1	2/8/2012 9:41:24 AM
Boron	5.5	2.0		mg/Kg	1	2/8/2012 9:41:24 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:41:24 AM
Chromium	6.5	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Cobalt	3.9	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Copper	7.2	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Iron	13,000	480		mg/Kg	500	3/16/2012 10:13:54 AM
Lead	2.2	0.25		mg/Kg	1	2/8/2012 9:41:24 AM
Manganese	210	0.97		mg/Kg	10	3/16/2012 10:12:02 AM
Molybdenum	0.28	0.40	J	mg/Kg	1	2/8/2012 9:41:24 AM
Nickel	5.9	0.50		mg/Kg	1	2/8/2012 9:41:24 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:41:24 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:41:24 AM
Vanadium	22	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Zinc	21	2.5		mg/Kg	1	2/8/2012 9:41:24 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank	
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded	
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		Page 12 of 3	I

### Hall Environmental Analysis Laboratory, Inc.

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Project:

Lab ID:

1201885-013

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: BK-7 (0-0.5') Collection Date: 1/27/2012 3:30:00 PM RCRA Background Investigation Matrix: SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	ND	1.5		mg/Kg	5	2/1/2012 11:18:07 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 11:18:07 PM
Sulfate	ND	7.5		mg/Kg	5	2/1/2012 11:18:07 PM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.012	0.033	J	mg/kg	1	2/2/2012 10:39:24 AM
EPA METHOD 6010B: SOIL METALS						Analyst: ELS
Aluminum	12,000	1,500		mg/Kg	500	2/13/2012 7:51:19 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Arsenic	3.2	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Barium	140	0.50		mg/Kg	5	2/10/2012 7:54:00 AM
Beryllium	0.40	0.15		mg/Kg	1	2/8/2012 9:46:02 AM
Boron	4.3	2.0		mg/Kg	1	2/8/2012 9:46:02 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:46:02 AM
Chromium	5.8	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Cobalt	3.2	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Copper	5.5	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Iron	11,000	490		mg/Kg	500	3/16/2012 10:17:59 AM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 9:46:02 AM
Manganese	200	0.98		mg/Kg	10	3/16/2012 10:16:07 AM
Molybdenum	0.27	0.40	J	mg/Kg	1	2/8/2012 9:46:02 AM
Nickel	4.6	0.50		mg/Kg	1	2/8/2012 9:46:02 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:46:02 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Uranium	0.48	5.0	J	mg/Kg	1	2/8/2012 9:46:02 AM
Vanadium	19	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Zinc	19	2.5		mg/Kg	1	2/8/2012 9:46:02 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 13 of 31

### Hall Environmental Analysis Laboratory, Inc.

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Lab ID:

1201885-014

Client Sample ID: BK-7 (1.5-2.0') **CLIENT:** Western Refining Southwest, Inc. Project: RCRA Background Investigation Collection Date: 1/27/2012 3:35:00 PM Matrix: SOIL **Received Date:** 1/31/2012 9:30:00 AM

Luo ID: 1201005 014	Matrix, k		nee		012 9.50.00 7101
Analyses	Result	RL Q	Qual Unit	s DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: BRM
Fluoride	2.9	1.5	mg/l	Kg 5	2/1/2012 11:52:55 PM
Chloride	ND	7.5	mg/l	<g 5<="" td=""><td>2/1/2012 11:52:55 PM</td></g>	2/1/2012 11:52:55 PM
Sulfate	10	7.5	mg/l	<g 5<="" td=""><td>2/1/2012 11:52:55 PM</td></g>	2/1/2012 11:52:55 PM
EPA METHOD 7471: MERCURY					Analyst: ELS
Mercury	0.013	0.033	J mg/l	kg 1	2/2/2012 10:41:11 AM
EPA METHOD 6010B: SOIL METALS					Analyst: ELS
Aluminum	17,000	1,500	mg/l	Kg 500	2/13/2012 7:53:19 AM
Antimony	ND	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM
Arsenic	2.5	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM
Barium	760	2.0	mg/l	Kg 20	2/10/2012 7:58:10 AM
Beryllium	0.51	0.15	mg/l	Kg 1	2/8/2012 9:50:14 AM
Boron	6.4	4.0	mg/l	Kg 2	2/8/2012 9:52:22 AM
Cadmium	ND	0.10	mg/l	Kg 1	2/8/2012 9:50:14 AM
Chromium	7.5	0.30	mg/l	Kg 1	2/8/2012 9:50:14 AM
Cobalt	4.4	0.30	mg/l	Kg 1	2/8/2012 9:50:14 AM
Copper	7.5	0.30	mg/l	Kg 1	2/8/2012 9:50:14 AM
Iron	16,000	490	mg/l	Kg 500	3/16/2012 10:31:29 AM
Lead	2.8	0.25	mg/l	Kg 1	2/8/2012 9:50:14 AM
Manganese	260	0.99	mg/l	Kg 10	3/16/2012 10:20:14 AM
Molybdenum	0.31	0.40	J mg/l	Kg 1	2/8/2012 9:50:14 AM
Nickel	6.6	0.50	mg/l	Kg 1	2/8/2012 9:50:14 AM
Selenium	ND	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM
Silver	ND	0.25	mg/l	Kg 1	2/8/2012 9:50:14 AM
Thallium	ND	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM
Uranium	ND	5.0	mg/l	Kg 1	2/8/2012 9:50:14 AM
Vanadium	24	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM
Zinc	24	2.5	mg/l	Kg 1	2/8/2012 9:50:14 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 14 of 3

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

-

 Client Sample ID: BK-8 (0-0.5')

 Collection Date: 1/27/2012 3:50:00 PM

 Matrix: SOIL
 Received Date: 1/31/2012 9:30:00 AM

Lab ID: 1201885-015	Matrix: S	SOIL		<b>Received Date:</b> 1/31/2012 9:30:00 AM		
Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	0.85	1.5	J	mg/Kg	5	2/2/2012 12:27:44 AM
Chloride	ND	7.5		mg/Kg	5	2/2/2012 12:27:44 AM
Sulfate	4.0	7.5	J	mg/Kg	5	2/2/2012 12:27:44 AM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.0089	0.033	J	mg/kg	1	2/2/2012 10:43:08 AM
EPA METHOD 6010B: SOIL METALS	;					Analyst: ELS
Aluminum	9,700	600		mg/Kg	200	2/13/2012 7:55:20 AM
Antimony	0.57	2.5	J	mg/Kg	1	2/8/2012 9:54:25 AM
Arsenic	1.6	2.5	J	mg/Kg	1	2/8/2012 9:54:25 AM
Barium	150	0.50		mg/Kg	5	2/10/2012 8:09:39 AM
Beryllium	0.33	0.15		mg/Kg	1	2/8/2012 9:54:25 AM
Boron	4.0	2.0		mg/Kg	1	2/8/2012 9:54:25 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:54:25 AM
Chromium	4.6	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Cobalt	2.7	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Copper	4.0	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Iron	8,700	200		mg/Kg	200	3/16/2012 10:35:37 AM
Lead	2.3	0.25		mg/Kg	1	2/8/2012 9:54:25 AM
Manganese	180	1.0		mg/Kg	10	3/16/2012 10:33:47 AM
Molybdenum	0.22	0.40	J	mg/Kg	1	2/8/2012 9:54:25 AM
Nickel	3.7	0.50		mg/Kg	1	2/8/2012 9:54:25 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:54:25 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:54:25 AM
Vanadium	15	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Zinc	15	2.5		mg/Kg	1	2/8/2012 9:54:25 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 15 of 31

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

1201885-016

-

Lab ID:

 Client Sample ID: BK-8 (1.5-2.0')

 Collection Date: 1/27/2012 3:55:00 PM

 Matrix: SOIL
 Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	
EPA METHOD 300.0: ANIONS					Analyst: BRN	
Fluoride	12	6.0	mg/Kg	20	2/2/2012 1:19:58 AM	
Chloride	540	30	mg/Kg	20	2/2/2012 1:19:58 AM	
Sulfate	10,000	30	E mg/Kg	20	2/2/2012 1:19:58 AM	
EPA METHOD 7471: MERCURY					Analyst: ELS	
Mercury	ND	0.033	mg/kg	1	2/2/2012 10:44:54 AM	
EPA METHOD 6010B: SOIL METALS					Analyst: ELS	
Aluminum	20,000	1,500	mg/Kg	500	2/13/2012 7:57:23 AM	
Antimony	ND	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	
Arsenic	2.9	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	
Barium	480	1.0	mg/Kg	10	2/10/2012 8:13:32 AM	
Beryllium	0.67	0.15	mg/Kg	1	2/8/2012 10:11:44 AM	
Boron	9.9	2.0	mg/Kg	1	2/8/2012 10:11:44 AM	
Cadmium	ND	0.10	mg/Kg	1	2/8/2012 10:11:44 AM	
Chromium	8.3	0.30	mg/Kg	1	2/8/2012 10:11:44 AM	
Cobalt	4.1	0.30	mg/Kg	1	2/8/2012 10:11:44 AM	
Copper	5.2	0.30	mg/Kg	1	2/8/2012 10:11:44 AM	
Iron	13,000	480	mg/Kg	500	3/16/2012 10:41:52 AN	
Lead	1.4	0.25	mg/Kg	1	2/8/2012 10:11:44 AM	
Manganese	360	0.96	mg/Kg	10	3/16/2012 10:39:52 AN	
Molybdenum	0.90	0.40	mg/Kg	1	2/8/2012 10:11:44 AM	
Nickel	5.4	0.50	mg/Kg	1	2/8/2012 10:11:44 AM	
Selenium	ND	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	
Silver	ND	0.25	mg/Kg	1	2/8/2012 10:11:44 AM	
Thallium	ND	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	
Uranium	ND	5.0	mg/Kg	1	2/8/2012 10:11:44 AM	
Vanadium	24	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	
Zinc	21	2.5	mg/Kg	1	2/8/2012 10:11:44 AM	

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 16 of 31

### Hall Environmental Analysis Laboratory, Inc.

Project:

1201885-017

Lab ID:

**CLIENT:** Western Refining Southwest, Inc. RCRA Background Investigation Matrix: SOIL

Client Sample ID: BK-7 (0-0.5') DUP Collection Date: 1/27/2012 3:30:00 PM **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRN
Fluoride	ND	1.5		mg/Kg	5	2/2/2012 9:44:52 AM
Chloride	ND	7.5		mg/Kg	5	2/2/2012 9:44:52 AM
Sulfate	1.4	7.5	J	mg/Kg	5	2/2/2012 9:44:52 AM
EPA METHOD 7471: MERCURY						Analyst: ELS
Mercury	0.011	0.033	J	mg/kg	1	2/2/2012 10:50:11 AM
EPA METHOD 6010B: SOIL METALS						Analyst: ELS
Aluminum	11,000	1,500		mg/Kg	500	2/13/2012 7:59:30 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Arsenic	2.2	2.5	J	mg/Kg	1	2/8/2012 10:16:01 AM
Barium	160	0.50		mg/Kg	5	2/10/2012 8:20:00 AM
Beryllium	0.36	0.15		mg/Kg	1	2/8/2012 10:16:01 AM
Boron	4.0	2.0		mg/Kg	1	2/8/2012 10:16:01 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 10:16:01 AM
Chromium	5.3	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Cobalt	3.0	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Copper	5.1	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Iron	12,000	500		mg/Kg	500	3/18/2012 12:46:41 PM
Lead	2.7	0.25		mg/Kg	1	2/8/2012 10:16:01 AM
Manganese	200	0.99		mg/Kg	10	3/16/2012 10:43:55 AM
Molybdenum	0.23	0.40	J	mg/Kg	1	2/8/2012 10:16:01 AM
Nickel	4.3	0.50		mg/Kg	1	2/8/2012 10:16:01 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 10:16:01 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Uranium	0.37	5.0	J	mg/Kg	1	2/8/2012 10:16:01 AM
Vanadium	17	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Zinc	18	2.5		mg/Kg	1	2/8/2012 10:16:01 AM

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank	
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded	
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	
	S	Spike Recovery outside accepted recovery limits		Page 17 of 3	I

#### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:**Western Refining Southwest, Inc.**Project:**RCRA Background Investigation

1201885-018

Lab ID:

Client Sample ID: BK-EB-012712 Collection Date: 1/27/2012 4:25:00 PM Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED ME	TALS					Analyst: RAG
Aluminum	ND	0.020		mg/L	1	2/10/2012 3:10:48 PM
Barium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Beryllium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Boron	ND	0.040		mg/L	1	2/10/2012 3:10:48 PM
Cadmium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Chromium	0.00077	0.0060	J	mg/L	1	2/10/2012 3:10:48 PM
Cobalt	0.00059	0.0060	J	mg/L	1	2/10/2012 3:10:48 PM
Copper	ND	0.0060		mg/L	1	2/10/2012 3:10:48 PM
Iron	ND	0.020		mg/L	1	2/13/2012 2:57:17 PM
Lead	ND	0.0050		mg/L	1	2/10/2012 3:10:48 PM
Manganese	0.00085	0.0020	J	mg/L	1	2/10/2012 3:10:48 PM
Molybdenum	ND	0.0080		mg/L	1	2/10/2012 3:10:48 PM
Nickel	ND	0.010		mg/L	1	2/10/2012 3:10:48 PM
Silver	ND	0.0050		mg/L	1	2/10/2012 3:10:48 PM
Vanadium	ND	0.050		mg/L	1	2/10/2012 3:10:48 PM
Zinc	0.081	0.010		mg/L	1	2/13/2012 2:57:17 PM
EPA METHOD 200.7: TOTAL METALS	6					Analyst: RAG
Aluminum	0.042	0.020		mg/L	1	2/6/2012 7:27:52 PM
Barium	0.0010	0.0020	J	mg/L	1	2/6/2012 7:27:52 PM
Beryllium	ND	0.0020		mg/L	1	2/6/2012 7:27:52 PM
Boron	0.0036	0.040	J	mg/L	1	2/6/2012 7:27:52 PM
Cadmium	ND	0.0020		mg/L	1	2/6/2012 7:27:52 PM
Chromium	0.00093	0.0060	J	mg/L	1	2/6/2012 7:27:52 PM
Cobalt	ND	0.0060		mg/L	1	2/6/2012 7:27:52 PM
Copper	0.0045	0.0060	J	mg/L	1	2/6/2012 7:27:52 PM
Iron	0.063	0.020		mg/L	1	2/6/2012 7:27:52 PM
Lead	ND	0.0050		mg/L	1	2/6/2012 7:27:52 PM
Manganese	0.00097	0.0020	J	mg/L	1	2/6/2012 7:27:52 PM
Molybdenum	ND	0.0080		mg/L	1	2/6/2012 7:27:52 PM
Nickel	0.00063	0.010	J	mg/L	1	2/6/2012 7:27:52 PM
Silver	ND	0.0050		mg/L	1	2/6/2012 7:27:52 PM
Vanadium	ND	0.050		mg/L	1	2/6/2012 7:27:52 PM
Zinc	0.0099	0.010	J	mg/L	1	2/6/2012 7:27:52 PM
EPA 200.8: DISSOLVED METALS						Analyst: SNV
Antimony	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Arsenic	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Selenium	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Thallium	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Uranium	ND	0.0010		mg/L	1	2/8/2012 10:52:35 AM
200.8 ICPMS METALS:TOTAL						Analyst: SNV

Matrix: AQUEOUS

Qualifiers: */X Value exceeds Maximum Contaminant Level.	
--	--

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method BlankH Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

#### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: BK-EB-012712 **Project: RCRA** Background Investigation Collection Date: 1/27/2012 4:25:00 PM Lab ID: 1201885-018 Matrix: AQUEOUS Received Date: 1/31/2012 9:30:00 AM Analyses Result **RL** Qual Units DF **Date Analyzed** 200.8 ICPMS METALS:TOTAL Analyst: SNV ND 0.0025 2.5 2/6/2012 2:54:16 PM Antimony mg/L Arsenic ND 0.0025 mg/L 2.5 2/6/2012 2:54:16 PM Selenium ND 0.0025 mg/L 2.5 2/6/2012 2:54:16 PM Thallium ND 0.0025 mg/L 2.5 2/6/2012 2:54:16 PM Uranium ND 0.0025 mg/L 2.5 2/6/2012 2:54:16 PM EPA METHOD 245.1: MERCURY Analyst: JLF 2/6/2012 3:41:25 PM Mercury 0.000050 0.00020 mg/L 1 J

<b>Oualifiers:</b>	*/X	V

- K Value exceeds Maximum Contaminant Level.E Value above quantitation range
- J Analyte detected below quantitation limits
- 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
- RL Reporting Detection Limit

#### CASE NARRATIVE

#### February 22, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1201885 Anatek Batch: 120201021

**Project Summary:** Seventeen (17) soil samples were received on 2/1/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 5.7C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1201885-001B BK-1 (0-0.5')	120201021-001	EPA 335.4
1201885-002B BK-1 (1.5-2.0')	120201021-002	EPA 335.4
1201885-003B BK-2 (0-0.5')	120201021-003	EPA 335.4
1201885-004B BK-2 (1.5-2.0')	120201021-004	EPA 335.4
1201885-005B BK-3 (0-0.5')	120201021-005	EPA 335.4
1201885-006B BK-3 (1.5-2.0')	120201021-006	EPA 335.4
1201885-007B BK-4 (0-0.5')	120201021-007	EPA 335.4
1201885-008B BK-4 (1.5-2.0')	120201021-008	EPA 335.4
1201885-009B BK-5 (0-0.5')	120201021-009	EPA 335.4
1201885-010B BK-5 (1.5-2.0'	120201021-010	EPA 335.4
1201885-011B BK-6 (0-0.5')	120201021-011	EPA 335.4
1201885-012B BK-6 (1.5-2.0')	120201021-012	EPA 335.4
1201885-013B BK-7 (0-0.5')	120201021-013	EPA 335.4
1201885-014B BK-7 (1.5-2.0')	120201021-014	EPA 335.4
1201885-015B BK-8 (0-0.5')	120201021-015	EPA 335.4
1201885-016B BK-8 (1.5-2.0'	120201021-016	EPA 335.4
1201885-017B BK-7 (0-0.5') DUP	120201021-017	EPA 335.4

#### **QA/QC** Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

#### 1. Holding Time Requirements

No problems encountered.

#### 2. GC/MS Tune Requirements

N/A

#### 3. Calibration Requirements

No problems encountered.

#### 4. Surrogate Recovery Requirements

N/A.

#### 5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

#### 6. Method Blank Requirements

No problems encountered.

#### 7. Internal Standard(s) Response Requirements

No problems encountered.

#### 8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

John. Call

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120201021
Address:	4901 HAWKINS NE SUITE D	Project Name:	1201885
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

#### **Analytical Results Report**

Sample Number Client Sample ID Aatrix Comments	120201021-001 1201885-001B / BK-1 (0- Soil	0.5)	Sampling Date Sampling Time Sample Locatio	• 1	/27/2012 Da :30 PM	ite/Time Receiv	ed 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW I	EPA 335.4	
%moisture		12.2	Percent		2/14/2012	CRW 9	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cent2632; ID:WA00169; WA:C585; MT:Cent0095 

 Anatek Labs, Inc.

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504 E Sprague Ste. D · Spokane WA 99202 · (509) 838-3999 · Fax (509) 838-4433 · email spokane@anateklabs.com

120201021 1201885

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:
Address:	4901 HAWKINS NE SUITE D	Project Name:
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-002 1201885-002B / BK-1 (1.5-2 Soil	.0)	Sampling Date Sampling Time Sample Locatio	1	/27/2012 <b>D</b> a :34 PM	ite/Time Rec	eived 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide %moisture		ND 4.5	mg/Kg Percent	0.3	2/9/2012 2/14/2012	CRW CRW	EPA 335.4 %moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch
Address:	4901 HAWKINS NE SUITE D	Projec
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

#### Batch #: 120201021 Project Name: 1201885

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-003 1201885-003B / BK-2 (0-0 Soil	5)	Sampling Date Sampling Time Sample Locatio	2	/27/2012 Da ::05 PM	ite/Time Rece	lved 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture		9.4	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120201021
Address:	4901 HAWKINS NE SUITE D	Project Name:	1201885
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-004 1201885-004B / BK-2 (1.5-2.0) Soil	Sampling Date Sampling Time Sample Locatio	2:10	7/2012 <b>Da</b> 0 PM	te/Time Receive	<b>d</b> 2/1/2012	10:37 AM
Parameter	Resul	t Units	PQL	Analysis Date	Analyst I	Viethod	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW EI	PA 335.4	
%moisture	7	Percent		2/14/2012	CRW %	moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C565; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	E
Address:	4901 HAWKINS NE SUITE D	F
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

# Batch #: 120201021 Project Name: 1201885

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-005 1201885-005B / BK-3 (0-0.5) Soil		Sampling Date Sampling Time Sample Location	<b>)</b> 2	/27/2012 <b>D</b> a 1:30 PM	ate/Time Recei	ived 2/1/2012	10:37 AM
Parameter	Re	sult	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	1	0.6	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA0D169; WA:C585; MT:Cert0095

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120201021

1201885

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:
Address:	4901 HAWKINS NE SUITE D	Project Name:
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

### Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120201021-006 1201885-006B / BK-3 (1.5-2.0) Soil	San	npling Date npling Time nple Locatio	2	/27/2012 Da 105 PM	ate/Time Rece	ived 2/1/2012	10:37 AM
Parameter	Res	ult	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	NE	)	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	4.2	2	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2832; ID:WA00169; WA:C585; MT:Cert0095

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> 120201021 1201885

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:
Address:	4901 HAWKINS NE SUITE D	Project Name:
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

### Analytical Results Report

Sample Number Client Sample ID Matrīx Comments	120201021-007 1201885-007B / BK-4 (0-0.5) Soil	Sampling Da Sampling Tir Sample Loca	me 2	/27/2012 <b>Da</b> :40 PM	ite/Time Rece	ived 2/1/2012	10:37 AM
Parameter	Resi	ılt Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	21.6	B Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cent2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120201021
Address:	4901 HAWKINS NE SUITE D	Project Name:	1201885
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120201021-008 1201885-008B / BK-4 (1.5-) Soil	2.0)	Sampling Date Sampling Time Sample Locatio	2	/27/2012 Da ::45 PM	ite/Time Recei	ved 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture		3.6	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

Batch #: 120201021 Project Name: 1201885

**Analytical Results Report** 

Sample Number Client Sample ID Matrix Comments	120201021-009 1201885-009B / BK-5 (0-0.5) Soil		Sampling Date Sampling Time Sample Locatio	3	/27/2012 <b>D</b> a :00 PM	ite/Time Receiv	<b>ved</b> 2/1/2012	10:37 AM
Parameter	Re	sult	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	Ν	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	14	4.3	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C565; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:
Address:	4901 HAWKINS NE SUITE D	Project Name:
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

# Analytical Results Report

120201021 1201885

Sample Number Client Sample ID Matrix Comments	120201021-010 1201885-010B / BK-5 (1.5-2.0) Soil		Sampling Date Sampling Time Sample Locatio	3	/27/2012 Da :05 PM	ite/Time Rec	eived	2/1/2012	10:37 AM
Parameter	Res	sult	Units	PQL	Analysis Date	Analyst	Me	thod	Qualifier
Cyanide	N	ID	mg/Kg	0.3	2/9/2012	CRW	EPA	335.4	
%moisture	4	.4	Percent		2/14/2012	CRW	%mc	oisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E67893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	E
Address:	4901 HAWKINS NE SUITE D	F
	ALBUQUERQUE, NM 87109	
Attn:	ANDY FREEMAN	

Batch #: 120201021 Project Name: 1201885

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-011 1201885-011B / BK-6 (0 Soil	-0.5)	Sampling Date Sampling Time Sample Locati	• 3	/27/2012 Da :15 PM	ite/Time Red	ceived	2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Mətl	hod	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 3	335.4	
%moisture		10.6	Percent		2/14/2012	CRW	%moi	sture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

Batch #: 120201021 Project Name: 1201885

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-012 1201885-012B / BK-6 (1.5-2.0) Soil	Sampling Date Sampling Time Sample Locati	e 3	/27/2012 D :20 PM	ate/Time Red	eived	2/1/2012	10:37 AM
Parameter	Result	Units	PQL	Analysis Date	Analyst	Met	hod	Qualifier
Cyanide %moisture	ND 4.1	mg/Kg Percent	0.3	2/9/2012 2/14/2012	CRW CRW	EPA	335.4 isture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

#### Batch #: 120201021 Project Name: 1201885

## Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120201021-013 1201885-013B / BK-7 (0-0. Soil	5)	Sampling Date Sampling Time Sample Locati	. 3	/27/2012 Da :30 PM	ate/Time Rece	i <b>ved</b> 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture		9.5	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2532; ID:WA00169; WA:C565; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

 Batch #:
 120201021

 Project Name:
 1201885

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-014 1201885-014B / BK-7 (1.5-2.0 Soil	))	Sampling Date Sampling Time Sample Location	3	/27/2012 <b>Da</b> :35 PM	ite/Time Receiv	red 2/1/2012	10:37 AM
Parameter	R	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	·
%moisture		5.2	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:IDD0013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cent2632; ID:WA00169; WA:C585; MT:Cent0095

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#### Client: HALL ENVIRONMENTAL ANALYSIS LAB Address: 4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109 Attn: ANDY FREEMAN

Batch #: 120201021 Project Name: 1201885

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-015 1201885-015B / BK-8 (0- Soil	0.5)	Sampling Date Sampling Time Sample Locati	e 3	/27/2012 <b>D</b> a :50 PM	ite/Time Rece	ived 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture		7.4	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-D02; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

Batch #: 120201021 Project Name: 1201885

Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120201021-016 1201885-016B / BK-8 (1.5-2 Soil	2.0)	Sampling Date Sampling Time Sample Locatio	3	/27/2012 <b>Da</b> :55 PM	ate/Time Receive	ed 2/1/2012	10:37 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/9/2012	CRW E	PA 335.4	
%moisture		8.7	Percent		2/14/2012	CRW %	6moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2832; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB
Address:	4901 HAWKINS NE SUITE D
	ALBUQUERQUE, NM 87109
Attn:	ANDY FREEMAN

Batch #: 120201021 Project Name: 1201885

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120201021-017 1201885-017B / BK-7 (0-0.5) D Soil		Sampling Date Sampling Time Sample Locatio	3	/27/2012 Da :30 PM	te/Time Reco	eived	2/1/2012	10:37 AM
Parameter	Re	sult	Units	PQL	Analysis Date	Analyst	Meth	od	Qualifier
Cyanide	N	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 3	35.4	
%moisture	9	9.6	Percent		2/14/2012	CRW	%mois	sture	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level

- ND Not Detected
- PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Wednesday, February 22, 2012

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120201021
Address:	4901 HAWKINS NE SUITE D	Project Name:	1201885
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		
	Analytical Results Rep	ort	

Quality Control Data

Lab Control Sample										
Parameter	LCS Result	Units	s LCS	Spike %	Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide	0.548	mg/k	g 0	5 10	)9.6	80	-120	2/9/2	2012	2/9/2012
Cyanide	0.524	mg/kg	g 0	5 10	)4.8	80	-120	2/9/2	2012	2/9/2012
Matrix Spike										
Sample Number Parameter		Sample Result	MS Result	Units		MS pike	%Rec	AR %Rec	Prep Date	Analysis Dat
120201021-016 Cyanide		ND	14.6	mg/kg		13.7	106.6	60-140	2/9/2012	2/9/2012
120201021-002 Cyanide		ND	14.1	mg/kg		13		60-140	2/9/2012	2/9/2012
Matrix Spike Duplicate	MSD		MSD				AR			
Parameter	Result	Units	Spike	%Rec	%	RPD	%RPD	Pre	p Date	Analysis Date
Cyanide	14.9	mg/kg	13.7	108.8	2	2.0	0-25	2/9	)/2012	2/9/2012
Cyanide	14.0	mg/kg	13	107.7		0.7	0-25	2/9	/2012	2/9/2012
Method Blank				<u>.</u> .						
Parameter		Re	sult	Units	5		PQL	Pr	ep Date	Analysis Date
Cyanide		1	ND	mg/K	g		0.3	:	2/9/2012	2/9/2012
Cyanide		N	ND	mg/K	a		0.3		2/9/2012	2/9/2012

AR Acceptable Range

ND Not Detected

PQL Practical Quantitation Limit

RPD Relative Percentage Difference

#### Comments:

Certifications held by Anatek Labs ID: EPA: JD00013; AZ:0701; CO: JD00013; FL(NELAP): E87893; ID: JD00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR: JD200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA: WA00169; CA:Cert2632; ID: WA00169; WA:C585; MT:Cert0095

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## Login Report

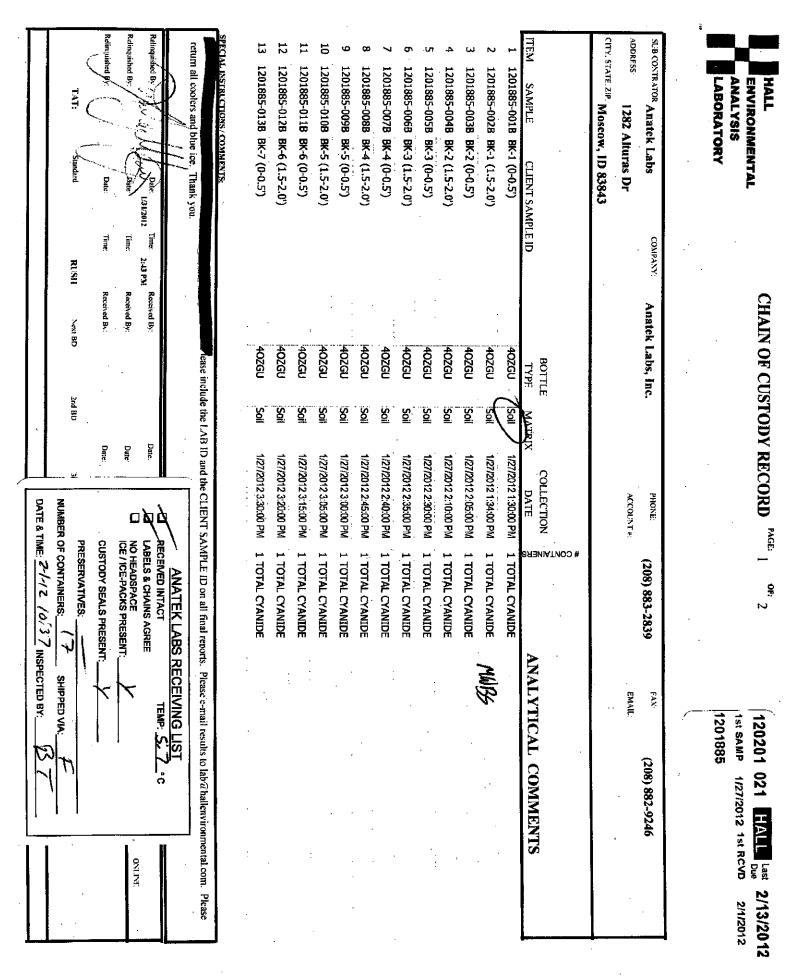
Customer Name: Contact Name:	4901 HAWKII ALBUQUERG	NS NE SUITE QUE		87109	Order II Order Dat roject Name: 1201	e: 2/1/2012
Comment:						
Sample #: 1202010	)21-001 Custo	ner Sample #:	12018	85-001B / BK-1 (0-0.5)		
Recv'd: 🔽	Collector:			Date Collected:	1/27/2012	
Quantity: 1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:						
Test		La	b	Method	Due Date	Priority
%Moisture		м		%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL E	PA	М		EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #: 1202010	)21-002 <b>Custo</b> i	ner Sample #:	12018	85-002B / BK-1 (1.5-2.0	))	· · · ·
Recv'd: 🖌	Collector:			Date Collected:	1/27/2012	
Quantity: 1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:						
Test		La	ıb	Method	Due Date	Priority
%Moisture		М		%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL E	PA	М		EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #: 1202010	021-003 Custor	ner Sample #:	12018	85-003B / BK-2 (0-0.5)		
Recv'd: 🗸	Collector:			Date Collected:	1/27/2012	
Quantity: 1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:						
Test		La	ıb I	Method	Due Date	Priority
%Moisture		М		%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL E	PA	М		EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>

Customer	Name: H	ALL ENVIF	RONMENT	AL ANA	LYSIS LAB	Order I	<b>D:</b> 120201021
	4	901 HAWK	INS NE SU	IITE D		Order Dat	te: 2/1/2012
	A	LBUQUER	QUE	N	M 87109		
Contact	Name: A	NDY FREE	MAN		P	roject Name: 1201	885
Com	nment:						
Sample #:	120201021	-004 Custo	omer Sample	#: 120	1885-004B / BK-2 (1.5-2.)	0)	· · · · · · · · · · · · · · · · · · ·
Recv'd:	$\checkmark$	Collector:			Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:							
Test				Lab	Method	Due Date	Priority
%Moisture				М	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE T	OTAL EPA			М	EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #:	120201021	-005 Custo	omer Sample	#: 120	1885-005B / BK-3 (0-0.5)		
Recv'd:		Collector:			Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:							
Test				Lab	Method	Due Date	Priority
%Moisture				М	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE T	OTAL EPA			М	EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #:	120201021	-006 Custo	omer Sample	#: 120	1885-006B / BK-3 (1.5-2.0	0)	
<b>.</b>						-,	
Recv'd:	$\checkmark$	Collector:			Date Collected:	1/27/2012	
Recv'd: Quantity:	<ul><li>✓</li><li>1</li></ul>	Collector: Matrix:	Soil		Date Collected: Date Received:		
			Soil			1/27/2012	
Quantity:			Soil	Lab		1/27/2012	Priority
Quantity: Comment:			Soil		Date Received:	1/27/2012 2/1/2012 10:37:00 A	Priority <u>Normal (6-10 Days)</u>
Quantity: Comment: Test	1	Matrix:	Soil	Lab	Date Received: Method	1/27/2012 2/1/2012 10:37:00 A Due Date	
Quantity: Comment: Test %Moisture CYANIDE T	1	Matrix:	Soil	Lab M M	Date Received: Method %moisture	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012	Normal (6-10 Days)
Quantity: Comment: Test %Moisture CYANIDE T	1 OTAL EPA	Matrix:		Lab M M	Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012	Normal (6-10 Days)
Quantity: Comment: Test %Moisture CYANIDE T Sample #:	1 OTAL EPA 120201021	Matrix:		Lab M M	Date Received: Method %moisture EPA 335.4 1885-007B / BK-4 (0-0.5)	1/27/2012 2/1/2012 10:37:00 A <b>Due Date</b> 2/13/2012 2/13/2012	Normal (6-10 Days)
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd:	1 OTAL EPA 120201021-	Matrix: -007 Custo Collector:	omer Sample	Lab M M	Date Received: Method %moisture EPA 335.4 1885-007B / BK-4 (0-0.5) Date Collected:	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 1/27/2012	Normal (6-10 Days)
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd: Quantity:	1 OTAL EPA 120201021-	Matrix: -007 Custo Collector:	omer Sample	Lab M M	Date Received: Method %moisture EPA 335.4 1885-007B / BK-4 (0-0.5) Date Collected:	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 1/27/2012	Normal (6-10 Days)
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd: Quantity: Comment:	1 OTAL EPA 120201021-	Matrix: -007 Custo Collector:	omer Sample	Lab M M #: 120	Date Received: Method %moisture EPA 335.4 1885-007B / BK-4 (0-0.5) Date Collected: Date Received:	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 1/27/2012 2/1/2012 10:37:00 A	<u>Normal (6-10 Days)</u> <u>Normal (6-10 Days)</u>

Customer	Name: H	ALL ENVI	RONMEN	TAL ANA	LYSIS LAB	Order I	<b>D:</b> 120201021
	-	901 HAWK				Order Dat	te: 2/1/2012
	A	LBUQUER	RQUE	N	VI 87109		
Contact	Name: A		EMAN		Р	roject Name: 1201	885
Corr	nment:						
Sample #:	120201021	-008 Cust	omer Samp	le #: 120	1885-008B / BK-4 (1.5-2.0	0)	
Recv'd:		Collector	:		Date Collected:	1/27/2012	
Quantity: Comment:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Test				Lab	Method	Due Date	Priority
%Moisture				М	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE T	TOTAL EPA			М	EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #:	120201021	-009 <b>Cust</b>	omer Samp	le #: 120	1885-009B / BK-5 (0-0.5)		
Recv'd:	$\checkmark$	Collector:	:		Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:							
Test				Lab	Method	Due Date	Priority
%Moisture				м	%moisture	2/13/2012	<u>Normal (6-10 Days)</u>
CYANIDE T	OTAL EPA			М	EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #:	120201021	-010 Cust	omer Sampi	e#: 120	1885-010B / BK-5 (1.5-2.0	))	
Recv'd:		Collector:			Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:							
Test				Lab	Method	Due Date	Priority
%Moisture				М	%moisture	2/13/2012	<u>Normal (6-10 Days)</u>
CYANIDE T	OTAL EPA			М	EPA 335.4	2/13/2012	<u>Normal (6-10 Days)</u>
Sample #:	120201021	-011 Cust	omer Sampi	e#: 120	1885-011B / BK-6 (0-0.5)		
Sample #: Recv'd:	120201021	-011 Cust	-	<b>e#:</b> 120 <sup>.</sup>	1885-011B / BK-6 (0-0.5) Date Collected:	1/27/2012	
-			-	<b>e #:</b> 120 <sup>.</sup>		1/27/2012 2/1/2012 10:37:00 A	
Recv'd:	$\checkmark$	Collector:	-	e#: 120 <sup>.</sup>	Date Collected:		
Recv'd: Quantity:	$\checkmark$	Collector:	-	e#: 120 Lab	Date Collected:		Priority
Recv'd: Quantity: Comment:	$\checkmark$	Collector:	-		Date Collected: Date Received:	2/1/2012 10:37:00 A	Priority <u>Normal (6-10 Days)</u>

					LYSIS LAB	Order I	D: 120201021
	49	01 HAWK	INS NE SL	ЛТЕ D		Order Dat	e: 2/1/2012
	AL	BUQUER	QUE	N	M 87109		
Contact	Name: AN	NDY FREE	MAN		P	roject Name: 1201	885
Com	nment:						
Sample #:	120201021-	012 Custo	omer Sample	#: 120	1885-012B / BK-6 (1.5-2.0	0)	
Recv'd:	$\checkmark$	Collector:			Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:		·					
Test				Lab	Method	Due Date	Priority
%Moisture				м	%moisture	2/13/2012	Normal (6-10 Days
CYANIDE 1	TOTAL EPA			М	EPA 335.4	2/13/2012	Normal (6-10 Days
Sample #:	120201021-	013 Custo	omer Sample	#; 120	1885-013B / BK-7 (0-0.5)		<u> </u>
Recv'd:		Collector:			Date Collected:	1/27/2012	
Quantity:	1	Matrix:	Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:							
						/	
Test %Moisture			<u></u>	Lab M	Method %moisture	Due Date 2/13/2012	Priority
	OTAL EPA			M	EPA 335.4	2/13/2012	Normal (6-10 Days
-							<u>Normal (6-10 Days</u>
Sample #:	120201021-	014 Custo	omer Sample	<i>,#</i> : 120	1885-014B / BK-7 (1.5-2.0	))	
Recv'd:		Collector:			Date Collected:	1/27/2012	
Recv'd: Quantity:	<b>⊻</b> 1	Collector: Matrix:	Soil		Date Collected: Date Received:	1/27/2012 2/1/2012 10:37:00 A	
			Soil				
Quantity:			Soil	Lab			Priority
Quantity: Comment:			Soil	Lab M	Date Received:	2/1/2012 10:37:00 A	Priority Normal (6-10 Days
Quantity: Comment: Test %Moisture			Soil		Date Received: Method	2/1/2012 10:37:00 A	
Quantity: Comment: Test %Moisture CYANIDE T	1	Matrix:	Soil omer Sample	M M	Date Received: Method %moisture	2/1/2012 10:37:00 A Due Date 2/13/2012	Normal (6-10 Days
Quantity: Comment: Test %Moisture CYANIDE T	1 TOTAL EPA	Matrix:	· · · · · · · · · · · · · · · · · · ·	M M	Date Received: Method %moisture EPA 335.4	2/1/2012 10:37:00 A Due Date 2/13/2012	Normal (6-10 Days
Quantity: Comment: Test %Moisture CYANIDE T Sample #:	1 -OTAL EPA 120201021-	Matrix: 015 Custo	· · · · · · · · · · · · · · · · · · ·	M M	Date Received: Method %moisture EPA 335.4 1885-015B / BK-8 (0-0.5)	2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012	Normal (6-10 Days
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd:	1 TOTAL EPA 120201021-	Matrix: 015 Custo Collector:	mer Sample	M M	Date Received: Method %moisture EPA 335.4 1885-015B / BK-8 (0-0.5) Date Collected:	2/1/2012 10:37:00 A <b>Due Date</b> 2/13/2012 2/13/2012 1/27/2012	Normal (6-10 Days
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd: Quantity:	1 TOTAL EPA 120201021-	Matrix: 015 Custo Collector:	mer Sample	M M	Date Received: Method %moisture EPA 335.4 1885-015B / BK-8 (0-0.5) Date Collected:	2/1/2012 10:37:00 A <b>Due Date</b> 2/13/2012 2/13/2012 1/27/2012	Normal (6-10 Days
Quantity: Comment: Test %Moisture CYANIDE T Sample #: Recv'd: Quantity: Comment:	1 TOTAL EPA 120201021-	Matrix: 015 Custo Collector:	mer Sample	M M #: 120	Date Received: Method %moisture EPA 335.4 1885-015B / BK-8 (0-0.5) Date Collected: Date Received:	2/1/2012 10:37:00 A <b>Due Date</b> 2/13/2012 2/13/2012 1/27/2012 2/1/2012 10:37:00 A	<u>Normal (6-10 Days</u> <u>Normal (6-10 Days</u>

Customer Name: HALL ENVIRONMENT 4901 HAWKINS NE SU	Order I Order Dat			
ALBUQUERQUE	N	M 87109		
Contact Name: ANDY FREEMAN		Р	roject Name: 1201	885
Comment:		· · · ·		
Sample #: 120201021-016 Customer Sample	#: 120	)1885-016B / BK-8 (1.5-2.0	0)	
Recv'd: 🔽 Collector:		Date Collected:	1/27/2012	
Quantity: 1 Matrix: Soil		Date Received:	2/1/2012 10:37:00 A	
Comment:				
Test	Lab	Method	Due Date	Priority
%Moisture	М	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL EPA	м	EPA 335.4	2/13/2012	Normal (6-10 Days)
Sample #: 120201021-017 Customer Sample Recv'd: 🖌 Collector: Quantity: 1 Matrix: Soil		11885-017B / BK-7 (0-0.5) Date Collected: Date Received:	1/27/2012 2/1/2012 10:37:00 A	
Recvid: 🗹 Collector: Quantity: 1 Matrix: Soil Comment:		Date Collected: Date Received:	1/27/2012 2/1/2012 10:37:00 A	
Recv'd: v Collector: Quantity: 1 Matrix: Soil Comment: Test	Lab	Date Collected: Date Received: Method	1/27/2012 2/1/2012 10:37:00 A Due Date	Priority
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:	Lab M	Date Collected: Date Received: Method %moisture	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012	Normal (6-10 Days)
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012	
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:	Lab M M	Date Collected: Date Received: Method %moisture	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012	Normal (6-10 Days)
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012	Normal (6-10 Days)
Recv'd: <ul> <li>Collector:</li> <li>Quantity:</li> <li>1</li> <li>Matrix:</li> <li>Soil</li> </ul> Comment:       Matrix:       Soil         Test              %Moisture               CYANIDE TOTAL EPA	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012	Normal (6-10 Days)
Recv'd: <ul> <li>Collector:</li> <li>Quantity:</li> <li>Matrix:</li> <li>Soil</li> </ul> Comment:         Matrix:         Soil           Test         Value         Samples received in a cooler?           Samples received in a cooler?         Collector:         Collector:           Samples received in a cooler?         Collector:         Collector:	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 ) Yes	Normal (6-10 Days)
Recv'd: <ul> <li>Collector:</li> <li>Quantity:</li> <li>Matrix:</li> <li>Soil</li> </ul> Quantity:         1         Matrix:         Soil           Comment:         Matrix:         Soil           Test         Value         Samples received in a cooler?         Samples received intact?           Samples received intact?         What is the temperature inside the cooler?         Samples received with a COC?	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 Yes Yes 5.7 Yes	Normal (6-10 Days)
Recv'd: <ul> <li>Collector:</li> <li>Quantity:</li> <li>Matrix:</li> <li>Soil</li> </ul> Quantity:         1         Matrix:         Soil           Comment:         Matrix:         Soil         Soil           Test         Value         Samples received in a cooler?         Samples received intact?         Vhat is the temperature inside the cooler?         Samples received with a COC?         Samples received within holding time?	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 2/13/2012 7 Yes Yes 5.7 Yes Yes Yes	Normal (6-10 Days)
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:       Soil       Soil       Soil         Test       Samples received in a cooler?       Samples received intact?       Samples received intact?         What is the temperature inside the cooler?       Samples received with a COC?       Samples received within holding time?         Are all sample bottles properly preserved?       Are all sample bottles properly preserved?	Lab M M	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 2/13/2012 Yes Yes 5.7 Yes Yes Yes Yes Yes	Normal (6-10 Days)
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:       Soil       Soil         Test	Lab M E CON	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 2/13/2012 Yes Yes 5.7 Yes Yes Yes Yes Yes	Normal (6-10 Days)
Recv'd:       Image: Collector:         Quantity:       1       Matrix:       Soil         Comment:       Soil       Soil       Soil         Test       Samples received in a cooler?       Samples received intact?       Samples received intact?         What is the temperature inside the cooler?       Samples received with a COC?       Samples received within holding time?         Are all sample bottles properly preserved?       Are all sample bottles properly preserved?	Lab M E CON	Date Collected: Date Received: Method %moisture EPA 335.4	1/27/2012 2/1/2012 10:37:00 A Due Date 2/13/2012 2/13/2012 2/13/2012 Yes Yes 5.7 Yes Yes Yes Yes Yes	Normal (6-10 Days)



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les C Attempt to Cool ?	Temp of samples	3rd BD	2nd BD	Next BD	RUSH	TAT: Sandart
FOR LAB USE ONLY				Received By:		Relinquished By
REPORT TRANSMITTAL DESIRED: HARDCOPY (even cost) FAX EMAIL ONLINE	HARDCOP	Date: Time.	1	Received By:	Time 2:43 PM	Retinquished By
case include the LAB iD and the CLIENT SAMPLE ID on all final reports. Please c-mail results to lab@hallenvironmental.com. Please	viPLE ID on all final repo	B iD and the CLIENT SA	ude the LA	icase incl		retum all coolers and blue ice. Thank you,
						SPECIAL INSTRUCTIONS/ COMMENTS:
· ·						
· · · · · · · · · · · · · · · · · · ·	0				anna fan san an an Ann Slav an An	
	0			: ب		
	0	•				
	<b>1 TOTAL CYANIDE</b>	1/27/2012 3:30:00 PM	Soil	40ZGU		1201885-0178 BK-7 (0-0.5') DUP
	1 TOTAL CYANIDE	1/27/2012 3:55:00 PM	Soil	40ZGU		1201885-016B BK-8 (1.5-2.0')
•	<b>1 TOTAL CYANIDE</b>	1/27/2012 3:50:00 PM	Soil	40ZGU		1201885-015B BK-8 (0-0.5')
	1 TOTAL CYANIDE	1/27/2012 3:35:00 PM	Soil	40ZGU		1201885-014B BK-7 (1.5-2.0')
ANALYTICAL COMMENTS	₩ CONTAINERS	COLLECTION NX DATE	E MATRIX	BOITLE	LEID	SAMPLE CLIENT SAMPLE ID
						CITY. STATE ZIP: Moscow, ID 83843
EMAIL:		ACCOUNT #				1282 Alturas Dr
FAX. (208) 882-9246	(208) 883-2839	PHONE	:	Anatek Labs, Inc.	COMPANY.	SUB CONTRATOR: Anatek Labs
FAX: 505-345-4107 Websile: www.hallenvironmental.com						
4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975						ENVIRONMENTAL ANALYSIS LABORATORY
Hall Environmental Analysis Laboratory	2 2 2	Y RECORD 2	<b>GOLS</b> (	CHAIN OF CUSTODY RECORD		

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# **CYANIDE EXTRACTION BENCHSHEET SW 846**

# Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt	H2O (mL)	Final Volume	Multiplier	Chemist
1/31/12		10.0	10.11	240	250	247.	Can
	120126014-1	9.5	10.14			250	1
<b>├───                                  </b>	120131027-1	91.8	10.04			27.1	t i
	-2	92.2	7.98			27.2	
<u> </u>	29-1	88.5	10.03			28.2	
	-7	88.9	10.18			27.6	
	-3	87.7	9.98			28.6	
	-4	20.7	9.99			27.6	
	-5	86.4	10.06			28.8	
	-6	91.2	10.12			27.1	
	-7.	96.9	10.07			25.6	
	-8	94.8	10.11			26.1	
2/1/12	120131030_1	26.3	1.98	7.20	250	26.0	how
· · ·	-Z	76.8	10,04		i .	25.7	1
	-3	97.1	10.08			25.5	
	- 4	90.7	10.02			27.5	
	-5	92.1	10.03			27.1	
	-6	89.8	10.12			275	
	-7	95.1	10.02			26.2	1
	-8	91.0	10.00			27.5	<del></del>
·	-9	91.4	[0.00			27.4	
4	-10	91.1	10.02	4		27.4	
2/2/12	12013/0 30-11	91.9	10.02	250	250	27.	Con
		93.5	10.00		1	26.7	
	-13	93.4	10.06			26.6	
·	-14	93.0	10.02			26.8	1
	-15	22.8	10.01			26.9	1
	-16	12.4	10.03			24.0	
	~17	970	10.19			15.3	1
	-18	92.1	12,07			770	
	31-1	968	10.06			25.7	1
<u> </u>	-2	943	10.03	4		22,6	4
2/6/12	120701021-1	87.8	10.02	230	250	28.4	CAN
	-2	95.5	10.05		1	260	1
	- 7	90.6	9.97			27,7	
	-4	90.6 93.0	10.04			26.8	
	-5	81.4	10.00			28.0 28.0	
	<i> [</i>	75.8	10.0 <			260	
		79.2	(0.01			39	
	-8	96.3	10:03			25.9	
	-9	85.7	999			29.2	- <u>†</u>
	-10	95.6	4,98			26.2	-+
	120126025-1	67.2	10.01 10.02			15.9 29.2 26.2 37.2	<del>_}_</del>
	170202028-1	91.0	10.02			27.4	1

N:\Bench Sheets\Cyanide Extraction Benchsheet.xis

# **CYANIDE EXTRACTION BENCHSHEET SW 846**

# Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt	H2O (mL)	Final Volume	Multiplier	Chemist
2/7/12	120201021-11	89.4	10.03	240	2.50	27.9	Crw
	- 12	15.9	10.00			26,1	
	-13	90.5	10:02			276	
	-14	94,8	10.07			26.2	
	-15	92.6	10.03			26.9	
	-16	91.3	10.01			27.4	
	-17.	90.4 91.8	10.11	4		27.4	
18/12	120201019-1	91.8	10.00	250	250	27.2	CAN
	-2	93.7				2h.6	
	120707027-	93.0	10.01			26.9	
	2	89.4	10-18	4		27.5	
18/12	120201019 - 3	96.7	10.00	150	250	25,9	Om-
	-4	96-6	5.01	125	125	25.8	
	-5	94.6	5,00			26.4 26.2	
	- 6	94,5	5.05			26.2	
	-7	94.8 94.9	5.10			25.9	<u> </u>
	-8	94.7	5.02			26.2	$\square$
		97.2	4,99			25.8	
	-10	92.4	5.01			27.0	
		94.3	5.00			26.5	. 
2/10/12	120202031-1	15.0	5.00	4		167	
410/10	17.0207014-1	95.4	10.04	240	250	26.1	NW _
	120207017-1	89,4	10,04		į .	17.9	
	-2	92.2 96.7	10.00			27.1	
		94.9 94.9	10.00	<u> </u>	·	25.8	
	-4		10.00			26.3	
		95.3	10.09			2/0-2	
	<u> </u>	955 903				75.9	
	-77		9.99		l.	27.7	
		90.2 88.9	10.05			177.6	
	120207027-1 -2	97.7	10.03	<u> </u>		28.0	
		87.0	10.03			26.9	<u> </u>
	-4	40.4	10.01			28.h	
		<u>67 m</u>	10.0			Ltib	
	-6	00 h	10.07		· · · · · · · · · · · · · · · · · · ·	19 t	<b>├</b> - <b>├</b>
		280	10.00			10 0	
+	-7	93.0 89.0 88.8 92.9	10.03			27.6 26.7 27.6 27.6 28.7 26.8	
		- F (2 + 1	<u></u>	<u> </u>		<u>1/6 · 8</u>	
·					· · · · · · · · · · · · · · · · · · ·		
							·

N:\Bench Sheets\Cyanide Extraction Benchsheet.xls

### Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

 M825-01
 Exp: 1/4/2013

 Free Cyanide MS/MSD/LCS Soln:
 M824-05
 Exp: 1/2/28/2012

Method requirements: All QC +/- 10% Equipment: Midi-vap Instrument: ALPCHEM FIA 3000 Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multîplier	Spike Amount (mL)	WAD? (check if yes)
1	120131030-18	soileen	Nall	50ml	27.0	Same		
2	120201021-1		1		28.4			
3	-2				26.0			
4	-Zins						Iml	
5	-Zunsp				ł			
6	-115				l×.		4	
7	-BL.		_		ł			
8	- 3				27.7			
9	-4				26.8			
10	-5	-	4	4	28.0	1		
	120201021-6	soileph	NabH	Some	26.0	Sime		
12	-7		1	· · · · · · · · · · · · · · · · · · ·	31.9	1		
13	-8				25,9			
14	-9				29.2			
15	-10				26.2			
<u>16</u>					27.9			
17	-12				26.1			
18 19 20					27.6			
19	-14				26.2			
20	-15	4	4	4	26.9			

\* If soils this calculation is taken from cyanide extraction bench sheet.

\*\* If soils, mLs of extract used for distillation.

Extraction Reagents: Reagent #:

methyl red indicator	A041-03
18 N H <sub>2</sub> SO <sub>4</sub>	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl <sub>2</sub>	A043-06

Analytical Reagents:Reagent #:Barbituric AcidR038-13Sodium PhosphateR026-23Chloramine-tR048-09PyridineR043-03

Distillation Initials/Date Distilled:

Analyst Initials/Date Analyzed: [100 2/9/12

N:\Bench Sheets\Total Cyanide EPA 335.4.xls

### Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

	M838-03 exp: 2/9/2013	
Total Cyanide MS/MSD/LCS Soln:		
Free Cyanide MS/MSD/LCS Soln:	<u>M824-05</u> Exp: 12/28/2012	

Method requirements: All QC +/- 10% Equipment: Midi-vap Instrument: ALPCHEM FIA 3000 Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120201021-16	soil pour	NaOH	50mL	27.4	Same		
2	-lbms		1	1	1		low	
3	-16msp				+			
4	1005				X	-	4	
5	-84				ł			
6	-17				77.4			
7	120201019-1				27.2			
8	-2				26.6			
.9	120202027-1				26.9			
10	-2	<u>∽</u>	4	4	27.5	1		
11	120201019 - 3	soilepa	NADH	50 ml	25.9	Same		
12	- 4				25.8			
13	-5				26.4			
14	-6				26.2			
15					25.9			
16	-8				26.2			
<b>1</b> 7	_9				15.8			
18	-10				27.0	1		
19	-11				26.5			
20	120202031-1	4	4	+	167	4		_

\* If soils this calculation is taken from cyanide extraction bench sheet.

\*\* If soils, mLs of extract used for distillation.

Extraction Reagents: Reagent #;

A041-03
A043-08 A043-10
R009-12
R014-16
A043-06

Analytical Reagents: Barbituric Acid Sodium Phosphate Chloramine-t Pyridine Reagent #: R038-13 R026-23 R048-09 R043-03

Distillation Initials/Date Distilled: MW 2/9/12

Analyst Initials/Date Analyzed: Crw 2/1/12

N:\Bench Sheets\Total Cyanide EPA 335.4.xis

CAN 2/14/12

Operator: CRW

120208FIACNS

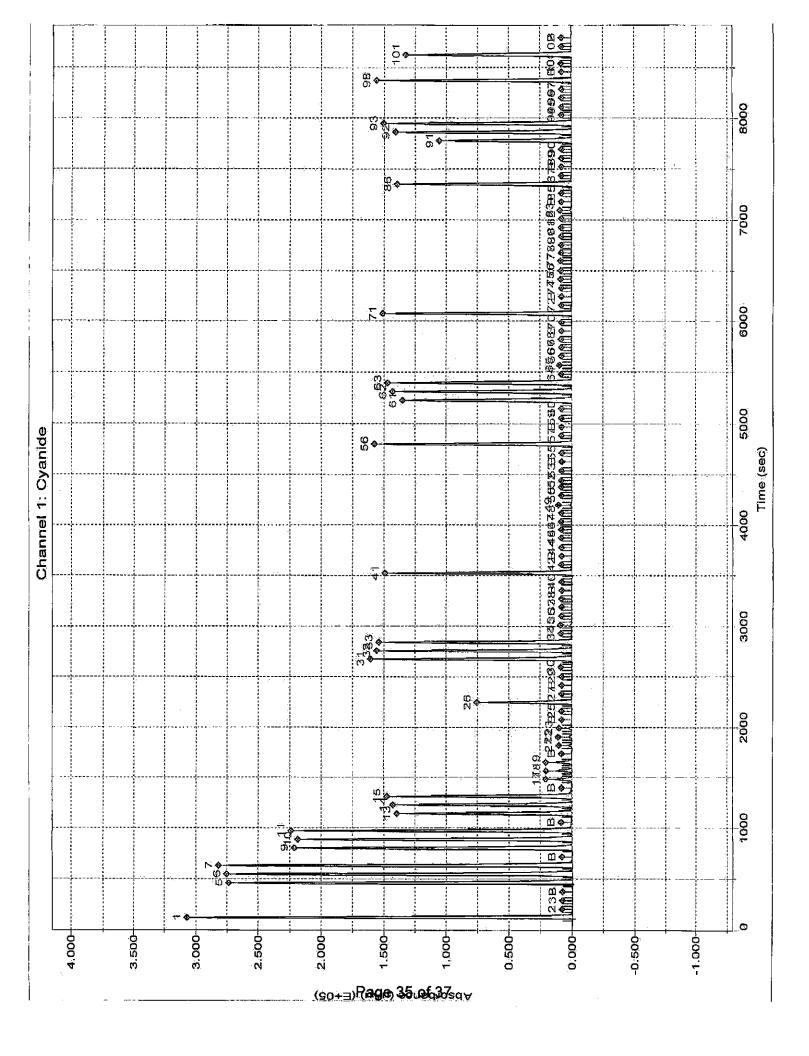
120209 FIACNS

Peak	Cup	Name	Туре	Dil Wt	i.	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	5390600	0.922962
2	Ő	Carryover	co	1	1	13123	0,005170
3	0	Carryover	co	1	1	1186	0.003133
B	Ŭ,	Baseline	RB	1	1	-1111	0.002741
5 6	2	Cal 1.00 ppm	С	1	1	5834096	0.998655
5 7	2	Cal 1.00 ppm	C	1	1	5848290	1.001078
3	2	Cal 1.00 ppm	C	1	1	5845756	1.000646
3	3	Baseline	RB	1	1	996	0.003100
, 0	3	Cal 0.80 ppm Cal 0.80 ppm	Ċ	1	1	4595277	0.787222
11	3	Cal 0.80 ppm Cal 0.80 ppm	C C	1	1	4652028	0.796908
.⊥ 3.	ő	Baseline	RB	1	1	4693766	0.804031
.3	4	Cal 0.50 ppm	C	1 1	1	-5784	0.001943
. 4	4	Cal 0.50 ppm Cal 0.50 ppm	ç	i	1 1	2914050	0.500281
.5	4	Cal 0.50 ppm	ć	i	1	2920794 2940328	0.501432
3	ō	Baseline	RB	1	1	-1799	0.504766 0.002623
7	5	Cal 0.05 ppm	ĉ	1	1	249151	0.045454
.8	5	Cal 0.05 ppm	č	1	1	258617	0.047069
9	5	Cal 0.05 ppm	č	1	1	254447	0.046357
L.	O <sup>r</sup>	Baseline	ŘВ	î	ī	-2882	0.002438
1	6	Cal 0.01 ppm	C	1	ī	41520	0.010017
2	6	Cal 0.01 ppm	ē	1	1	43883	0.010420
3	6	Cal 0.01 ppm	Ċ	ī	1	42615	0.010203
b:	0	Baseline	RB	1	ī	-1211	0.002723
:5	1	Blank	BLNK	ĩ	1	1633	0.003209
6	7	ICV 0.25 ppm	CCV	Ť	1	1492641	0.257684
7	1	Blank	BLNK	1	1	1020	0.003104
	Ò	Baseline	RB	1.	1	1066	0.003112
9	8	120201021-BL S	U	Ĵ.	1	-1516	0.002671
Ū.	9	120201021-002	Ŭ	26	1	5024	0.098475
1	10	120201021-002M	sυ	26	1	3152872	14.067086
2	11	120201021-002M	SD U	26	1	3132856	
3	12	120201021-LCS	U	1	1	3051385	0.523721
4	13	•120201021-001	Ū	28.4	1	13771	0.149965
5	14	•120201021-003	U	27.7	1	22660	0.188294
6	15	•120201021-004	Ų	26.8	1	6242	0.107080
7	16	·120201021-005	Ū	28	1	4657	0.104299
8	17	.120131031-018	0	27	1	7313	0.112813
0	0	Baseline	RB	1	1	698	0.003049
1	1.	Blank	BLNK	1	1	362	0.002992
ž	4. 1	CCV 0.5 ppm Blank	CCV	1	1	2924401	0.502048
- <b>Z</b>	Ŭ Ŭ	Read Baseline	BLNK RB	1	1	2697	0.003390
4	18	• 120201021-006	кь U	1	1	-507	0.002844
5	19	<pre>&gt; 120201021-007</pre>	υ	26 31.9	1	-4678	0.055426
6	20	120201021-007 120201021-008	ប	25.9	1 1	257	0.094867
<b>2</b>	$\overline{21}$	<pre>\$120201021-009</pre>	U	29.2	1	5408 6119	0.099798
8	22	•120201021-010	ΰ	26.2	1	2261	0.116057
9	23	<pre>*120201021-011</pre>	Ŭ	27.9	1	26002	0.086879 0.205568
ō	24	•120201021-012	ΰ	26.1	1	-5326	0.052752
1	25	<b>*</b> 120201021-013	õ	27.6	1	1812	0.089407
2	26	120201021-014	Ŭ	26.2	ì	1717	0.084448
3	27	·120201021-015	Ū	26.9	1	2772	0.091548
	О	Baseline	RB	1	1	-1401	0.002691
5	1	Blank	BLNK	1	1	-2418	0.002517
6	4	CCV 0.5 ppm	CCV	1	1	2989289	0 513122
7	1	Blank	BLNK	1	1	1858	0.003247
	0	Read Baseline	RB	1	ļ	-2480	0.002507
9	28	120201021-BL S	U	ĺ	1	3007	0.003443
0		120201021-016	Ú	27.4	1	669	0.083415
1	30	120201021-016Ms		27.4	1	3109539	14.621899
2	31	120201021-016Mg	SD U	27.4	1	3159403	
3	32	120201021-LCS	U	1	1	3195121	0.548252
4	33	•120201021-017	υ	27.4	1	844	0.084231
5	34	<pre>* 120202027-001</pre>	U	26.9	1	6422	0.108303
	35	▶ 120202027-002	U	27.5	1	-4496	
6			•	Page 32 of 37	т	-44,50	0.059477

геак	் புற ————	Name	Type L	)11	Wt	Area	Calc.	(ppm)
67	36	,120201019-001	U	27.2	1	-1695		0.071828
68	37	120201019-002	υ	26.6	1	1626		0.085325
B	0	Baseline	RB	1	i	-3581		0.002319
70	1	Blank	BLNK	1	1 1 1	-2426		0.002516
71	4	CCV 0.5 ppm	CCV	1	1	3002372		0.515355
72	1	Blank	BLNK	1	1	-1646		0.002649
в	0	Read Baseline	RB	1	1	-1297		0.002709
74	38	120201019-003	U	25.9	1 1 1	77		0.076230
75	39	-120201019-004	U	25.8	1	11861		0.127826
76	40	120201019-005	U	26.4	1	7043		0.109089
77	41	<pre>(120201019-006)</pre>	Ü	26.2	1 1	7924		0.112200
78	42	\$120201019-007	σ	25.9	1	5897		0.101957
79	43	120201019-008	U	26.2	1	492		0.078968
80	44	120201019-009	Ü	25.8	1	-3643		0.059557
31	45	↓ 120201019-010	U	27	1	4032		0.097694
32	46	+120201019-011	U	26.5	1	-1725		0.069845
33	47	•120202031-001	U	167	1	22796		1.139075
в	0	Baseline	RB	1	1	-2335		0.002532
35	1	Blank	BLNK	1	1	-2357		0.002528
36	4	CCV 0.5 ppm	CCV	1	1	2972572		0.510269
37	1	Blank	BLNK	1	1	3191		0.003475
3	Õ	Read Baseline	RB	1	1	-818		0.002790
39	48	, 120131002-BL F	U	1	1	-1957		0.002596
90	49	+120131002-001	υ	1 1	1	-2802		0.002452
91	50	120131002-001MS	ប	1	1	2386461		0.410236 revan
22	51	120131002-001MSI	סט		1 .	1 3138383	z	0.538569 /4
9 <u>3</u>	52	120131002-LCS	U	1	1	3237147		0.555425
94	53		Ŭ	1	1	-3937		0.002258
95	54		ΰ	1	1	-2480		0.002507
96	55		υ	1	1	-2668		0.002475
37	56		Ü	l	1	-6073		0.001894
38	57	,120131002-001MS	U	1	1 1	3113982		0.5344047mS
Э	ò	Baseline	RB	1	1	-433		0.002856
100	1	Blank	BLNK	1	1	-128		0.002908
101	4	CCV 0.5 ppm	CCV	1	1	3018840		0.518166
102	1	Blank	BLNK	1.		-2358		0.002528
3	Ó	Read Baseline	RB	1	1 1	910		0.003085

Peak	Cup	Flags
Ł	2	
2	0	
3	0	27.7
5.	ů V	BL
ŝ	2	
2	2	
L.2. 8 8 5 6 7 8 9	0	BL
	3	
LQ	3	
11	02220330	<u></u>
3. 1.7	4	BL
L3 L4	4	
15	4	
3 [7	0	BL
Ê7	5	OL
L 8	5	
L9	5	
3	5 5 5 6 6 6	BL.
22	ы б	OL
23	ĕ	0
3	Ō	BL
25	I	
26	1 7 1	
27	1L Ö	BL
3 2.9	8	DL .
	Ŭ	

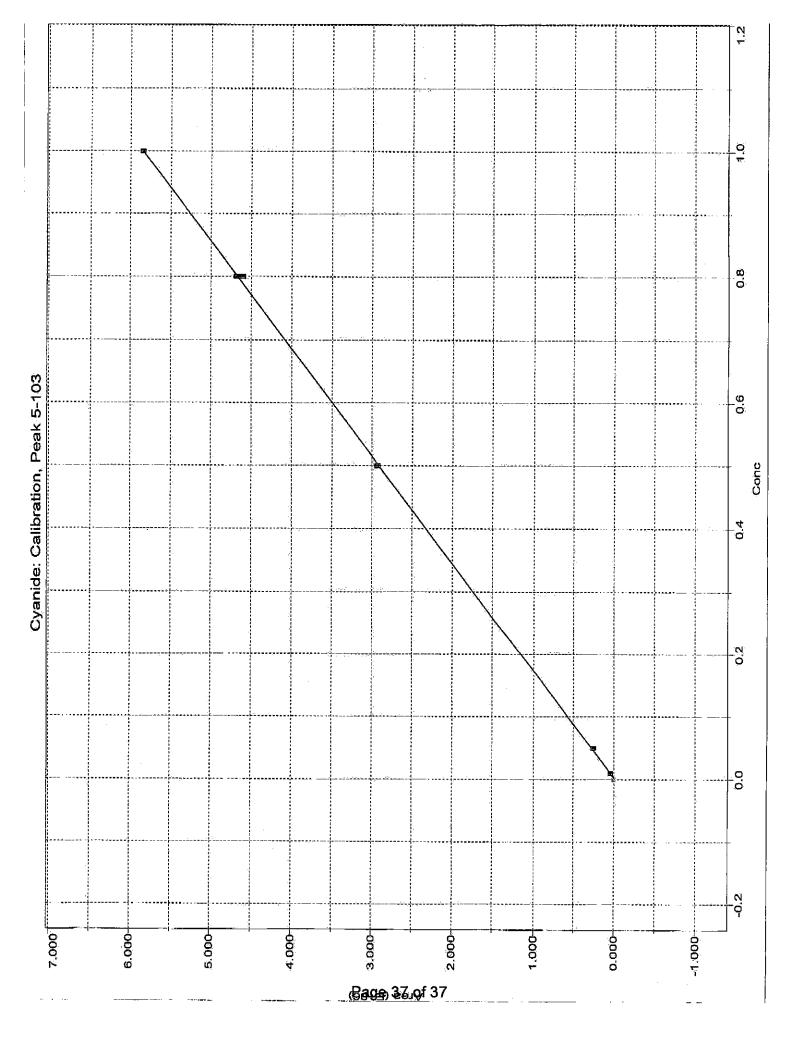
Peak	Cup	Flags
30	9	
31 32	10 11	
33	12	
34 35	$\begin{array}{c} 1 \\ 1 \\ 4 \end{array}$	
36	15	
37 38	16 17	
B	D	BL
40 41	1 4 1	
42	1	
В 44	0 18	BL
45	19	
46 47	20 21	
48	22	
49 50	23 24	
51	25	
52 53	26 27	
в	Θ	BL
55 56	1 4	
57	1	D.7
B 59	1 4 1 28	BL
60 61	29 30	
62	31	
63 64	32 33	
65	34	
66 67	35 36	
68	37	
В. 70	0 1	BL
71	4	
72 B	1 0	BL
74	38 39 40	
75 76	39 40	
77 78	41 42	
79	43	
80 81	44 45	
82 83	46	
83 B	47 0	<u>B</u> L
85	1. 4	
86 87	4 1	
в	Ö	BL
89 90	0 48 49	
91	50 51	
92 93	52	
94 95	53 54	
96	55	
97 98	56 57	
B	0	BL
100	1	Page 34 of 37



File name: T:\DATA1\FLOW4\2012\EPA335.4\020912CM.RST Date: February 09, 2012 Operator: CRW

*	Name	Conc	Area
<b> </b> * * * * * * * * * * * * * * * * * * *	Cal 1.00 ppm Cal 1.00 ppm Cal 0.80 ppm Cal 0.80 ppm Cal 0.80 ppm Cal 0.50 ppm Cal 0.50 ppm Cal 0.50 ppm	1.000000 1.000000 1.000000 0.800000 0.800000 0.800000 0.500000 0.500000 0.500000 0.500000	5834096.00000 5848289.500000 5845756.000000 4595277.000000 4652028.000000 4693766.500000 2914049.750000 2920793.500000 2940328.000000
* * * * * *	Cal 0.05 ppm Cal 0.05 ppm Cal 0.05 ppm Cal 0.01 ppm Cal 0.01 ppm Cal 0.01 ppm	0.050000 0.050000 0.050000 0.010000 0.010000 0.010000	249151.046875 258617.031250 254446.984375 41520.464844 43883.496094 42615.242188
	Calib Coef: y=bx+a a: (intercept) b:	-1.7168e+04 5.8591e+06	
	Corr Coef:	0.999948	
	Carryover:	0.2431	5

No Drift Peaks



WO#: 1201885 13-Apr-12

	stern Refining RA Backgroun											
•	-											
Sample ID MB		Type: MI		TestCode: EPA Method 200.7: Dissolved Metals								
Client ID: PBW	Bat	ch ID: R9	01	F	RunNo: 901							
Prep Date:	Analysis	Date: 2/	10/2012	Ś	SeqNo: 2	5640	Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Aluminum	ND	0.020										
Barium	ND	0.0020										
Beryllium	ND	0.0020										
Boron	ND	0.040										
Cadmium	ND	0.0020										
Chromium	ND	0.0060										
Cobalt	ND	0.0060										
Copper	ND	0.0060										
Lead	ND	0.0050										
Manganese	ND	0.0020										
Molybdenum	ND	0.0080										
Nickel	ND	0.010										
Silver	ND	0.0050										
Vanadium	ND	0.050										
	Correct	Turney L		Tee			000 7 Disast		-			
Sample ID LCS		Type: LC		TestCode: EPA Method 200.7: Dissolved Metals RunNo: 901								
Client ID: LCSW		ch ID: R9										
Prep Date:	Analysis	Date: 2/	10/2012	ç	SeqNo: 2	5641	Units: <b>mg/L</b>					
Analyte	Result	PQL		SPK Ref Val		LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Aluminum	0.56	0.020	0.5000	0	112	85	115					
Barium	0.49	0.0020	0.5000	0	97.5	85	115					
Beryllium	0.50	0.0020	0.5000	0	101	85	115					
Boron	0.51	0.040	0.5000	0	103	85	115					
Cadmium	0.49	0.0020	0.5000	0	98.9	85	115					
Chromium	0.49	0.0060	0.5000	0	98.3	85	115					
Cobalt	0.47	0.0060	0.5000	0	94.1	85	115					
Copper	0.48	0.0060	0.5000	0	96.7	85	115					
Lead	0.48	0.0050	0.5000	0	96.2	85	115					
Manganese	0.48	0.0020	0.5000	0	95.5	85	115					
Molybdenum	0.51	0.0080	0.5000	0	101	85	115					
Nickel	0.47	0.010	0.5000	0	93.2	85	115					
Silver	0.10	0.0050	0.1000	0	100	85	115					
Vanadium	0.51	0.050	0.5000	0	102	85	115					
	Samp	туре: <b>М</b>	BLK	Tes	tCode: E	PA Method	200.7: Dissol	ved Meta	s			
Sample ID MB	Batch ID: R921				RunNo: <b>9</b>							
Sample ID <b>MB</b> Client ID: <b>PBW</b>	Bat	ch ID: R9	21									
		ch ID: <b>R9</b> Date: <b>2</b> /			SeqNo: 2	6476	Units: mg/L					
Client ID: <b>PBW</b> Prep Date:			13/2012	\$			-	%RPD	RPDLimit	Qual		
Client ID: PBW	Analysis	Date: 2/	13/2012				Units: <b>mg/L</b> HighLimit	%RPD	RPDLimit	Qual J		

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

Client: Project:	Western Refining S RCRA Background											
Sample ID LCS	SampT	ype: LC	S	TestCode: EPA Method 200.7: Dissolved Metals								
Client ID: LCSW	Batch	n ID: R9	21	RunNo: 921								
Prep Date:	Analysis D	Analysis Date: 2/13/2012			SeqNo: 26477							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Iron	0.49	0.020	0.5000	0.003150	98.2	85	115					
Zinc	0.50	0.010	0.5000	0	99.7	85	115					

#### Qualifiers:

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: **1201885** 

13-Apr-12

Client:Western Refining Southwest, Inc.Project:RCRA Background Investigation

Client Di       PBW       Batk-ID:       551       RunNo:       212       RunNo:       RunNo:       212       RunNo:	-			-							
Prep Date:       2/2/2012       Analysis Date:       2/6/2012       Seq No:       22882       Units:       mg/L         Analyte       Result       PQL       SPK value       SPK Ref Val       %REC       LowLimit       HighLimit       %RPD       RPDLimit       Qual         Muminum       ND       0.00014       0.0002          S       J         Sarglium       0.00014       0.0002          S       J       J         Sarglium       0.00014       0.0002          S       J       J         Chordium       ND       0.00050       0         S       S       J       J         Chordium       ND       0.00050          S       S       J       J         Chordium       0.0004       0.0002         S       S       S       J       J         Chordium       0.0004       0.0005         S       S       S       J       J         Chordium       0.0004       0.0004       0.0004       S       S       S       J       J	Sample ID MB-551	Samp	Tes	PA Method	200.7: Total M	letals					
Result         PQL         SPK value         SPK Ref Val         % REC         LowLimit         HighLimit         % RPD         RPDLimit         Qual           Muninum         ND         0.020	Client ID: PBW	Batc	ch ID: 55	1	F	RunNo: 801					
ND         0.020           Jahum         ND         0.0020           Jahum         0.00014         0.0020           Jonan         ND         0.0020           Jahum         ND         0.0020           Jahum         ND         0.0060           Zadhium         ND         0.0060           Chall         0.00059         0.0060           Schall         0.0020         J           Jopper         ND         0.0050           Schall         0.0024         0.0020           Jadaganese         ND         0.0020           Jaanganese         ND         0.0020           Jaanganese         ND         0.0021         J           Jaanganese         ND         0.010         J           Jaandum         0.0024         0.0050         J           Jaandum         0.00086         0.050         J           Jaanganese         ND         0.011         J           Sample ID         LCS-S51         SampType: LCS         TestCode: EPA Method 200.7: Total Metals           Client ID:         LCSW         Batch ID: 551         RunNo: 801           Prep Date:         2/2/2/2012         Analysi	Prep Date: 2/2/2012	Analysis I	Date: 2/	6/2012	S	SeqNo: 2	2882	Units: mg/L			
BarumND0.0020Sequiliar0.00140.0020SadinumND0.0020SadinumND0.0020SchaltND0.0050Choonosso0.0060	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Baryliam       0.00014       0.002       0.040         Joron       ND       0.040       0.040         Sathium       ND       0.0000       0.010         Chonium       ND       0.0000       0.0100         Chonium       0.0000       0.0000       0.0000         Chonium       0.0011       0.0000       0.0011         Chonium       0.0011       0.0020       0.0011         Chonium       0.0024       0.0080       0.0011         Chonium       0.0024       0.0080       0.0011         Chonium       0.0024       0.0080       0.011         Anaganese       ND       0.0020	Aluminum	ND	0.020								
Baron       ND       0.040         Cadmiur       ND       0.0020         Cobalt       0.00059       0.0060         Cobalt       0.00059       0.0050         Cobalt       0.0010       0.0020         Cobalt       0.0020       0.0021         Sample ID       CCS-S51       0.0021       Jatandum         0.00050       0.0013       0.011       Jatandum         Cobalt       0.0053       Jatandum       Jatandum         Cobalt       0.0053       Jatandum       Jatandum         Cobalt       D.0055       Jatandum       Jatandum         Cobalt       D.0055       Jatandum       Jatandum         Cobalt       D.0055       Jatandum       Jatandum         Cobalt       D.0055       Jatandum       Jatandum         Cobalt       D.0050       Dome       Jatandum       Jatandum	Barium	ND	0.0020								
Cadmium       ND       0.0020         Chromium       0.0050       0.0050         Obdall       0.0050       0.0050         con       0.011       0.020         ron       0.011       0.020         danganese       ND       0.0050         danganese       ND       0.0050         danganese       ND       0.0020         daybdenum       0.0024       0.0050         Sample ID       0.00250       J         Sample ID       0.00260       J         Sample ID       CSS*       Sample ID       0.0013         Sample ID       CSS*       Test       J         Madyum       0.00086       0.050       J         Sample ID       CSS*       Batch ID:       St       Test         Sample ID       CSS*       Batch ID:       St       NInts: mg/L         Sample ID       CSS*       Batch ID:       St       NInts: mg/L         Sample ID       CSS*       Batch ID:       St       St       St         Samu       0.020       0.5000       0       97.4       85       115         Samu       0.020       0.5000       0.001400       <	Beryllium	0.00014	0.0020								J
Chronium       ND       0.0060       J         Coball       0.0050       J         Copper       ND       0.0050       J         cada       ND       0.0050       J         cada       ND       0.0050       J         cada       ND       0.0020       J         danganese       ND       0.0020       J         kickel       ND       0.0050       J         kickel       ND       0.0050       J         kickel       ND       0.0050       J         kickel       ND       0.0050       J         Sample ID       LCS-551       Samprype: LCS       TestCore: EPA Method 2007: Total Method         Sample ID       LCS-551       Samprype: LCS       TestNnno:       801         Prep Date:       2/2/2012       Analysis       St       RunNo:       801         Sample ID       LCS-551       Southod       Southod       Southod       St       St         Sample ID       LCS-551       Southod       St       St       St       St       St         Sample ID       LCS-551       Southod       St       St       St       St       St <td< td=""><td>Boron</td><td>ND</td><td>0.040</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Boron	ND	0.040								
chalat       0.00059       0.0060       J         Copper       ND       0.0050       J         ron       0.011       0.020       J         danganese       ND       0.0050       J         dolydenum       0.0024       0.0060       J         kikel       ND       0.0050       J         dolydenum       0.0004       0.0050       J         siker       ND       0.0050       J         danadium       0.0008       0.010       J         Sampel D       LCS-551       Samp Type: Les       Test Net Set Set Net Set Net Set Net Set Set Net Set Set Net Set Set Net Set Net Set Net Set Net Set Set Net Set Net Set Set Net Set	Cadmium	ND	0.0020								
CapperND0.0060ron0.0110.020JeadND0.0050JMagnaresND0.00240.0080JMolybdenum0.00240.0080JMolybdenum0.00240.0050JRaadium0.000860.050JRaadium0.000860.050JRaadium0.000860.050JRaadium0.00130.010JSample IDLCS-551Sample IDSPK valueRangerseND0.020SPK valueSample IDLCS-551Sample IDSPK valueMolybenum0.0016SPK valueSPK Ref ValMangerseND0.00200.0014Mangerse0.0200.50000Mangerse0.0200.50000Mangerse0.0200.50000Saturnum0.560.0200.00140Mangerse0.0400.50000Saturnum0.440.00200.5000Saturnum0.440.00200.00140Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.00050Saturnum0.440.00200.5000 <td>Chromium</td> <td>ND</td> <td>0.0060</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Chromium	ND	0.0060								
Torn       0.011       0.020       J         ead       ND       0.0050	Cobalt	0.00059	0.0060								J
ron       0.011       0.020         .ead       ND       0.0020         danganese       ND       0.0020         kickel       ND       0.0020         silver       ND       0.0010         kickel       ND       0.0020         silver       ND       0.0020         kickel       ND       0.0010         silver       ND       0.0013         0.0013       0.010       Ja         Sample ID       LCS-551       Sarry-Free: Structory       Structory         Sample ID       LCS-551       Sarry-Free: Structory       Structory       Ja         Analyte       Result       PCI       SPK value       SPK PK       No       Structory       Structory       Structory         Sarple ID       LCS-551       Source       Structory       Structory       Structory       Structory       Ja         Analyte       Result       PQL       Structory       Structory </td <td>Copper</td> <td>ND</td> <td>0.0060</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Copper	ND	0.0060								
Manganese       ND       0.0024       0.0080       J         Molybdenum       0.0024       0.0080       J         ND       0.0010       J         Standatium       0.00086       0.050       J         Anadium       0.00086       0.050       J         Standatium       0.00086       0.050       J         Standatium       0.0013       0.010       J         Standatium       0.00013       0.010       J         Standatium       0.00013       0.010       Standatium       J         Client ID:       LCS-\$51       Samy Type: LCS       TestCode: EPA Method 20.7: Total Metats       J         Prop Date:       2/2/2012       Analysis       Date       SPK Natus       SPK Ref Val       %REC       LowLimit       Might.Imit       %RPD       RPDLimit       Qual         Muninum       0.56       0.020       0.5000       0       97.4       85       115       S       115	ron	0.011	0.020								J
Molydenum       0.0024       0.0080       J         Vickel       ND       0.010       J         Silver       ND       0.0050       J         Vanadium       0.00086       0.050       J         Sample ID       LCS-551       SampT-pp:       LCS       Festore       EVARthod       J         Sample ID       LCS-551       SampT-pp:       LCS       Festore       EVARthod       200.7: Total Metals         Client ID:       LCSW       Batch       ID:       551       RunNo:       801       J         Analyte       Result       PQL       SPK value       SPK Ref Val       %REC       LowLinit       HighLinit       %RPD       RPDLinit       Qual         Numinum       0.56       0.020       0.5000       0       91.12       85       115         Sarum       0.51       0.0020       0.5000       0       97.1       85       115         Sarum       0.49       0.0020       0.5000       0       97.1       85       115         Sarum       0.49       0.0020       0.5000       0       97.1       85       115         Sarum       0.499       0.0020       0.5000	Lead	ND	0.0050								
Molydenum       0.0024       0.0080	Vanganese	ND	0.0020								
Nickel ND 0.010 Silver ND 0.0050 Jandium 0.00086 0.050 Sample ID LCS-551	Molybdenum	0.0024	0.0080								J
ND       0.0050         Anadium       0.00086       0.050         Janadium       0.00086       0.050         Jinc       0.0013       0.010       J         Sample ID       LCS-551       Samprive: LCS       TestCode:       EV-Method 2007: Total Metals       J         Client ID:       LCSW       Battrix:       St/2012       Set       Set       Units: mg/L         Analyte       Result       PQL       SPK value       SPK ref Val       %RED       LowLinit       HighLinit       %RPD       RPDLinit       Qual         Numinum       0.560       0.020       0.5000       0       91.4       85       115       51       Set	Vickel	ND									
thr         0.001         0.010         J           Sample ID         LCS-551         SampType:         LCS         TestCode:         EPA Method 200.7:         Total Metals           Client ID:         LCSW         Batch ID:         551         RunNo:         801           Prep Date:         2/2/2012         Analysis         Date:         2/6/2012         SeqNo:         22833         Units:         mg/L           Analyte         Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         %RPD         RPDLimit         Qual           Numinum         0.56         0.020         0.5000         0         97.4         85         115           Saruium         0.49         0.0020         0.5000         0         97.4         85         115           Saruium         0.49         0.0020         0.5000         0         97.1         85         115           Cobalt         0.49         0.0020         0.5000         0         97.1         85         115           Cobalt         0.47         0.0060         0.5000         0         97.3         85         115           Copper         0.49	Silver	ND	0.0050								
Sample ID         LCS-551         SampType:         LCS         TestCode:         EPA Method 200.7:         Total Metals           Client ID:         LCSW         Batch ID:         551         RunNo:         801           Prep Date:         2/2/2012         Analysis Date:         2/6/2012         SeqNo:         22883         Units:         mg/L           Analyte         Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         %RPD         RPDLimit         Qual           Muminum         0.56         0.020         0.5000         0         97.4         85         115           Sarium         0.49         0.0020         0.5000         0         97.4         85         115           Sarium         0.51         0.002         0.5000         0         98.3         85         115           Chomium         0.49         0.0020         0.5000         0         97.1         85         115           Chomium         0.49         0.0060         0.5000         0         97.3         85         115           Chomium         0.49         0.0005         0.5000         0         97.3         85         115<	/anadium	0.00086	0.050								J
Client ID:       LCSW       Batch ID:       551       RunNo:       801         Prep Date:       2/2/2012       Analysis Date:       2/6/2012       SeqNo:       22883       Units:       mg/L         Analyte       Result       PQL       SPK value       SPK Ref Val       %REC       LowLimit       HighLimit       %RPD       RPD Limit       Qual         Numinum       0.56       0.020       0.5000       0       112       85       115         Baruim       0.49       0.020       0.5000       0       97.4       85       115         Seryllium       0.51       0.020       0.5000       0       99.9       85       115         Soron       0.50       0.040       0.5000       0       99.9       85       115         Chomium       0.49       0.0020       0.5000       0       97.4       85       115         Cobalt       0.47       0.0060       0.5000       0       97.1       85       115         Cobalt       0.47       0.0060       0.5000       0       97.8       85       115         Cobalt       0.47       0.0020       0.5000       0       97.3       85	Zinc	0.0013	0.010								J
Prep Date:         2/2/2012         SerVi:         288         Units:         mg/L           Analyte         Result         PQL         SPK value         SPK Ref Val         %REC         LowLinit         HighLinit         %RPD         RPDLinit         Qual           Auminum         0.66         0.020         0.5000         0         112         85         115           Barlum         0.49         0.0020         0.5000         0         97.4         85         115           Barlum         0.51         0.0020         0.5000         0         97.4         85         115           Barlum         0.51         0.0020         0.5000         0         97.4         855         115           Barlum         0.50         0.002         0.5000         0         97.4         855         115           Cadmin         0.49         0.002         0.5000         0         97.4         855         115           Chominu         0.449         0.0020         0.5000         0         97.8         855         115           Cobalt         0.449         0.0050         0.5000         0         97.3         855         115           Mang	Sample ID LCS-551	Samp	Type: LC	S	Tes	tCode: E	PA Method	200.7: Total M	letals		
Analyte         Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         %RPD         RPDLimit         Qual           Aluminum         0.56         0.020         0.5000         0         112         85         115           Barium         0.49         0.0020         0.5000         0         97.4         85         115           Beryllium         0.51         0.0020         0.5000         0         99.9         85         115           Boron         0.50         0.040         0.5000         0         98.3         85         115           Cadmium         0.49         0.0020         0.5000         0         98.3         85         115           Cadmium         0.49         0.0060         0.5000         0         97.1         85         115           Cadmium         0.49         0.0060         0.5000         0         97.8         85         115           Cadmium         0.49         0.020         0.5000         0         97.3         85         115           Copper         0.49         0.020         0.5000         0         95.7         85         115 </td <td>Client ID: LCSW</td> <td>Batc</td> <td>ch ID: 55</td> <td>1</td> <td>F</td> <td>RunNo: 8</td> <td>01</td> <td></td> <td></td> <td></td> <td></td>	Client ID: LCSW	Batc	ch ID: 55	1	F	RunNo: 8	01				
Aluminum       0.56       0.020       0.5000       0       112       85       115         Barium       0.49       0.0020       0.5000       0       97.4       85       115         Baryllium       0.51       0.0020       0.5000       0.001400       101       85       115         Boron       0.50       0.040       0.5000       0       99.9       85       115         Cadmium       0.49       0.0020       0.5000       0       98.3       85       115         Chromium       0.49       0.0060       0.5000       0       97.1       85       115         Cobalt       0.47       0.060       0.5000       0       97.8       85       115         Cobalt       0.49       0.020       0.5000       0       97.8       85       115         Cobalt       0.49       0.020       0.5000       0       97.3       85       115         cobalt       0.49       0.020       0.5000       0       97.3       85       115         ead       0.49       0.020       0.5000       0       95.7       85       115         Manganese       0.48 <td< td=""><td>Prep Date: 2/2/2012</td><td>Analysis I</td><td>Date: 2/</td><td>6/2012</td><td>S</td><td>SeqNo: 2</td><td>2883</td><td>Units: mg/L</td><td></td><td></td><td></td></td<>	Prep Date: 2/2/2012	Analysis I	Date: 2/	6/2012	S	SeqNo: 2	2883	Units: mg/L			
Barium0.490.00200.5000097.485115Beryllium0.510.00200.50000.000140010185115Boron0.500.4000.5000099.985115Cadmium0.490.00200.5000097.185115Chromium0.490.00600.5000097.185115Cobalt0.470.00600.50000.000590094.885115Cobalt0.490.00600.5000097.885115Cobalt0.490.00200.5000097.385115Cobalt0.490.00200.5000097.385115Anganese0.480.00200.5000095.785115Molybdenum0.510.00800.5000093.585115Silver0.090.0050093.585115Anadium0.510.5000.00860010285115	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium0.510.00200.50000.000140010185115Boron0.500.0400.5000099.985115Cadmium0.490.00200.5000098.385115Chromium0.490.00600.5000097.185115Cobalt0.470.00600.5000097.885115Copper0.490.0200.5000097.885115copper0.490.0200.5000097.385115Anganese0.480.00200.5000095.785115Alolybdenum0.510.00800.5000093.585115Silver0.0990.00500.1000098.885115Anadain0.510.05000.000860010285115	Aluminum	0.56	0.020	0.5000	0	112	85	115			
Abor0.500.0400.500099.985115Cadmium0.490.00200.5000098.385115Chromium0.490.00600.5000097.185115Cobalt0.470.00600.50000.000590094.885115Copper0.490.00600.5000097.885115copper0.490.0200.5000097.385115Lead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.05000.000860010285115	Barium	0.49	0.0020	0.5000	0	97.4	85	115			
Cadmium0.490.00200.5000098.385115Chromium0.490.00600.50000.000590094.885115Cobalt0.470.00600.50000.000590094.885115Copper0.490.00200.5000097.885115ron0.490.0200.50000.0106095.085115Lead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.000860010285115	Beryllium	0.51	0.0020	0.5000	0.0001400	101	85	115			
Chromium0.490.00600.5000097.185115Cobalt0.470.00600.50000.000590094.885115Copper0.490.00600.5000097.885115ron0.490.0200.50000.0106095.085115Lead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.000860010285115	Boron	0.50	0.040	0.5000	0	99.9	85	115			
Cobalt0.470.00600.50000.00590094.885115Copper0.490.00600.5000097.885115ron0.490.0200.50000.0106095.085115.ead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Nickel0.470.0100.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.00860010285115	Cadmium	0.49	0.0020	0.5000	0	98.3	85	115			
Copper0.490.00600.5000097.885115ron0.490.0200.50000.0106095.085115.ead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Nickel0.470.0100.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.00860010285115	Chromium	0.49	0.0060	0.5000	0	97.1	85	115			
Norm0.490.0200.50000.0106095.085115Lead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Nickel0.470.0100.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.00860010285115	Cobalt	0.47	0.0060	0.5000	0.0005900	94.8	85	115			
Lead0.490.00500.5000097.385115Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Nickel0.470.0100.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.00860010285115	Copper	0.49	0.0060	0.5000	0	97.8	85	115			
Manganese0.480.00200.5000095.785115Molybdenum0.510.00800.50000.00241010185115Nickel0.470.0100.5000093.585115Silver0.0990.00500.1000098.885115/anadium0.510.0500.50000.00860010285115	ron	0.49	0.020	0.5000	0.01060	95.0	85	115			
Molybernum         0.51         0.0080         0.5000         0.002410         101         85         115           vickel         0.47         0.010         0.5000         0         93.5         85         115           Silver         0.099         0.0050         0.1000         0         98.8         85         115           /anadium         0.51         0.050         0.5000         0.008600         102         85         115	ead	0.49	0.0050	0.5000	0	97.3	85	115			
Nickel         0.47         0.010         0.5000         0         93.5         85         115           Silver         0.099         0.0050         0.1000         0         98.8         85         115           /anadium         0.51         0.050         0.5000         0.008600         102         85         115	Manganese	0.48	0.0020	0.5000	0	95.7	85	115			
Silver0.0990.00500.1000098.885115/anadium0.510.0500.000860010285115	Molybdenum	0.51	0.0080	0.5000	0.002410	101	85	115			
Silver0.0990.00500.1000098.885115/anadium0.510.0500.000860010285115	Vickel	0.47	0.010	0.5000	0	93.5	85	115			
/anadium 0.51 0.050 0.5000 0.0008600 102 85 115	Silver	0.099	0.0050	0.1000	0						
	Vanadium	0.51	0.050	0.5000	0.0008600						

#### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1201885

13-Apr-	12
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Client: Project:		Western Refining S RCRA Background									
Sample ID	MB	Samp	Type: ME	BLK	Tes	tCode: El	PA 200.8: [	Dissolved Met	als		
Client ID:	PBW	Bato	h ID: <b>R8</b>	18	F	RunNo: 8	18				
Prep Date:		Analysis I	Date: 2/	7/2012	5	SeqNo: 2	3440	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		ND	0.0010								
Arsenic		ND	0.0010								
Cadmium		ND	0.0010								
Copper		ND	0.0010								
Lead		ND	0.0010								
Nickel		ND	0.0010								
Selenium		ND	0.0010								
Thallium		ND	0.0010								
Sample ID	LCS	Samp	Type: LC	s	Tes	tCode: El	PA 200.8: [	Dissolved Met	als		
Client ID:	LCSW	Bato	h ID: <b>R8</b>	18	F	RunNo: 8	18				
Prep Date:		Analysis I	Date: 2/	7/2012	8	SeqNo: 2	3451	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		0.022	0.0010	0.02500	0	87.5	85	115			
Arsenic		0.023	0.0010	0.02500	0	92.0	85	115			
Cadmium		0.023	0.0010	0.02500	0	92.6	85	115			
Copper		0.022	0.0010	0.02500	0	89.5	85	115			
Lead		0.022	0.0010	0.02500	0	86.4	85	115			
Nickel		0.023	0.0010	0.02500	0	90.1	85	115			
Selenium		0.025	0.0010	0.02500	0	100	85	115			
Thallium		0.022	0.0010	0.02500	0	86.8	85	115			
Sample ID	MB	Samp	Туре: МЕ	BLK	Tes	tCode: El	PA 200.8: [	Dissolved Met	als		
Client ID:	PBW	Bato	h ID: <b>R8</b>	41	F	RunNo: 8	41				
Prep Date:		Analysis I	Date: 2/	8/2012	S	SeqNo: 2	4238	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium		ND	0.0010								
Sample ID	LCS	Samp	Type: LC	:s	Tes	tCode: El	PA 200.8: [	Dissolved Met	als		
Client ID:	LCSW	Bato	h ID: <b>R8</b>	41	F	RunNo: 8	41				
Prep Date:		Analysis I	Date: 2/	8/2012	S	SeqNo: 2	4239	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium		0.025	0.0010	0.02500	0	99.3	85	115			

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: 1201885 13-Apr-12

Client: Project:		rn Refining S Background									
Sample ID	MB-551 SampType: MBLK				Tes	tCode: 2	00.8 ICPMS	Metals:Total			
Client ID:	PBW Batch ID: 551			F	RunNo: 7	88					
Prep Date:	2/2/2012	Analysis I	Date: 2/	6/2012	S	eqNo: 2	2523	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Copper		ND	0.0025								
Antimony		ND	0.0025								
Arsenic		ND	0.0025								
Cadmium		ND	0.0025								
Lead		ND	0.0025								
Nickel		ND	0.0025								
Selenium		ND	0.0025								
Thallium		ND	0.0025								
Uranium		ND	0.0025								

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1201885
	13-Apr-12

Client: Project:		Refining Sout ackground In										
Sample ID	MB-602	SampType: MBLK			Tes	tCode: E						
Client ID:	PBW	Batch ID	: <b>602</b>		F	RunNo: 789						
Prep Date:	2/6/2012	Analysis Date	: 2/6/2	012	S	eqNo: 2	2439	Units: mg/L				
Analyte		Result F	QL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	(	0.000051 0.00	020								J	
Sample ID	LCS-602		Tes	Code: E	PA Method	245.1: Mercu	ry					
Client ID:	LCSW	Batch ID: 602			RunNo: <b>789</b>							
Prep Date:	2/6/2012	Analysis Date	: 2/6/2	012	SeqNo: 22440			Units: mg/L				
Analyte		Result F	QL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.0051 0.00	020 0	0.005000	.00005124	101	80	120				
Sample ID	1201885-018AMS     SampType: MS     TestCode: EPA Method 245.1: Mercury											
Client ID:	BK-EB-012712	Batch ID: 602			RunNo: <b>789</b>							
Prep Date:	2/6/2012	Analysis Date	: 2/6/2	012	S	eqNo: 2	2442	Units: mg/L				
Analyte		Result F	QL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.0053 0.00	020 0	0.005000	.00004974	104	75	125				
Sample ID 1201885-018AMSD SampType: MSD TestCode: EPA Method 245.1: Mercury												
Client ID:	BK-EB-012712 Batch ID: 602		RunNo: <b>789</b>									
Prep Date:	2/6/2012	Analysis Date	: 2/6/2	012	S	eqNo: 2	2443	Units: mg/L				
Analyte		Result F	QL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury		0.0052 0.00	020 0	0.005000	.00004974	103	75	125	0.661	20		

#### Qualifiers:

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

- Page 25 of 31

WO#:	120	1885
	70.4	

13-Apr-12
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	stern Refining S RA Background									
Sample ID MB-522	Samp	SampType: MBLK			TestCode: EPA Method 300.0: Anions					
Client ID: PBS	Bato	Batch ID: 522			RunNo: 7	19				
Prep Date: 1/31/2012	Analysis	Analysis Date: 2/1/2012		SeqNo: 20699			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Sulfate	ND	1.5								
Sample ID LCS-522	Samp	SampType: LCS			TestCode: EPA Method 300.0: Anions					
Client ID: LCSS	Bato	Batch ID: 522		F	RunNo: 7	19				
Prep Date: 1/31/2012	Analysis	Analysis Date: 2/1/2012		SeqNo: 20700			Units: <b>mg/Kg</b>			
	Desult	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Analyte	Result	1 GL								
Analyte Fluoride	Result 1.5	0.30	1.500	0	101	90	110			
•			1.500 15.00	0 0	101 91.0	90 90	110 110			

#### Qualifiers:

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

WO#:	1201885
	13-Apr-12

Client: Project:		Refining So ackground 1									
Sample ID	MB-545	PA Method	7471: Mercu	ry							
Client ID:	PBS	Batch	ID: <b>54</b>	5	F	unNo: 7	17				
Prep Date:	2/2/2012	Analysis Da	ate: 2/	2/2012	S	eqNo: 2	0502	Units: mg/k	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.033								
Sample ID	LCS-545	SampTy	vpe: LC	S	Tes	tCode: El	PA Method	7471: Mercu	ry		
Client ID:	LCSS	Batch	ID: <b>54</b>	5	F	unNo: 7	17				
Prep Date:	2/2/2012	Analysis Da	ate: 2/	2/2012	S	eqNo: 2	0503	Units: mg/k	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.17	0.033	0.1667	0	104	80	120			
Sample ID	1201885-001AMS	SampTy	pe: <b>MS</b>	5	Tes	Code: El	PA Method	7471: Mercu	ry		
Client ID:	BK-1 (0-0.5')	Batch	ID: 54	5	F	lunNo: 7	17				
Prep Date:	2/2/2012	Analysis Da	ate: 2/	2/2012	S	eqNo: 2	0505	Units: mg/k	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.18	0.033	0.1657	0.01196	102	75	125			
Sample ID	1201885-001AMS	<b>)</b> SampTy	/pe: <b>MS</b>	SD .	Tes	tCode: El	PA Method	7471: Mercu	ry		
Client ID:	BK-1 (0-0.5')	Batch	ID: <b>54</b>	5	F	lunNo: 7	17				
Prep Date:	2/2/2012	Analysis Da	ate: 2/	2/2012	S	eqNo: 2	0506	Units: mg/k	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.18	0.033	0.1659	0.01196	98.7	75	125	3.22	20	

### **Qualifiers:**

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

WO#: 1201885

13-Apr-12

Client:	Western Refining Southwest, Inc.
Project:	RCRA Background Investigation

Sample ID	MB-529	SampT	ype: ME	BLK	TestCode: EPA Method 6010B: Soil Metals							
Client ID:	PBS	Batcl	h ID: 52	9	F	RunNo: 8	33					
Prep Date:	2/1/2012	Analysis E	Date: 2/	8/2012	SeqNo: 23909			Units: mg/Kg				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Aluminum		0.53	3.0								J	
Antimony		ND	2.5									
Arsenic		ND	2.5									
Barium		ND	0.10									
Beryllium		ND	0.15									
Cadmium		ND	0.10									
Chromium		ND	0.30									
Copper		0.14	0.30								J	
Lead		ND	0.25									
Molybdenum		ND	0.40									
Nickel		0.10	0.50								J	
Selenium		1.4	2.5								J	
Silver		ND	0.25									
Thallium		ND	2.5									
Uranium		ND	5.0									
Vanadium		ND	2.5									
Zinc		ND	2.5									
	LCS-529	ND		S	Tes	tCode: El	PA Method	6010B: Soil I	Metals			
Zinc Sample ID		ND Samp1	2.5			tCode: Ef		6010B: Soil I	Vietals			
Zinc Sample ID	LCSS	ND Samp1	2.5 Type: <b>LC</b> h ID: <b>52</b>	9	F		33	6010B: Soil I Units: mg/K				
Zinc Sample ID Client ID:	LCSS	ND Samp1 Batcl Analysis D Result	2.5 Type: LC n ID: 52 Date: 2/ PQL	9 8/2012 SPK value	F	RunNo: <b>8</b> SeqNo: <b>2</b> %REC	33	Units: <b>mg/K</b> HighLimit		RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte	LCSS	ND SampT Batcl Analysis D Result 28	2.5 Type: LC n ID: 52 Date: 2/ PQL 3.0	9 8/2012 SPK value 25.00	ਜ 2	RunNo: <b>8</b> SeqNo: <b>2</b> <u>%REC</u> 110	33 3910 LowLimit 80	Units: <b>mg/K</b> HighLimit 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony	LCSS	ND SampT Batcl Analysis D Result 28 25	2.5 Type: LC n ID: 52 Date: 2/ PQL 3.0 2.5	9 8/2012 SPK value 25.00 25.00	F S SPK Ref Val 0.5285 0	RunNo: <b>8</b> SeqNo: <b>2</b> <u>%REC</u> 110 102	33 3910 LowLimit 80 80	Units: <b>mg/K</b> HighLimit 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic	LCSS	ND SampT Batcl Analysis D Result 28 25 24	2.5 Type: LC n ID: 52 Date: 2/ PQL 3.0 2.5 2.5	9 8/2012 SPK value 25.00 25.00 25.00	F S SPK Ref Val 0.5285	RunNo: <b>8</b> SeqNo: <b>2</b> <u>%REC</u> 110 102 96.5	33 3910 LowLimit 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 24	2.5 Type: LC Date: 2/ PQL 3.0 2.5 2.5 0.10	9 8/2012 SPK value 25.00 25.00 25.00 25.00	F S SPK Ref Val 0.5285 0	RunNo: 8 BeqNo: 2 %REC 110 102 96.5 96.9	33 3910 LowLimit 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 24 24 25	2.5 Type: LC Date: 2/ PQL 3.0 2.5 0.10 0.15	9 8/2012 25.00 25.00 25.00 25.00 25.00	F S SPK Ref Val 0.5285 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100	33 3910 LowLimit 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 24 25 24 25 24	2.5 Type: LC Date: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10	9 8/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00	F S SPK Ref Val 0.5285 0 0 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100 96.4	33 3910 LowLimit 80 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 25 24 25 24 24 25	2.5 Type: LC b ID: 52: Date: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30	9 8/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F S SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100 96.4 96.9	33 3910 LowLimit 80 80 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 24 25 24 24 25	2.5 	9 8/2012 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F S SPK Ref Val 0.5285 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101	33 3910 LowLimit 80 80 80 80 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium Copper Lead	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 24 25 24 24 25 24 24 25 24	2.5 Type: LC on ID: 52: Date: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30 0.30 0.25	9 8/2012 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100 96.4 96.9 101 95.8	33 3910 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium Copper Lead Molybdenum	LCSS	ND SampT Batcl Analysis D 28 25 24 24 25 24 24 25 24 24 25 24 25 24 24 25 24 25 24 25 24 25	2.5 Type: LC Date: 2/ PQL 3.0 2.5 0.10 0.15 0.10 0.30 0.30 0.25 0.40	9 8/2012 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Barium Barium Cadmium Chromium Copper Lead Molybdenum Nickel	LCSS	ND SampT Batcl Analysis D 28 25 24 24 25 24 24 25 24 25 24 25 24 25 24 25 24 25 24 25 24 25 23	2.5 Type: LC an ID: 52: Date: 2/ PQL 3.0 2.5 0.10 0.15 0.10 0.30 0.30 0.25 0.40 0.50	9 8/2012 25.00	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101 93.0	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 25 24 25 24 25 24 25 24 25 24 25 23 24	2.5 Type: LC an ID: 52: Date: 2/ PQL 3.0 2.5 0.10 0.15 0.10 0.30 0.30 0.25 0.40 0.50 2.5	9 8/2012 SPK value 25.00 2	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Barium Barium Cadmium Chomium Copper Lead Molybdenum Nickel Selenium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 24 25 24 25 24 25 24 25 23 24 25 23 24 4.9	2.5 Type: LC a ID: 52 Date: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30 0.30 0.30 0.25 0.40 0.50 2.5 0.40 0.50 2.5 0.25	9 8/2012 SPK value 25.00	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101 95.8 101 95.8 101 93.0 91.1 97.9	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium Copper Lead Molybdenum Nickel Selenium Silver	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 24 25 24 25 24 25 24 25 24 25 24 25 23 24 4.9 24	2.5 Type: LC pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30 0.30 0.25 0.40 0.50 2.5 0.25 0.55	9 8/2012 SPK value 25.00 2	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101 95.8 101 93.0 91.1 93.0 91.1 97.9 97.5	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium Copper Lead Molybdenum Nickel Selenium Silver Thallium	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 24 25 24 25 24 25 24 25 23 24 25 23 24 4.9	2.5 Type: LC a ID: 52 Date: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30 0.30 0.30 0.25 0.40 0.50 2.5 0.40 0.50 2.5 0.25	9 8/2012 SPK value 25.00	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: %REC 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101 95.8 101 95.8 101 93.0 91.1 97.9	33 3910 LowLimit 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	
Zinc Sample ID Client ID: Prep Date: Analyte Aluminum Antimony Arsenic Barium Barium Barium Cadmium Chromium Copper Lead Molybdenum Nickel	LCSS	ND SampT Batcl Analysis D Result 28 25 24 24 25 24 24 25 24 24 25 24 25 24 25 24 25 24 25 24 25 23 24 4.9 24	2.5 Type: LC pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 0.10 0.30 0.30 0.25 0.40 0.50 2.5 0.25 0.55	9 8/2012 SPK value 25.00 2	F SPK Ref Val 0.5285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 8: SeqNo: 2: <u>%REC</u> 110 102 96.5 96.9 100 96.4 96.9 101 95.8 101 95.8 101 95.8 101 93.0 91.1 93.0 91.1 97.9 97.5	33 3910 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	Qual	

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: 1201885 13-Apr-12

Client:

Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	1201885-002AMS	SampT	ype: MS	6	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	BK-1 (1.5-2.0')	Batch	n ID: 529	9	F	RunNo: <b>8</b>	33				
Prep Date:	2/1/2012	Analysis D	ate: 2/	8/2012	S	SeqNo: 2	3957	Units: mg/k	٤g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		7.9	5.0	24.68	0	32.1	75	125			S
Arsenic		24	5.0	24.68	1.894	91.1	75	125			
Beryllium		23	0.30	24.68	0.5638	91.8	75	125			
Cadmium		22	0.20	24.68	0	88.6	75	125			
Chromium		31	0.60	24.68	8.403	91.5	75	125			
Copper		32	0.60	24.68	8.672	94.4	75	125			
Lead		23	0.50	24.68	3.223	79.5	75	125			
Molybdenum		20	0.80	24.68	0.7050	77.2	75	125			
Nickel		27	1.0	24.68	7.398	80.2	75	125			
Selenium		17	5.0	24.68	0	67.7	75	125			S
Silver		4.4	0.50	4.936	0	88.4	75	125			
Thallium		ND	5.0	24.68	0	0	75	125			S
Uranium		22	10	24.68	0	90.1	75	125			
Vanadium		57	5.0	24.68	29.62	112	75	125			
Zinc		51	5.0	24.68	28.34	91.6	75	125			

Sample ID 1201885-002AMSD SampType: MSD TestCode: EPA Method 6010B: Soil Metals											
Client ID:	BK-1 (1.5-2.0')	Batch	ID: 52	9	F	RunNo: 8	33				
Prep Date:	2/1/2012	Analysis D	ate: 2/	8/2012	S	SeqNo: 2	3960	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		7.4	5.0	24.92	0	29.6	75	125	6.95	20	S
Arsenic		23	5.0	24.92	1.894	84.8	75	125	5.72	20	
Beryllium		21	0.30	24.92	0.5638	83.5	75	125	8.37	20	
Cadmium		21	0.20	24.92	0	82.5	75	125	6.22	20	
Chromium		29	0.60	24.92	8.403	81.8	75	125	7.37	20	
Copper		30	0.60	24.92	8.672	85.8	75	125	6.13	20	
Lead		22	0.50	24.92	3.223	74.6	75	125	4.69	20	S
Molybdenum		19	0.80	24.92	0.7050	72.4	75	125	5.20	20	S
Nickel		25	1.0	24.92	7.398	71.7	75	125	7.39	20	S
Selenium		17	5.0	24.92	0	67.3	75	125	0.411	20	S
Silver		4.1	0.50	4.984	0	81.5	75	125	7.14	20	
Thallium		ND	5.0	24.92	0	0	75	125	0	20	S
Uranium		19	10	24.92	0	78.0	75	125	13.5	20	
Vanadium		53	5.0	24.92	29.62	93.5	75	125	7.66	20	
Zinc		47	5.0	24.92	28.34	75.9	75	125	7.51	20	
Sample ID	MB-529	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	PBS	Batch	ID: 529	9	F	RunNo: <b>8</b> :	36				
Prep Date:	2/1/2012	Analysis D	ate: 2/	8/2012	S	SeqNo: 2	4025	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1201885
	13-Apr-12

Client: Project:		Refining Sc ackground									
Sample ID	MB-529	SampTy	/pe: <b>ME</b>	BLK	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	PBS	Batch	ID: <b>52</b>	9	F	RunNo: 8	36				
Prep Date:	2/1/2012	Analysis Da	ate: <b>2/</b>	8/2012	S	SeqNo: 2	4025	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		0.15	2.0								J
Sample ID	LCS-529	SampTy	/pe: <b>LC</b>	S	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	LCSS	Batch	ID: 52	9	F	RunNo: 8	36				
Prep Date:	2/1/2012	Analysis Da	ate: 2/	8/2012	S	SeqNo: 2	4026	Units: mg/k	٨g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		25	2.0	25.00	0.1460	97.7	80	120			
Sample ID	1201885-002AMS	SampTy	/pe: <b>M</b> \$	6	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	BK-1 (1.5-2.0')	Batch	ID: 52	9	F	RunNo: <b>8</b>	36				
Prep Date:	2/1/2012	Analysis Da	ate: 2/	8/2012	S	SeqNo: 2	4037	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		33	4.0	24.68	8.018	100	75	125			
Sample ID	1201885-002AMSI	D SampTy	/pe: <b>M\$</b>	SD	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	BK-1 (1.5-2.0')	Batch	ID: 52	9	F	RunNo: 8	36				
Prep Date:	2/1/2012	Analysis Da	ate: <b>2/</b>	8/2012	S	SeqNo: 2	4040	Units: mg/k	٨g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		31	4.0	24.92	8.018	91.4	75	125	6.16	20	
Sample ID	MB-529	SampTy	/pe: <b>ME</b>	BLK	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	PBS	Batch	ID: <b>52</b>	9	F	RunNo: 8	37				
Prep Date:	2/1/2012	Analysis Da	ate: 2/	8/2012	S	SeqNo: 2	4083	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt		ND	0.30								
Sample ID	LCS-529	SampTy	/pe: <b>LC</b>	s	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	LCSS	Batch	ID: 52	9	F	RunNo: 8	37				
Prep Date:	2/1/2012	Analysis Da	ate: <b>2/</b>	8/2012	5	SeqNo: 2	4084	Units: mg/k	٨g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt		24	0.30	25.00	0	94.5	80	120			
Sample ID	1201885-002AMS	SampTy	/pe: <b>MS</b>	<u> </u>	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	BK-1 (1.5-2.0')	Batch	ID: 52	9	F	RunNo: 8	37				
Prep Date:	2/1/2012	Analysis Da	ate: 2/	8/2012	S	SeqNo: 2	4116	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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

RL Reporting Detection Limit

WO#:	1201885
	13-Apr-12

Client: Project:	Western F RCRA Ba	-									
Sample ID	1201885-002AMSD	) SampT	ype: M	SD	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	BK-1 (1.5-2.0')	Batch	n ID: 52	9	F	RunNo: 8	37				
Prep Date:	2/1/2012	Analysis D	ate: 2	/8/2012	S	SeqNo: 2	4119	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt		24	0.60	24.92	5.300	76.5	75	125	6.99	20	
Sample ID	MB-1105	SampT	уре: МІ	BLK	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	PBS	Batch	n ID: 11	05	F	RunNo: 1	507				
Prep Date:	3/15/2012	Analysis D	ate: 3	/16/2012	S	SeqNo: 4	2441	Units: mg/h	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
ron		ND	1.0								
Manganese		ND	0.10								
Sample ID	LCS-1105	SampT	ype: LC	s	Tes	tCode: El	PA Method	6010B: Soil	Metals		
Client ID:	LCSS	Batch	ID: 11	05	F	RunNo: 1	507				
Prep Date:	3/15/2012	Analysis D	ate: 3	/16/2012	S	SeqNo: 4	2442	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
ron		26	1.0	25.00	0	105	80	120			
Manganese		24	0.10	25.00	0	94.3	80	120			

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

### HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquergue, NM 87105 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

# Sample Log-In Check List

Client Name:	Western Refining Southw	est, Inc Bloomfield	Wo	rk Ord	er N	lumb	oer: 1	201885		
Received by/da	te: LM	1/3/12								
Logged By:	Lindsay Mangin	1/31/2012 9:30:0	0 AM				Inch	'y Hongo 'y Hongo		
Completed By:	Lindsay Mangin	1/31/2012 1:43:0	9 PM				Freed	y Allange		
Reviewed By:	MG1/31/12									
Chain of Cus	•									
1. Were seals	intact?			Yes	~	No		Not Pres	sent	
2. Is Chain of	Custody complete?			Yes	✓	No		Not Pres	sent	
3. How was th	e sample delivered?			<u>UPS</u>						
<u>Log In</u>										
4. Coolers are	e present? (see 19. for cooler	r specific information)		Yes	~	No			NA	
5. Was an att	empt made to cool the samp	les?		Yes	~	No			NA	
6. Were all sa	imples received at a tempera	ature of >0° C to 6.0°	С	Yes.	V	No			NA	
7. Sample(s)	in proper container(s)?			Yes	~	No				
8. Sufficient s	ample volume for indicated t	est(s)?		Yes	✓	No				
9. Are sample	es (except VOA and ONG) pr	operly preserved?		Yes	✓	No				
10. Was prese	rvative added to bottles?			Yes		No	✓		NA	
11. VOA vials	have zero headspace?			Yes		No		No VOA \	vials 🗸	
12. Were any	sample containers received b	oroken?		Yes		No	✓		(	
	rwork match bottle labels? epancies on chain of custody	/)		Yes	~	No		bot	of preserved ttles checked pH:	
14. Are matric	es correctly identified on Cha	in of Custody?		Yes	✓	No			-	or >12 unless noted)
15. Is it clear v	hat analyses were requested	1?		Yes	✓	No			Adjusted?	
	olding times able to be met? y customer for authorization.	)		Yes	~	No			Checked by:	
Special Han	dling (if applicable)									
	notified of all discrepancies	with this order?		Yes		No			NA 🗸	
Perso	n Notified:	C	Date:					<u></u>		
By W	hom:	۱. ا	/ia:	eMa	il	Pl	hone	Fax	In Person	AX2*
Rega	rding:				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Clien	Instructions:									· · ·
18. Additional	remarks:									

RECEIVED ONLY HNO3 BOTTLES FOR THE GW SAMPLE.

### 19 Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By	
1	3.8	Good	Yes				]

221	HALL FULLBONMENTAL	YSIS	www.hallenvironmental.com	心体g01 Hawkins NE - Albuquerque, NM 87109		Analysis Request	(≯O₁) seel)	5 bCB.6 5 bCB.6 5 bCB.6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	НАТ 568 (с 1,1) 1,1) 1,1) 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60		BTEX + MT BTEX + MT TPH Metho TPH (Meth B310 (PNA 8310 (PNA 8310 (PNA 8260B (VO 8270 (Sem 7PL - 7PL -											Remarks:		his serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
-	Chain-of-Custody Record Turn-Around Time:	Client: Western Rehning Sevthurst Juli gerandard a Rush	Project Nam	Mailing Address: 55 Read 4990 RULA BACK GROWD INVESTURING 4901 Hawkins NE	NN 87401 Project #:	Phone #: 505- 633-4166	Fax#: Keiling , Robins on Cunreon Project Manager:	Kebiwoon .	on Sample: Keilig R. & Tracy P.	XEDD (Type) EXCE Sample Texperature: 3, 3	Matrix     Sample Request ID     Container     Preservative       Type and #     Type	1/27/12/20 50:1 13x-1 (0-0.5') (z) 4m have have none -1	1 [3K-1 (12-2.0)]	- BK-2 (0-0°2)	- [] BK-2 (1.5-2.0')	 5 BK-3(1.	14.40 [3K-4 (0-0.5') -7	M:45 BK-4 (1.5-2.0') -8	15:00 BK-5 (0-0.5') -9	15205 BK-S (1.5-2.0') -10	21- 1 4 4 (	MMY Received by: Date Time	Date: Time: Relinquished by: Received by: Date Time	If necessary, samples submitted to Hall Environmental may be subcoptracted to other accredited laboratories. This serves as notice of this pos

Chain-of-Custody Record	Turn-Around Time:	5
		ENVIG
<u>لا</u>	🕅 Standard 🗆 Rush	ANALYSIS LABORATORY
		www.hallenvironmental.com
Zerd 400	RURA BACKEROWUN INVESTIGHTUN	→ 4901 Hawki
NW BIHON	Project #:	Tel. 505-345-3975 Fax 505-345-4107
2-4166		Analysis Request
email or Fax#: Keily, Robinson Curr. Com Project	Project Manager	(≯C
OA/QC Package:	Kelly Kebiuson	ei(]\26 9i(]\26 9i(]\26
	Samper Kelly R. + Trac. P.	100 100 100 100 100 100 100 100
Other	On Ice: A Yes S Mo T I	1T + 3351( 
KEDD (Type) Excel	Sample Temperature: 2. X	P = 200 P
Matrix Sample Request ID	Container Type and # Type	ТЕХ + МТ ВТЕХ + МТ ВТЕХ + МТ ВТЕХ + МТ СПР (Method B10 (PNA B310 (PNA B320
127/12 1530 Soil BK-7 (0-0.5')	(2) yes Noul -13	
1535 1 BK-7 (1.5-2.0)	-	
	51-	
122 BK-8(1.5-2.0)	71-	
V 1530 1 34-7 (0-0.5') DUP	LI- n n dod	
GU BK - EB- 012712	2 Rul HNO2 -18	
20 12 1500 AV WOLL 1 MM	Received by: Date Time	Remarks:
Time: Relinquished by:	/ // Date	- seament. Est many te xus.
f noncessary scamples submitted to Holl Environmental may be submitted to	the archediant abadatories This serves as notice of	<ul> <li>this meshlifty. Any sub-contracted data will be clearly notated on the analytical report.</li> </ul>

2

### Analyte **Analytical Method** Antimony SW-846 method 6010/6020 Arsenic SW-846 method 6010/6020 Barium SW-846 method 6010/6020 Includes Beryllium SW-846 method 6010/6020 SW-846 method 6010/6020 Cadmium Solt Chromium SW-846 method 6010/6020 Soil Samples SW-846 method 6010/6020 Cobalt SW-846 method 335.3/335.2 mod **Cyanide** SW-846 method 6010/6020 Lead Mercury SW-846 method 7470/7471 GW Samples (both drssolid at total analysis) SW-846 method 6010/6020 Nickel Selenium SW-846 method 6010/6020 SW-846 method 6010/6020 Silver SW-846 method 6010/6020 Thallium Vanadium SW-846 method 6010/6020 Zinc SW-846 method 6010/6020 GENERAL CHEMISTRY ANALYSES **Analytical Method** Analyte Total Dissolved Solids SM-2540C Bicarbonate SM-2320B (disselved) EPA method 300.0 (dissolved & total) Chloride Sulfate EPA method 300.0 (dissolved & total) FOR Grounducotes ONLY

For Soil and Groundwarty Samples (Dissolved and Totals

### METALS ANALYSES

=								
Calcium -	<ul> <li>EPA method 6010/6020 (dissolved)</li> </ul>							
Magnesium	EPA method 6010/6020 (total)							
Sodium -	EPA method 6010/6020 (dissolved)							
Potassium	EPA method 6010/6020 (dissolved)							
Manganeşe	SW-846 method 6010/6020 (dissolved &							
and the second se	total)							
Nitrațe/hitrite	EPA method 300.0 (dissolved)							
lron	SW-846 method 6010/6020 (dissolved &							
	total)							
SWMU No. 16 Constituent List								
Awalista	Amplerical Mathead							

		Analyte		Analytical Method
4	180 <sup>, .</sup>	Aluminum		SW-846 method 6010/6020
	ا هت	Boron		SW-846 method 6010/6020
1	1	Copper		SW-846 method 6010/6020
-	1	Molybdenum	4	SW-846 method 6010/6020
-	ĺ	Uranium		SW-846 method 6020
		Fluoride		SW-846 method 300

luctored Soils an EBS.

Both Lists



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

April 13, 2012

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: RCRA Background Investigation

OrderNo.: 1202153

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/3/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 28, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <u>www.hallenvironmental.com</u> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

andy

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Analytical Report Lab Order 1202153 Date Reported: 4/13/2012

# Hall Environmental Analysis Laboratory, Inc.

CLIENT:Western Refining Southwest, Inc.Project:RCRA Background InvestigationLab ID:1202153-001Matrix: SOIL

-

Client Sample ID: BK-9 (73-73.5) Collection Date: 2/1/2012 9:00:00 AM Received Date: 2/3/2012 3:25:00 PM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	0.85	1.5	J	mg/Kg	5	2/6/2012 1:37:01 PM
EPA METHOD 7471: MERCURY						Analyst: <b>JLF</b>
Mercury	ND	0.033		mg/Kg	1	2/15/2012 4:29:46 PM
EPA METHOD 6010B: SOIL METALS						Analyst: ELS
Aluminum	10,000	1,500		mg/Kg	500	2/20/2012 12:25:14 PM
Antimony	2.1	2.5	J	mg/Kg	1	2/19/2012 8:46:30 AM
Arsenic	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Barium	720	2.0		mg/Kg	20	2/20/2012 12:23:23 PM
Beryllium	0.23	0.15		mg/Kg	1	2/19/2012 8:46:30 AM
Boron	ND	2.0		mg/Kg	1	2/19/2012 8:46:30 AM
Cadmium	0.10	0.10		mg/Kg	1	2/19/2012 8:46:30 AM
Chromium	49	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Cobalt	6.1	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Copper	19	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Lead	1.4	0.50		mg/Kg	2	2/20/2012 12:16:29 PM
Molybdenum	4.0	0.40		mg/Kg	1	2/19/2012 8:46:30 AM
Nickel	12	0.50		mg/Kg	1	2/19/2012 8:46:30 AM
Selenium	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Silver	ND	0.25		mg/Kg	1	2/19/2012 8:46:30 AM
Thallium	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Uranium	5.6	5.0		mg/Kg	1	2/19/2012 8:46:30 AM
Vanadium	35	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Zinc	27	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
CYANIDE-TOTAL						Analyst: Anat
Cyanide	ND	0.30		mg/Kg	1	2/14/2012

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.		Analyte detected in the associated Method Blank				
	Е	Value above quantitation range		Holding times for preparation or analysis exceeded				
	J	Analyte detected below quantitation limits		Not Detected at the Reporting Limit				
	R	RPD outside accepted recovery limits		Reporting Detection Limit				
	S	Spike Recovery outside accepted recovery limits		Page 1 of e				

### CASE NARRATIVE

### February 27, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1202153 Anatek Batch: 120207014

**Project Summary:** One (1) soil sample was received on 2/7/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Sample was received at 4.5 C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1202153 BK-9 (73-73.5)	120207014-001	EPA 335.4

### **QA/QC** Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Ý	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	· Y	NA
Method Blank(s) Valid?	Ý	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Ύ	NA
Comments:	Y	NA

### 1. Holding Time Requirements

No problems encountered.

### 2. GC/MS Tune Requirements

N/A

### 3. Calibration Requirements

No problems encountered.

### 4. Surrogate Recovery Requirements

N/A.

### 5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

### 6. Method Blank Requirements

No problems encountered.

### 7. Internal Standard(s) Response Requirements

N/A

8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

John. Conthe

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120207014
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202153
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### Analytical Results Report

Sample Number Client Sample ID Matrix	120207014-001 1202153-001B / BK-9 (73-73.5) Soil	Sampling Date Sampling Time Sample Location	2/1/2012 9:00 AM	Date/Time Received	2/7/2012	11:45 AM
Comments						

	Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
I	Cyanide	ND	mg/Kg	0.3	2/14/2012	CRW	EPA 335.4	
1	%moisture	4.6	Percent		2/17/2012	CRW	%moisture	

### Surrogate Data

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level

ND Not Detected

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C565; MT:Cert0095

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRON	MENTAL ANAL	YSIS LA	З .`	Batch	#:	12	202070	14		
Address:	4901 HAWKINS	NE SUITE D			Projec	t Nam	i <b>e:</b> 12	202153	· .		
	ALBUQUERQU	E, NM 87109									
Attn:	ANDY FREEMA	•									
		Analyti	cal Res	ults Rep	oorf .						
		-		trol Data							
		- Contraction of the contraction	anty con	uror Dala						•	
Lab Control Sa	Imple								· .		
Parameter		LCS Result	Units	LCS Sp	oike %Rec	AR	%Rec	Prep	Date	Analysis Date	
Cyanide		0.512	mg/kg	0.5	102.4	80	-120	2/14/		2/14/2012	
						•					
Matrix Spike			Comolo	MS		MS		AR			
Sample Number	Parameter		Sample Result	Result	Units	Spike	%Rec	AR %Rec	Prep Date	Analysis Date	
120207017-001	Cyanide	<b>.</b>	ND	13.7	mg/kg	14	97.9	60-140	2/14/2012	=	
Matrix Spike D	uplicate								•		
-	•	MSD		MSD			AR	_	<b>_</b> .		
Parameter Cyanide		Result 14.2	Units mg/kg	Spike 14	%Rec 101.4	%RPD 3.6	%RPD 0-25		<b>p Date</b> 4/2012	Analysis Date 2/14/2012	
	,	14.2	тулу	14	101.4		0-25	211	4/2012	2/14/2012	
Method Blank	·										
Parameter			Res	suit	Units		PQL	Pr	ep Date	Analysis Date	
Cyanide			N	D	mg/Kg		0.3	2	/14/2012	2/14/2012	

AR ND Acceptable Range Not Detected PQL RPD Practical Quantitation Limit

Relative Percentage Difference

### Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0025

Anatek Labs, Inc. 1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

## Login Report

Contact Name: ANDY FREEMAN       Project Name: 1202153         Comment:       Sample #: 12027014-001       Customer Sample #: 1202153-001B / BK-9 (73-73.5)         Recv'd:	Customer Name: HALL ENVIRONMENTAL 4901 HAWKINS NE SUIT ALBUQUERQUE	LYSIS LAB M 87109	Order ID: 1202070 Order Date: 2/7/20			
Sample #:       120207014-001       Customer Sample #:       1202153-001B / BK-9 (73-73.5)         Recv'd:       Image: Collector:       Date Collected:       2/1/2012         Quantity:       1       Matrix:       Soil       Date Received:       2/1/2012 11:45:00 A         Comment:       Test       Lab       Method       Due Date       Priority         %Moisture       M       %moisture       2/1/2012       Normal (6-10 Days)         CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         Samples received in a cooler?       Yes       Samples received intact?       Yes         Samples received intact?       Yes       Yes       Samples received with a COC?       Yes         Samples received within holding time?       Yes       Yes       Yes         Are all sample bottles properly preserved?       Yes       Yes         Are all samples free of headspace?       N/A       Yes         Are VCC samples free of headspace?       N/A       Yes         Are VCC samples free of headspace?       N/A       Yes	Contact Name: ANDY FREEMAN		P	roject Name: 1202	153	
Recv'd:       Image: Collector:       Date Collected:       2/1/2012         Quantity:       1       Matrix:       Soil       Date Received:       2/7/2012 11:45:00 A         Comment:       Image: Collected:       2/7/2012 11:45:00 A       Priority         %Moisture       Lab       Method       Due Date       Priority         %Moisture       M       %moisture       2/17/2012       Normal (6-10 Days)         CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         Samples received in a cooler?       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         Samples received intact?       Yes       Yes       Yes       Samples received with a COC?       Yes         Samples received with a COC?       Yes       Yes       Yes       Yes       Yes         Are all sample bottles property preserved?       Yes       Yes       Yes       Yes         Are VOC samples free of headspace?       N/A       N/A       N/A       N/A	Comment:			· .		
Quantity:       1       Matrix:       Soil       Date Received:       2/7/2012 11:45:00 A         Comment:       Date Received:       2/7/2012 11:45:00 A         Test       Lab       Method       Due Date       Priority         %Moisture       M       %moisture       2/17/2012       Mormal (6-10 Days)         CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Mormal (6-10 Days)         Samples received in a cooler?       M       EPA 335.4       Yes         Samples received in a cooler?       Yes       Yes         Samples received in a cooler?       Yes       Yes         Samples received with a COC?       Yes       Yes         Samples received within holding time?       Yes       Yes         Are all sample bottles properly preserved?       Yes       Yes         Are VOC samples free of headspace?       N/A       N/A         Is there a trip blank to accompany VOC samples?       N/A       N/A	Sample #: 120207014-001 Customer Sample #	120	)2153-001B / BK-9 (73-73	5)		
Test       Lab       Method       Due Date       Priority         %Moisture       M       %moisture       2/17/2012       Normal (6-10 Days)         CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         SAMPLE CONDITION RECORD         Samples received in a cooler?       Yes         Samples received intact?       Yes       Yes         What is the temperature inside the cooler?       4.5       Samples received with a COC?       Yes         Samples received with a COC?       Yes       Yes       Are all sample bottles properly preserved?       Yes         Are VOC samples free of headspace?       N/A       N/A       N/A       N/A	Recv'd: 🗸 Collector:		Date Collected:	2/1/2012		
TestLabMethodDue DatePriority%MoistureM%moisture2/17/2012Normal (6-10 Days)CYANIDE TOTAL EPAMEPA 335.42/17/2012Normal (6-10 Days)BAMPLE CONDITION RECORDSamples received in a cooler?YesSamples received intact?YesWhat is the temperature inside the cooler?4.5Samples received with a COC?YesSamples received within holding time?YesAre all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	Quantity: 1 Matrix: Soil		Date Received:	2/7/2012 11:45:00 A		
%Moisture       M       %moisture       2/17/2012       Normal (6-10 Days)         CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         SAMPLE CONDITION RECORD         Samples received in a cooler?       Yes         Samples received intact?       Yes         What is the temperature inside the cooler?       4.5         Samples received with a COC?       Yes         Samples received within holding time?       Yes         Are all sample bottles properly preserved?       Yes         Are VOC samples free of headspace?       N/A         Is there a trip blank to accompany VOC samples?       N/A	Comment:					
CYANIDE TOTAL EPA       M       EPA 335.4       2/17/2012       Normal (6-10 Days)         SAMPLE CONDITION RECORD         Samples received in a cooler?       Yes         Samples received intact?       Yes         What is the temperature inside the cooler?       4.5         Samples received with a COC?       Yes         Samples received within holding time?       Yes         Are all sample bottles properly preserved?       Yes         Are VOC samples free of headspace?       N/A         Is there a trip blank to accompany VOC samples?       N/A	Test	Lab	Method	Due Date	Priority	
Samples received in a cooler?       Yes         Samples received intact?       Yes         What is the temperature inside the cooler?       4.5         Samples received with a COC?       Yes         Samples received within holding time?       Yes         Are all sample bottles properly preserved?       Yes         Are vOC samples free of headspace?       N/A         Is there a trip blank to accompany VOC samples?       N/A	%Moisture	М	%moisture	2/17/2012	Normal (6-10 Days)	
Samples received in a cooler?YesSamples received intact?YesWhat is the temperature inside the cooler?4.5Samples received with a COC?YesSamples received within holding time?YesAre all sample bottles properly preserved?YesAre vOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	CYANIDE TOTAL EPA	М	EPA 335.4	2/17/2012	<u>Normal (6-10 Days)</u>	
Samples received intact?YesWhat is the temperature inside the cooler?4.5Samples received with a COC?YesSamples received within holding time?YesAre all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	SAMPLE	CON	DITION RECORD	)		
What is the temperature inside the cooler?4.5Samples received with a COC?YesSamples received within holding time?YesAre all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	Samples received in a cooler?			Yes	· · · · ·	
Samples received with a COC?YesSamples received within holding time?YesAre all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	Samples received intact?			Yes	•	
Samples received within holding time?YesAre all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	What is the temperature inside the cooler?			4.5		
Are all sample bottles properly preserved?YesAre VOC samples free of headspace?N/AIs there a trip blank to accompany VOC samples?N/A	Samples received with a COC?			Yes		
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Is there a trip blank to accompany VOC samples? N/A	Are all sample bottles properly preserved?			Yes		
	Are VOC samples free of headspace?		н 	N/A		
Labels and chain agree? Yes	Is there a trip blank to accompany VOC sample	es?		N/A		
	Labels and chain agree?			Yes		

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		hed By/	B);	and in		*******LEVEL 4 D/ coolers and blue ice.	SPECIAL INSTRUCTIONS / COMMENTS												120215	SAN	CATE, ZIP	Š	SUB CONTRATOR Anatek Labs	HALL ANAL LABO
	TAT:	Í		i alla		L4DA	CITONS												1202153-001B	SAMPLE	Mose	1282	R. Anat	HALL ENVIRONMENTAL ANALYSIS LABORATORY
	St			Here's	Ê	TA PACKE	/ COMM		·			<	·								юw, П	1282 Alturas Dr	ek La	IS TORY
	Standard 🔲	Date:	Date:			VOL	ENTS:										:		BK-9 (73-73.5)	CLIENT	CITY, STATE, ZIP. MOSCOW, ID 83843	as Dr	bs	AL I
				2/6/36		******LEVEL 4 DATA PACKET, PROVIDE QC*******Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. coolers and blue ice. Thank nou.	1.1			   								:	5	CLIENT SAMPLE ID	3			
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)-7-1	DE CONTANERS:	ICE / ICE-PACKS PRESENT:	LABELS & CHAINS AGREE NO HEADSPACE	RECEIVED INTACT		ports. P				-							MMBS		TOTAL CYANIDE				(208) 883-2	
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						.com. P												:		<b>NEN</b>			-9246	HALL Last 12 1st RCVD
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Page 6 of 14

# **CYANIDE EXTRACTION BENCHSHEET SW 846**

instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
2/7/12	120201021-11	89.4	10.03	250	7.50	27.9	Con
	-12	15,9	10.00	·		26,1	
· [	-13	90.5	10:02			7.7.6	
		94,8	10.07			26.2	
	-15	92.6	10.03			26.9	
	-16	91.3	10.01			27.4	
10/11	-17	91.8	10.11	4	4	27.4	
2/ 8/ 12	120201019 - 1 -2	11.8	10.00	250	250	27.2	Carl
		93.7			· .	26.6	<u> </u>
	120707027-1	93.0	10-01			26.9	<u> </u>
2/8/12	1000 ALALA Z	89.4	10-18			27.5	
4 S/ IF	120201019 - 3	96.7	10.00	250	1250	15.9	Om
	- 4	96.6	5.00	lly	167	25.8	
		94.6		<u> </u>		26.4	
		94.5 94.8	5.05	_		26.2	
	-8	94.9	5.10			25.9	<u>                                     </u>
		97.2	5.02 4.99		<u> </u>	26,2 25.8	
	-10	92.4	5.01			27.0	├
	-11	94.3	5.00			26.5	
	120202031-1	15.0	5.00	4		167	
2/10/12	17.0207014-1	95.4	10.04	240	290	7.6,1	now
	12020707-1	89.4	10,04	000		27.9	<u>/ // · /</u>
	-2	922	10.00			27.1	
	- 3	96.7	10.03			25.8	
	-4	94.9	10.00			14.3	
	- 4	953	10.01			26.2	
	-6	95.5	10.09			15.9	
	-++	90.3	9.99			27.7	
		90.2	10.05			17.6	
	20207017-1	\$8.9	10.03			28.0	
	2	927	16.01		1	26.9	
	-3	87.0	10.03	·		28.6	
	-4	90.4	10.01			27.6	
	-6	93,0	10.07			26.7	
		89.0 88.8	10.07		·····	27.6	
	-7	88.8	10.00			28.7,	<u> </u>
_ {*	<u>×</u>	92,9	10.03	ł		26.8	4
<u> </u>					·		
				;			

N:\Bench Sheets\Cyanide Extraction Benchsheet.xls

### Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

 Mail
 <th

Method requirements: All QC +/- 10% Equipment: Midi-vap Instrument: ALPCHEM FIA 3000 Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120207014-1	soil con	NaOH	Fome	26.	Same		
2	17-1				27.9	· · · · · · · · · · · · · · · · · · ·		
3	-/ms						ImL	
4	-lmsp				+			
5	144		/				t t	
6	-BL				t			
7	-2				27.			
8	-3				25.8			
9	-4				26.3			
10	-5	4	4	4	76.2	ł		
11	ومسكا بمحسين بالمستحص الصباب والمتحاصة فإصفا	Soil eren	North	Elmi	25.9	Same		
12	-7	<u> </u>	1		27.7			
13	-8				27.6			
14	120207027-1	·			28.0			
15	-2				26.9			
16	- 3	· · · · ·			28.6	-		
17	- 4				27.6			
18	-5				26.7			
19	- 6				27.6			
20	-7	2	t		28.2	4		

\* If soils this calculation is taken from cyanide extraction bench sheet.

\*\* If soils, mLs of extract used for distillation.

Extraction Reagents:	
methyl red indicator	A041-03
18 N H₂SO₄	A043-10
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl₂	A043-06

Analytical Reagents: Barbituric Acid Sodium Phosphate Chloramine-t Pyridine Reagent #: R038-13 R026-23 R048-09 R043-03

13/12 Distillation Initials/Date Distilled: UM

Analyst Initials/Date Analyzed: (MW 2/14/12

N:\Bench Sheets\Total Cyanide EPA 335.4.xis

### File name: T:\DATA1\FLOW4\2012\EPA335.4\021412CM.RST Date: February 14, 2012 Operator: CRW

CYW 2/17/12

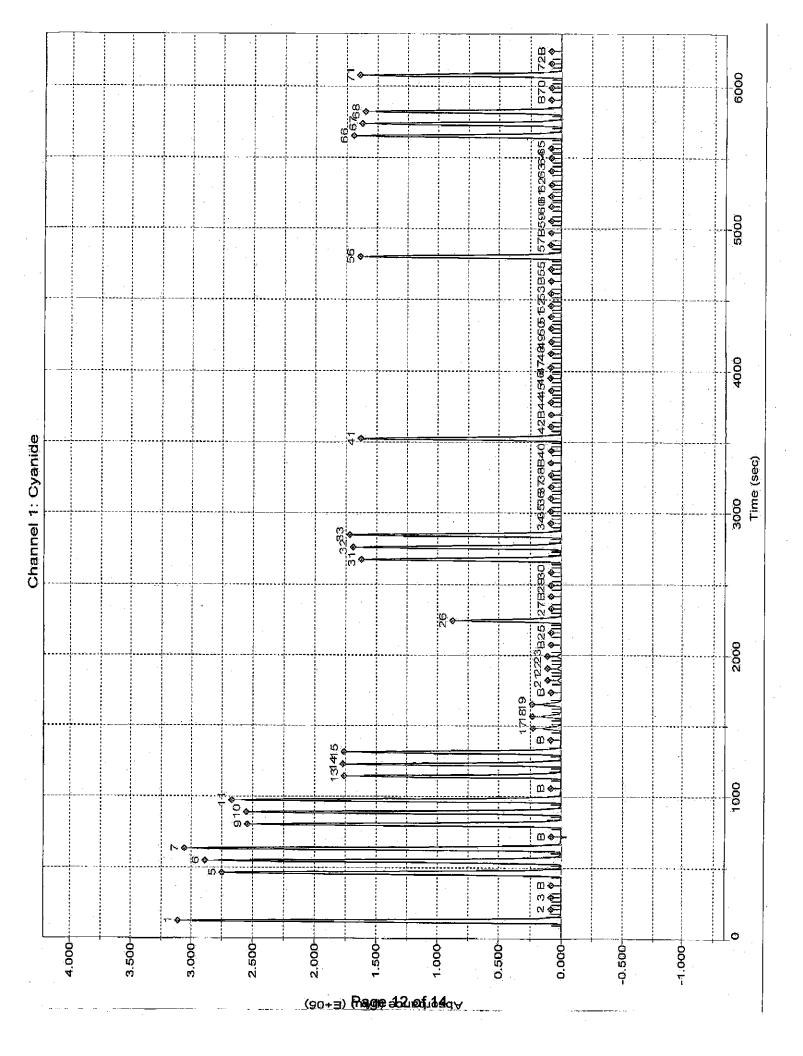
12021	3FIALNS
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ak	Cup	Name	Туре	Dil	Wt		Area	Calc.	(ppm)
	2	Sync	SYNC	1		1	6240112		0.950185
	0	Carryover	CO	1		ĺ	14767		0.003458
	Ö	Carryover	CO	1		1	4.057		0.001829
	0	Baseline	RB	1		1	4254		0.001859
	2	Cal 1.00 ppm	C	1		l	6451998		0.982408
	2	Cal 1.00 ppm	C	1		1	6376184		0.970878
	2	Cal 1.00 ppm	С	1		1	6445985		0.981493
	Ó.	Baseline	RB	1		1	-564		0.001126
	3	Cal 0.80 ppm	Ç	1		1	5240594		0.798182
	З	Cal 0.80 ppm	Ċ	1		1	5270748		0.802768
	3	Cal 0.80 ppm	С	1		1	5330839		0.811906
	σ	Baseline	RB	1		1	1473		0.001436
	4	Cal 0.50 ppm	С	1		1	3312679		0.504992
	4	Cal 0.50 ppm	Ċ.	1	÷	1	3343212		0.509635
	4	Cal 0.50 ppm	C	1		1	3343269		0.509644
	0	Baseline	RB	1	· ·	1	-4543		0.000521
	5	Cal 0.05 ppm	С	- 1		ī	304698		0.047549
	:5	Cal 0.05 ppm	Ĉ	1		1	309485		0.048277
	5	Cal 0.05 ppm	č	1			315598		0.049207
	õ	Baseline	RB	1.		1 1	-368		0.001156
	ୈ	Cal 0.01 ppm	C C	1		1	62752		0.010755
	6	Cal 0.01 ppm	c	1		. 1	60671	,	0.010439
	6	Cal 0.01 ppm	č	1		1	56879		0.009862
	õ	Baseline	RB	· · 1		1	516		0.001290
	1	Blank	BLNK	1		1	3584		0.001757
	7	ICV 0.25 ppm	CCV	1		1	1712997		0.261718
	.1	Blank	BLNK	1		1	-3191		0.000727
	ō	Baseline	RB	1		1	-3191 354		0.001266
	8	9 120207017-BL S	U	1		1	-3794		
		-120207017-001	Ŭ	27.9		1			0.000635
	10	120207017-001	-				-2036	1	0.025178
	11	120207017-001MS		27.9		1	3216405		13.680788
	12			27	9	1		ŧ .	14.190402
		b 120207017-LCS	U	1		1	3357160		0.511756
	13	• 120207017-002	U	27.1		ĺ	6448		0.059420
	14	<b>a 120207017-003</b>	U	25.8		1	6459		0.056612
	15	• 120207017-004	U	26.3		1	2397		0.041466
	16	120207017-005	U	26.2		1.	-2330		0.022472
	17	• 120207014-001	U	26.1		1	-3845		0.016375
	0	Baseline	RB	1		1	-775		0.001094
	1	Blank	BLNK	1		1	-7331		0.000097
	¥. ۲	CCV 0.5 ppm	CCV	1		1	3237268		0.493524
	1	Blank	BLNK	1		1	-4489		0.000529
	0 1 6	Read Baseline	RB	1		1	-2950		0.000763
	18	<pre>* 120207017-006</pre>	Ū	25.9		1	-3475		0.017705
	19		U	27.7		1	-6299		0.007038
	20	• 120207017-008	U	27.6		1	5149		0.055064
	21	• 120207027-001	U	2.8		1	-4150		0.016265
	22	¢120207027-002	U	26.9		l	1200		0.037512
	23	<ul> <li>120207027-003</li> </ul>	U	28.6		1	-8886		-0.003983
	24	¢120207027-004	U	27.6		1 · 1	-2833		0.021563
	25	+120207027-005	U	26.7			136Õ		0,037884
	26	• 120207027-006	σ	27.6		1	2106	-	0.042294
	27	■ 120207027-007	U	28.2		1	915		0.038105
	0	Baseline	RB	1		1	-690		0.001107
	1	Blank	BLNK	1		1	1771		0.001481
	4	CCV 0.5 ppm	CCV	l		1	3262052		0.497293
	1	Blank	BLNK	1		1	-1100		0.001045
	0	Read Baseline	RB	ī		ī	-4031		0.000599
	28	RINSE	U	1		1	-5188		0.000423
	29	RINSE	U	1		ī	-10405	· ·	-0.000370
	30	RINSE	υ	1		ī	-11017		-0.000463
	31	RINSE	Ū	1		1	-12689		-0.000718
	32	RINSE	Ŭ	1		1	-14595		-0.001007
	33	4120131002-BL F	Ŭ	1		1	-9775		-0.001007
	34	+120131002-001	U	1		1, 1,	-1080		0.001048
				1			3270905		0.498639
	35	\$ 120131002-001MS	L.]			1			

Peak	Cup	Name	Type Dil	Wt	A	rea	Calc.	(ppm)
57	36	120131002-001Ms	SD U	1	 l	3326716		0.507127
58	37	120131002-LCS	U	1	1	3258938		0.496819
3	0	Baseline	RB	1	1	-4128		0.000584
7.0	1	Blank	BLNK	1	1	-4264		0.000564
71	- 4	CCV 0.5 ppm	CCV	1	1	3238150		0.493658
72	1	Blank	BLNK	1	1	-3812		0.000632
3	0	Read Baseline	RB	l	1	-2605		0.000816

ak Cup	Flags	
2		
0		
0	BL	
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2		
2 2 2 0 3 3	BL	
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0	BL	
4		
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1 7		
1		
0	BL	
8 9		
10		
11 12		
13		
14		
15 16		
17		
0	BL	
1 4		
1		
0 18	BL	
19		
19 20 21		
21 22		
22 23	LO	
23 24 25 26 27		
25 26		
27		
0 1 4	BL	
4		
1		
0 28	BL	

Peak Cup	Flags
50         29           61         30           62         31           63         32           54         33           55         34           56         35           57         36	LO LO LO LO LQ
58 37	BL
3 0 70 1 71 4 72 1 3 0	BL
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	Page 11 of 14



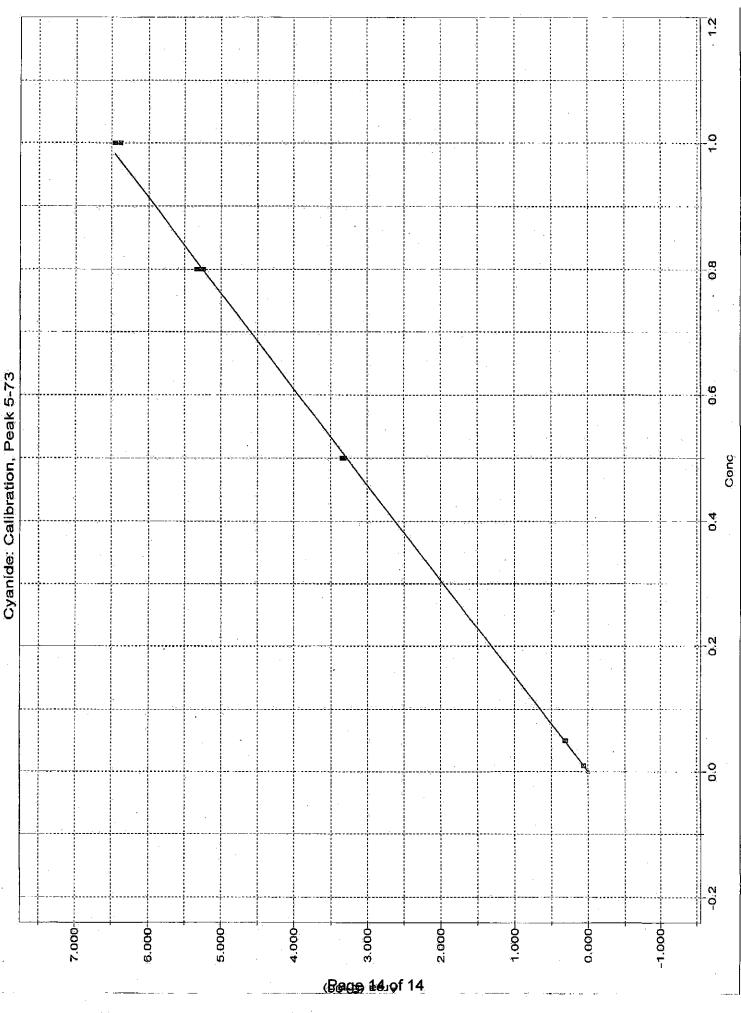
### File name: T:\DATA1\FLOW4\2012\EPA335.4\021412CM.RST Date: February 14, 2012 Operator: CRW

*	Name	Conc	Area
-			
ĸ	Cal 1.00 ppm	1.000000	6451997.500000
×,	Cal 1.00 ppm	1.000000	6376183.500000
ĸ.	Cal 1.00 ppm	1.000000	6445985.000000
k	Cal 0.80 ppm	0.800000	5240594.500000
₩	Cal 0.80 ppm	0.800000	5270747.500000
k	Cal 0.80 ppm	0.800000	5330839.000000
R.	Cal 0.50 ppm	0.500000	3312679.000000
۲	Cal 0.50 ppm	0.500000	3343211.750000
۴	Cal 0.50 ppm	0.500000	3343268.750000
Ŀ.	Cal 0.05 ppm	0.050000	304698.437500
۲	Cal 0.05 ppm	0.050000	309484.875000
¢.	Cal 0.05 ppm	0.050000	315597.906250
F.	Cal 0.01 ppm	0.010000	62752.015625
¥	Cal 0.01 ppm	0.010000	60670.792969
۴.	Cal 0.01 ppm	0.010000	56878.894531
	Calib Coef: y=bx+a		
	a: (intercept)	-7.9701e+03	
•	b:	6.5756e+06	· · · · · · · · · · · · · · · · · · ·
	Corr Coef:	0.999677	

0.237%

No Drift Peaks

Carryover:



•

WO#:	1202153
	13-Apr-12

Client: Project:		stern Refining So RA Background									
Sample ID	MB-571	BLK	Tes	tCode: EF	PA Method	300.0: Anion	s				
Client ID:	t ID: PBS Batch ID: 571				F	RunNo: <b>78</b>	34				
Prep Date:	2/3/2012	Analysis Da	ate: <b>2/</b>	6/2012	S	SeqNo: 22	2392	Units: mg/K	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		ND	0.30								
Sample ID	LCS-571	SampT	ype: LC	S	Tes	tCode: EF	PA Method	300.0: Anion	s		
Client ID:	LCSS	Batch	ID: 57	1	F	RunNo: <b>78</b>	34				
Prep Date:	2/3/2012	Analysis Da	ate: <b>2/</b>	6/2012	S	SeqNo: 22	2393	Units: mg/K	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		1.4	0.30	1.500	0	94.3	90	110			

### Qualifiers:

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1202153
	13-Apr-12

Client: Project:		ern Refining S A Background									
Sample ID	MB-723	SampT	ype: ME	BLK	Tes	tCode: EF	PA Method	7471: Mercu	ry		
Client ID: I	D: <b>PBS</b> Batch ID: <b>723</b>				F	RunNo: 90	63				
Prep Date: 2/15/2012 Analysis Date: 2/				15/2012	S	7905	Units: mg/Kg				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.033								
Sample ID	LCS-723	SampT	ype: LC	S	Tes	tCode: EF	PA Method	7471: Mercu	ry		
Client ID:	LCSS	Batch	n ID: 72	3	F	RunNo: 90	53				
Prep Date:	2/15/2012	Analysis D	ate: 2/	15/2012	S	eqNo: 27	7906	Units: mg/K	ģ		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.18	0.033	0.1667	0	105	80	120			

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: 1202153 2

13-Apr-1	4
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Client:	Western Refining Southwest, Inc.
Project:	RCRA Background Investigation

Froject: KCKA	Dackground	mvesu	gation							
Sample ID MB-749	SampType: MBLK TestCode: EPA Method 6010B: Soil Metals									
Client ID: PBS Batch ID: 749			F	RunNo: 1015						
Prep Date: 2/17/2012	Analysis Date: 2/19/2012			S	SeqNo: 2	9260	Units: <b>mg/L</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.58	3.0								J
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	0.16	2.0								J
Cadmium	0.029	0.10								J
Chromium	ND	0.30								
Cobalt	ND	0.30								
Copper	ND	0.30								
Molybdenum	0.074	0.40								J
Nickel	0.12	0.50								J
Selenium	1.0	2.5								J
Silver	0.041	0.25								J
Thallium	ND	2.5								
Uranium	0.93	5.0								J
Vanadium	0.043	2.5								J
Zinc	ND	2.5								
Sample ID LCS-749	SampT	ype: LC	S	Tes	TestCode: EPA Method 6010B: Soil Metals					
Client ID: LCSS	Batch	n ID: <b>74</b>	9	F	RunNo: 1	015				
Prep Date: 2/17/2012	Analysis D	Date: 2/	19/2012	S	SeqNo: 2	9261	Units: mg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.5830	111	80	120			
Antimony	24	2.5	25.00	0	97.6	80	120			
Arsenic	24	2.5	25.00	0	95.2	80	120			
Barium	24	0.10	25.00	0	97.1	80	120			
Beryllium	25	0.15	25.00	0	101	80	120			
Boron	24	2.0	25.00	0.1580	97.2	80	120			
Cadmium	24	0.10	25.00	0.02850	96.9	80	120			
Chromium	25	0.30	25.00	0	99.2	80	120			

### **Qualifiers:**

Cobalt

Copper

Nickel

Selenium Silver

Thallium Uranium

Vanadium

Molybdenum

\*/X Value exceeds Maximum Contaminant Level.

24

26

26

24

23

5.0

25

26

26

0.30

0.30

0.40

0.50

2.5

0.25

2.5

5.0

2.5

25.00

25.00

25.00

25.00

25.00

5.000

25.00

25.00

25.00

0

0

0

0.07350

0.1240

0.04100

0.9285

0.04250

1.030

94.9

103

103

95.8

88.3

99.1

100

100

103

80

80

80

80

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80

80

80

80

120

120

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120

- Е Value above quantitation range
- Analyte detected below quantitation limits J
- R RPD outside accepted recovery limits

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

WO#:	1202153
	13-Apr-12

Client: Project:		Refining S ackground										
Sample ID			Гуре: LC	-	Tes	tCode: El	PA Method	6010B: Soil	Metals			
	LCSS		h ID: <b>74</b>		TestCode: EPA Method 6010B: Soil Metals RunNo: 1015							
								Linito: mar/l				
Prep Date:	2/17/2012	Analysis [		19/2012	3	eqNo: 2	9201	Units: mg/L				
Analyte		Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Zinc		24	2.5	25.00	0	94.2	80	120				
Sample ID	1202153-001AMS	Samp	Гуре: МS	3	Tes	tCode: El	PA Method	6010B: Soil	Metals			
Client ID:	BK-9 (73-73.5)	73-73.5) Batch ID: 749			F	RunNo: 1	015					
Prep Date:	2/17/2012	Analysis E	Date: 2/	19/2012	S	SeqNo: 2	9271	Units: mg/k	٢g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Intimony		12	2.5	24.85	2.108	41.4	75	125			S	
Arsenic		22	2.5	24.85	0	86.6	75	125				
Beryllium		23	0.15	24.85	0.2275	91.1	75	125				
Boron		22	2.0	24.85	0	86.8	75	125				
Cadmium		22	0.10	24.85	0.1012	88.3	75	125				
Cobalt		26	0.30	24.85	6.108	81.7	75	125				
Copper		36	0.30	24.85	18.74	71.0	75	125			S	
lolybdenum		23	0.40	24.85	4.017	77.0	75	125				
lickel		26	0.50	24.85	11.55	59.1	75	125			S	
elenium		18	2.5	24.85	0	72.1	75	125			S	
ilver		4.5	0.25	4.970	0	90.3	75	125				
hallium		ND	2.5	24.85	0	0	75	125			S	
Jranium		28	5.0	24.85	5.606	89.6	75	125				
linc		46	2.5	24.85	26.93	75.1	75	125				
Sample ID	1202153-001AMSI	D Samp1	Гуре: М	SD.	Tes	tCode: El	PA Method	6010B: Soil	Metals			
Client ID:	BK-9 (73-73.5)	Batc	h ID: <b>74</b> 9	9	F	RunNo: 1	015					
Prep Date:	2/17/2012	Analysis [	Date: 2/	19/2012	S	eqNo: 2	9272	Units: mg/k	(g			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
ntimony		11	2.5	24.74	2.108	33.9	75	125	16.5	20	S	
rsenic		20	2.5	24.74	0	82.8	75	125	5.01	20		
Beryllium		23	0.15	24.74	0.2275	91.9	75	125	0.456	20		
Boron		21	2.0	24.74	0	83.7	75	125	4.09	20		
Cadmium		22	0.10	24.74	0.1012	86.6	75	125	2.43	20		
Cobalt		26	0.30	24.74	6.108	79.7	75	125	2.29	20	~	
Copper Askibalanum		34	0.30	24.74	18.74	60.8	75	125	7.44	20	S	
1olybdenum		22	0.40	24.74	4.017	72.8	75 75	125	4.98	20	S	
elenium		18	2.5	24.74	0	73.6	75 75	125	1.67	20	S	
1		4.3	0.25	4.948	0	87.1	75	125 125	4.01 0	20 20	S	
			0 -	04 74				125	()	20		
Silver Thallium		ND	2.5	24.74	0	0	75 75				3	
		ND 27 45	2.5 5.0 2.5	24.74 24.74 24.74	0 5.606 26.93	0 87.9 72.9	75 75 75	125 125	1.90 1.36	20 20 20	S	

### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1202153
	13-Apr-12

Client: Project:		Refining So ackground									
Sample ID	MB-749	SampT	ype: ME	BLK	TestCode: EPA Method 6010B: Soil Metals						
Client ID:	PBS	Batch	ID: 74	9	F	lunNo: 1	032				
Prep Date:	2/17/2012	Analysis D	ate: 2/	20/2012	S	eqNo: 2	9831	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead		ND	0.25								
Sample ID	Sample ID     LCS     TestCode:     EPA Method 6010B: Soil Metals										
Client ID:	LCSS Batch ID: 749				RunNo: 1032						
Prep Date:	2/17/2012 Analysis Date: 2/20/2012				SeqNo: 29832			Units: <b>mg/L</b>			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead		23	0.25	25.00	0	93.2	80	120			
Sample ID	1202153-001AMS	SampT	ype: <b>M</b> \$	3	Tes	tCode: El	PA Method	6010B: Soil I	Vetals		
Client ID:	BK-9 (73-73.5)	Batch	ID: 74	9	RunNo: 1032						
Prep Date:	2/17/2012	Analysis D	ate: 2/	20/2012	SeqNo: 29834 Uni			Units: mg/K	Units: mg/Kg		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead		20	0.50	24.85	1.441	76.6	75	125			
Sample ID	1202153-001AMSI	D SampT	ype: <b>M</b> \$	SD	Tes	Code: El	PA Method	6010B: Soil I	Vetals		
Client ID:	BK-9 (73-73.5)	Batch	ID: 74	9	F	lunNo: 1	032				
Prep Date:	2/17/2012	Analysis D	ate: 2/	20/2012	S	eqNo: 2	9835	Units: mg/K	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead		22	0.50	24.74	1.441	82.2	75	125	6.13	20	

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

### HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.con

# Sample Log-In Check List

Providente Alton 23/13	
Received by/date	
Logged By: Ashley Gallegos 2/3/2012 3:25:00 PM	
Logged By:     Ashley Gallegos     2/3/2012 3:25:00 PM       Completed By:     Ashley Gallegos     2/3/2012 4:05:30 PM	
Reviewed By: MG 2/3/12	
Chain of Custody	
1. Were seals intact? Yes 🗌 No 🗌 Not Present 🗹	
2. Is Chain of Custody complete? Yes 🗹 No 🗌 Not Present 🗌	
3. How was the sample delivered? Client	
<u>Log In</u>	
4. Coolers are present? (see 19. for cooler specific information) Yes ☑ No □ NA □	
5. Was an attempt made to cool the samples? Yes V No NA	
6. Were all samples received at a temperature of >0° C to 6.0°C Yes  ✔ No    NA    NA	
7. Sample(s) in proper container(s)? Yes 🗹 No	
8. Sufficient sample volume for indicated test(s)? Yes V No	
9. Are samples (except VOA and ONG) properly preserved? Yes 🗹 No	
10. Was preservative added to bottles? Yes No 🗹 NA	
11. VOA vials have zero headspace? Yes 🗌 No 🗌 No VOA Vials 🗹	
12. Were any sample containers received broken? Yes 🗌 No 🗹	
13. Does paperwork match bottle labels?       Yes       ✓ No       # of preserved bottles checked for pH:         (Note discrepancies on chain of custody)       Yes       ✓ No       □	
14. Are matrices correctly identified on Chain of Custody? Yes 🗹 No 🗌 (<2 or >12 unles	ss noted)
15. Is it clear what analyses were requested? Yes ☑ No	
16. Were all holding times able to be met? Yes ☑ No □	
(If no, notify customer for authorization.) Checked by:	[
Special Handling (if applicable)	
17. 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:	

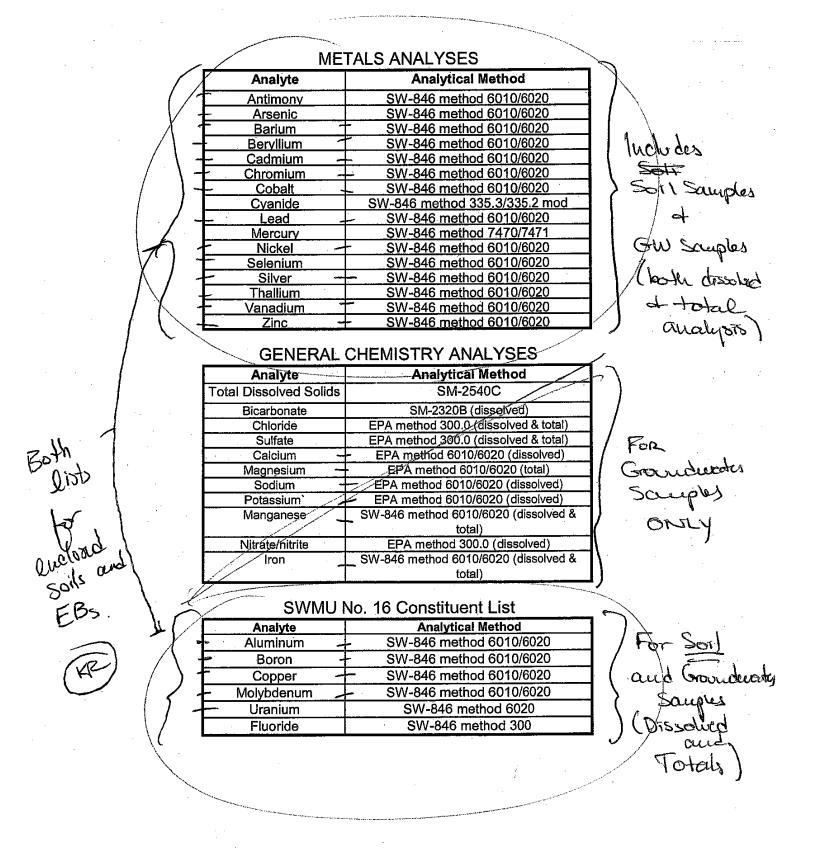
18. Additional remarks:

### 19, Cooler Information

Cooler No	Temp ⁰C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

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				BACKLOUND INESTIGATION Hawkins NE -								į										1	6	7	other accredited abbratories. This serves as notice of this possibility. Any sub-contracted data will be dearly notated on the analytical report.
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	Chain-of-Custody Record	Ĩ	Bloowfield	Addr	Reowheld,		Fax	Jacké	4P	(Typ	Time	900					V			$\mathbf{M}$			Time: [ <b>7</b> 00	Time:	If necessary, samples submitted to Hall Environmental may be subcontra
	S	Client:		Mailing Address:		Phone #:	email or Fax# Keil	QA/QC Package: □ Standard	Accreditation	KEDD (Type)	Date	5								V			<u>ب</u> ۲		=
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Background



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

March 22, 2012

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4166 FAX: (505) 632-3911

RE: RCRA Background Investigation

OrderNo.: 1202350

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 4 sample(s) on 2/10/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 29, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <u>www.hallenvironmental.com</u> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

andy

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109



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

# **Case Narrative**

WO#:1202350Date:3/22/2012

 CLIENT:
 Western Refining Southwest, Inc.

 Project:
 RCRA Background Investigation

The chloride and sulfate reported in fraction -004A was filtered.

Analytical Report Lab Order 1202350 Date Reported: 3/22/2012

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Ξ

Client Sample ID: BK-10 (5-6') Collection Date: 2/7/2012 7:53:00 AM Received Date: 2/10/2012 9:30:00 AM

Lab ID: 1202350-001	Matrix: S	SOIL		Received Date: 2/10/2012 9:30:00 AM							
Analyses	Result	RL (	Qual	Units	DF	Date Analyzed					
EPA METHOD 300.0: ANIONS						Analyst: BRM					
Fluoride	3.0	0.30		mg/Kg	1	2/10/2012 12:52:44 PM					
Chloride	210	30		mg/Kg	20	2/10/2012 1:05:08 PM					
Sulfate	2,300	30		mg/Kg	20	2/10/2012 1:05:08 PM					
EPA METHOD 7471: MERCURY						Analyst: ELS					
Mercury	ND	0.033		mg/kg	1	2/14/2012 9:59:23 AM					
EPA METHOD 6010B: SOIL METALS						Analyst: ELS					
Aluminum	7,900	1,500		mg/Kg	500	2/17/2012 8:39:38 AM					
Antimony	1.1	5.0	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Arsenic	ND	5.0		mg/Kg	2	2/13/2012 8:23:16 AM					
Barium	150	0.50		mg/Kg	5	2/17/2012 8:37:43 AM					
Beryllium	0.25	0.30	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Boron	3.8	4.0	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Cadmium	0.065	0.20	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Chromium	4.6	0.60		mg/Kg	2	2/13/2012 8:23:16 AM					
Cobalt	2.6	0.60		mg/Kg	2	2/13/2012 8:23:16 AM					
Copper	3.5	0.60		mg/Kg	2	2/17/2012 8:35:40 AM					
Iron	9,100	500		mg/Kg	500	3/18/2012 12:59:27 PM					
Lead	2.6	0.50		mg/Kg	2	2/17/2012 8:35:40 AM					
Manganese	180	0.48		mg/Kg	5	3/18/2012 12:57:27 PM					
Molybdenum	0.33	0.80	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Nickel	3.8	1.0		mg/Kg	2	2/13/2012 8:23:16 AM					
Selenium	1.1	5.0	J	mg/Kg	2	2/13/2012 8:23:16 AM					
Silver	ND	0.50		mg/Kg	2	2/13/2012 8:23:16 AM					
Thallium	ND	5.0		mg/Kg	2	2/13/2012 8:23:16 AM					
Uranium	ND	10		mg/Kg	2	2/13/2012 8:23:16 AM					
Vanadium	15	5.0		mg/Kg	2	2/13/2012 8:23:16 AM					
Zinc	16	5.0		mg/Kg	2	2/13/2012 8:23:16 AM					
CYANIDE-TOTAL						Analyst: Anat					
Cyanide	ND	0.30		mg/Kg	1	2/15/2012					

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 2 of 21

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Client Sample ID: BK-10 (5-6') DUP Collection Date: 2/7/2012 7:53:00 AM Received Date: 2/10/2012 9:30:00 AM

Lab ID: 1202350-002	Matrix: S	SOIL		<b>Received Date:</b> 2/10/2012 9:30:00 AM			
Analyses	Result RI		Qual Units		DF	Date Analyzed	
EPA METHOD 300.0: ANIONS						Analyst: BRM	
Fluoride	2.9	0.30		mg/Kg	1	2/10/2012 1:17:33 PM	
Chloride	220	30		mg/Kg	20	2/10/2012 1:29:57 PM	
Sulfate	2,200	30		mg/Kg	20	2/10/2012 1:29:57 PM	
EPA METHOD 7471: MERCURY						Analyst: ELS	
Mercury	ND	0.033		mg/kg	1	2/14/2012 10:04:46 AM	
EPA METHOD 6010B: SOIL METALS						Analyst: ELS	
Aluminum	8,300	1,500		mg/Kg	500	2/17/2012 8:43:28 AM	
Antimony	3.0	12	J	mg/Kg	5	2/17/2012 8:41:35 AM	
Arsenic	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM	
Barium	110	0.50		mg/Kg	5	2/17/2012 8:41:35 AM	
Beryllium	0.33	0.75	J	mg/Kg	5	2/17/2012 8:41:35 AM	
Boron	5.0	10	J	mg/Kg	5	2/17/2012 8:41:35 AM	
Cadmium	ND	0.50		mg/Kg	5	2/17/2012 8:41:35 AM	
Chromium	5.1	1.5		mg/Kg	5	2/17/2012 8:41:35 AM	
Cobalt	3.0	1.5		mg/Kg	5	2/17/2012 8:41:35 AM	
Copper	3.8	1.5		mg/Kg	5	2/17/2012 8:41:35 AM	
Iron	9,900	500		mg/Kg	500	3/18/2012 1:07:39 PM	
Lead	3.8	1.2		mg/Kg	5	2/17/2012 8:41:35 AM	
Manganese	190	0.50		mg/Kg	5	3/18/2012 1:05:41 PM	
Molybdenum	0.40	2.0	J	mg/Kg	5	2/17/2012 8:41:35 AM	
Nickel	4.3	2.5		mg/Kg	5	2/17/2012 8:41:35 AM	
Selenium	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM	
Silver	ND	1.2		mg/Kg	5	2/17/2012 8:41:35 AM	
Thallium	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM	
Uranium	ND	25		mg/Kg	5	2/17/2012 8:41:35 AM	
Vanadium	17	12		mg/Kg	5	2/17/2012 8:41:35 AM	
Zinc	19	12		mg/Kg	5	2/17/2012 8:41:35 AM	
CYANIDE-TOTAL						Analyst: Anat	
Cyanide	ND	0.30		mg/Kg	1	2/15/2012	

Qualifiers:		Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R		RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		Page 3 of 2	

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Ξ

Client Sample ID: BK-10 (40-42') Collection Date: 2/7/2012 10:43:00 AM Received Date: 2/10/2012 9:30:00 AM

Lab ID: 1202350-003	Matrix: S	SOIL		<b>Received Date:</b> 2/10/2012 9:30:00 AM			
Analyses	Result RL		Qual Units		DF	Date Analyzed	
EPA METHOD 300.0: ANIONS						Analyst: BRM	
Fluoride	2.8	6.0	J	mg/Kg	20	2/10/2012 1:42:21 PM	
Chloride	ND	30		mg/Kg	20	2/10/2012 1:42:21 PM	
Sulfate	210	30		mg/Kg	20	2/10/2012 1:42:21 PM	
EPA METHOD 7471: MERCURY						Analyst: ELS	
Mercury	ND	0.033		mg/kg	1	2/14/2012 10:06:32 AM	
EPA METHOD 6010B: SOIL METALS						Analyst: ELS	
Aluminum	20,000	1,500		mg/Kg	500	2/17/2012 8:47:28 AM	
Antimony	3.1	13	J	mg/Kg	5	2/17/2012 8:45:28 AM	
Arsenic	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM	
Barium	24	0.50		mg/Kg	5	2/17/2012 8:45:28 AM	
Beryllium	0.96	0.75		mg/Kg	5	2/17/2012 8:45:28 AM	
Boron	2.5	10	J	mg/Kg	5	2/17/2012 8:45:28 AM	
Cadmium	ND	0.50		mg/Kg	5	2/17/2012 8:45:28 AM	
Chromium	11	1.5		mg/Kg	5	2/17/2012 8:45:28 AM	
Cobalt	4.5	1.5		mg/Kg	5	2/17/2012 8:45:28 AM	
Copper	8.8	1.5		mg/Kg	5	2/17/2012 8:45:28 AM	
Iron	14,000	500		mg/Kg	500	3/18/2012 1:12:13 PM	
Lead	2.4	1.3		mg/Kg	5	2/17/2012 8:45:28 AM	
Manganese	90	0.50		mg/Kg	5	3/18/2012 1:10:11 PM	
Molybdenum	0.55	2.0	J	mg/Kg	5	2/17/2012 8:45:28 AM	
Nickel	6.7	2.5		mg/Kg	5	2/17/2012 8:45:28 AM	
Selenium	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM	
Silver	ND	1.3		mg/Kg	5	2/17/2012 8:45:28 AM	
Thallium	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM	
Uranium	4.0	25	J	mg/Kg	5	2/17/2012 8:45:28 AM	
Vanadium	28	13		mg/Kg	5	2/17/2012 8:45:28 AM	
Zinc	36	13		mg/Kg	5	2/17/2012 8:45:28 AM	
CYANIDE-TOTAL						Analyst: Anat	
Cyanide	ND	0.30		mg/Kg	1	2/15/2012	

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R S	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	Spike Recovery outside accepted recovery limits		Page 4 of 2

#### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Client Sample ID: BK-EB-020812 Collection Date: 2/8/2012 1:40:00 PM

Lab ID: 1202350-004	Matrix: A	Matrix: AQUEOUS			<b>Received Date:</b> 2/10/2012 9:30:00 AM			
Analyses	Result	RL (	Qual	Units	DF	F Date Analyzed		
EPA METHOD 300.0: ANIONS						Analyst: BRN		
Chloride	ND	0.50		mg/L	1	2/10/2012 1:00:31 PM		
Sulfate	ND	0.50		mg/L	1	2/10/2012 1:00:31 PM		
EPA METHOD 300.0: ANIONS						Analyst: BRN		
Chloride	1.4	0.50		mg/L	1	2/10/2012 11:53:11 AM		
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	2/10/2012 11:53:11 AM		
Nitrogen, Nitrate (As N)	0.033	0.10	J	mg/L	1	2/10/2012 11:53:11 AM		
Sulfate	0.35	0.50	J	mg/L	1	2/10/2012 11:53:11 AM		
EPA METHOD 200.7: DISSOLVED	METALS					Analyst: RAG		
Aluminum	ND	0.020		mg/L	1	2/10/2012 4:33:41 PM		
Barium	0.00034	0.0020	J	mg/L	1	2/10/2012 4:33:41 PM		
Beryllium	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM		
Boron	ND	0.040		mg/L	1	2/10/2012 4:33:41 PM		
Cadmium	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM		
Calcium	0.084	1.0	J	mg/L	1	2/10/2012 4:33:41 PM		
Chromium	ND	0.0060		mg/L	1	2/10/2012 4:33:41 PM		
Cobalt	0.00047	0.0060	J	mg/L	1	2/10/2012 4:33:41 PM		
Copper	ND	0.0060		mg/L	1	2/10/2012 4:33:41 PM		
Iron	0.0083	0.020	J	mg/L	1	2/13/2012 4:04:53 PM		
Lead	ND	0.0050		mg/L	1	2/10/2012 4:33:41 PM		
Manganese	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM		
Molybdenum	ND	0.0080		mg/L	1	2/10/2012 4:33:41 PM		
Nickel	ND	0.010		mg/L	1	2/10/2012 4:33:41 PM		
Potassium	ND	1.0		mg/L	1	2/13/2012 4:04:53 PM		
Silver	ND	0.0050		mg/L	1	2/10/2012 4:33:41 PM		
Sodium	0.19	1.0	J	mg/L	1	2/13/2012 4:04:53 PM		
Vanadium	ND	0.050		mg/L	1	2/10/2012 4:33:41 PM		
Zinc	0.063	0.010		mg/L	1	2/13/2012 4:04:53 PM		
EPA METHOD 200.7: TOTAL MET	ALS					Analyst: RAG		
Aluminum	0.031	0.020		mg/L	1	2/14/2012 2:21:40 PM		
Barium	ND	0.0020		mg/L	1	2/14/2012 2:21:40 PM		
Beryllium	ND	0.0020		mg/L	1	2/14/2012 2:21:40 PM		
Boron	ND	0.040		mg/L	1	2/15/2012 4:30:40 PM		
Cadmium	0.00044	0.0020	J	mg/L	1	2/14/2012 2:21:40 PM		
Chromium	0.0012	0.0060	J	mg/L	1	2/14/2012 2:21:40 PM		
Cobalt	ND	0.0060		mg/L	1	2/14/2012 2:21:40 PM		
Copper	0.0058	0.0060	J	mg/L	1	2/14/2012 2:21:40 PM		
Iron	0.088	0.10	J	mg/L	5	2/14/2012 2:42:04 PM		
Lead	ND	0.0050		mg/L	1	2/14/2012 2:21:40 PM		
Magnesium	0.057	5.0	J	mg/L	5	2/14/2012 2:42:04 PM		
Manganese	0.0019	0.0020	J	mg/L	1	2/14/2012 2:21:40 PM		

Qualifiers: \*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

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
- RL Reporting Detection Limit

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:**Western Refining Southwest, Inc.**Project:**RCRA Background Investigation

1202350-004

-

Lab ID:

Client Sample ID: BK-EB-020812 Collection Date: 2/8/2012 1:40:00 PM Received Date: 2/10/2012 9:30:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: TOTAL METALS						Analyst: RAG
Molybdenum	ND	0.0080		mg/L	1	2/14/2012 2:21:40 PM
Nickel	0.00076	0.010	J	mg/L	1	2/14/2012 2:21:40 PM
Silver	ND	0.0050		mg/L	1	2/14/2012 2:21:40 PM
Vanadium	ND	0.050		mg/L	1	2/14/2012 2:21:40 PM
Zinc	0.0019	0.010	J	mg/L	1	2/14/2012 2:21:40 PM
EPA 200.8: DISSOLVED METALS						Analyst: SNV
Antimony	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Arsenic	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Selenium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Thallium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Uranium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
200.8 ICPMS METALS:TOTAL						Analyst: SNV
Antimony	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Arsenic	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Selenium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Thallium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Uranium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
EPA METHOD 7470: MERCURY						Analyst: JLF
Mercury	ND	0.00020		mg/L	1	2/14/2012 2:40:39 PM
EPA 335.4: CYANIDE SUBBED						Analyst: Anat
Cyanide	ND	0.010		mg/L	1	2/15/2012
SM2320B: ALKALINITY						Analyst: JLF
Bicarbonate (As CaCO3)	ND	20		mg/L CaCO3	1	2/14/2012 5:57:50 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	2/14/2012 5:57:50 PM
Total Alkalinity (as CaCO3)	ND	20		mg/L CaCO3	1	2/14/2012 5:57:50 PM
SM2540C MOD: TOTAL DISSOLVED SC	DLIDS					Analyst: KS
Total Dissolved Solids	ND	20.0		mg/L	1	2/15/2012 4:34:00 PM

Matrix: AQUEOUS

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank		
	Е	Value above quantitation range	Н	Holding times for preparation or analysis exceeded		
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit		
	R RPD outside accepted recovery limits		RL	Reporting Detection Limit		
	S Spike Recovery outside accepted recovery limits			Page 6 of 21		

#### CASE NARRATIVE

#### February 27, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1202350 Anatek Batch: 120214032

**Project Summary:** Three (3) soil samples were and one water sample were received on 2/14/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 4.5C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1202350-001B BK-10 (5-6')	120214032-001	EPA 335.4
1202350-002B BK-10 (5-6') DUP	120214032-002	EPA 335.4
1202350-003B BK-10 (40-42')	120214032-003	EPA 335.4
1202350-004E BK-EB-020812 (water)	120214032-004	EPA 335.4

#### QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NÁ
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	. Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

#### 1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

#### 6. Method Blank Requirements

No problems encountered.

#### 7. Internal Standard(s) Response Requirements

N/A.

#### 8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

John. Contt

Approved by:

# Anatek Labs, Inc. 1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com

504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120214032
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202350
-	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120214032-001 1202350-001B / BK-10 (5-6') Soil	)	Sampling Date	2/	1. The second	ate/Time Receiv ampling Time	red 2/14/2012 7:53 AM	12:17 PM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/Kg	0.3	2/15/2012	CRW	EPA 335.4	
%moisture		4.4	Percent		2/17/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120214032	
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202350	•
	ALBUQUERQUE, NM 87109			
Attn:	ANDY FREEMAN			

#### Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120214032-002 1202350-002B / BK-10 (5-6') DUP Soil	Sampling Date	2		ate/Time Rec ampling Tim		12:17 PM
Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/15/2012	CRW	EPA 335.4	
%moisture	4.1	Percent		2/17/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120214032
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202350
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

#### **Analytical Results Report**

Sample Number Client Sample ID Matrix	120214032-003 1202350-003B / BK-10 ( Soil	40-42')	Sampling Date	2		ate/Time Rec ampling Tim		12:17 PM
Comments Parameter		Result	Units	PQL	Analysis Date	e Analvst	Method	Qualifier
Cyanide %moisture	· .	ND 8.4	mg/Kg Percent	0.3	2/15/2012 2/17/2012	CRW CRW	EPA 335.4 %moisture	

Authorized Signature

John Coddingtor, Lab Manager

MCL EPA's Maximum Contaminant Level

ND

Not Detected PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2532; ID:WA00169; WA:C585; MT:Cert0095

Monday, February 27, 2012

Page 3 of 3

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Client: Address: Attn:	HALL ENVIRONM 4901 HAWKINS N ALBUQUERQUE, ANDY FREEMAN	IE SUITE D NM 87109	YSIS LAI	3	_	Batch Projec	#: t Nam		202140 202350			
	,	Analyti	cal Res	ults Re	epor	t						
	· .	Qu	ality Con	trol Data	1							
Lab Control Sa	mple										<u> </u>	
<b>Parameter</b> Cyanide		LCS Result 0.518	Units mg/kg		<b>Spike</b> .5	%Rec 103.6		% <b>Rec</b> -120	•	<b>Date</b> 2012	Analysis 2/15/20	
Matrix Spike Sample Number	Parameter		Sample	MS	Um	4-	MS	0/ D	AR	D D-4-		
120207027-008	Cyanide		Result ND	Result 13.1	Uni mg/l		Spike 13.4	%Rec 97.8	%Rec 60-140	Prep Date 2/15/2012		is Date /2012
											-	

Matrix Spike Duplicate								
Parameter Cyanide	MSD Result 13.2	Units mg/kg	MSD Spike 13.4	<b>%Rec</b> 98.5	%RPD 0.8	AR %RPD 0-25	Prep Date 2/15/2012	Analysis Date 2/15/2012
- Syannas		ngng		00.0	0.0	0-20	2/10/2012	2/10/2012
Method Blank							·	
Parameter		Res	ult	Units		PQL	Prep Date	Analysis Date
Cyanide	· · ·	N	D	mg/Kg		0.3	2/15/2012	2/15/2012

AR Acceptable Range ND Not Detected PQL Practical Quantitation Limit RPD **Relative Percentage Difference** 

#### Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cent2632; ID:WA00169; WA:C585; MT:Cent0095

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120214032	
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202350	
	ALBUQUERQUE, NM 87109			
Attn:	ANDY FREEMAN	•		

#### **Analytical Results Report**

Sample Number Client Sample ID	120214032-004 1202350-004E / BK-EB-0	20812	Sampling Date	2		ate/Time Rece ampling Time	ived 2/14/2012 1:40 PM	12:17 PM
Matrix Comments	Water							
Parameter	· · ·	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide		ND	mg/L	0.01	2/21/2012	CRW	EPA 335.4	

Authorized Signature

John Coddingtor, Lab Manager

MCL EPA's Maximum Contaminant Level

ND Not Detected PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Monday, February 27, 2012

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120214032	۰.
Address:	4901 HAWKINS NE SUITE D	Project Name:	1202350	
	ALBUQUERQUE, NM 87109			
Attn:	ANDY FREEMAN			

#### Analytical Results Report

Quality Control Data

Lab Control Sample										
Parameter	LCS Result	Units	s LCS S	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide	0.489	mg/L	- <u>Q</u> .	5	97.8	90	-110	2/21/	2012	2/21/2012
Matrix Spike										<u> </u>
Sample Number Parameter		Sample	MS	1114	_	MS	0( <b>D</b>	AR		
120217018-006 Cyanide		Result ND	<b>Result</b> 0.476	Unit		Spike	%Rec	%Rec	Prep Date	
			0.470	mg/l	-	0.5	95.2	80-120	2/21/2012	2/21/2012
Matrix Splke Duplicate										
Parameter	MSD Result	Units	MSD Spike	.%R	oc (	%RPD	AR %RPD	Dro	p Date	Analysis Date
Cyanide	0.498	mg/L	0.5	99		4.5	0-25		1/2012	2/21/2012
Method Blank										
Parameter		Re	sult	Un	its		PQL	Pr	ep Date	Analysis Date
Cyanide			ŃD	m	ı/L		0.01		1/2012	2/21/2012

 AR
 Acceptable Range

 ND
 Not Detected

 PQL
 Practical Quantitation Limit

 RPD
 Relative Percentage Difference

#### Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Monday, February 27, 2012

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### Login Report

Customer Na	me: HAL	L ENVIR	ONMENTAL		YSIS LAB	Order I	D: 120214032
	.490	1 HAWKI	NS NE SUIT	ED		Order Dat	e: 2/14/2012
	ALE	UQUERO	QUE	NN	<b>N</b> 87109		
Contact Na	me: ANI		MAN		P	roject Name: 1202	350
Comm					•		
Comm	GIIL.					·	
Sample #: 12	0214032-00	)1 Custo	mer Sample #:	1202	2350-001B / BK-10 (5-6')		
Recv'd:		Collector:	•		Date Collected:	2/7/2012	
Quantity: 1	1	Matrix:	Soil		Date Received:	2/14/2012 12:17:00 P	
Comment:							
Test				Lab	Method	Due Date	Priority
%Moisture				М	%moisture	2/24/2012	<u>Normal (6-10 Days)</u>
CYANIDE TOT	TAL EPA			М	EPA 335.4	2/24/2012	<u>Normal (6-10 Days)</u>
Sample #: 12	0214032-00	2 Custo	mer Sample #:	1202	350-002B / BK-10 (5-6') I	DUP	
Recv'd:		Collector:			Date Collected:	2/7/2012	
Recv'd: 💽 Quantity: 1		Collector: Matrix:	Soil		Date Collected: Date Received:	2/7/2012 2/14/2012 12:17:00 P	
			Soil	ĸ			
Quantity: 1			Soil				
Quantity: 1			Soil	Lab			Priority
Quantity: 1 Comment:			Soil	Lab M	Date Received:	2/14/2012 12:17:00 P	
Quantity: 1 Comment: Test	1		Soil		Date Received: Method	2/14/2012 12:17:00 P Due Date	Priority
Quantity: 1 Comment: Test %Moisture CYANIDE TOT	1	Matrix:	Soil	M M	Date Received: Method %moisture	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012	Priority <u>Normal (6-10 Days)</u>
Quantity: 1 Comment: Test %Moisture CYANIDE TOT	AL EPA	Matrix:	· · ·	M M	Date Received: Method %moisture EPA 335.4	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012	Priority <u>Normal (6-10 Days)</u>
Quantity: 1 Comment: Test %Moisture CYANIDE TOT Sample #: 120	AL EPA 0214032-00	Matrix:	· · ·	M M	Date Received: Method %moisture EPA 335.4 350-003B / BK-10 (40-42	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012 2/24/2012	Priority <u>Normal (6-10 Days)</u> <u>Normal (6-10 Days)</u>
Quantity: 1 Comment: <u>Test</u> %Moisture CYANIDE TOT Sample #: 120 Recv'd:	AL EPA 0214032-00	Matrix: 3 Custor Collector:	ner Sample #:	M M	Date Received: Method %moisture EPA 335.4 350-003B / BK-10 (40-42 Date Collected:	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012 2/) 2/7/2012	Priority <u>Normal (6-10 Days)</u> <u>Normal (6-10 Days)</u>
Quantity: 1 Comment: <u>Test</u> %Moisture CYANIDE TOT Sample #: 120 Recv'd: v Quantity: 1	AL EPA 0214032-00	Matrix: 3 Custor Collector:	ner Sample #:	M M	Date Received: Method %moisture EPA 335.4 350-003B / BK-10 (40-42 Date Collected:	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012 2/) 2/7/2012	Priority <u>Normal (6-10 Days)</u> <u>Normal (6-10 Days)</u>
Quantity: 1 Comment: <u>Test</u> %Moisture CYANIDE TOT Sample #: 120 Recv'd: v Quantity: 1 Comment:	AL EPA 0214032-00	Matrix: 3 Custor Collector:	ner Sample #:	M M 1202	Date Received: Method %moisture EPA 335.4 350-003B / BK-10 (40-42 Date Collected: Date Received:	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012 2/7/2012 2/7/2012 2/14/2012 12:17:00 P	Priority <u>Normai (6-10 Days)</u> <u>Normai (6-10 Days)</u>
Quantity: 1 Comment: <u>Test</u> %Moisture CYANIDE TOT Sample #: 120 Recv'd: v Quantity: 1 Comment: Test	AL EPA 0214032-00	Matrix: 3 Custor Collector:	ner Sample #:	M M 1202 Lab	Date Received: Method %moisture EPA 335.4 350-003B / BK-10 (40-42 Date Collected: Date Received: Method	2/14/2012 12:17:00 P Due Date 2/24/2012 2/24/2012 2/2/2/2012 2/7/2012 2/14/2012 12:17:00 P Due Date	Priority <u>Normal (6-10 Days)</u> <u>Normal (6-10 Days)</u>

# Customer Name: HALL ENVIRONMENTAL ANALYSIS LABOrder ID:1202140324901 HAWKINS NE SUITE DOrder Date:2/14/2012ALBUQUERQUENM87109

#### Contact Name: ANDY FREEMAN

Project Name: 1202350

Comment:

Sample #:	12021403	2-004 <b>Cus</b> i	tomer Sample #:	120	02350-004E / BK-EB-0208	12	
Recv'd:	$\checkmark$	Collector	•		Date Collected:	2/8/2012	
Quantity:	1	Matrix:	Water		Date Received:	2/14/2012 12:17:00	) P
Comment:			÷.,	÷			
Test			· · ·	Lab	Method	Due Date	Priority
CYANIDE	TOTAL EP	4		М	EPA 335.4	2/24/2012	Normal (6-10 Days)
			SAMPLE	CON	DITION RECORD	)	· · ·
Sam	ples receiv	ed in a cooler	?			Yes	· · · · · · · · · · · · · · · · · · ·
Sam	ples receiv	ed intact?				Yes	
Wha	t is the tern	perature inside	e the cooler?			4.5	
Sam	ples receiv	ed with a COC	??		· · ·	Yes	- -
Sam	ples receiv	ed within holdi	ng time?			Yes	
Area	all sample b	ottles properly	/ preserved?			Yes	·
Are	VOC sampl	es free of hea	dspace?			N/A	
ls th	ere a trip bl	ank to accomp	any VOC sample	es?		N/A	
Labe	is and chai	n agree?				Yes	
							· · ·

	: 2-14/12 /2/17 INSPECTED BY:	DATE & TIME: 2/4/12						
	$\frac{1}{100} \frac{1}{100} \frac{1}$	3rd PRE NUMBER OF	2nd BD	Next BD 7 2n	RUSH	Standard 📋	TAT:	
	CUSTODY SEALS PRESENT		Date:	Received By:	Time: Re	Date:	Relinquished By:	Keling
antimo [	NO HEADSPACE	   	Date:	Received By:	Time: Re	Date:	Kelinquished By:	Keling
ACT TEMP: <u>7.5</u> °C	RECEIVED INTACT	لم لم لم	Date	Received By:	Time: 10:24 AM	Mary Bate: Mary Dioizouz	Relinquished By:	Reling
CEIVING LIST	ANATEK LABS REC				and a many a contra a many and a			
****LEVEL 4 PLEASE PROVIDE QC*******Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.	s. Please e-mail results to lab@	LE ID on all final report	ENT SAMP	the LAB ID and the CLI	******Please include	SE PROVIDE QC**	****LEVEL 4 PLEA ice. Thank you.	ā *
						COMMENTS:	SPECIAL INSTRUCTIONS / COMMENTS:	SPEC
•								
	•							
	0						-	10
	0							;
	0						- <b></b>	<b>c</b>
	0				MWWSS	 		7
	0							6
	0							5
	<b>1 TOTAL CYANIDE</b>	2/8/2012 1:40:00 PM	Aqueous	500AMBHDP Aqueous		1202350-004E BK-EB-020812		_ ح
	1 TOTAL CYANIDE	277/2012 10:43:00 AM	Soil	40ZGU		1202350-003B BK-10 (40-42')		ω
	<b>1 TOTAL CYANIDE</b>	2/7/2012 7:53:00 AM	Soil	40ZGU		3 BK-10 (5-6') DUP	1202350-002B	2
	1 TOTAL CYANIDE	2/7/2012 7:53:00 AM	Soil	40ZGU		1202350-001B BK-10 (5-6')		
ANALYTICAL COMMENTS		COLLECTION N	MATRIX	BOTTLE	MPLE ID	CLIENT SAMPLE ID	m sample	ITEM
	<b># CO</b>	N00 #						
				-		ow, ID 83843	CITY, STATE, ZIP: MOSCOW, ID 83843	g
EMAIL:		ACCOUNT #				1282 Alturas Dr	ADDRESS: 1282	ADD
FAX: (208) 882-9246	(208) 883-2839	PHONE:		Anatek Labs, Inc.	COMPANY:	ek Labs	SUB CONTRATOR: Anatek Labs	BUS

HALL Environmental Analysis Laboratory

CHAIN OF CUSTODY RECORD MGE: 1

QR. \_

1202350

1st SAMP 2/7/2012 1st RCVD

2/14/2012

Hall Reminormanial Anchora Laboration 120214 032

Page 11 of 25

File name: T:\DATA1\FLOW4\2012\EPA335.4\022112CN.RST Date: February 21, 2012 Sperator: JTT/CRW

CMW 2/22/12

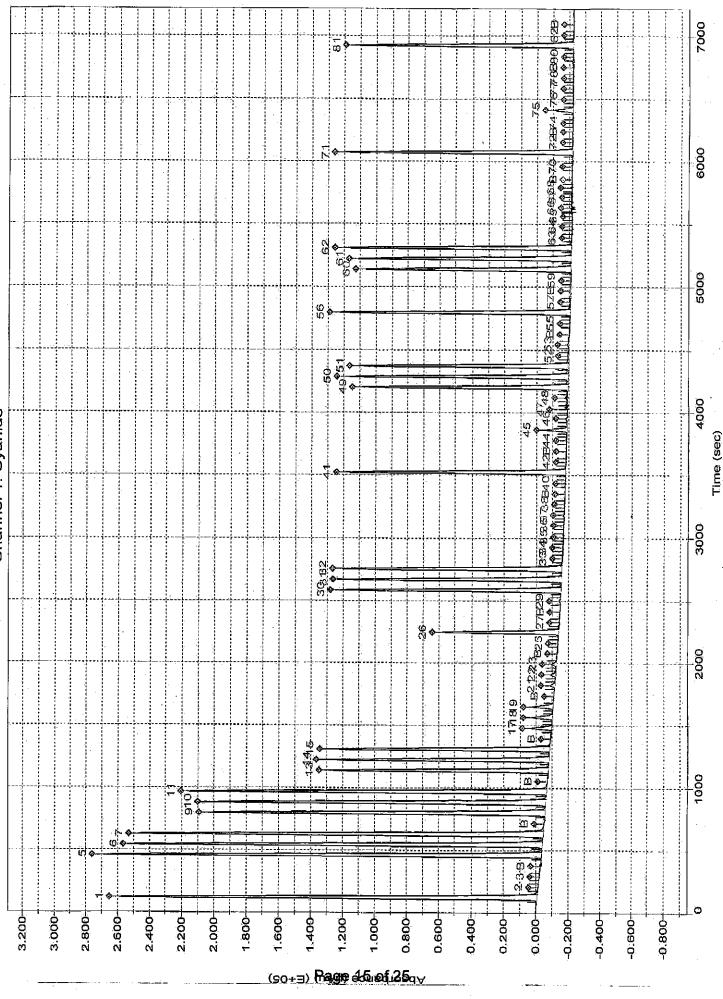
1202211	FIACNW
---------	--------

- <b>L</b>				10000	( == ,0.00	~ ~		
Peak	Cup	Name	Туре	Dil	Wt	Area	Calc	(ppm)
1	2	Sync	SYNC	1		1 5699854		0.980929
2	0	Carryover	CO	1	,	1 2080		0.000752
3	0	Carryover	CO	. 1		1 -2666		-0.000064
3.	0	Baseline	RB	1		1 -5180		-0.000497
5	2	Cal 1.00 ppm	С	. 1		1 5895348		1.014559
5	2	Cal 1.00 ppm	Ğ.	1.		1 5857978		1.008130
7	2	Cal 1.00 ppm	ē.	1		1 5814036		1.000571
3	Ó	Baseline	RB	1		1 7594		0.001701
•	3	Cal 0.80 ppm	c	1		1 4724392		0.813122
LO	3	Cal 0.80 ppm	č	1		1 4687798		0.806827
. <u>.</u>	3	Cal 0.80 ppm	č	1		1 4793075	•	0.824937
3	õ	Baseline	RB	1		1   1712		
3	4	Cal 0.50 ppm	C	1.		1 2898468	· ·	0.000689
4	4	Cal 0.50 ppm	Ċ	1				0.499012
,5	4	Cal 0.50 ppm	c	1				0.500710
.J }	0	Baseline	RB	-				0.498767
7	5		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1		1 -4819		-0.000435
	•	Cal 0.05 ppm	C	1		1 261123		0.045315
8	5	Cal 0.05 ppm	C	1		1 267215		0.046363
. 9	5	Cal 0.05 ppm	С	1		1. 276648		0.047986
	O	Baseline	RB	1		1 -817		0.000254
1	6	Cal 0.01 ppm	С	1		1 57502		0.010286
2	6	Cal 0.01 ppm	C	1		1 64834		0.011548
З	6	Cal 0.01 ppm	C	1		1 65410		0.011647
b:	0	Baseline	RB	1		1 3642		0.001021
65	1	Blank	BLNK	. 1		12898		-0.000104
6	7	ICV 0.25 ppm	ĈCV	1		1 1521704		0.262170
7	1	Blank	BLNK	1		1 -4159		-0.000321
	Ö	Baseline	RB	1		1 -1798		0.000085
9	8	120207028-001 R		30.2		1 11376		0.071013
0	ē	-120207028-001MS	υ	30.2		1 2954055		15.358950
1	10	120207028-001MS		30.2		1 296964	'n	15.439961
2	11	120207028-LCS	ບັ	1		1 3063630	2	0.527424
3	1.2	120207028-BL	υ	1				
34	13	•120207028-002	U	28.1		5 - 18500-		-0.000704
35	14	•120214032-004	0			1 -13282		-0.053119
36 16	15		•=	1		1 -10990		-0.001496
37	$15 \\ 16$	\$120214037-001 \$120217018-001	U	1		1 -4989		-0.000464
88	1.0	<pre>&gt;120217032-001</pre>	Ŭ	1		1 7655		0.001711
2:0 }	ů,		U	1		1. 22		0.000398
0		Baseline	RB	1		1 -527		0.000304
	1	Blank	BLNK	1		1 3277		0.000958
1	4	CCV 0.5 ppm	CCV	1		1 2934942		0.505287
1	1	Blank	BLNK	1		1 -269		0.000348
£ 7	0	Read Baseline	RB	1		1 -2143		0.000026
4	18	120217018-003	U	1		1 2212		0.000775
5	19	<pre>&lt;120217018-004</pre>	Ď	1		1 251989		0.043744
6	20	.120217018-005	U io	T 1		1 13768		0.002763
7	21	·120217018-006	U	1		1 18204		0.003526
8	22	-JI20217032-006 W			L	1 3668(	5.	0.006706
9	23	120217032-006MS		1		1 2766943		0.476386
0	24	120217032-006MSI		-	L	1 2892484	1	0.497982
1	25	120217032-LCS	U	1.		L 2839514		0.488870
2	26	¢1202170 <del>3</del> 2-BL	U	1		1 31941		0.005889
3	27	120217033-001	U.	1		1 38679		0.007048
	Ö	Baseline	RB	1		1 5361		0.001317
5	1	Blank	BLNK	• 1		1 -3802		-0.000260
6	4	CCV 0.5 ppm	CCV	1	-	1 2950465		0.507957
7	1	Blank	BLNK	1		1 2733		0.000865
	0	Read Baseline	RB	1		1 -872		0.000244
9	28	120215006-006 DI				1 -6498	3	-0.000723
0	29	120215006-006MS		1		L 2864499	•	0.493168
1	30	120215006-006MSI		-		1 2834083	3	0.48793
	31	120215006-LCS	ັບ	1		1 2942564	* .	0.506598
2		120215006-BL	Ŭ	1				-0.001768
2	32		3.e	±	_	L -T7200		-0.UUI/06
2 3	32 33			· -1	-			
52 53 54	33	120215008-006	U	1		1 -22587		-0.003491
2 3 4 5	33 34	120215008-006 120215009-006	U U	· 1 1	. 1	L -18203		-0.003491 -0.002737
2 3	33	120215008-006	U	1 1 1	. 1			-0.003491

?eak	Cup Name		Type Dil	Wt A		Area	Calc. (ppm)	
37	36	■ 120215011-006	U	1	 1	14948	0.002966	
58	37	r 120215012-006	U	1	1	12010	0.002460	
3	0	Baseline	RB	1	1	17024	0.003323	
10	1	Blank	BLNK	1	ï	10958	0.002280	
11	4	CCV 0.5 ppm	CCV	1	1	2955563	0.508834	
12	1	Blank	BLNK	1	1.	3165	0.000939	
3	0	Read Baseline	RB	1	1	-3585	-0.000222	
'4	38	RINSE	U	1	1	-5636	-0.000575	
15	3.9	120217018-004	U	1	1	238291	0.041387	
6	40	RINSE	U	1.	1	-13913	-0.001999	
17	41	RINSE	U	1	1	-13806	-0.001981	
8	42	RINSE	U	1	1	-16870	-0.002508	
3	0	Baseline	RB	1	1	-15369	-0.002249	
0	1	Blank	BLNK	1	ĺ	-8322	-0.001037	
11	4	CCV 0.5 ppm	CCV	1	1	3062064	0.527155	
12	1	Blank	BLNK	1	1	1190	0.000599	
\$ <sup>.</sup>	<b>O</b> <sup>2</sup>	Read Baseline	RB	1	1	-924	0.000236	

eak	Cup	Flags
	2 0 0 2 2 2	LO BL
0	0 3 3	BL
1 3 4	3 0 4 4	BL
5 7 8	4 0 5 5	BL
9 1 2	0 6 6	OL BL OL
2 3 5 6 7	6 0 1 7	BL LO
9.0	1 0 8 9	LO BL
1 2 3 4 5 6 7	10 11 12 13 14 15 16	LO LO LO
8 0 1	17 0 1 4	BI.
1 2 4 5 6 7 8 9	4 1 18 19 20 21 22 23	BL

SU       24         51       25         52       26         53       27         B       0         B       0         S5       1         IO       BL         S5       1         B       0         S6       4         S7       1         B       0         S0       29         G1       30         G2       31         G3       32       LO         64       33       LQ         G5       34       LO         G6       35	Peak	Cup	Flags	
51 $25$ $52$ $26$ $53$ $27$ B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         B       0         C       29         C       21         C       31         S       10         C       31         C       33         C       34         L0       1         C       1         C       1         C       1         C       1         C       1         C       1         C       1         D       3         D       3         D       3         D       3	50 50	24		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	51	25		
B       0       BL         55       1       LO         56       4         57       1         B       0       BL UM         59       28       LO         60       29         61       30         62       31         63       32         LO       Co         55       34         LO       Co         56       35         57       36         58       37         3       0         BL       UM         70       1         71       4         72       1         3       0         BL       Co         75       39         76       40         10       LO         78       42         10       BL         30       0         31       LO	52	26		
B       0       BL         55       1       LO         56       4         57       1         B       0       BL UM         59       28       LO         60       29         61       30         62       31         63       32         LO       Co         55       34         LO       Co         56       35         57       36         58       37         3       0         BL       UM         70       1         71       4         72       1         3       0         BL       Co         75       39         76       40         10       1         12       LO         73       1         13       0         14       38         15       39         76       42         14       LO         78       42         14       LO         30       1 </th <th>53</th> <th>27</th> <th></th> <th></th>	53	27		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	в	0	BL	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	55	1	ΓO	· · · · · · · · · · · · · · · · · · ·
B       0       BL       UM         59       28       LO         60       29         61       30         62       31         63       32         64       33         55       34         LO         56       35         57       36         58       37         3       0         BL       UM         70       1         71       4         72       1         3       0         BL       UM         74       38         LO       10         75       39         76       40         10       LO         78       42         LO       30         30       BL	56	4		
	5.7	1		
	B.	Q.	BL UM	
	59	28	LO	
	60	29		
	61	30		
	62 6 3	31 चित्र		
56 $35$ $57$ $36$ $58$ $37$ $3$ $0$ $3$ $0$ $70$ $1$ $71$ $4$ $72$ $1$ $3$ $0$ $74$ $38$ $10$ $10$ $75$ $39$ $76$ $40$ $10$ $10$ $77$ $41$ $10$ $10$ $78$ $42$ $30$ $1$ $30$ $1$	0.0 ©1	22	⊥0 то	
56 $35$ $57$ $36$ $58$ $37$ $3$ $0$ $3$ $0$ $70$ $1$ $71$ $4$ $72$ $1$ $3$ $0$ $74$ $38$ $10$ $10$ $75$ $39$ $76$ $40$ $10$ $10$ $77$ $41$ $10$ $10$ $78$ $42$ $30$ $1$ $30$ $1$	55	34	10	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	56	35	ЦО	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	57	36		
3       0       BL UM         70       1         71       4         72       1         3       0         74       38         75       39         76       40         77       41         78       42         3       0         30       1	58	37		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3	0	BL UM	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7.0	1		
3       0       BL         74       38       L0         75       39         76       40       L0         77       41       L0         78       42       L0         3       0       BL         30       1       L0	71	.4		
75 39 76 40 LO 77 41 LO 78 42 LO 3 0 BL 30 1 LO	72	1		
75 39 76 40 LO 77 41 LO 78 42 LO 3 0 BL 30 1 LO	3	0	BL	
76       40       LO         77       41       LO         78       42       LO         3       0       BL         30       1       LO	/4	38	LO	
77 41 LO 78 42 LO 3 0 BL 30 1 LO	15	39		
78 42 LO 3 0 BL 30 1 LO	7.6	40	LO	
3 0 BL 30 1 LO	7.0			
30 1 LO 31 4 32 1 3 0 BL	2	42 0		
30 1 10 31 4 32 1 3 0 BL	វិក	ں ۲		
32 1 3 O BL	3.0	4	50	
3 0 BL	32	i		
	3	0	BL	



Channel 1: Cyanide

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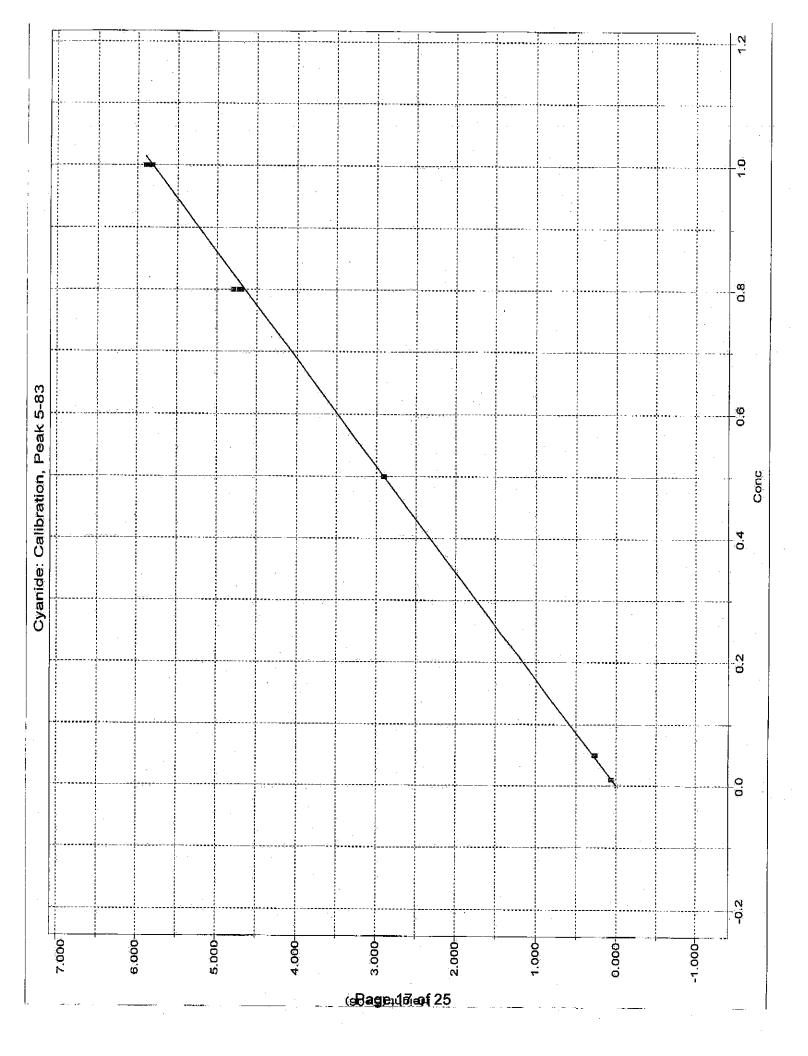
File name: T:\DATA1\FLOW4\2012\EPA335.4\022112CN.RST Date: February 21, 2012 Operator: JTT

*	Name	9		Conc	Area	
_					<b>=</b> ,-,	
*	Cal	1.00	ppm	1.000000	5895348.000000	
÷	Cal	1.00	ppm	1.000000	5857977.500000	
*	Cal	i.00	ppm	1.000000	5814036.000000	
*	Ça)	0.80	ppm	0.800000	4724392.500000	
¥	Cal	0.80	ppm	0.800000	4687798.500000	
*	Cal	0.80	ppm	0.800000	4793075.000000	
*	Cal	0.50	ppm	0.500000	2898468.500000	
*	Cal	0.50	ppm	0.500000	2908340.750000	
*	Cal	0.50	ppm	0.500000	2897045.000000	
*	Cal	0.05	ppm	0.050000	261122.890625	
*	Cal	0.05	ppm	0.050000	267214.531250	
*	Cal	0.05	ppm	0.050000	276648.062500	
*	Cal	0.01	ppm	0.010000	57502.253906	
*	Cal	0.01	ppm	0.010000	64833.636719	
*	Cal		ppm	0.010000	65410.171875	

Calib Coef: ÿ=bx+a	
a: (intercept) b:	-2.2928e+03 5.8130e+06
Corr Coef:	0.999885

Carryover:	0.0365%

No Drift Peaks



### **CYANIDE EXTRACTION BENCHSHEET SW 846**

Instrument names & IDs: Denver A-160 balance; Alpohem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
2/14/12	120207012-1	91.8	10.04	250	7,50	27.	Con
1	-2	96,9	10.07	1	1	25.6	1
	- 3	95.0	10.04			26.2	
	-4	90.0 90.2	10.07			27.6	
	-5	90.2	10.01			27,7	
	120208030 - 1	91.1 89.5	10.01			77.4	
	-2	89.5	10.06			27.8	
	- 3	90.1	10.11			27.3	
	-4	80.1	10.14			30,8	
	-5	96.8 97.4	10.07			27.3 30,8 25.6	
	-6	97.4	10.09	4	t t	75.4	4
	120214032-1	95.6	10.04	-		26.0	
.	-2	95.9	10.01			26.0	
4	-3	91.1 83.1	10.03	+	4	77.7 30.2	4
2/16/12	120207028-1	83.1	9.96	240	250	30.2	CHW
	-2	88.4	10.05	L.		28.1	4
					-		•
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N:\Bench Sheets\Cyanide Extraction Benchsheet.xls

#### Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

 Mail
 <th

Method requirements: All QC +/- 10% Equipment: Midi-vap Instrument: ALPCHEM FIA 3000 Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120207027-8	era soil	NaBH	50mil	26.8	Same		
2	Sus		1.			<u> </u>	line	
3	_Sinsp	- <u></u>			4		l l	
4	-45				×		4	
5	-BL				4			
6	120207012-1				27.1			
7	-2				25.6			
8	-3				26.2			
9	-4				27.6			
10	15	<u> </u>	4	-t	27.7	_ {		
11	120208030-1	CAR SUI	Nall	Gome	77.4	Same		
<u>12</u>	-Z	·			27.8			
13	-3				27.3			
14	-4			ļ	30.8			
15	-5				25.6			
16	-6				25.4			·
17	120214032-1				260			
18	-2				26.0			
19	-3				17.2	_ {		
20		1	· · ·					

\* If soils this calculation is taken from cyanide extraction bench sheet.

\*\* If soils, mLs of extract used for distillation.

 Extraction Reagents:
 Reagent #:

 methyl red indicator
 A041-03

 18 N H<sub>2</sub>SO<sub>4</sub>
 A043-10

 sulfamic acid
 R009-12

 0.025N NaOH
 R014-16

 51% MgCl<sub>2</sub>
 A043-06

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R026-23
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: <u>MW 2/15/12</u>

Analyst Initials/Date Analyzed: //M/ 2/15/12

N:\Bench Sheets\Total Cyanide EPA 335.4.xls

File name: T:\DATA1\FLOW4\2012\EPA335.4\021512CM.RST Date: February 15, 2012 Operator: JTT 1202-15 FTA CAS 120215 ETACNS

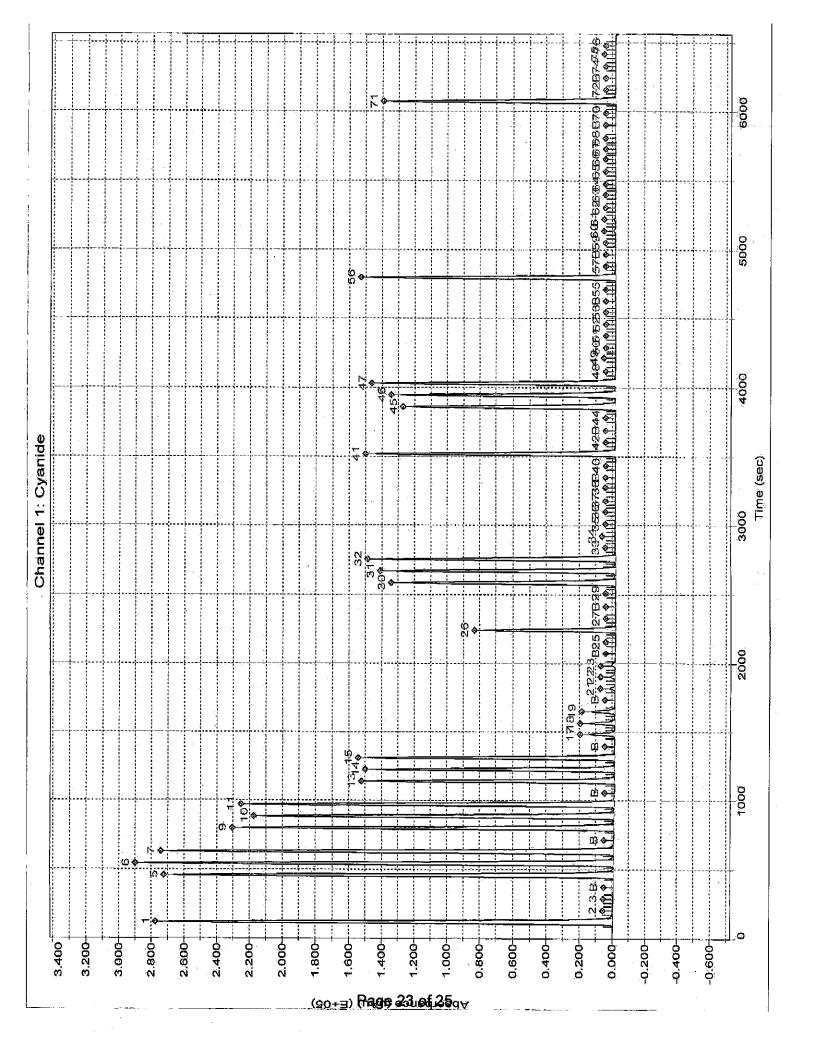
CAN 2/17/12

OPOT.	102151-14005								
Peak	Cup	Name	Туре		Wt		Area	Calc.	(ppm)
1.	2	Sync	SYNC	1		1	5825412		1.023780
2	Ō	Carryover	co	1.		1	22125		0.004010
3	0	Carryover	co	1		1	6865		0.001329
В	0	Baseline	RB	1		ī	-159		0.000095
5	2	Cal 1.00 ppm	С	1		ī	5800565		1.019414
6	2	Cal 1.00 ppm	С	1		1	5938287		1.043615
7	2	Cal 1.00 ppm	С	1		1	5805906		1.020352
B	0	Baseline	RB	1		1	1019		0.000302
9	3	Cal 0.80 ppm	C	1		1	4707213		0.827287
10	3	Cal 0.80 ppm	C	1		1	4758870		0.836364
11	3	Cal 0.80 ppm	Ĉ	1		1	4788800		0.841624
3	Ö	Baseline	RB	• 1		1	-1310		-0.000108
13	4	Cal 0.50 ppm	C	1		1	2926831		0.514433
14	4	Cal 0.50 ppm	С	1		1	2944859		0.517601
15	4	Cal 0.50 ppm	C	1		1	2923532		0.513854
3	õ	Baseline	RB	1		1	-96		0.000105
17	5	Cal 0.05 ppm	С	1		1	279029		0.049154
18 L9	5	Cal 0.05 ppm	Ċ	1		1	278124		0.048995
1.9 3	5	Cal 0.05 ppm	C	1		1	279436		0.049226
» 21	6	Baseline Cal 0.01 ppm	RB	1		1	-825		-0.000023
22	6		C C	1 1	L.	1	57916		0.010299
23	6	Cal 0.01 ppm Cal 0.01 ppm	c	1		1 1	58423		0.010389
3	0	Baseline	RB	1		1	58837		0.010461
25	1	Blank	BLNK	1		1	-409		0.000051
26	7	ICV 0.25 ppm	CCV	1		l	-3308 1537964		-0.000459
27	1	Blank	BLNK	1		1	1057964		0.270378 0.000212
3	Ō	Baseline	RB	1		1	1092		0.000314
29	8	T120203013-001 DW			L .	1			0.001518
30	9	120203013-001MS	-	1	-	1		L	0.491457
31	10	120203013-001MSI	ນີ່ບໍ່		L	1		ż	0.501920
32	11	120203013-LCS	U	1		1	2959570		0.520186
33	12	•120203013-BL	U	1		1	6321		0.001233
3:4	13	120208026-006	ប	1		1	18965		0.003455
35	14	§120208027-006	U	1		1	7761		0.001486
36	15	¢120208028-006	U	1		1	4100		0.000843
37	16	• 120208029-006	U	1.		1	3261		0.000695
38	17	0120210022-006	U	1		1	4007		0.000827
3 10	0 1	Baseline Blank	RB	1		1	-187		0.000090
11	4	CCV 0.5 ppm	BLNK CCV	1		1 1	-1906		-0.000212
12	1	Blank	BLNK	1		1	2965604 -10723		0.521247
3	Ō	Read Baseline	RB	1	•	1	-699		-0.001762
14	18		U	26.8		1	-827		-0.000615
15	19		U	26.8		1	2779246		13.091780
16	20	120207027-008MSE	Ŭ Ū	26.8	3.	1			13.240262
17	21	120207027-LCS	U	. 1		1	2949645		0.518442
8	22	120207027-BL	U	· <u>1</u>		1	-7029		-0.001113
9	23	● 120207012-001	U	27.1		1	5832		0.031092
50	24	0120207012-002	U	25.6		1	99		0,003579
51	25	<b>₽</b> 120207012-003	U.	26.2		1	107		0.003698
52	26	120207012-004	U	27.6		1	-4643		-0.019140
13	27	<pre>\$ 120207012-005</pre>	U	27.7		1	-2045		-0.006563
3	0	Baseline	RB	1		1	-1413		-0.000126
55	1	Blank	BLNK	1		1	786		0.000260
56	4	CCV 0.5 ppm	ccv	1		1	2965979		0.521313
57	1	Blank	BLNK	1		1	-5832		-0.000902
3 200	0	Read Baseline	RB.	1		1	1650		0.000412
i 9 50	28	<b>\$120208030-001</b>	U .	27.4		1 1	7278		0.038397
50 51	29	<pre>     120208030-002     120208030     120208030     120208030     120208030     120208030     120208030     12020803     12020803     12020803     12020803     12020803     1202080     1202080     1202080     1202080     1202     120208     1202     1202     1202     1202     120     120     120     120     120     120     120     120     120     120     120     120     120     120     120     120     120     12     120     12     1     12     1     1     1</pre>	U	27.8			23450		0.117961
52	30 31	°120208030-003	U	27.3		1	18157		0.090448
53	31 32	• 120208030-004 • 120208030-004	U U	30.8		1	-659		0.000204
53 54	33	¢120208030-005 ¢120208030-006	U U	25.6		1	-885		-0.000849
55	33 34	o 120214032-001	U U	25.4		1.1	-3446		-0.012271
56	35	b120214032-001 b120214032-002	U U	26 26		1 1	-1682 -867		-0.004502
			~		20 65 25	ш.	-00/		-0.000780
		· · · · ·		Faye	20 of 25				

Peak	Cup	Name	Туре	Dil	Wt	Area	Calc. (ppm)
67	36	■ 120214032-003	 U	27.2	1	-2669	-0.009427
68	37	RINSE	U	i	1	-1605	-0.000160
B	0	Baseline	RB	.1	1	-507	0.00033
70	1	Blank	BLNK	1	1	-5655	-0.000871
71	4	CCV 0.5 ppm	CCV	1	1	2910344	0.511536
72	1	Blank	BLNK	1	1	-7377	-0.001174
В	¢	Read Baseline	RB	1	1	-513	0.000032
74	38		U	1	- 1	-1829	-0.000199
7.5	39		U	1	1	-1762	-0.000187
7.6	40		Ŭ	1	1	-5162	-0.000785
Poak	Chin	Flags					

Peak	Cup	Flags	
<b></b>			
2	2 0		
2 3 5 6 7 3	0		
B 5	0 2 2 2 3 3 3 3 4 4 4	$\mathbf{BL}$	
6	2		
7	2		
3 a	0 3	BL	
9 10	3		
11	3		
3	0	BL	
14	4		
15	4		
3	0	BL	
18	5		
19	0 5 5 5 0 6 6 0 1 7		
3	0	BL	
21 20	ю б		
23	6		
3	Ö	BL	
2.5	1.	LO	
27	1		
11 13 14 5 7 8 9 12 3 5 6 7 9 0 12 3 3 3 3 3 3 5 6 7 8	1 9 10 11 12 13 14	BL	
2.9	8		
3.1	10		
32	11		
3:3	12		
3.5	14		
36	15		
37	16 17		
3-03 . 3	0	BL	
10	1	LO	
10 11 12	4 1 0 18 19	7.0	
3	1	LO BL	
14	18	ΤŌ	
15	19		
14 15 16 17	20 21		
18	22 23	LO	
1.9	23		
18 19 50 51 52 53	24 25 26 27		
ī2	26	LO	
53	27	LO	
3 55 56	.0	BL	
56 56	1 4		
	· •		

Peak Cup	Flags	
57 1 B 0 59 28	LO BL	
60         29           61         30           62         31           63         32           64         33           65         34           66         35           67         36           68         37	LO LO LO LO LO	
B         O           70         1           71         4           72         1           3         0           74         38           75         39           76         40	BL LO BL LO LO	
	·	

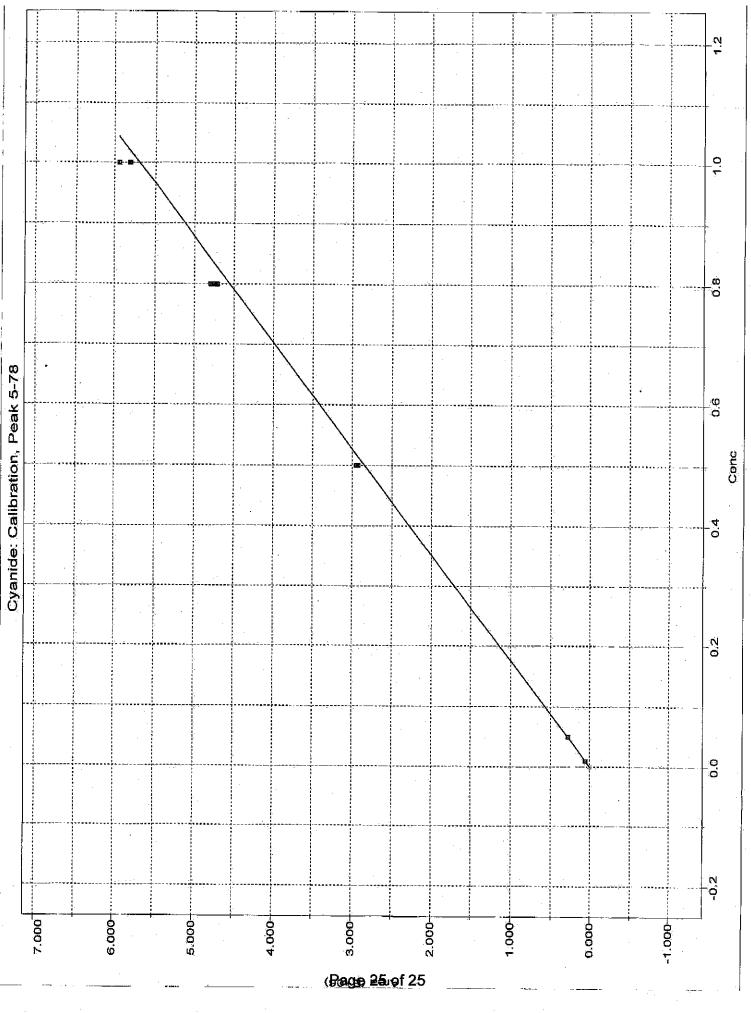


#### File name: T:\DATA1\FL@W4\2012\EPA335.4\021512CM.RST Date: February 15, 2012 Operator: JTT

*	Name	Conc	Area
_			
*	Cal 1.00 ppm	1.000000	5800565.000000
*	Cal 1.00 ppm	1.000000	5938287.000000
*	Cal 1.00 ppm	1.000000	5805906.000000
*	Cal 0.80 ppm	0.800000	4707213.000000
*	Cal 0.80 ppm	0.800000	4758870.000000
<b>.</b> *.	Cal 0.80 ppm	0.800000	4788800.500000
*	Cal 0.50 ppm	0.500000	2926830.750000
*	Cal 0.50 ppm	0.500000	2944859.000000
*	Cal 0.50 ppm	0.500000	2923532.000000
*	Cal 0.05 ppm	0.050000	279028.687500
*	Cal 0.05 ppm	0.050000	278124.031250
*	Cal 0.05 ppm	0.050000	279435.531250
*	Cal 0.01 ppm	0.010000	57915.500000
*	Cal 0.01 ppm	0.010000	58423.179688
*	Cal 0.01 ppm	0.010000	58836.558594
	Calib Coef:		
	y≖bx+a	· · · · ·	
		6 0 6 6 7 - 1 0 2	
	a: (intercept)	-6.9667e+02	
	b:	5.6908e+06	

Corr Coef: 0.999837 Carryover: 0.38%

No Drift Peaks



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WO#: 1202350 22-Mar-12

Client:	Western Refining	Southwe	st, Inc.									
Project:	RCRA Background Investigation											
10,000	NCNA Dackground investigation											
Sample ID: MB		Type: ME		TestCode: EPA Method 200.7: Dissolved Metals								
Client ID: PBW	Bate	h ID: <b>R9</b>	01	F	RunNo: 9	01						
Prep Date:	Analysis	Date: 2/	10/2012	S	SeqNo: 2	5640	Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Aluminum	ND	0.020										
Barium	ND	0.0020										
Beryllium	ND	0.0020										
oron	ND	0.040										
admium	ND	0.0020										
alcium	ND	1.0										
hromium	ND	0.0060										
obalt	ND	0.0060										
opper	ND	0.0060										
ead	ND	0.0050										
langanese	ND	0.0020										
lolybdenum	ND	0.0080										
lickel	ND	0.010										
ilver	ND	0.0050										
'anadium	ND	0.050										
Sample ID: LCS	Samp	Type: LC	S	Tes	tCode: E	PA Method	200.7: Dissol	ved Meta	s			
Client ID: LCSW		:h ID: <b>R9</b>			RunNo: 9							
Prep Date:	Analysis				SeqNo: 2		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
luminum	0.56	0.020	0.5000	0	112	85	115					
arium		0.0020	0.5000	0	97.5	85	115					
	0.49	0.0020 0.0020	0.5000 0.5000	0 0	97.5 101	85 85	115 115					
eryllium	0.49 0.50	0.0020	0.5000	0	101	85	115					
eryllium oron	0.49 0.50 0.51	0.0020 0.040	0.5000 0.5000	0 0	101 103	85 85	115 115					
Barium Beryllium Boron Cadmium Calcium	0.49 0.50 0.51 0.49	0.0020 0.040 0.0020	0.5000 0.5000 0.5000	0 0 0	101 103 98.9	85 85 85	115 115 115					
eryllium oron admium alcium	0.49 0.50 0.51 0.49 51	0.0020 0.040 0.0020 1.0	0.5000 0.5000 0.5000 50.00	0 0 0 0	101 103 98.9 102	85 85 85 85	115 115 115 115					
eryllium oron admium alcium hromium	0.49 0.50 0.51 0.49 51 0.49	0.0020 0.040 0.0020 1.0 0.0060	0.5000 0.5000 0.5000 50.00 0.5000	0 0 0 0	101 103 98.9 102 98.3	85 85 85 85 85	115 115 115 115 115					
eryllium oron admium alcium hromium obalt	0.49 0.50 0.51 0.49 51 0.49 0.47	0.0020 0.040 0.0020 1.0 0.0060 0.0060	0.5000 0.5000 0.5000 50.00 0.5000 0.5000	0 0 0 0 0	101 103 98.9 102 98.3 94.1	85 85 85 85 85 85	115 115 115 115 115 115					
eryllium oron admium alcium hromium obalt opper	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0060	0.5000 0.5000 0.5000 50.00 0.5000 0.5000 0.5000	0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7	85 85 85 85 85 85 85	115 115 115 115 115 115 115 115					
eryllium oron admium alcium chromium cobalt copper ead	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48 0.48	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0060 0.0050	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2	85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115					
eryllium oron admium alcium chromium cobalt copper ead langanese	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48 0.48 0.48	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0060 0.0050 0.0020	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5	85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115					
eryllium coron cadmium calcium chromium cobalt copper ead Manganese folybdenum	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48 0.48 0.48 0.51	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0050 0.0020 0.0080	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101	85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115					
eryllium oron admium alcium chromium cobalt copper ead langanese lolybdenum lickel	0.49 0.50 0.51 0.49 0.49 0.49 0.49 0.47 0.48 0.48 0.48 0.48 0.51 0.47	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0050 0.0020 0.0080 0.010	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2	85 85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115					
eryllium oron admium aclcium acobalt cobalt copper ead tanganese tolybdenum lickel ilver	0.49 0.50 0.51 0.49 0.49 0.47 0.48 0.48 0.48 0.48 0.51 0.47 0.10	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0060 0.0050 0.0020 0.0080 0.010 0.0050	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.1000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2 100	85 85 85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115					
eryllium oron admium alcium hromium obalt opper ead anganese olybdenum ickel ilver anadium	0.49 0.50 0.51 0.49 0.47 0.48 0.47 0.48 0.48 0.48 0.51 0.47 0.10 0.51	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0020 0.0080 0.010 0.0050 0.050	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2 100 102	85 85 85 85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115					
eryllium coron cadmium calcium chromium cobalt copper ead Manganese Molybdenum lickel cilver 'anadium	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48 0.48 0.48 0.48 0.51 0.47 0.10 0.51 Samp	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0050 0.0020 0.0080 0.010 0.0050 0.050	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7 Es	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2 100 102	85 85 85 85 85 85 85 85 85 85 85 85	115 115 115 115 115 115 115 115 115 115	ved Metal	s			
eryllium coron cadmium calcium chromium cobalt copper ead danganese dolybdenum lickel iliver 'anadium Sample ID: <b>MB</b> Client ID: <b>PBW</b>	0.49 0.50 0.51 0.49 0.47 0.48 0.48 0.48 0.48 0.48 0.51 0.47 0.10 0.51 Samp Bate	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0020 0.0080 0.010 0.0050 0.0050 Type: ME	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7 Tes	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2 100 102 tCode: El	85 85 85 85 85 85 85 85 85 85 85 85 21	115 115 115 115 115 115 115 115 115 115	ved Metal	Is			
eryllium coron cadmium calcium chromium cobalt copper ead Manganese Molybdenum lickel cilver 'anadium	0.49 0.50 0.51 0.49 51 0.49 0.47 0.48 0.48 0.48 0.48 0.51 0.47 0.10 0.51 Samp	0.0020 0.040 0.0020 1.0 0.0060 0.0060 0.0050 0.0020 0.0080 0.010 0.0050 0.0050 Type: ME	0.5000 0.5000 50.00 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7 Tes	101 103 98.9 102 98.3 94.1 96.7 96.2 95.5 101 93.2 100 102	85 85 85 85 85 85 85 85 85 85 85 85 21	115 115 115 115 115 115 115 115 115 115	ved Metal	s			

Е Value above quantitation range

- Analyte detected below quantitation limits J
- R RPD outside accepted recovery limits

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

WO#:	1202350
	22-Mar-12

Client: Project:	Western Refining S RCRA Background									
Sample ID: MB	200.7: Dissol	ved Meta	ls							
Client ID: PBW	ent ID: PBW Batch ID: R921			F	RunNo: <b>9</b> 2	21				
Prep Date: Analysis		Date: 2/	13/2012	S	eqNo: 20	6476	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0032	0.020								J
Potassium	ND	1.0								
Sodium	ND	1.0								
Zinc	ND	0.010								
Sample ID: LCS	Samp	Type: LC	S	TestCode: EPA Method 200.7: Dissolved Metals						
Client ID: LCSW	Bato	h ID: R9	21	F	RunNo: <b>9</b> 2	21				
Prep Date:	Analysis	Date: 2/	13/2012	S	eqNo: 20	6477	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
	0.49	0.020	0.5000	0.003150	98.2	85	115			
Iron	0.40	0.010								
Iron Potassium	48	1.0	50.00	0	96.9	85	115			
			50.00 50.00	0 0	96.9 98.4	85 85	115 115			

#### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: **1202350** 

22-Mar-12

Client:	Western Refining Southwest, Inc.
Project:	RCRA Background Investigation

Sample ID: MB-685	Samp	Туре: МЕ	BLK	TestCode: EPA Method 200.7: Total Metals						
Client ID: PBW	Batch ID: 685			F	34					
Prep Date: 2/13/2012	Analysis	Date: 2/	14/2012	\$	SeqNo: 2	7010	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	0.00039	0.0020								J
Chromium	0.00064	0.0060								J
Cobalt	ND	0.0060								
Copper	0.0028	0.0060								J
ron	ND	0.020								
ead	ND	0.0050								
<i>l</i> agnesium	0.0072	1.0								J
langanese	ND	0.0020								
Nolybdenum	0.0034	0.0080								J
lickel	ND	0.010								
ilver	ND	0.0050								
'anadium	ND	0.050								
linc	0.0011	0.010								J
Sample ID: LCS-685		Type: LC	S	Tes	tCode: El	PA Method	200.7: Total N	letals		
Sample ID: LCS-685	Samp				tCode: El		200.7: Total N	letals		
Sample ID: LCS-685 Client ID: LCSW	Samp	Type: LC	5	F		34	200.7: Total M Units: mg/L	<b>l</b> etals		
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012	Samp Bate	Type: LC	5 14/2012	F	RunNo: <b>9</b> 3	34		<b>/letals</b> %RPD	RPDLimit	Qual
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte	Samp Bato Analysis	Type: <b>LC</b> ch ID: <b>68</b> Date: <b>2</b> /	5 14/2012	F	RunNo: <b>9</b> : SeqNo: <b>2</b> :	34 7011	Units: <b>mg/L</b>		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte	Samp Bato Analysis Result	Type: <b>LC</b> ch ID: <b>68</b> Date: <b>2/</b> PQL	5 14/2012 SPK value	F SPK Ref Val	RunNo: <b>9</b> SeqNo: <b>2</b> %REC	<b>34</b> 7011 LowLimit	Units: <b>mg/L</b> HighLimit		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum	Samp Bate Analysis Result 0.54	Type: <b>LC</b> ch ID: <b>68</b> Date: <b>2</b> / PQL 0.020	5 14/2012 SPK value 0.5000	F SPK Ref Val	RunNo: <b>9</b> : SeqNo: <b>2</b> : <u>%REC</u> 108	<b>34</b> <b>7011</b> LowLimit 85	Units: <b>mg/L</b> HighLimit 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Jarium Beryllium	Samp Bate Analysis Result 0.54 0.47	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020	5 14/2012 SPK value 0.5000 0.5000 0.5000	F SPK Ref Val 0 0	RunNo: <b>9</b> 3 SeqNo: <b>2</b> 7 <u>%REC</u> 108 94.0	34 7011 LowLimit 85 85	Units: <b>mg/L</b> HighLimit 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Numinum Barium Barium Cadmium	Samp Bate Analysis Result 0.54 0.47 0.51	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000	F SPK Ref Val 0 0 0	RunNo: <b>9</b> : SeqNo: <b>2</b> <u>%REC</u> 108 94.0 101	34 7011 LowLimit 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Barium Barium Baryllium Cadmium Chromium	Samp Bato Analysis Result 0.54 0.47 0.51 0.48	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000	F SPK Ref Val 0 0 0 0.0003900	RunNo: 93 SeqNo: 2 <u>%REC</u> 108 94.0 101 96.5	34 7011 LowLimit 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Barium Barium Baryllium Cadmium Chromium Cobalt	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0020 0.0060	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0.0003900 0.0006400 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4	34 7011 LowLimit 85 85 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Barium Barium Cadmium Chromium Cobalt Copper	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.46	Type: LC ch ID: 689 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0060 0.0060	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0.0003900 0.0006400 0	RunNo: 9: SeqNo: 2 <u>%REC</u> 108 94.0 101 96.5 95.4 92.3	34 7011 LowLimit 85 85 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Jarium Jarium Comput Copper On	Samp Bate Analysis 0.54 0.47 0.51 0.48 0.48 0.48 0.46 0.47	Type: LC ch ID: 689 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	F SPK Ref Val 0 0 0 0 0.0003900 0.0006400 0 0.0002820	RunNo: 9: SeqNo: 2 <u>%REC</u> 108 94.0 101 96.5 95.4 92.3 94.3	34 7011 LowLimit 85 85 85 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Jarium Jarium Cadmium Chromium Copper on ead	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.46 0.47 0.47	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0060 0.020	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.3 94.3	34 7011 85 85 85 85 85 85 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115 115 115 115 115		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Auminum Barium Barium Barium Cadmium Chromium Cobalt Copper on ead Magnesium	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.48 0.47 0.47	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0060 0.0060 0.0060	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.3 94.3 94.4 93.7	34 7011 85 85 85 85 85 85 85 85 85 85	Units: <b>mg/L</b> HighLimit 115 115 115 115 115 115 115 115 115 11		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Auminum Barium Barium Baryllium Cadmium Chromium Cobalt Copper ron ead Magnesium Manganese	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.46 0.47 0.47 0.47 51	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0060 0.0050 1.0	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0 0.0003900 0.0006400 0 0.002820 0 0 0.002820 0 0 0.007190 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.3 94.3 94.4 93.7 103	34 7011 85 85 85 85 85 85 85 85 85 85 85 85	Units: mg/L HighLimit 115 115 115 115 115 115 115 115 115 11		RPDLimit	
	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.46 0.47 0.47 0.47 51 0.46	Type: LC ch ID: 68 Date: 2/ PQL 0.020 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0060 0.0050 1.0 0.0020	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0 0.0003900 0.0006400 0 0.002820 0 0 0.002820 0 0 0.007190 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.4 93.7 103 92.2	34 7011 85 85 85 85 85 85 85 85 85 85 85 85 85	Units: mg/L HighLimit 115 115 115 115 115 115 115 115 115 11		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte luminum arium eryllium admium admium admium abalt opper on ead lagnesium langanese lolybdenum lickel	Samp Bate Analysis Result 0.54 0.47 0.51 0.48 0.48 0.48 0.46 0.47 0.47 0.47 51 0.46 0.50	Type: LC ch ID: 689 Date: 2/ PQL 0.0020 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0050 1.0 0.0020 0.0020 0.0020 0.0020 0.0020	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0 0.0003900 0.0006400 0 0.002820 0 0 0.002820 0 0 0.007190 0 0.003360	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.3 94.3 94.4 93.7 103 92.2 98.9 91.1	34 7011 85 85 85 85 85 85 85 85 85 85 85 85 85	Units: mg/L HighLimit 115 115 115 115 115 115 115 115 115 11		RPDLimit	
Sample ID: LCS-685 Client ID: LCSW Prep Date: 2/13/2012 Analyte Juminum Barium Barium Barium Codmium Cobalt Copper Fon ead Magnesium Manganese Molybdenum	Samp Bate Analysis Result 0.54 0.47 0.47 0.48 0.48 0.48 0.46 0.47 0.47 0.47 0.47 51 0.46 0.50 0.46	Type: LC ch ID: 689 Date: 2/ PQL 0.0020 0.0020 0.0020 0.0060 0.0060 0.0060 0.0060 0.0060 0.0020 0.0050 1.0 0.0020 0.0020 0.0020 0.0020 0.0080 0.010	5 14/2012 SPK value 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000	SPK Ref Val 0 0 0 0.0003900 0.0006400 0 0.002820 0 0 0.002820 0 0 0 0.007190 0 0.003360 0 0	RunNo: 9: SeqNo: 2 %REC 108 94.0 101 96.5 95.4 92.3 94.3 94.3 94.4 93.7 103 92.2 98.9	34 7011 85 85 85 85 85 85 85 85 85 85 85 85 85	Units: mg/L HighLimit 115 115 115 115 115 115 115 115 115 11		RPDLimit	

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#: 1202350 22-Mar-12

Project: RCRA Background Investigation

Sample ID:	1202350-004CMS	SampType: MS TestCode: EPA Method 200.7: Total Metals									
Client ID:	BK-EB-020812	Bato	ch ID: 685	ł	F	RunNo: <b>934</b>					
Prep Date:	2/13/2012	Analysis	Date: 2/1	4/2012	ę	SeqNo: 27015					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.58	0.020	0.5000	0.03108	110	70	130			
Barium		0.46	0.0020	0.5000	0	91.6	70	130			
Beryllium		0.49	0.0020	0.5000	0	97.7	70	130			
Cadmium		0.48	0.0020	0.5000	0.0004400	95.2	70	130			
Chromium		0.47	0.0060	0.5000	0.001160	94.2	70	130			
Cobalt		0.46	0.0060	0.5000	0	91.2	70	130			
Copper		0.46	0.0060	0.5000	0.005760	91.2	70	130			
Lead		0.46	0.0050	0.5000	0	92.8	70	130			
Manganese		0.45	0.0020	0.5000	0.001940	89.5	70	130			
Molybdenum		0.49	0.0080	0.5000	0	98.0	70	130			
Nickel		0.45	0.010	0.5000	0.0007600	89.8	70	130			
Silver		0.094	0.0050	0.1000	0	94.5	70	130			
Vanadium		0.48	0.050	0.5000	0	96.1	70	130			
Zinc		0.45	0.010	0.5000	0.001860	89.1	70	130			
Sample ID:	1202350-004CMSE	) Samp	Туре: <b>МЅ</b>	D	Tes	tCode: EF	PA Method	200.7: Total I	Vetals		
Client ID:	BK-EB-020812		ch ID: 685		F	RunNo: <b>9</b> :	34				
Prep Date:	2/13/2012	Analysis	Date: 2/1	4/2012	S	SeqNo: 2	7085	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		0.58	0.020	0.5000	0.03108	111	70	130	0.701	20	
Barium		0.46	0.0020	0.5000	0	92.1	70	130	0.562	20	
Beryllium		0.49	0.0020	0.5000	0	98.7	70	130	0.957	20	
Cadmium		0.46	0.0020	0.5000	0.0004400	92.8	70	130	2.51	20	
Chromium		0.46	0.0060	0.5000	0.001160	91.7	70	130	2.63	20	
Cobalt		0.44	0.0060	0.5000	0	88.7	70	130	2.76	20	
Copper		0.46	0.0060	0.5000	0.005760	91.2	70	130	0.00217	20	
Lead		0.45	0.0050	0.5000	0	90.5	70	130	2.45	20	
Manganese		0.45	0.0020	0.5000	0.001940	90.3	70	130	0.817	20	
Molybdenum		0.48	0.0080	0.5000	0	95.4	70	130	2.70	20	
Nickel		0.44	0.010	0.5000	0.0007600	88.3	70	130	1.66	20	
Silver		0.095	0.0050	0.1000	0	94.6	70	130	0.148	20	
Vanadium		0.48	0.050	0.5000	0	96.8	70	130	0.728	20	
Zinc		0.45	0.010		0.001860	89.9	70	130	0.852	20	
-	1202350-004CMS	Samp	Туре: <b>МЅ</b>		Tes	tCode: EF	PA Method	200.7: Total I	Vetals		
Sample ID:	-	SampType: <b>MS</b> Batch ID: <b>685</b>				RunNo: <b>9</b> :		-			
Sample ID: Client ID:	BK-EB-020812	Bato	ch ID: 685								
Client ID:	BK-EB-020812 2/13/2012		Date: 2/1			SeqNo: 2	7087	Units: mg/L			
Client ID:				4/2012		SeqNo: 27 %REC	7087 LowLimit	Units: <b>mg/L</b> HighLimit	%RPD	RPDLimit	Qual
Client ID: Prep Date:		Analysis	Date: <b>2/1</b>	4/2012	S			-	%RPD	RPDLimit	Qual

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD 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

RL Reporting Detection Limit

Client: Project:		Refining So ckground									
Sample ID:	1202350-004CMSE	SampT	уре: МS	SD.	TestCode: EPA Method 200.7: Total Metals						
Client ID:	BK-EB-020812	Batch	ID: 68	5	F	RunNo: 934					
Prep Date:	2/13/2012	Analysis D	ate: 2/	14/2012	S	SeqNo: 27	7088	Units: <b>mg/L</b>			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron		0.58	0.10	0.5000	0.08790	98.2	70	130	3.61	20	
Magnesium		51	5.0	50.00	0.05675	103	70	130	0.614	20	
Sample ID:	MB-685	SampT	уре: <b>МЕ</b>	BLK	Tes	tCode: EF	PA Method	200.7: Total N	letals		
Client ID:	PBW Batch ID: 685				F	RunNo: 95	59				
Prep Date:	2/13/2012	15/2012	S	SeqNo: 27	7822	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		ND	0.040					-			
Sample ID:	LCS-685	SampT	ype: <b>LC</b>	S	Tes	tCode: EF	PA Method	200.7: Total M	letals		
Client ID:	LCSW	Batch	ID: 68	5	RunNo: <b>959</b>						
Prep Date:	2/13/2012	Analysis D	ate: 2/	15/2012	S	SeqNo: 27	7823	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		0.49	0.040	0.5000	0	98.9	85	115			
Sample ID:	1202350-004CMS	SampT	уре: МS	3	Tes	tCode: EF	PA Method	200.7: Total N	letals		
Client ID:	BK-EB-020812	Batch	ID: 68	5	F	RunNo: 95	59				
Prep Date:	2/13/2012	Analysis D	ate: 2/	15/2012	S	SeqNo: 28	3184	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		0.47	0.040	0.5000	0	93.5	70	130			
Sample ID:	1202350-004CMSE	SampT	уре: МS	SD	Tes	tCode: EF	PA Method	200.7: Total N	letals		
Client ID:	BK-EB-020812	Batch	ID: 68	5	F	RunNo: 98	59				
Prep Date:	2/13/2012	Analysis D	ate: 2/	15/2012	5	SeqNo: 28	3188	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron		0.47	0.040	0.5000	0	94.4	70	130	0.949	20	

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WO#:	1202350
	22-Mar-12

Client: Project:	Western Refining So RCRA Background I									
Sample ID: MB	SampTy	/pe: <b>MB</b>	BLK	Tes						
Client ID: PBW	Batch	ID: <b>R9</b>	22	RunNo: <b>922</b>						
Prep Date:	Analysis Da	Analysis Date: 2/13/2012			SeqNo: 26622					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND (	0.0010								
Arsenic	ND (	0.0010								
	ND (	0.0010								
Selenium	ND (	0.0010								
Selenium Fhallium		0.0010								
	ND (									
Thallium	ND (	0.0010 0.0010	<u>s</u>	Tes	tCode: EF	PA 200.8: [	Dissolved Met	als		
Thallium Jranium	ND ( ND ( SampTy	0.0010 0.0010			tCode: EF		Dissolved Met	als		
Thallium Jranium Sample ID: LCS	ND ( ND ( SampTy	0.0010 0.0010 /pe: LC ID: R9	22	F		22	Dissolved Met	tals		
Thallium Jranium Sample ID: LCS Client ID: LCSW	ND ( ND ( SampTy Batch	0.0010 0.0010 /pe: LC ID: R9	22 13/2012	F	RunNo: <b>9</b> 2	22		als %RPD	RPDLimit	Qual
Thallium Jranium Sample ID: LCS Client ID: LCSW Prep Date:	ND ( ND ( SampTy Batch Analysis Da Result	0.0010 0.0010 /pe: LC ID: R9: ate: 2/*	22 13/2012	F S	RunNo: 92 SeqNo: 26	22 6623	Units: mg/L		RPDLimit	Qual
Thallium Jranium Sample ID: LCS Client ID: LCSW Prep Date: Analyte	ND ( ND ( SampTy Batch Analysis Da Result 0.024 (	0.0010 0.0010 /pe: LC ID: R9: ate: 2/* PQL	22 13/2012 SPK value	R S SPK Ref Val	RunNo: 92 SeqNo: 26 %REC	22 6623 LowLimit	Units: <b>mg/L</b> HighLimit		RPDLimit	Qual
Thallium Jranium Sample ID: LCS Client ID: LCSW Prep Date: Analyte Antimony	ND ( ND ( SampTy Batch Analysis Da Result 0.024 ( 0.026 (	0.0010 0.0010 /pe: LC ID: R9: ate: 2/* PQL 0.0010	22 13/2012 SPK value 0.02500	F SPK Ref Val	RunNo: <b>92</b> SeqNo: <b>26</b> <u>%REC</u> 97.8	22 6623 LowLimit 85	Units: <b>mg/L</b> HighLimit 115		RPDLimit	Qual
Thallium Jranium Sample ID: LCS Client ID: LCSW Prep Date: Analyte Analyte Antimony Arsenic	ND ( ND ( SampTy Batch Analysis Da Result 0.024 ( 0.026 ( 0.027 (	0.0010 0.0010 //pe: LC ID: R9: ate: 2/ PQL 0.0010 0.0010	22 13/2012 SPK value 0.02500 0.02500	R SPK Ref Val 0 0	RunNo: <b>92</b> SeqNo: <b>26</b> <u>%REC</u> 97.8 104	22 6623 LowLimit 85 85	Units: <b>mg/L</b> HighLimit 115 115		RPDLimit	Qual

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- RL Reporting Detection Limit

WO#:	1202350					
	22 Mar 12					

Qual

%RPD

RPDLimit

22-Mar-12

	estern Refining S CRA Background										
Sample ID: MB-685	ble ID: MB-685 SampType: MBLK					TestCode: 200.8 ICPMS Metals:Total					
Client ID: PBW	Bato	h ID: 68	5	RunNo: <b>948</b>							
Prep Date: 2/13/2012	Analysis	Date: 2/	14/2012	SeqNo: 27416 Units:							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit				
Arsenic	ND	0.0025									
Selenium	ND	0.0025									
Uranium	0.000031	0.0025									
Sample ID: MB-685 SampType: MBLK				TestCode: 200.8 ICPMS Metals:Total							
	DDW Datab ID: 005										

Uranium	0.000031	0.0025								J
Sample ID: MB-685	SampType: MBLK			TestCode: 200.8 ICPMS Metals:Total						
Client ID: PBW	Batch ID: 685			RunNo: 1028						
Prep Date: 2/13/2012	Analysis D	Date: 2/	20/2012	S	SeqNo: 29	9709	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0025								
Arsenic	ND	0.0025								
Selenium	ND	0.0025								
Thallium	ND	0.0025								

Uranium ND 0.0025

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WO#:	1202350
	22-Mar-12

	ern Refining S A Background									
Sample ID: MB-674	SampT	ype: ME	BLK	Tes	tCode: EF	PA Method	300.0: Anion	S		
Client ID: PBS	Batcl	h ID: 67	4	F	RunNo: <b>8</b> 9	98				
Prep Date: 2/10/2012	Analysis E	Date: 2/	10/2012	S	eqNo: 2	5516	Units: mg/K	g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Chloride Sulfate	ND ND	1.5 1.5								
	ND		S	Tes	tCode: Ef	PA Method	300.0: Anion	S		
Sulfate	ND Samp1	1.5			tCode: EF		300.0: Anion	s		
Sulfate Sample ID: LCS-674	ND Samp1	1.5 Type: <b>LC</b> h ID: <b>67</b> 4	4	F		98	<b>300.0: Anion</b> Units: <b>mg/K</b>			
Sulfate Sample ID: LCS-674 Client ID: LCSS	ND SampT Batcl	1.5 Type: <b>LC</b> h ID: <b>67</b> 4	4 10/2012	F	RunNo: <b>8</b> 9	98			RPDLimit	Qual
Sulfate Sample ID: LCS-674 Client ID: LCSS Prep Date: 2/10/2012	ND SampT Batcl Analysis D	1.5 Type: LC h ID: 67 Date: 2/	4 10/2012	F	8unNo: <b>8</b> 9 GeqNo: <b>2</b> 9	98 5517	Units: mg/K	g	RPDLimit	Qual
Sulfate Sample ID: LCS-674 Client ID: LCSS Prep Date: 2/10/2012 Analyte	ND SampT Batcl Analysis D Result	1.5 Type: <b>LC</b> h ID: <b>67</b> Date: <b>2/</b> PQL	4 10/2012 SPK value	F S SPK Ref Val	2unNo: 89 SeqNo: 29 %REC	98 5517 LowLimit	Units: <b>mg/K</b> HighLimit	g	RPDLimit	Qual

#### Qualifiers:

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- RL Reporting Detection Limit

WO#:	1202350
	22.14 12

Client: Project:	Western Refining S RCRA Background									
Sample ID: MB	SampT	ype: ME	BLK	Tes	Code: EF	PA Method	300.0: Anions			
Client ID: PBW	Batch	n ID: R9	04	R	unNo: <b>90</b>	)4				
Prep Date:	Analysis D	ate: 2/	10/2012	S	eqNo: 25	5863	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								
Sample ID: LCS	SamnT	ype: LC	c	Tes	Code <sup>.</sup> FF		300.0: Anions			
•	Gampi	ypc. <b>LC</b>	0	103		Ameniou	Sould: Among			
Client ID: LCSW		n ID: R9			tunNo: 90		Sould. Among			
•		n ID: <b>R9</b>	04	F		)4	Units: mg/L			
Client ID: LCSW	Batch	n ID: <b>R9</b>	04 10/2012	F	unNo: <b>9(</b>	)4		%RPD	RPDLimit	Qual
Client ID: LCSW Prep Date:	Batch Analysis D	n ID: <b>R9</b> ate: <b>2/</b>	04 10/2012	ਸ S	tunNo: 90	)4 5864	Units: <b>mg/L</b>		RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte	Batch Analysis D Result	n ID: <b>R9</b> ate: <b>2/</b> PQL	04 10/2012 SPK value	R S SPK Ref Val	2unNo: 90 eqNo: 25 %REC	04 5864 LowLimit	Units: <b>mg/L</b> HighLimit		RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Chloride	Batch Analysis D Result 4.6	n ID: <b>R9</b> nate: <b>2/</b> PQL 0.50	04 10/2012 SPK value 5.000	R S SPK Ref Val 0	2unNo: 90 6eqNo: 25 %REC 92.6	04 5864 LowLimit 90	Units: <b>mg/L</b> HighLimit 110		RPDLimit	Qual

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WO#:	1202350
	22-Mar-12

Client: Project:		Refining Souch									
Sample ID:	MB-689	SampT	ype: ME	BLK	Tes	Code: EF	PA Method	7471: Mercur	у		
Client ID:	PBS	Batch	n ID: 68	9	F	unNo: 92	26				
Prep Date:	2/13/2012	Analysis D	ate: 2/	14/2012	S	eqNo: 20	6731	Units: mg/kg	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.033								
Sample ID:	LCS-689	SampT	ype: LC	S	Tes	Code: EF	PA Method	7471: Mercur	у		
Client ID:	LCSS	Batch	n ID: 68	9	F	unNo: 92	26				
Prep Date:	2/13/2012	Analysis D	ate: 2/	14/2012	S	eqNo: 20	6732	Units: mg/kg	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.17	0.033	0.1667	0	99.7	80	120			
Sample ID:	1202350-001AMS	SampT	уре: М	3	Tes	Code: EF	PA Method	7471: Mercur	у		
Client ID:	BK-10 (5-6')	Batch	n ID: 68	9	F	unNo: 92	26				
Prep Date:	2/13/2012	Analysis D	ate: 2/	14/2012	S	eqNo: 20	6749	Units: mg/kg	9		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.16	0.033	0.1647	0	98.8	75	125			
Sample ID:	1202350-001AMS	) SampT	ype: <b>M</b>	SD	Tes	Code: EF	PA Method	7471: Mercur	у		
Client ID:	BK-10 (5-6')	Batch	n ID: 68	9	F	unNo: 92	26				
Prep Date:	2/13/2012	Analysis D	ate: 2/	14/2012	S	eqNo: 20	6750	Units: mg/kg	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.17	0.033	0.1657	0	103	75	125	4.39	20	

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WO#:	1202350
	22-Mar-12

Client: Project:	Western H RCRA Ba	U									
Sample ID:	MB-707	Samp	оТуре: І	MBLK	Tes	tCode: EF	PA Method	7470: Mercur	у		
Client ID:	PBW	Bat	ch ID: 7	707	F	RunNo: 93	35				
Prep Date:	2/14/2012	Analysis	Date:	2/14/2012	S	SeqNo: 27	7024	Units: mg/L			
Analyte		Result	PQI	_ SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.0002	20							
Sample ID:	LCS-707	Samp	оТуре: <b>І</b>	LCS	Tes	tCode: EF	PA Method	7470: Mercur	у		
Client ID:	LCSW	Bat	ch ID: 7	707	F	RunNo: 93	35				
Prep Date:	2/14/2012	Analysis	Date:	2/14/2012	S	SeqNo: 27	7025	Units: mg/L			
Analyte		Result	PQL	_ SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0055	0.0002	0.005000	0	109	80	120			
Sample ID:	1202350-004CMS	Samp	оТуре: І	ИS	Tes	tCode: EF	PA Method	7470: Mercur	у		
Client ID:	BK-EB-020812	Bat	ch ID: 7	707	F	RunNo: 93	35				
Prep Date:	2/14/2012	Analysis	Date:	2/14/2012	S	SeqNo: 27	7027	Units: mg/L			
Analyte		Result	PQL	_ SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0055	0.0002	0.005000	0	109	75	125			
Sample ID:	1202350-004CMSE	<b>)</b> Samp	оТуре: І	MSD	Tes	tCode: EF	PA Method	7470: Mercur	у		
Client ID:	BK-EB-020812	Bat	ch ID: 7	707	F	RunNo: <b>9</b> 3	35				
Prep Date:	2/14/2012	Analysis	Date:	2/14/2012	S	SeqNo: 27	7028	Units: mg/L			
Analyte		Result	PQL	_ SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
,											

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WO#: 1202350

22-Mar-12

Client:Western Refining Southwest, Inc.Project:RCRA Background Investigation

Sample ID: MB-677	e ID: MB-677 SampType: MBLK				TestCode: EPA Method 6010B: Soil Metals					
Client ID: PBS	Batch ID: 677			F	RunNo: 900					
Prep Date: 2/10/2012	Analysis D	ate: 2/	13/2012	S	SeqNo: 2	5543	Units: mg/K	g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.67	3.0								J
Antimony	0.53	2.5								J
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	0.16	2.0								J
Cadmium	0.026	0.10								J
Chromium	0.094	0.30								J
Cobalt	ND	0.30								
lolybdenum	ND	0.40								
lickel	0.20	0.50								J
Selenium	1.4	2.5								J
Silver	ND	0.25								
hallium	ND	2.5								
Iranium	0.54	5.0								J
/anadium	ND	2.5								
Zinc	0.94	2.5								J
Zinc Sample ID: <b>LCS-677</b>		2.5 ype: <b>LC</b>	S	Tes	tCode: Ef	PA Method	6010B: Soil M	/letals		J
Sample ID: LCS-677	SampT				tCode: EF		6010B: Soil N	letals		J
Sample ID: LCS-677 Client ID: LCSS	SampT	ype: LC	7	F		00	6010B: Soil M Units: mg/K			J
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012	SampT Batch	ype: LC	7 13/2012	F	RunNo: <b>9</b>	00			RPDLimit	J
Sample ID: <b>LCS-677</b> Client ID: <b>LCSS</b> Prep Date: <b>2/10/2012</b> Analyte	SampT Batch Analysis D	ype: LC 1 ID: 677 Date: 2/	7 13/2012	F	RunNo: <b>9</b> GeqNo: <b>2</b>	00 5544	Units: <b>mg/K</b>	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum	SampT Batch Analysis D Result	ÿpe: <b>LC</b> n ID: <b>67</b> 7 Date: <b>2</b> / PQL	7 13/2012 SPK value	F S SPK Ref Val	RunNo: <b>9</b> SeqNo: <b>2</b> %REC	00 5544 LowLimit	Units: <b>mg/K</b> HighLimit	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum	SampT Batch Analysis D Result 28	ype: LC 1D: 677 Date: 2/ PQL 3.0	7 13/2012 SPK value 25.00	F S SPK Ref Val 0.6685	RunNo: 90 SeqNo: 29 <u>%REC</u> 110	00 5544 LowLimit 80	Units: <b>mg/K</b> HighLimit 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Juminum Juminum Juminum	SampT Batch Analysis D Result 28 26	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5	7 13/2012 SPK value 25.00 25.00	F S SPK Ref Val 0.6685 0.5325	RunNo: 90 SeqNo: 29 <u>%REC</u> 110 102	00 5544 LowLimit 80 80	Units: <b>mg/K</b> HighLimit 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Intimony Irsenic Barium	SampT Batch Analysis D Result 28 26 23	ype: LC n ID: 677 Date: 2/ PQL 3.0 2.5 2.5	7 13/2012 SPK value 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0	RunNo: 9 6eqNo: 2 %REC 110 102 90.6	5544 LowLimit 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Numinum Antimony Arsenic Barium Beryllium	SampT Batch Analysis D Result 28 26 23 23 24	ype: LC Date: 2/ PQL 3.0 2.5 2.5 0.10	7 13/2012 SPK value 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0	RunNo: 9 6eqNo: 2 %REC 110 102 90.6 95.9	00 5544 <u>LowLimit</u> 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Juminum Antimony Arsenic Barium Beryllium Boron	SampT Batch Analysis D Result 28 26 23 24 25	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 0.10 0.15	7 13/2012 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0	RunNo: 90 SeqNo: 2 %REC 110 102 90.6 95.9 98.7	00 5544 LowLimit 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Numinum Antimony Arsenic Barium Beryllium Boron Cadmium	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24	ype: LC a ID: 677 pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 2.0	7 13/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0.1635	RunNo: 90 SeqNo: 29 <u>%REC</u> 110 102 90.6 95.9 98.7 95.3	00 5544 LowLimit 80 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum Juminum	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 25 24 24	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 2.0 0.10	7 13/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0.1635 0.02550	RunNo: 90 SeqNo: 29 <u>%REC</u> 110 102 90.6 95.9 98.7 95.3 94.8	00 5544 80 80 80 80 80 80 80 80 80 80	Units: <b>mg/K</b> HighLimit 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Intimony Issenic Isarium Iseryllium Isoron Isadmium Ishromium Isobalt	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 24 24 24 23 25	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.40	7 13/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0 0.1635 0.02550 0.09450	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte luminum ntimony rsenic arium eryllium oron admium thromium thromium	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 24 24 24 24 24 23	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.40 0.50	7 13/2012 SPK value 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Juminum Juminum Juminum Juminum Juminum Juminum Beryllium Boron Cadmium Chromium Cobalt Jolybdenum Jickel	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 24 24 24 23 25	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.40	7 13/2012 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4 102	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Juminum Juminum Juminum Juminum Juminum Juminum Juminum Beryllium Beryllium Beryllium Beryllium Boron Cadmium Chomium Cobalt Jolybdenum Lickel Belenium	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 24 24 24 23 25 23	ype: LC n ID: 677 pate: 2/ PQL 3.0 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.40 0.50	7 <b>13/2012</b> 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4 102 90.1	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
	SampT Batch Analysis D Result 28 26 23 24 25 24 25 24 24 24 24 24 23 25 23 25 23 24	ype: LC pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.40 0.50 2.5	7 13/2012 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0 0.1635 0.02550 0.09450 0 0 0 0 0 0 0 0 0 0 0 1.418	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4 102 90.1 89.9	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Auminum Autimony Arsenic Barium Baron Cadmium Chromium Cobalt Aolybdenum Lickel Gelenium Silver 'hallium	SampT Batch Analysis D Result 28 26 23 24 25 24 24 25 24 24 24 24 23 25 23 25 23 24 4.8	ype: LC plD: 677 pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.30 0.40 0.50 2.5 0.25	7 13/2012 25.00 25.0	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0.1635 0.02550 0.09450 0 0 0 0.2015 1.418 0	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4 102 90.1 89.9 96.3	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	
Sample ID: LCS-677 Client ID: LCSS Prep Date: 2/10/2012 Analyte Auminum Antimony Arsenic Barium Beryllium Boron Cadmium Chromium Cobalt Aolybdenum Lickel Selenium Silver	SampT Batch Analysis D Result 28 26 23 24 25 24 24 24 24 24 24 24 23 25 23 24 4.8 24 4.8 24	ype: LC plD: 677 pate: 2/ PQL 3.0 2.5 2.5 0.10 0.15 2.0 0.10 0.30 0.30 0.30 0.40 0.50 2.5 0.25 2.5	7 13/2012 SPK value 25.00	F SPK Ref Val 0.6685 0.5325 0 0 0 0 0 0.1635 0.02550 0.09450 0 0 0 0.2015 1.418 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 90 SeqNo: 29 %REC 110 102 90.6 95.9 98.7 95.3 94.8 95.7 93.4 102 90.1 89.9 96.3 95.9	00 5544 80 80 80 80 80 80 80 80 80 80 80 80 80	Units: mg/K HighLimit 120 120 120 120 120 120 120 120 120 120	g	RPDLimit	

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1202350
	22-Mar-12

	n Refining Southwest, Inc. Background Investigation					
Sample ID: MB-677	SampType: MBLK	TestCode: EPA Method 6010B: Soil Metals				
Client ID: PBS	Batch ID: 677	RunNo: 909				
Prep Date: 2/10/2012	Analysis Date: 2/13/2012	SeqNo: 26102	Units: <b>mg/Kg</b>			
Analyte		SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Copper Lead	ND 0.30 ND 0.25					
Sample ID: LCS-677	SampType: LCS	TestCode: EPA Method	6010B: Soil Metals			
Client ID: LCSS	Batch ID: 677	RunNo: 909				
Prep Date: 2/10/2012	Analysis Date: 2/13/2012	SeqNo: 26103	Units: <b>mg/Kg</b>			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Copper	25 0.30 25.00	0 101 80	120			
Lead	24 0.25 25.00	0 94.9 80	120			
Sample ID: MB-677	SampType: MBLK	TestCode: EPA Method	6010B: Soil Metals			
Client ID: PBS	Batch ID: 677	RunNo: 994				
Prep Date: 2/10/2012	Analysis Date: 2/17/2012	SeqNo: 28799	Units: <b>mg/L</b>			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Copper	0.17 0.30			J		
Lead	ND 0.25					
Sample ID: LCS-677	SampType: LCS	TestCode: EPA Method	6010B: Soil Metals			
Client ID: LCSS	Batch ID: 677	RunNo: 994				
Prep Date: 2/10/2012	Analysis Date: 2/17/2012	SeqNo: 28800	Units: <b>mg/L</b>			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Copper	25 0.30 25.00	0.1690 97.9 80	120			
Lead	23 0.25 25.00	0 92.8 80	120			
Sample ID: MB-1127	SampType: MBLK	TestCode: EPA Method	6010B: Soil Metals			
Client ID: PBS	Batch ID: 1127	RunNo: 1527				
Prep Date: 3/17/2012	Analysis Date: 3/18/2012	SeqNo: 42804	Units: <b>mg/L</b>			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Iron	ND 1.0					
Manganese	ND 0.10					
Sample ID: LCS-1127	SampType: LCS	TestCode: EPA Method	6010B: Soil Metals			
Client ID: LCSS	Batch ID: 1127	RunNo: 1527				
Prep Date: 3/17/2012	Analysis Date: 3/18/2012	SeqNo: 42805	Units: <b>mg/L</b>			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual		
Analyte Iron	ResultPQLSPK value261.025.00	SPK Ref Val%RECLowLimit010580	HighLimit %RPD 120	RPDLimit Qual		

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

Page 19 of 21

RL Reporting Detection Limit

ND Not Detected at the Reporting Limit

WO#:	1202350
	22-Mar-12

Client: Project:	Western Refining Southwest RCRA Background Investig							
Sample ID: mb-1	SampType: ME	BLK	TestC	Code: SM2320B: A	Ikalinity			
Client ID: PBW	Batch ID: R9	47	Ru	nNo: <b>947</b>				
Prep Date:	Analysis Date: 2/	14/2012	Se	qNo: <b>27332</b>	Units: <b>mg/L</b>	CaCO3		
Analyte	Result PQL	SPK value S	PK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCC	3) ND 20							
Sample ID: Ics-1	SampType: LC	S	TestC	Code: SM2320B: A	Ikalinity			
Client ID: LCSW	Batch ID: R9	47	Ru	nNo: <b>947</b>				
Prep Date:	Analysis Date: 2/	14/2012	Se	qNo: <b>27333</b>	Units: <b>mg/L</b>	CaCO3		
Analyte	Result PQL	SPK value S	PK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCC	3) 79 20	80.00	0	98.8 88.1	104			
Sample ID: mb-2	SampType: ME	BLK	TestC	Code: SM2320B: A	Ikalinity			
Client ID: PBW	Batch ID: R9	47	Ru	nNo: <b>947</b>				
Prep Date:	Analysis Date: 2/	14/2012	Se	qNo: <b>27357</b>	Units: <b>mg/L</b>	CaCO3		
Analyte	Result PQL	SPK value S	PK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCC	3) ND 20							
Sample ID: Ics-2	SampType: LC	s	TestC	Code: SM2320B: A	Ikalinity			
Client ID: LCSW	Batch ID: R9	47	Ru	nNo: <b>947</b>				
Prep Date:	Analysis Date: 2/	14/2012	Se	qNo: <b>27358</b>	Units: <b>mg/L</b>	CaCO3		
Analyte	Result PQL	SPK value S	PK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCC	3) 80 20	80.00	0	99.5 88.1	104			

#### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

RL Reportin

WO#:	1202350
	22-Mar-12

	estern Refining Southwest, Inc. RA Background Investigation			
Sample ID: MB-709	SampType: MBLK		OD: Total Dissolved Solids	
Client ID: PBW	Batch ID: 709	RunNo: 962		
Prep Date: 2/14/2012	Analysis Date: 2/15/2012	SeqNo: 27879	Units: <b>mg/L</b>	
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit (	Qual
Total Dissolved Solids	ND 20.0			
Sample ID: LCS-709	SampType: LCS	TestCode: SM2540C M	OD: Total Dissolved Solids	
Client ID: LCSW	Batch ID: 709	RunNo: 962		
Prep Date: 2/14/2012	Analysis Date: 2/15/2012	SeqNo: 27880	Units: <b>mg/L</b>	
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit (	Qual
Total Dissolved Solids	1,010 20.0 1,000	0 101 80	120	

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

### HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquergue, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.con

# Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield	Work Order Number: 1202350
Received by/date: AG 2/10/12	
Logged By: Lindsay Mangin 2/10/2012 9:30:00 A	M July Mago
Completed By: Lindsay Mangin 2/10/2012 9:54:01 A	M July Hlago
Reviewed By: AA 21013	
Chain of Custody	
1. Were seals intact?	Yes 🗹 No 🗋 Not Present 🗌
2. Is Chain of Custody complete?	Yes 🗹 No 🗌 Not Present 🗌
3. How was the sample delivered?	<u>UPS</u>
<u>Log In</u>	
4. Coolers are present? (see 19. for cooler specific information)	Yes 🗹 No 🗌 🛛 NA 🗌
5. Was an attempt made to cool the samples?	Yes 🗹 No 🗌 🛛 NA 🗌
6. Were all samples received at a temperature of $>0^{\circ}$ C to $6.0^{\circ}$ C	Yes 🗹 No 🗍 🛛 NA 🗌
7. Sample(s) in proper container(s)?	Yes 🗹 No 🗌
8. Sufficient sample volume for indicated test(s)?	Yes 🗹 No 🗌
9 Are samples (except VOA and ONG) properly preserved?	Yes 🗹 No 🗌
10. Was preservative added to bottles?	Yes 🗌 No 🗹 🛛 NA 🗌
11. VOA vials have zero headspace?	Yes 🗌 No 🗌 No VOA Vials 🗹
12. Were any sample containers received broken?	Yes No 🗹
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑ No □ # of preserved bottles checked 3 / for pH:
14. Are matrices correctly identified on Chain of Custody?	Yes ☑ No □ (<2 or 22 unless noted)
15. Is it clear what analyses were requested?	Yes 🗹 No 🗌 Adjusted?
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes 🗹 No 🗆 Checked by:
Special Handling (if applicable)	
17. Was client notified of all discrepancies with this order?	Yes 🗆 No 🗔 🛛 NA 🗹 🗸
Person Notified: Date:	
By Whom: Via:	🗌 eMaii 📋 Phone 🛄 Fax 🔄 In Person
Regarding:	
Client Instructions:	
18, Additional remarks:	

19. Cooler Information

. 2		lation			ş.		
	Cooler No	Temp ⁰C	Condition	Seal Intact	Seal No	Seal Date	Signed By
	1	2.4	Good	Yes			

		www.hallenvironmental.com	4901 Hawkins NE - Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Analysis Request	() () () () () () () () () () () () () (	o ss∋) ∋iŪ\ss 52,₄Oq	× 1002; 3'NO2; 3'NO2; 1071) 1071) 1071 10	AOV AOV AOV AOV AOV AOV AOV AOV	BTEX + MTE BTEX + MTE TPH Method TPH Method B2DB (Metho 8310 (PUA d 8310 (PUA d 8081 Pestici 8081 Pestici 8081 Pestici 8081 Pestici 8081 Pestici Anions (F, Cl 8081 Pestici 8081 Pistici 8081 Pistici 80							×			Remarks:	- See atteching + Ix and lit lit		If necessary, samples submitted to Hall Environmental may be subcontracted to other acyredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	🗙 Standard 🗆 Rush	Pfoject Name:	A		Background RUEN INVESTIGARD	Project Manager: N	Kelly Keliwar	Sampler: Kelly, Kathery M	Sample Temberature:	Container Preservative HEAL No. Type and # Type 100023500	Jun Noul -1	2			4	1 Polly   Hr Say	1 poly/ Na OH	$\frown$		Received by: Date Time		61010	itracted to other accredited laboratories. This serves as notice of this
Chain-of-Custody Record	1	Filer	Mailing Address: SD Prod 4996		Phone #: 505-632-4166	ax#: Kelly	QA/QC Package: 1 □ Standard \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	□ Other	vne)	Matrix Sample Request ID	7/1/12 753 501 [BK-10 (S-12)]	Soil .	1043 Soil BK-10	3/2 1340 Woter BK-EB-020812						e: Time: Relinquished by:	2 1000 1 xxx round		If necessary, samples submitted to Hall Environmental may be subcor

### METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

## GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	ERA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium`	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved &
	tòtal)
Nitrate/nitrite	EPA method 300 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved &
	total)

## SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

For Sor and Groundwardy Dis Totals

For Groundwoodes Scruptes ONILY

Includes Sott Sori Samples 9 GW Samples (both dissolid at total analysis)



June 26, 2012

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: Background Investigation

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

OrderNo.: 1206661

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 8 sample(s) on 6/15/2012 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 <u>www.hallenvironmental.com</u> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. 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.

Sincerely,

ander

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

1206661-001

**Background Investigation** 

**Project:** 

Lab ID:

Client Sample ID: EB-061412 Collection Date: 6/14/2012 9:30:00 AM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: BRN
Fluoride	ND	0.10	mg/L	1	6/16/2012 12:09:54 AN
Chloride	ND	0.50	mg/L	1	6/16/2012 12:09:54 AN
Sulfate	ND	0.50	mg/L	1	6/16/2012 12:09:54 AN
Nitrate+Nitrite as N	ND	1.0	mg/L	5	6/19/2012 5:57:10 PM
EPA METHOD 200.7: DISSOLVED	METALS				Analyst: ELS
Aluminum	ND	0.020	mg/L	1	6/20/2012 9:45:23 AM
Barium	ND	0.0020	mg/L	1	6/20/2012 9:45:23 AM
Beryllium	ND	0.0020	mg/L	1	6/20/2012 9:45:23 AM
Boron	ND	0.040	mg/L	1	6/20/2012 9:45:23 AM
Cadmium	ND	0.0020	mg/L	1	6/20/2012 9:45:23 AM
Calcium	ND	1.0	mg/L	1	6/21/2012 9:00:53 AM
Chromium	ND	0.0060	mg/L	1	6/20/2012 9:45:23 AM
Cobalt	ND	0.0060	mg/L	1	6/20/2012 9:45:23 AM
Copper	ND	0.0060	mg/L	1	6/20/2012 9:45:23 AM
Iron	ND	0.020	mg/L	1	6/21/2012 12:49:57 PM
Magnesium	ND	1.0	mg/L	1	6/21/2012 9:00:53 AM
Manganese	ND	0.0020	mg/L	1	6/20/2012 9:45:23 AM
Molybdenum	ND	0.0080	mg/L	1	6/21/2012 9:00:53 AM
Nickel	ND	0.010	mg/L	1	6/21/2012 9:00:53 AM
Potassium	ND	1.0	mg/L	1	6/21/2012 9:00:53 AM
Silver	ND	0.0050	mg/L	1	6/20/2012 9:45:23 AM
Sodium	ND	1.0	mg/L	1	6/21/2012 9:00:53 AM
Vanadium	ND	0.050	mg/L	1	6/20/2012 9:45:23 AM
Zinc	0.025	0.010	mg/L	1	6/20/2012 9:45:23 AM
EPA METHOD 200.7: TOTAL MET	ALS				Analyst: ELS
Aluminum	ND	0.020	mg/L	1	6/20/2012 9:14:54 AM
Barium	ND	0.0020	mg/L	1	6/20/2012 9:14:54 AM
Beryllium	ND	0.0020	mg/L	1	6/20/2012 9:14:54 AM
Boron	ND	0.040	mg/L	1	6/20/2012 9:14:54 AM
Cadmium	ND	0.0020	mg/L	1	6/20/2012 9:14:54 AM
Chromium	ND	0.0060	mg/L	1	6/20/2012 9:14:54 AM
Cobalt	ND	0.0060	mg/L	1	6/20/2012 9:14:54 AM
Copper	ND	0.0060	mg/L	1	6/20/2012 9:14:54 AM
Iron	ND	0.020	mg/L	1	6/21/2012 12:11:03 PN
Magnesium	ND	1.0	mg/L	1	6/21/2012 12:11:03 PN
Manganese	ND	0.0020	mg/L	1	6/20/2012 9:14:54 AM
Molybdenum	ND	0.0080	mg/L	1	6/21/2012 2:07:06 PM
Nickel	ND	0.010	mg/L	1	6/21/2012 12:11:03 PN
Silver	ND	0.0050	mg/L	1	6/20/2012 9:14:54 AM
Vanadium	ND	0.050	mg/L	1	6/20/2012 9:14:54 AM
Zinc	0.010	0.010	mg/L	1	6/20/2012 9:14:54 AM

Matrix: AQUEOUS

Qualifiers: \*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

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

RL Reporting Detection Limit

U Samples with CalcVal < MDL

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# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Background InvestigationLab ID: 1206661-001

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Client Sample ID: EB-061412 Collection Date: 6/14/2012 9:30:00 AM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS					Analyst: SNV
Antimony	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
Arsenic	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
Lead	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
Selenium	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
Thallium	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
Uranium	ND	0.0010	mg/L	1	6/19/2012 4:49:26 PM
200.8 ICPMS METALS:TOTAL					Analyst: SNV
Antimony	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
Arsenic	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
Lead	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
Selenium	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
Thallium	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
Uranium	ND	0.0025	mg/L	2.5	6/20/2012 4:59:16 PM
EPA METHOD 245.1: MERCURY					Analyst: RAG
Mercury	ND	0.00020	mg/L	1	6/19/2012 4:53:35 PM
SM2320B: ALKALINITY					Analyst: DBD
Bicarbonate (As CaCO3)	ND	20	mg/L CaCO3	1	6/18/2012 9:47:24 AM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	6/18/2012 9:47:24 AM
Total Alkalinity (as CaCO3)	ND	20	mg/L CaCO3	1	6/18/2012 9:47:24 AM
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analyst: <b>KS</b>
Total Dissolved Solids	ND	20.0	mg/L	1	6/20/2012

Matrix: AQUEOUS

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Met	hod Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analyst	sis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	D 0 600
	S	Spike Recovery outside accepted recovery limits	U	Samples with CalcVal < MDL	Page 2 of 22

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Background Investigation

Client Sample ID: MW-BCK2 Collection Date: 6/14/2012 12:00:00 PM

Lab ID: 1206661-002	Matrix:	AQUEOUS	<b>Received Date:</b> 6/15/2012 9:50:00 AM			
Analyses	Result	RL Qua	l Units	DF	Date Analyzed	
EPA METHOD 300.0: ANIONS					Analyst: BRN	
Fluoride	ND	2.0	mg/L	20	6/16/2012 12:47:09 AN	
Chloride	21	10	mg/L	20	6/16/2012 12:47:09 AN	
Sulfate	7900	500	mg/L	1000	6/22/2012 5:37:20 AM	
Nitrate+Nitrite as N	ND	2.0	mg/L	10	6/19/2012 6:09:34 PM	
EPA METHOD 200.7: DISSOLVED	METALS				Analyst: ELS	
Aluminum	3.8	0.10 *	mg/L	5	6/21/2012 11:18:21 AN	
Barium	0.035	0.0020	mg/L	1	6/21/2012 11:25:27 AN	
Beryllium	ND	0.0020	mg/L	1	6/21/2012 11:25:27 AN	
Boron	0.67	0.040	mg/L	1	6/21/2012 11:25:27 AN	
Cadmium	ND	0.0020	mg/L	1	6/21/2012 11:25:27 AN	
Calcium	390	5.0	mg/L	5	6/21/2012 11:18:21 AN	
Chromium	ND	0.0060	mg/L	1	6/21/2012 11:25:27 AN	
Cobalt	0.0068	0.0060	mg/L	1	6/21/2012 11:25:27 AN	
Copper	ND	0.0060	mg/L	1	6/21/2012 11:25:27 AN	
Iron	0.94	0.020 *	mg/L	1	6/21/2012 11:25:27 AN	
Magnesium	47	1.0	mg/L	1	6/21/2012 11:25:27 AN	
Manganese	1.1	0.010 *	mg/L	5	6/21/2012 11:18:21 AN	
Molybdenum	0.024	0.0080	mg/L	1	6/21/2012 2:22:16 PM	
Nickel	ND	0.010	mg/L	1	6/21/2012 11:25:27 AM	
Potassium	18	1.0	mg/L	1	6/21/2012 11:25:27 AN	
Silver	ND	0.0050	mg/L	1	6/21/2012 11:25:27 AN	
Sodium	3700	50	mg/L	50	6/21/2012 10:55:20 AN	
Vanadium	ND	0.050	mg/L	1	6/21/2012 11:25:27 AN	
Zinc	0.030	0.010	mg/L	1	6/21/2012 11:25:27 AM	
EPA METHOD 200.7: TOTAL META	LS				Analyst: ELS	
Aluminum	33	1.0 *	mg/L	50	6/21/2012 10:44:20 AM	
Barium	0.12	0.0020	mg/L	1	6/20/2012 9:21:24 AM	
Beryllium	0.0023	0.0020	mg/L	1	6/20/2012 9:21:24 AM	
Boron	0.60	0.040	mg/L	1	6/20/2012 9:21:24 AM	
Cadmium	ND	0.0020	mg/L	1	6/20/2012 9:21:24 AM	
Chromium	0.025	0.0060	mg/L	1	6/20/2012 9:21:24 AM	
Cobalt	0.019	0.0060	mg/L	1	6/20/2012 9:21:24 AM	
Copper	0.010	0.0060	mg/L	1	6/20/2012 9:21:24 AM	
Iron	29	1.0 *	mg/L	50	6/21/2012 10:44:20 AN	
Magnesium	52	1.0	mg/L	1	6/21/2012 11:36:54 AM	
Manganese	1.9	0.010 *	mg/L	5	6/20/2012 9:24:07 AM	
Molybdenum	0.017	0.0080	mg/L	1	6/21/2012 2:09:03 PM	
Nickel	0.015	0.010	mg/L	1	6/21/2012 11:36:54 AM	
Silver	ND	0.0050	mg/L	1	6/20/2012 9:21:24 AM	
Vanadium	ND	0.050	mg/L	1	6/20/2012 9:21:24 AM	
Zinc	0.089	0.010	mg/L	1	6/20/2012 9:21:24 AM	

Qualifiers: \*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

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

NDNot Detected at the Reporting LimitRLReporting Detection Limit

U Samples with CalcVal < MDL

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# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

1206661-002

Background Investigation

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Project:

Lab ID:

Client Sample ID: MW-BCK2 Collection Date: 6/14/2012 12:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS					Analyst: SNV
Antimony	ND	0.0050	mg/L	5	6/20/2012 2:18:17 PM
Arsenic	0.0027	0.0010	mg/L	1	6/19/2012 4:57:17 PM
Lead	ND	0.0050	mg/L	5	6/20/2012 2:18:17 PM
Selenium	0.0079	0.0010	mg/L	1	6/19/2012 4:57:17 PM
Thallium	ND	0.0050	mg/L	5	6/20/2012 2:18:17 PM
Uranium	ND	0.0050	mg/L	5	6/21/2012 11:39:03 AM
200.8 ICPMS METALS:TOTAL					Analyst: SNV
Antimony	ND	0.0025	mg/L	2.5	6/20/2012 5:03:12 PM
Arsenic	0.0047	0.0025	mg/L	2.5	6/20/2012 5:03:12 PM
Lead	0.025	0.0025	* mg/L	2.5	6/20/2012 5:03:12 PM
Selenium	0.0041	0.0025	mg/L	2.5	6/20/2012 5:03:12 PM
Thallium	ND	0.0025	mg/L	2.5	6/20/2012 5:03:12 PM
Uranium	0.0040	0.0025	mg/L	2.5	6/20/2012 5:03:12 PM
EPA METHOD 245.1: MERCURY					Analyst: RAG
Mercury	ND	0.0010	mg/L	5	6/19/2012 5:02:36 PM
SM2320B: ALKALINITY					Analyst: DBD
Bicarbonate (As CaCO3)	110	20	mg/L CaCO3	1	6/18/2012 9:52:31 AM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	6/18/2012 9:52:31 AM
Total Alkalinity (as CaCO3)	110	20	mg/L CaCO3	1	6/18/2012 9:52:31 AM
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analyst: <b>KS</b>
Total Dissolved Solids	12700	200	mg/L	1	6/20/2012

Matrix: AQUEOUS

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Meth	nod Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analyst	is exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	D ( 600
	S	Spike Recovery outside accepted recovery limits	U	Samples with CalcVal < MDL	Page 4 of 22

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project:Background InvestigationLab ID:1206661-003

Client Sample ID: MW-BCK2 (DUP) Collection Date: 6/14/2012 12:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL (	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: BRN
Fluoride	ND	2.0	mg/L	20	6/16/2012 1:11:58 AM
Chloride	20	10	mg/L	20	6/16/2012 1:11:58 AM
Sulfate	7800	500	mg/L	1000	6/22/2012 6:02:10 AM
Nitrate+Nitrite as N	ND	2.0	mg/L	10	6/19/2012 5:19:55 PM
EPA METHOD 200.7: DISSOLVED N	IETALS				Analyst: ELS
Aluminum	ND	0.020	mg/L	1	6/21/2012 11:30:13 AM
Barium	0.020	0.0020	mg/L	1	6/21/2012 11:30:13 AM
Beryllium	ND	0.0020	mg/L	1	6/21/2012 11:30:13 AM
Boron	0.71	0.040	mg/L	1	6/21/2012 11:30:13 AM
Cadmium	ND	0.0020	mg/L	1	6/21/2012 11:30:13 AM
Calcium	380	5.0	mg/L	5	6/21/2012 11:21:51 AM
Chromium	ND	0.0060	mg/L	1	6/21/2012 11:30:13 AM
Cobalt	ND	0.0060	mg/L	1	6/21/2012 11:30:13 AM
Copper	ND	0.0060	mg/L	1	6/21/2012 11:30:13 AM
Iron	0.099	0.020	mg/L	1	6/21/2012 11:30:13 AM
Magnesium	46	1.0	mg/L	1	6/21/2012 11:30:13 AN
Manganese	1.1	0.010	* mg/L	5	6/21/2012 11:21:51 AN
Molybdenum	0.015	0.0080	mg/L	1	6/21/2012 2:24:12 PM
Nickel	ND	0.010	mg/L	1	6/21/2012 11:30:13 AM
Potassium	16	1.0	mg/L	1	6/21/2012 11:30:13 AN
Silver	ND	0.0050	mg/L	1	6/21/2012 11:30:13 AN
Sodium	3700	50	mg/L	50	6/21/2012 10:58:36 AN
Vanadium	ND	0.050	mg/L	1	6/21/2012 11:30:13 AN
Zinc	0.023	0.010	mg/L	1	6/21/2012 11:30:13 AM
EPA METHOD 200.7: TOTAL META	LS				Analyst: ELS
Aluminum	25	1.0	* mg/L	50	6/21/2012 10:47:27 AM
Barium	0.13	0.0020	mg/L	1	6/20/2012 9:33:36 AM
Beryllium	ND	0.0020	mg/L	1	6/20/2012 9:33:36 AM
Boron	0.63	0.040	mg/L	1	6/20/2012 9:33:36 AM
Cadmium	ND	0.0020	mg/L	1	6/20/2012 9:33:36 AM
Chromium	0.017	0.0060	mg/L	1	6/20/2012 9:33:36 AM
Cobalt	0.013	0.0060	mg/L	1	6/20/2012 9:33:36 AM
Copper	0.011	0.0060	mg/L	1	6/20/2012 9:33:36 AM
Iron	21	1.0	* mg/L	50	6/21/2012 10:47:27 AN
Magnesium	50	1.0	mg/L	1	6/21/2012 11:39:36 AN
Manganese	1.7	0.010	* mg/L	5	6/20/2012 9:36:20 AM
Molybdenum	0.016	0.0080	mg/L	1	6/21/2012 2:10:57 PM
Nickel	ND	0.010	mg/L	1	6/21/2012 11:39:36 AM
Silver	ND	0.0050	mg/L	1	6/20/2012 9:33:36 AM
Vanadium	ND	0.050	mg/L	1	6/20/2012 9:33:36 AM
Zinc	0.066	0.010	mg/L	1	6/20/2012 9:33:36 AM

Matrix: AQUEOUS

#### Qualifiers: \*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

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

RL Reporting Detection Limit

U Samples with CalcVal < MDL

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# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project:Background InvestigationLab ID:1206661-003

Client Sample ID: MW-BCK2 (DUP) Collection Date: 6/14/2012 12:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS					Analyst: SNV
Antimony	ND	0.0050	mg/L	5	6/20/2012 2:30:09 PM
Arsenic	0.0032	0.0010	mg/L	1	6/19/2012 5:01:13 PM
Lead	ND	0.0050	mg/L	5	6/20/2012 2:30:09 PM
Selenium	0.011	0.0010	mg/L	1	6/19/2012 5:01:13 PM
Thallium	ND	0.0050	mg/L	5	6/20/2012 2:30:09 PM
Uranium	ND	0.0050	mg/L	5	6/21/2012 11:40:55 AM
200.8 ICPMS METALS:TOTAL					Analyst: SNV
Antimony	ND	0.0025	mg/L	2.5	6/20/2012 5:07:08 PM
Arsenic	0.0042	0.0025	mg/L	2.5	6/20/2012 5:07:08 PM
Lead	0.016	0.0025	* mg/L	2.5	6/20/2012 5:07:08 PM
Selenium	0.0054	0.0025	mg/L	2.5	6/20/2012 5:07:08 PM
Thallium	ND	0.0025	mg/L	2.5	6/20/2012 5:07:08 PM
Uranium	0.0026	0.0025	mg/L	2.5	6/20/2012 5:07:08 PM
EPA METHOD 245.1: MERCURY					Analyst: RAG
Mercury	ND	0.0010	mg/L	5	6/19/2012 5:39:57 PM
SM2320B: ALKALINITY					Analyst: DBD
Bicarbonate (As CaCO3)	100	20	mg/L CaCO3	1	6/18/2012 10:02:45 AM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	6/18/2012 10:02:45 AM
Total Alkalinity (as CaCO3)	100	20	mg/L CaCO3	1	6/18/2012 10:02:45 AM
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analyst: <b>KS</b>
Total Dissolved Solids	12500	200	mg/L	1	6/20/2012

Matrix: AQUEOUS

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Meth	hod Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analyst	sis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	D ( )00
	S	Spike Recovery outside accepted recovery limits	U	Samples with CalcVal < MDL	Page 6 of 22

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

1206661-004

**Background Investigation** 

**Project:** 

Lab ID:

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Matrix: AQUEOUS

Client Sample ID: MW-BCK1 Collection Date: 6/14/2012 1:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: BRN
Fluoride	0.25	0.10	mg/L	1	6/15/2012 2:32:41 PM
Chloride	35	10	mg/L	20	6/15/2012 2:43:54 PM
Sulfate	4100	50	mg/L	100	6/19/2012 3:28:13 PM
Nitrate+Nitrite as N	ND	1.0	mg/L	5	6/19/2012 5:32:20 PM
EPA METHOD 200.7: DISSOLVED N	IETALS				Analyst: ELS
Aluminum	0.11	0.020	mg/L	1	6/21/2012 11:33:28 AM
Barium	0.022	0.0020	mg/L	1	6/21/2012 11:33:28 AM
Beryllium	ND	0.0020	mg/L	1	6/21/2012 11:33:28 AN
Boron	0.23	0.040	mg/L	1	6/21/2012 11:33:28 AN
Cadmium	ND	0.0020	mg/L	1	6/21/2012 11:33:28 AN
Calcium	420	10	mg/L	10	6/21/2012 11:01:50 AN
Chromium	ND	0.0060	mg/L	1	6/21/2012 11:33:28 AN
Cobalt	ND	0.0060	mg/L	1	6/21/2012 11:33:28 AN
Copper	ND	0.0060	mg/L	1	6/21/2012 11:33:28 AN
Iron	0.10	0.020	mg/L	1	6/21/2012 11:33:28 AN
Magnesium	64	1.0	mg/L	1	6/21/2012 11:33:28 AN
Manganese	0.39	0.0020	* mg/L	1	6/21/2012 11:33:28 AN
Molybdenum	0.026	0.0080	mg/L	1	6/21/2012 2:26:06 PM
Nickel	ND	0.010	mg/L	1	6/21/2012 11:33:28 AM
Potassium	4.4	1.0	mg/L	1	6/21/2012 11:33:28 AN
Silver	ND	0.0050	mg/L	1	6/21/2012 11:33:28 AM
Sodium	950	10	mg/L	10	6/21/2012 11:01:50 AM
Vanadium	ND	0.050	mg/L	1	6/21/2012 11:33:28 AM
Zinc	0.012	0.010	mg/L	1	6/21/2012 11:33:28 AM
EPA METHOD 200.7: TOTAL META	LS				Analyst: ELS
Aluminum	31	1.0	* mg/L	50	6/21/2012 10:50:35 AN
Barium	0.28	0.0020	mg/L	1	6/20/2012 9:39:43 AM
Beryllium	0.0020	0.0020	mg/L	1	6/20/2012 9:39:43 AM
Boron	0.19	0.040	mg/L	1	6/20/2012 9:39:43 AM
Cadmium	ND	0.0020	mg/L	1	6/20/2012 9:39:43 AM
Chromium	0.032	0.0060	mg/L	1	6/20/2012 9:39:43 AM
Cobalt	0.029	0.0060	mg/L	1	6/20/2012 9:39:43 AM
Copper	0.050	0.0060	mg/L	1	6/20/2012 9:39:43 AM
Iron	41	1.0	* mg/L	50	6/21/2012 10:50:35 AM
Magnesium	67	1.0	mg/L	1	6/21/2012 11:42:19 AM
Manganese	1.4	0.010	* mg/L	5	6/20/2012 9:42:45 AM
Molybdenum	0.019	0.0080	mg/L	1	6/21/2012 2:12:51 PM
Nickel	0.032	0.010	mg/L	1	6/21/2012 11:42:19 AM
Silver	ND	0.0050	mg/L	1	6/20/2012 9:39:43 AM
Vanadium	ND	0.050	mg/L	1	6/20/2012 9:39:43 AM
Zinc	0.12	0.010	mg/L	1	6/20/2012 9:39:43 AM

Qualifiers: \*/X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

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

RL Reporting Detection Limit

 $U \qquad Samples \ with \ CalcVal < MDL$ 

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# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

1206661-004

Background Investigation

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Project:

Lab ID:

Client Sample ID: MW-BCK1 Collection Date: 6/14/2012 1:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS					Analyst: SNV
Antimony	ND	0.0010	mg/L	1	6/19/2012 5:05:09 PM
Arsenic	0.0014	0.0010	mg/L	1	6/19/2012 5:05:09 PM
Lead	ND	0.0010	mg/L	1	6/19/2012 5:05:09 PM
Selenium	0.0069	0.0010	mg/L	1	6/19/2012 5:05:09 PM
Thallium	ND	0.0010	mg/L	1	6/19/2012 5:05:09 PM
Uranium	0.012	0.0010	mg/L	1	6/19/2012 5:05:09 PM
200.8 ICPMS METALS:TOTAL					Analyst: SNV
Antimony	ND	0.0025	mg/L	2.5	6/20/2012 5:18:59 PM
Arsenic	0.0084	0.0025	mg/L	2.5	6/20/2012 5:18:59 PM
Lead	0.033	0.0025	* mg/L	2.5	6/20/2012 5:18:59 PM
Selenium	0.0060	0.0025	mg/L	2.5	6/21/2012 3:03:07 PM
Thallium	ND	0.0025	mg/L	2.5	6/20/2012 5:18:59 PM
Uranium	0.014	0.0025	mg/L	2.5	6/20/2012 5:18:59 PM
EPA METHOD 245.1: MERCURY					Analyst: RAG
Mercury	ND	0.0010	mg/L	5	6/19/2012 5:06:08 PM
SM2320B: ALKALINITY					Analyst: DBD
Bicarbonate (As CaCO3)	150	20	mg/L CaCO3	1	6/18/2012 10:12:38 AM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	6/18/2012 10:12:38 AM
Total Alkalinity (as CaCO3)	150	20	mg/L CaCO3	1	6/18/2012 10:12:38 AM
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analyst: KS
Total Dissolved Solids	4470	100	mg/L	1	6/20/2012

Matrix: AQUEOUS

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Me	hod Blank
	Е	Value above quantitation range	Н	Holding times for preparation or analy	sis exceeded
	J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	<b>D</b>
	S	Spike Recovery outside accepted recovery limits	U	Samples with CalcVal < MDL	Page 8 of 22

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Background Investigation

Client Sample ID: EB-061412-Filtered Collection Date: 6/14/2012 9:30:00 AM Received Date: 6/15/2012 9:50:00 AM

Lab ID: 1206661-005	Matrix: AQUEOUS		Received Date: 6/15/2012 9:50:00 AM			
Analyses	Result	RL Qua	l Units	DF	Date Analyzed	
EPA METHOD 300.0: ANIONS					Analyst: BRM	
Fluoride	ND	0.10	mg/L	1	6/15/2012 2:55:08 PM	
Chloride	ND	0.50	mg/L	1	6/15/2012 2:55:08 PM	
Nitrogen, Nitrite (As N)	ND	0.10	mg/L	1	6/15/2012 2:55:08 PM	
Nitrogen, Nitrate (As N)	ND	0.10	mg/L	1	6/15/2012 2:55:08 PM	
Sulfate	ND	0.50	mg/L	1	6/15/2012 2:55:08 PM	

Qualifiers: */X	ζ	Value exceeds Maximum Contaminant Level.
-----------------	---	--

- E Value above quantitation range
- J Analyte detected below quantitation limits
- 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
- RL Reporting Detection Limit
- $U \qquad Samples \ with \ CalcVal < MDL$

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Background Investigation

Client Sample ID: MW-BCK2 Filtered Collection Date: 6/14/2012 12:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Lab ID: 1206661-006	Matrix: A	QUEOUS	Received I	Received Date: 6/15/2012 9:50:00 AM			
Analyses	Result	RL Qua	al Units	DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: BRM		
Fluoride	ND	2.0	mg/L	20	6/15/2012 3:51:18 PM		
Chloride	23	10	mg/L	20	6/15/2012 3:51:18 PM		
Nitrogen, Nitrite (As N)	ND	0.10	mg/L	1	6/15/2012 3:40:04 PM		
Nitrogen, Nitrate (As N)	ND	2.0	mg/L	20	6/15/2012 3:51:18 PM		
Sulfate	8100	500	mg/L	1000	6/26/2012 1:39:53 PM		

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Ana
	Е	Value above quantitation range	Н	Holo
	J	Analyte detected below quantitation limits	ND	Not

- 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
- RL Reporting Detection Limit
- $U \qquad Samples \ with \ CalcVal < MDL$

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-007 Matrix: AQUEOUS

### Client Sample ID: MW-BCK 2 (Dup) Filtered Collection Date: 6/14/2012 12:00:00 PM Received Date: 6/15/2012 9:50:00 AM

<b>1200001 00</b> 7		IQ02000				
Analyses	Result RL Qual		l Units	DF	Date Analyzed	
EPA METHOD 300.0: ANIONS					Analyst: BRM	
Fluoride	ND	2.0	mg/L	20	6/15/2012 4:36:13 PM	
Chloride	21	5.0	mg/L	10	6/20/2012 12:21:49 AM	
Nitrogen, Nitrite (As N)	ND	0.10	mg/L	1	6/15/2012 4:24:59 PM	
Nitrogen, Nitrate (As N)	ND	2.0	mg/L	20	6/15/2012 4:36:13 PM	
Sulfate	8600	500	mg/L	1000	6/26/2012 5:33:28 AM	
			-			

- E Value above quantitation range
- J Analyte detected below quantitation limits
- 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
- RL Reporting Detection Limit
- $U \qquad Samples \ with \ CalcVal < MDL$
- Page 11 of 22

## Hall Environmental Analysis Laboratory, Inc.

**Project:** 

**CLIENT:** Western Refining Southwest, Inc. **Background Investigation** 1206661-008 Matrix: AOUEOUS

Client Sample ID: MW-BCK1 Filtered Collection Date: 6/14/2012 1:00:00 PM Received Date: 6/15/2012 9:50:00 AM

Lab ID: 1206661-008	Matrix: A	AQUEOUS	Received I	Received Date: 6/15/2012 9:50:00 AM				
Analyses	Result	RL Qua	al Units	DF	Date Analyzed			
EPA METHOD 300.0: ANIONS					Analyst: BRM			
Fluoride	0.24	0.10	mg/L	1	6/15/2012 4:47:27 PM			
Chloride	34	5.0	mg/L	10	6/20/2012 12:46:40 AM			
Nitrogen, Nitrite (As N)	ND	0.10	mg/L	1	6/15/2012 4:47:27 PM			
Nitrogen, Nitrate (As N)	0.15	0.10	mg/L	1	6/15/2012 4:47:27 PM			
Sulfate	3200	50	mg/L	100	6/20/2012 12:59:04 AM			

Qualifiers:	*/X	Value exceeds Maximum Contaminant Level.	В	Analyte detected in th
	Е	Value above quantitation range	Н	Holding times for pre-
	J	Analyte detected below quantitation limits	ND	Not Detected at the R
	_			

- RPD outside accepted recovery limits R
- S Spike Recovery outside accepted recovery limits
- the associated Method Blank
- reparation or analysis exceeded
- Reporting Limit
- RL Reporting Detection Limit
- U Samples with CalcVal < MDL

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120619027
Address:	4901 HAWKINS NE SUITE D	Project Name:	1206661
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### **Analytical Results Report**

Sample Number Client Sample ID Matrix Comments	120619027-001 1206661-001D / EB-061412 Water		Sampling Date Sampling Time Sample Location		14/2012 <b>Da</b> 30 AM	te/Time Rece	ived 6/19/2012	11:30 AM
Parameter	R	əsult	Units Po	QL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ł	ND	mg/L 0.	01	6/20/2012	CRW	EPA 335.4	

Sample Number Client Sample ID Matrix Comments	120619027-002 1206661-002D / MW-BK2 Water		Sampling Date Sampling Time Sample Locatior	1	/14/2012 Da 2:00 PM	ate/Time Rece	ived 6/19/2012	11:30 AM
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	_Qualifier
Cyanide		ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Sample Number Client Sample ID Matrix Comments	120619027-003 1206661-003D / MW-BK2 (DUP Water	) Sa	mpling Date mpling Time mple Locati	9	6/14/2012 12:00 PM	Date/Time Re	ceived	6/19/2012	11:30 AM
Parameter	Res	ult	Units	PQL	Analysis Da	te Analyst	Met	hod	Qualifier
Cyanide	N	D	mg/L	0.01	6/20/2012	CRW	EPA	335.4	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095 Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120619027
Address:	4901 HAWKINS NE SUITE D	Project Name:	1206661
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

### Analytical Results Report

Sample Number Client Sample ID Matrix Comments	120619027-004 1206661-004D / MW-BCK1 Water		Sampling Date Sampling Tim Sample Locat	e 1	6/14/2012 I 1:00 PM	Date/Time Re	ceived 6/19/2012	11:30 AM
Parameter		Result	Units	PQL	Analysis Dat	e Analyst	Method	Qualifier
Cyanide		ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Authorized Signature

John Coddingtor, Lab Manager

MCL EPA's Maximum Contaminant Level

ND Not Detected

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	Batch #:	120619027				
Address:	4901 HAWKINS NE SUITE D	Project Name:	1206661				
	ALBUQUERQUE, NM 87109						
Attn:	ANDY FREEMAN						
Analytical Description Description							

### Analytical Results Report

**Quality Control Data** 

Lab Control Sample										
Parameter	LCS Result	Units	LCS	Spike %Rec	: AR	%Rec	Prep	Date	Analysis Date	
Cyanide	0.496	mg/L	. 0.	0.5 99.2		90-110		2012	6/20/2012	
Matrix Spike										
- Comple Number - Descriptor		Sample	MS	linte	MS	0/ <b>D</b> aa	AR	Dee a Dete	<b>A</b> busis Det	
Sample Number Parameter 120619027-001 Cyanide		Result ND	Result 0.472	Units	<b>Spike</b> 0.5	% <b>Rec</b> 94.4	%Rec 80-120	Prep Date 6/20/2012	•	
	10110		0.472	mg/L	0.0		00-120	0/20/20 12		
Matrix Spike Duplicate										
Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Pre	p Date	Analysis Date	
Cyanide	0.491	mg/L	0.5	98.2	3.9	0-25	6/2	0/2012	6/20/2012	
Method Blank			<u>-</u>							
Parameter		Re	sult	Units		PQL	Pr	ep Date	Analysis Date	
Cyanide		N	ID	mg/L		0.01	612	0/2012	6/20/2012	

AR Acceptable Range

ND Not Detected

PQL Practical Quantitation Limit

RPD Relative Percentage Difference

#### Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E67893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

WO#:	1206661
	26-Jun-12

Client: Project:		Western Refining Background Invest		st, Inc.							
Sample ID MI	в	Samp	Туре: М	BLK	Tes	tCode: El	PA Method	200.7: Dissol	ved Meta	ls	
Client ID: PE	BW	Bate	ch ID: R3	580	F	RunNo: 3	580				
Prep Date:		Analysis Date: 6/21/2012			S	SeqNo: 1	00997	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium		ND	0.0020								
Beryllium		ND	0.0020								
Cadmium		ND	0.0020								
Calcium		ND	1.0								
Chromium		ND	0.0060								
Magnesium		ND	1.0								
Manganese		ND	0.0020								
Molybdenum		ND	0.0080								
Nickel		ND	0.010								
Potassium		ND	1.0								
Silver		ND	0.0050								
Sodium		ND	1.0								
Vanadium		ND	0.050								
Zinc		ND	0.010								

#### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1206661

Client: Project:		rn Refining S round Invest		st, Inc.							
Sample ID	MB-2437	Samp	Туре: М	BLK	TestCode: EPA Method 200.7: Total Metals						
Client ID:	PBW	Bato	ch ID: 24	37	F	RunNo: 3	558				
Prep Date:	6/18/2012	Analysis	Date: 6/	20/2012	5	SeqNo: 1	00447	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum		ND	0.020								
Barium		ND	0.0020								
Beryllium		ND	0.0020								
Boron		ND	0.040								
Cadmium		ND	0.0020								
Chromium		ND	0.0060								
Cobalt		ND	0.0060								
Copper		ND	0.0060								
Iron		ND	0.020								
Magnesium		ND	1.0								
Manganese		ND	0.0020								
Silver		ND	0.0050								
Vanadium		ND	0.050								
Zinc		ND	0.010								

#### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

# WO#: **1206661**

Client: Project:	Western I Backgrou	-		st, Inc.							
Sample ID	1206661-001CMS	Samp	Type: MS	S	Tes	tCode: EF	PA 200.8: [	Dissolved Met	als		
Client ID:	EB-061412	Bato	h ID: R3	8538	F	RunNo: 35	538				
Prep Date:		Analysis I	Date: 6/	/19/2012	5	SeqNo: 99	9655	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		0.026	0.0010	0.02500	0	103	70	130			
Arsenic		0.025	0.0010	0.02500	0	99.7	70	130			
Lead		0.025	0.0010	0.02500	0	102	70	130			
Selenium		0.024	0.0010	0.02500	0	97.8	70	130			
Thallium		0.026	0.0010	0.02500	0	102	70	130			
Uranium		0.023	0.0010	0.02500	0	93.3	70	130			
Sample ID	MB SampType: MBLK TestCode: EPA 200.8: Dissolved Metals										
Client ID:	PBW					RunNo: 35	538				
Prep Date:		Analysis I	Date: 6/	/19/2012	5	eqNo: 99	9660	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		ND	0.0010								
Arsenic		ND	0.0010								
Lead		ND	0.0010								
Selenium		ND	0.0010								
Thallium		ND	0.0010								
Uranium		ND	0.0010								
Sample ID	MB	Samp	Туре: МІ	BLK	Tes	tCode: EF	PA 200.8: [	Dissolved Met	als		
Client ID:	PBW	Bato	h ID: R3	8579	F	RunNo: 35	579				
Prep Date:		Analysis I	Date: 6/	/20/2012	S	eqNo: 10	0985	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		ND	0.0010								
Lead		ND	0.0010								
Thallium		ND	0.0010								
Sample ID	MB	Samp	Туре: МІ	BLK	Tes	tCode: EF	PA 200.8: [	Dissolved Met	als		
Client ID:	PBW	Bato	h ID: R3	8592	F	RunNo: 35	592				
Prep Date:		Analysis I	Date: 6/	/21/2012	S	eqNo: 10	01453	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium		ND	0.0010								

#### **Qualifiers:**

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1206661

26-Jun-12	
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Client: Project:		ern Refining S ground Invest		st, Inc.							
Sample ID	MB-2437 SampType: MBLK			TestCode: 200.8 ICPMS Metals:Total							
Client ID:	PBW	Batch ID: 2437			RunNo: 3586						
Prep Date:	6/18/2012	Analysis I	Date: 6/	20/2012	S	SeqNo: 1	01232	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony		ND	0.0025								
Arsenic		ND	0.0025								
Lead		ND	0.0025								
Selenium		ND	0.0025								
Thallium		ND	0.0025								
Uranium		ND	0.0025								

#### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

Western Refining Southwest, Inc.

Inc.	26-Jun-12

Project:	Backgrou	nd Invest	igation								
Sample ID	MB-2463	Samp	Туре: М	BLK	Tes	tCode: E	PA Method	245.1: Mercu	ry		
Client ID:	PBW	Bato	ch ID: 24	63	F	RunNo: 3	3543				
Prep Date:	6/19/2012	Analysis	Date: 6	/19/2012	S	SeqNo: 9	99864	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.00020								
Sample ID	1206661-001BMS	Samp	Туре: М	s	Tes	tCode: E	PA Method	245.1: Mercu	ry		
Client ID:	EB-061412	Bato	ch ID: 24	163	F	RunNo: 3	3543				
Prep Date:	6/19/2012	Analysis	Date: 6	/19/2012	S	SeqNo: 9	99867	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0058	0.00020	0.005000	0	116	75	125			
Sample ID	1206661-001BMS	Samp	Туре: М	SD	Tes	tCode: E	PA Method	245.1: Mercu	ry		
Client ID:	EB-061412	Bato	ch ID: 24	163	F	RunNo: 3	3543				
Prep Date:	6/19/2012	Analysis	Date: 6	/19/2012	5	SeqNo: 9	99868	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0055	0.00020	0.005000	0	109	75	125	5.73	20	

#### **Qualifiers:**

**Client:** 

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	120	6661
	A ( T	

26-Jun-	12
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Client: Project:	Western F Backgrou	-		st, Inc.							
Sample ID	MB	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	300.0: Anions	6		
Client ID:	PBW Batch ID: R3480				F	RunNo: 3	480				
Prep Date:		Analysis D	ate: 6/	15/2012	S	SeqNo: 9	7695	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		ND	0.10								
Chloride		ND	0.50								
Sulfate		ND	0.50								
Sample ID	МВ	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	300.0: Anions	8		
Client ID:	PBW	Batch	ID: R3	489	F	RunNo: 3	489				
Prep Date:		Analysis D	ate: 6/	15/2012	S	SeqNo: 9	8017	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		ND	0.10								
Nitrogen, Nitrat	te (As N)	ND	0.10								
Sulfate		ND	0.50								
Sample ID	1206661-005AMS	SampT	ype: <b>M</b> \$	6	Tes	tCode: El	PA Method	300.0: Anions	6		
Client ID:	EB-061412-Filtered	Batch	ID: <b>R3</b>	489	RunNo: 3489						
Prep Date:		Analysis D	ate: 6/	15/2012	5	SeqNo: 9	8022	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		0.62	0.10	0.5000	0	125	76.6	110			S
Chloride		6.0	0.50	5.000	0.1042	118	87.8	111			S
Nitrogen, Nitrite		1.2	0.10	1.000	0	118	72.5	111			S
Nitrogen, Nitrat Sulfate	ie (AS N)	3.1 12	0.10 0.50	2.500 10.00	0 0.1853	124 119	90.4 84.6	113 122			S
Sample ID	1206661-005AMSD							300.0: Anions	6		
Client ID:	EB-061412-Filtered		ID: <b>R3</b>			RunNo: 3					
Prep Date:		Analysis D	ate: 6/	15/2012	5	SeqNo: 9	8023	Units: mg/L			
Analyte		Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		0.54	0.10	0.5000	0	107	76.6	110	15.1	20	
Chloride	(A - NI)	5.0	0.50	5.000	0.1042	97.2	87.8	111	18.7	20	
Nitrogen, Nitrite		1.0	0.10	1.000	0	99.6	72.5	111	17.0	20	
Nitrogen, Nitrat Sulfate	IC (AS IV)	2.6 10	0.10 0.50	2.500 10.00	0 0.1853	103 99.4	90.4 84.6	113 122	18.7 18.0	20 20	
Juliale		10	0.50	10.00	0.1000	33.4	04.0	122	10.0	20	
Sample ID	MB	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	300.0: Anions	6		
Client ID:	PBW Batch ID: R3489				F	RunNo: 3	489				
Client ID.											
Prep Date:		Analysis D	ate: 6/	16/2012	5	SeqNo: 9	8080	Units: mg/L			

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

WO#:	1206661

26-Jun-12

Client: Project:	Western Refining Southwest, Inc. Background Investigation	
Sample ID <b>MB</b> Client ID: <b>PBW</b>	SampType: <b>MBLK</b> Batch ID: <b>R3489</b>	TestCode: EPA Method 300.0: Anions RunNo: 3489
Prep Date: Analyte	Analysis Date: 6/16/2012 Result PQL SPK value	SeqNo: 98080 Units: mg/L SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Fluoride Chloride Nitrogen, Nitrite (As N) Nitrogen, Nitrate (As N)	ND 0.10 ND 0.50 ND 0.10 ND 0.10	
Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions
Client ID: <b>PBW</b> Prep Date:	Batch ID: <b>R3540</b> Analysis Date: <b>6/19/2012</b>	RunNo: <b>3540</b> SeqNo: <b>99670</b> Units: <b>mg/L</b>
Analyte Chloride Sulfate Nitrate+Nitrite as N	ResultPQLSPK valueND0.50ND0.50ND0.20	SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions
Client ID: PBW	Batch ID: R3540	RunNo: <b>3540</b>
Prep Date:	Analysis Date: 6/20/2012	SeqNo: 99759 Units: mg/L
Analyte		SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Chloride Sulfate Nitrate+Nitrite as N	ND 0.50 ND 0.50 ND 0.20	
Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions
Client ID: PBW	Batch ID: R3610	RunNo: 3610
Prep Date:	Analysis Date: 6/21/2012	SeqNo: 101849 Units: mg/L
Analyte		SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Sulfate	ND 0.50	
Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions
Client ID: PBW	Batch ID: R3610	RunNo: <b>3610</b>
Prep Date:	Analysis Date: 6/22/2012	SeqNo: 101925 Units: mg/L
Analyte Sulfate	Result         PQL         SPK value           ND         0.50	SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions
Client ID: PBW	Batch ID: R3674	RunNo: 3674
Prep Date:	Analysis Date: 6/25/2012	SeqNo: 103580 Units: mg/L
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

### Qualifiers:

\*/X Value exceeds Maximum Contaminant Level.

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

e accepted recovery limits

WO#:	1206661
	26-Jun-12

Client: Project:		Western Refining South Background Investigatio							
Sample ID	MB	SampType:	MBLK	Test	Code: EPA Method	d 300.0: Anions	5		
Client ID:	PBW	Batch ID:	R3674	R	unNo: <b>3674</b>				
Prep Date:		Analysis Date:	6/25/2012	S	eqNo: 103580	Units: mg/L			
Analyte		Result PC	L SPK value	SPK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate		ND 0.	50						
Sample ID	MB	SampType:	MBLK	Test	Code: EPA Method	d 300.0: Anions	6		
Client ID:	PBW	Batch ID:	R3687	R	unNo: <b>3687</b>				
Prep Date:		Analysis Date:	6/26/2012	S	eqNo: 104078	Units: mg/L			
Analyte		Result PC	L SPK value	SPK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate		ND 0.	50						

### Qualifiers:

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

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Client: Project:		efining Sout		, Inc.							
Sample ID	mb-1	SampType	: MBL	ĸ	Tes	tCode: SI	M2320B: AI	kalinity			
Client ID:	PBW	Batch ID	: R35	00	F	RunNo: 3	500				
Prep Date:		Analysis Date	: 6/18	8/2012	S	eqNo: 98	8353	Units: mg/L	CaCO3		
Analyte		Result P	QL :	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity	(as CaCO3)	ND	20								
Sample ID	1206661-004A ms	SampType	: MS		Tes	tCode: SI	M2320B: AI	kalinity			
Client ID:	MW-BCK1	Batch ID	: R35	00	F	RunNo: 3	500				
Prep Date:		Analysis Date	: 6/18	8/2012	S	eqNo: 98	8363	Units: mg/L	CaCO3		
Analyte		Result P	QL :	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity	(as CaCO3)	210	20	80.00	149.8	79.7	62.6	110			
Sample ID	1206661-004A msd	SampType	: MSC	)	Tes	tCode: SI	M2320B: AI	kalinity			
Client ID:	MW-BCK1	Batch ID	: R35	00	F	RunNo: 3	500				
Prep Date:		Analysis Date	: 6/18	8/2012	S	eqNo: 98	8364	Units: mg/L	. CaCO3		
Analyte		Result P	QL :	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

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Qualifiers:

Total Alkalinity (as CaCO3)

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

Client:	Wester	rn Refining S	outhwe	st, Inc.							
Project:	Backg	round Investi	gation								
Sample ID N	IB-2466	SampT	ype: ME	BLK	Tes	tCode: S	M2540C MC	DD: Total Dise	solved So	lids	
Client ID: P	вw	Batch	n ID: <b>24</b>	66	F	RunNo: 3	568				
Prep Date:	6/19/2012	Analysis D	0ate: 6/	20/2012	S	SeqNo: 1	00603	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved S	olids	ND	20.0								

#### Qualifiers:

- \*/X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.com

Sample Log-In Check List

[								
Client Na	ime:	Western Refining S	outhwest, Inc Bloomfield	Work Or	der l	Numl	ber:	1206661
Received	i by/date	LM	06/15/12					
Logged B	By:	Michelle Garcia	6/15/2012 9:50:00 A	M			m	urell Ganua
Complete	ed By:	Michelle-Garcia	6/15/2012 10:17:28	АМ			m	intrelle Connie
Reviewed	d By:	A	04/15/12					·
<u>Chain o</u>	f Cust	ody						
1. Were	e seals ir	ntagr?		Yes		No		Not Present 🗹
2. Is Ch	hain of C	ustody complete?		Yes	✓	No		Not Present
3. How	was the	sample delivered?		Fed	<u>x</u>			
<u>Log In</u>								
4. Coole	ers are p	resent? (see 19. for	cooler specific information)	Yes	✓	No		NA 🗌
5. Was	an atten	npt made to cool the	samples?	Yes	✓	No		
6. Were	e all sam	ples received at a ter	nperature of >0° C to 6.0°C	Yes	✓	No		
7. Sam	ple(s) in	proper container(s)?		Yes	$\checkmark$	No		
8. Suffic	cient san	nple volume for indica	ated test(s)?	Yes	✓	No		
9 Are s	samples	(except VOA and ON	G) properly preserved?	Yes	$\checkmark$	No		
10. Was	preserva	ative added to bottles	?	Yes		No	✓	NA 🗌
11. VOA	vials ha	ve zero headspace?		Yes		No		No VOA Vials 🗹
12. Were	e any sar	nple containers recei	ved broken?	Yes		No	$\checkmark$	
		ork match bottle labe ancies on chain of cu		Yes	V	No		# of preserved bottles checked for pH:
14. Are m	natrices	correctly identified or	Chain of Custody?	Yes	✓	No		(<2 or >12 unless noted)
15. is it c	clear wha	t analyses were requ	ested?	Yes				Adjusted?
		ing times able to be r ustomer for authoriza		Yes	✓	No		Checked by:
Special I	<u>Handli</u>	ng (if applicable	2					
17. Was	client no	tified of all discrepan	cies with this order?	Yes		No		NA 🗹
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19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
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#### 4.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the Facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

- 1. Site or unit designation;
- 2. Date;
- 3. Time of arrival and departure;
- Field investigation team members including subcontractors and visitors;
- 5. Weather conditions;
- Daily activities and times conducted;
- 7. Observations;
- 8. Record of samples collected with sample designations and locations specified;
- 9. Photographic log, as appropriate;
- 10. Field monitoring data, including health and safety monitoring;
- 11. Equipment used and calibration records, if appropriate;
- 12. List of additional data sheets and maps completed;
- 13. An inventory of the waste generated and the method of storage or disposal; and
- 14. Signature of personnel completing the field record.

#### 4.8 Chemical Analyses

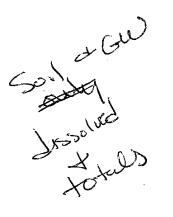
All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

Ground water and soil samples will also be analyzed for the following metals using the indicated analytical methods. The ground water analyses will be reported for dissolved and total metals.

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020

dissolut total

Analytical Method
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Ground water samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride 🔔	EPA method 300.0 (dissolved & total)
Sulfate -	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (dissolved & total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

Soil samples and ground water samples will be analyzed for the following constituents in addition to those listed above to support possible development of background for SWMU No. 16 (Active Landfill). The ground water analyses will be reported as both total and dissolved phase.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	

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Appendix F

**Quality Assurance/Quality Control Review** 

### 1.0 DATA VALIDATION INTRODUCTION

This summary presents data verification results for soil and groundwater samples collected from soil borings and monitoring wells installed at the Bloomfield Refinery in accordance with the approved Background Investigation Work Plan. The data review was performed in accordance with the procedures specified in the Order issued by NMED (NMED, 2007), USEPA Functional Guidelines for Organic and Inorganic Data Review, and quality assurance and control parameters set by the project laboratory Hall Environmental Analysis Laboratory, Inc.

A total of 21 soil samples and 2 groundwater samples were collected between January 2012 and June 2012 in accordance with the Background Investigation Work Plan. Soil and groundwater samples were submitted to Hall Environmental Analysis Laboratory for the following parameters in accordance with the approved Work Plan:

- Gasoline, diesel, and motor oil range organics by SW-846 Method 8015B (selected samples);
- Total recoverable metals (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc) by SW846 Method 6010B;
- Cyanide by EPA Method 335.4;
- Mercury by EPA Method 7471; and
- Anions (chloride, fluoride, and sulfate) by USEPA Method 300.0

In addition as stated in the approved Work Plan, ground water samples submitted to Hall Environmental Analysis Laboratory were analyzed for the following additional analytes:

- Anions (nitrate and nitrite) by USEPA Method 300.0;
- Alkalinity (total alkalinity, carbonate, and bicarbonate) by SM-2320B;
- Total metals (calcium, magnesium) by USEPA Method 6010B;
- Dissolved metals (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, magnesium, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc) by USEPA Method 200.7B; and
- Total dissolved solids by SM-2540C.

Additionally, 6 quality assurance samples consisting of trip blanks, equipment rinsate blanks, and field duplicates were collected and analyzed as part of the investigation activities. Table A-1 presents a summary of the sample identifications, laboratory sample identifications, and requested analytical parameters.

#### 2.0 QUALITY CONTROL PARAMETERS REVIEWED

Sample results were subject to a Level II data review that includes an evaluation of the following quality control (QC) parameters:

- Chain-of-Custody;
- Sample Preservation and Temperature Upon Laboratory Receipt
- Holding Times;
- Blank Contamination (method blanks, trip blanks, field blanks, and equipment rinsate blanks);
- Surrogate Recovery (for organic parameters);
- Laboratory Control Sample (LCS) Recovery and Relative Percent Difference (RPD);
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and RPD;
- Duplicates (field duplicate, laboratory duplicate); and
- Other Applicable QC Parameters.

The data qualifiers used to qualify the analytical results associated with QC parameters outside of the established data quality objectives are defined below:

- J+ The analyte was positively identified; however, the result should be considered an estimated value with a potential high bias.
- J- The analyte was positively identified; however, the result should be considered an estimated value with a potential low bias.
- UJ The reporting limit is considered an estimated value.
- R Quality control indicates that the data is not usable.

Results qualified as "J+", "J-", or "UJ" are of acceptable data quality and may be used quantitatively to fulfill the objectives of the analytical program, per EPA guidelines. In order to perform a statistical evaluation of the data collected as part of the background investigation activities, analytical results for analytes that were detected at concentrations above the respective laboratory detection limit but below the practical quanitation limit were qualified with a "J," as shown on Table 3 of this Investigation Report.

In addition, field sample BK-3 (1.5-2.0') analytical result for sulfate was qualified "J" since the reported concentration was above the analytical quanitation range.

Results for the performance monitoring events that required qualification based on the data verification are summarized in Table A-2.

### 2.1 CHAIN-OF-CUSTODY

The chain-of-custody documentation associated with project samples was found to be complete. Chain-of-custodies included sample identifications, date and time of collection, requested parameters, and relinquished/received signatures.

# 2.2 SAMPLE PRESERVATION AND TEMPERATURE UPON LABORATORY RECEIPT

Samples collected were received preserved and intact by Hall Environmental Laboratories, Inc. Samples were received by the laboratory at a temperature of 6.0 degrees Celsius or lower. Data qualification on lower temperature samples was not required.

### 2.3 HOLDING TIMES

All samples were extracted and analyzed within method-specified holding time limits.

### 2.4 BLANK CONTAMINATION

#### 2.4.1 Method Blank

Method blanks were analyzed at the appropriate frequency. Target compounds were not detected above the practical quanitation limit in the method blanks, with the exception of the following:

- Sulfate was detected in the method blank for analytical batch 502. Associated field sample results did not include sufate as a reported analyte, therefore data qualification was not needed.
- Aluminum, copper, nickel, and selenium were detected in the method blank for analytical batch 514 and 529. Associated field samples have detected concentrations greater than 10 times the respective concentrations detected in the method blank; therefore data qualification was not needed.
- Dissolved iron was detected in the method blank for analytical batch R921. Associated field sample results were non-detect; therefore data qualification was not needed.
- Beryllium, cobalt, iron, molybdenum, vanadium, and zinc were detected in method blank for analytical batch 551. Associated field sample detected

concentrations were greater than 100 times the respective concentrations detected in the method blank; therefore data qualification was not needed.

- Mercury was detected in the method blank for analytical batch 602. Associated field sample results were non-detect; therefore data qualification was not needed.
- Boron was detected in the method blank for analytical batch 529. Associated field samples have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Aluminum, boron, cadmium, molybdenum, nickel, selenium, silver, and vanadium were detected in the method blank for analytical batch 749. Associated detected field sample results have concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Cadmium, chromium, copper, magnesium, molybdenum, uranium, and zinc were detected in the method blank for analytical batch 685. Associated field sample results have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Aluminum, antimony, boron, cadmium, chromium, copper, nickel, selenium, uranium, and zinc were detected in the method blank for analytical batch 677. Associated field sample results have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.

#### 2.4.2 Trip Blank

Trip blanks were analyzed at the appropriate frequency as specified in the Order. Target compounds were not detected in the trip blanks.

#### 2.4.3 Field Blanks/Equipment Rinsate Blank

Field and equipment rinsate blanks were collected at the appropriate frequency as specified in the Background Investigation Work Plan. Target compounds were not detected in the field blanks and equipment rinsate blank, with the exception of the following:

• Zinc was detected in equipment blank EB-061412 at 0.025 mg/L and 0.010 mg/L. Associated field samples were qualified "J+" due to a potential high bias.

#### 2.4.4 Common Laboratory Contaminants

Per USEPA guidelines, common laboratory contaminants for VOC analysis are acetone,

2-butanone (MEK), cyclohexane, chloromethane, and methylene chloride. Common laboratory contaminants for SVOC analysis include phthalates. Concentrations were not detected in method blanks, and therefore no field data was qualified due to common laboratory impacts.

## 2.5 SURROGATE RECOVERY

Surrogate recoveries for the organic and inorganic analyses were performed at the required frequency and were within laboratory acceptance limits.

### 2.6 LCS RECOVERY AND RELATIVE PERCENT DIFFERENCE

LCS/LCS duplicates were performed at the required frequency and were evaluated based on the following criteria:

- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate, but the analyte was not detected in the associated batch, then data qualification was not required.
- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate and the analyte was detected in the associated batch, then the analyte results were qualified "J+" to account for a potential high bias.
- If the analyte recovery was below acceptance limits for LCS or LCS duplicate then the analyte results in the associated analytical batch were qualified ("UJ" for non-detects and "J-" for detected results) to acount for a potential low bias.

LCS/LCSD percent recoveries and relative percent differences (RPDs) were within acceptance limits; therefore no data qualification due to LCS/LCSD was required.

#### 2.7 MS/MSD RECOVERY AND RELATIVE PERCENT DIFFERENCE

MS/MSD samples were performed at the required frequency and were evaluated by the following criteria:

- If the MS or MSD recovery for an analyte was above acceptance limits but the analyte was not detected in the associated analytical batch, then data qualification was not required.
- If the MS or MSD recovery for an analyte was above acceptance limits and the analyte was detected in the associated analytical batch, then analyte results were qualified "J+" to account for a potential high bias.

- Low MS/MSD recoveries for inorganic parameters result in sample qualification of the associated analytical batch.
- Results were not qualified based on non-project specific MS/MSD (i.e., batch QC) recoveries.

MS/MSD percent recoveries and RPDs were within acceptance limits except for the following:

- The MS/MSD percent recoveries for Antimony (43.8% / 41.0%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Antimony were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (40.7% / 42.5%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recoveries for Lead (73.8%), Nickel (74.3%), Selenium (74.1%), and Zinc (73.7%) were below the lower acceptance limit of 75% for analytical batch 514. The MS recoveries for these analytes were within acceptance limits, therefore data qualification was not necessary.
- The MS/MSD percent recoveries for Antimony (32.1% / 29.6%) were below the lower acceptance limit of 75% for analytical batch 529. Associated field sample results for Antimony were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Selenium (67.7% / 67.3%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Selenium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (0% / 0%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recoveries for Lead (74.6%), Molybdenum (72.4%), and Nickel (71.7%) were below the lower acceptance limit of 75% for analytical batch 529. The MS recoveries for these analytes were within acceptance limits, therefore data qualification was not required.
- The MS/MSD percent recoveries for Antimony (41.4% / 33.9%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Antimony were non-detect. Data qualification "J-" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Copper (71.0% / 60.8%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample

results for Selenium were non-detect. Data qualification "J-" was required to indicate a potential bias for the associated samples.

- The MS/MSD percent recoveries for Selenium (72.1% / 73.6%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Selenium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (0% / 0%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recovery for Zinc (72.9%) was below the lower acceptance limit of 75% for analytical batch 749. The MS recovery for this analyte was within acceptance limit, therefore data qualification was not required.
- The MS percent recoveries for Fluoride (125%), Chloride 118%), Nitrite (118%) and Nitrate (124%) were above the upper acceptance limit of 110%, 111%, 111%, and 113%, respectively, for analytical batch R3489. The MS duplicate recoveries for these analytes were within acceptance limits; therefore data qualification was not required.

#### 2.8 DUPLICATES

#### 2.8.1 Field Duplicates

Field duplicates were collected at a rate required per the approved Background Investigation Work Plan. The RPDs between the field duplicate and its associated sample were calculated and are presented in Table A-3. The field duplicates were evaluated by the following criteria:

- If an analyte was detected at a concentration greater than five times the method reporting limit, the RPD should be less than 35 percent for soil and 25 percent for ground water samples.
- If an analyte was detected at a concentration that is less than five times the method reporting limit, then the difference between the sample and the field duplicate should not exceed the method reporting limit.
- Duplicate RPDs are calculated by dividing the difference of the concentrations by the average of the concentrations.

Field duplicate RPDs were within acceptance limits except for the following:

- Lead for field sample BK-10 (5-6')
- Aluminum, chromium, iron, lead, zinc, barium, iron, molybdenum, selenium, and zinc for MW-BCK2

#### 3.0 COMPLETENESS SUMMARY

Two types of completeness were calculated for this project: contract and technical. The following equations were used to calculate the two types of completeness:

% Contract Completeness = 
$$\left(\frac{\text{Number of contract compliant results}}{\text{Number of reported results}}\right) \times 100$$

% Technical Completeness = 
$$\left(\frac{\text{Number of usable results}}{\text{Number of reported results}}\right) \times 100$$

The overall contract completeness, which includes the evaluation of protocol and contract deviations, which includes the evaluation of the QC parameters listed in Section 2.0, was approximately 97.5 percent for soil analysis and 97 percent for groundwater analysis. The technical completeness attained for Background Investigation activities was 100 percent. The completeness results are provided in Table A-4. The analytical results for the required analytes per the approved Background Investigation Work Plan were considered usable for the intended purposes and the project DQOs have been met.

TABLE A-1Sampling and Analysis Schedule

# Table A-1 Sampling and Analysis Schedule Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

Lab ID	Date Collected	Sample Type
1201809-001	1/24/2012	N
1201809-002	1/24/2012	Ν
1201809-003		TB
1201885-001	1/27/2012	Ν
1201885-002	1/27/2012	Ν
1201885-003	1/27/2012	Ν
1201885-004	1/27/2012	Ν
1201885-005	1/27/2012	Ν
1201885-006	1/27/2012	Ν
1201885-007	1/27/2012	Ν
1201885-008	1/27/2012	Ν
1201885-009	1/27/2012	Ν
1201885-010	1/27/2012	Ν
1201885-011	1/27/2012	Ν
1201885-012	1/27/2012	Ν
1201885-013	1/27/2012	Ν
1201885-014	1/27/2012	Ν
1201885-015	1/27/2012	Ν
1201885-016	1/27/2012	Ν
1201885-017	1/27/2012	FD
1201885-018	1/27/2012	Ν
1202153-001	2/1/2012	Ν
1202350-001	2/7/2012	Ν
1202350-002	2/7/2012	FD
1202350-003	2/7/2012	Ν
1202350-004	2/8/2012	Ν
1206661-001	6/14/2012	Ν
1206661-002	6/14/2012	Ν
1206661-003	6/14/2012	FD
1206661-004	6/14/2012	Ν
	1201809-002 1201809-003 1201885-001 1201885-002 1201885-003 1201885-004 1201885-005 1201885-006 1201885-006 1201885-007 1201885-009 1201885-010 1201885-011 1201885-011 1201885-013 1201885-014 1201885-015 1201885-015 1201885-016 1201885-016 1201885-017 1201885-018 1202153-001 1202350-002 1202350-004 1202350-004 1202350-004 1206661-002 1206661-003	1201809-001         1/24/2012           1201809-002         1/24/2012           1201809-003         1/27/2012           1201885-001         1/27/2012           1201885-002         1/27/2012           1201885-003         1/27/2012           1201885-004         1/27/2012           1201885-005         1/27/2012           1201885-006         1/27/2012           1201885-006         1/27/2012           1201885-007         1/27/2012           1201885-008         1/27/2012           1201885-009         1/27/2012           1201885-010         1/27/2012           1201885-011         1/27/2012           1201885-012         1/27/2012           1201885-013         1/27/2012           1201885-014         1/27/2012           1201885-015         1/27/2012           1201885-016         1/27/2012           1201885-017         1/27/2012           1201885-018         1/27/2012           1201885-019         2/1/2012           1201885-010         2/1/2012           1201885-011         2/1/2012           1201885-013         1/27/2012           1201885-014         1/27/2012          1201885-01

Notes:

VOCs = Volatile Organic Compounds

N = Normal field sample

FD = Field duplicate

TB = Trip Blank EB = Equipment Blank MB = Methanol Blank TABLE A-2Qualified Data

# Table A-2Qualified DataBackground Investigation ReportWestern Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
BK-9 (5-5.5')	1/24/2012	Antimony	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Antimony	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Antimony	2.1	mg/Kg	Soil	J-	Qualified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Copper	19	mg/Kg	Soil	J-	Qualified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Selenium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Selenium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-3 (1.5-2.0')	1/27/2012	Sulfate	7,600	mg/kg	Soil	J	Qualified due to concentration above the quanitation limit.
BK-8 (1.5-2.0')	1/27/2012	Sulfate	10,000	mg/kg	Soil	J	Qualified due to concentration above the quanitation limit.
BK-9 (5-5.5')	1/24/2012	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Thallium	< 5.0	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Thallium	< 2.5	mg/Kg	Soil	UJ	Qualified due to low MS/ MSD recovery.
MW-BCK2	6/14/2012	Zinc	0.089	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK2	6/14/2012	Zinc	0.030	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK1	6/14/2012	Zinc	0.12	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK1	6/14/2012	Zinc	0.012	mg/L	Water	J+	Qualified due to associated equipment blank detections.

MS/MSD - Matrix spike/matrix spike duplicate

ug/kg - microgram per kilogram mg/kg - milligrams per kilogram UJ - Estimated reporting limit

J+ = high bias

# TABLE A-3Field Duplicate Summary

## Table A-3 Field Duplicate Summary Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

		BK-7 (0-0.5')	BK-7 (0-0.5') DUP	RPD
	Parameter	Sample Result	Field Duplicate	(%)
Inorganics (mg/kg)	Aluminum	12,000	11,000	8.7
	Antimony	< 2.5	< 2.5	NC
	Arsenic	3.2	< 2.5	NC
	Barium	140	160	13.3
	Beryllium	0.40	0.36	10.5
	Boron	4.3	4.0	7.2
	Cadmium	< 0.10	< 0.10	NC
	Chloride	< 7.5	< 7.5	NC
	Chromium	5.8	5.3	9.0
	Cobalt	3.2	3.0	6.5
	Copper	5.5	5.1	7.5
	Cyanide	< 0.50	< 0.50	NC
	Fluoride	< 1.5	< 1.5	NC
	Iron	11,000	12,000	8.7
	Lead	2.4	2.7	11.8
	Manganese	200	200	0.0
	Mercury	< 0.033	< 0.033	NC
	Molybdenum	< 0.40	< 0.40	NC
	Nickel	4.6	4.3	6.7
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.25	NC
	Sulfate	< 7.5	< 7.5	NC
	Thallium	< 2.5	< 2.5	NC
	Uranium	< 5.0	< 5.0	NC
	Vanadium	19	17	11.1
	Zinc	19	18	5.4

Notes:

RPD = Relative percent difference; [(difference)/(average)]\* 100

NC = Not calculated; RPD values were not calculated for non-detects

mg/kg = milligrams per kilogram \* = Field Duplicate RPD Outlier

## Table A-3 Field Duplicate Summary Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

		BK-10 (5-6')	BK-10 (5-6') DUP	RPD
	Parameter	Sample Result	Field Duplicate	(%)
Inorganics (mg/kg)	Aluminum	7,900	8,300	4.9
	Antimony	< 5.0	< 12	NC
	Arsenic	< 5.0	< 12	NC
	Barium	150	110	30.8
	Beryllium	< 0.30	< 0.75	NC
	Boron	< 4.0	< 10	NC
	Cadmium	< 0.20	< 0.50	NC
	Chloride	210	220	4.7
	Chromium	4.6	5.1	10.3
	Cobalt	2.6	3.0	14.3
	Copper	3.5	3.8	8.2
	Cyanide	< 0.30	< 0.30	NC
	Fluoride	3.0	2.9	3.4
	Iron	9,100	9,900	8.4
	Lead	2.6	3.8	37.5*
	Manganese	180	190	5.4
	Mercury	< 0.033	< 0.033	NC
	Molybdenum	< 0.80	< 2.0	NC
	Nickel	3.8	4.3	12.3
	Selenium	< 5.0	< 12	NC
	Silver	< 0.50	< 1.2	NC
	Sulfate	2,300	2,200	4.4
	Thallium	< 5.0	< 12	NC
	Uranium	< 10	< 25	NC
	Vanadium	15	17	12.5
L	Zinc	16	19	17.1

Notes:

RPD = Relative percent difference; [(difference)/(average)]\* 100

NC = Not calculated; RPD values were not calculated for non-detects

mg/kg = milligrams per kilogram \* = Field Duplicate RPD Outlier

# Table A-3 Field Duplicate Summary Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

	Donomaton	MW-BCK2	MW-BCK2 (DUP)	RPD
Conoral Chomister (mal).	Parameter Chloride	21 Sample Result	Field Duplicate	(%) 4.9
General Chemistry (mg/l);	Fluoride	< 2.0	20 < 2.0	-
	Nitrate+Nitrite as N	< 2.0	< 2.0	NC NC
	Sulfate	< 2.0 7900	< 2.0 7800	1.3
	Total Dissolved Solids			-
		12700 110	12500 100	1.6 9.5
	Bicarbonate (As CaCO3)			
	Carbonate (As CaCO3) Total Alkalinity (as CaCO3)	< 2.0	< 2.0 100	NC 9.5
Total Metals (mg/l):	Aluminum	33	25	9.5 27.6 *
Total Wietais (ing/i):	Antimony	< 0.0025	< 0.0025	NC
	Arsenic	0.0047	0.0042	11.2
	Barium	0.12	0.13	8.0
		0.0023	< 0.0020	NC
	Beryllium			
	Boron	0.60	0.63	4.9
	Cadmium Chromium	< 0.0020	< 0.0020	NC 29.1 *
		0.025	0.017	38.1 *
	Cobalt	0.019	0.013	37.5
	Copper	0.010	0.011	9.5
	Cyanide	<0.01	<0.01	NC
	Iron	29	21	32 *
	Lead	0.025	0.016	43.9 *
	Magnesium	52	50	3.9
	Manganese	1.9	1.7	11.1
	Mercury	< 0.0010	< 0.0010	NC
	Molybdenum	0.017	0.016	6.1
	Nickel	0.015	< 0.010	NC
	Selenium	0.0041	0.0054	27.4
	Silver	< 0.0050	< 0.0050	NC
	Thallium	< 0.0025	< 0.0025	NC
	Uranium	0.0040	0.0026	42.4
	Vanadium	< 0.050	< 0.050	NC
	Zinc	0.089	0.066	29.7 *
Dissolved Metals (mg/l):	Aluminum	3.8	< 0.020	NC
	Antimony	< 0.0050	< 0.0050	NC
	Arsenic	0.0027	0.0032	16.9
	Barium	0.035	0.020	54.5 *
	Beryllium	< 0.0020	< 0.0020	NC
	Boron	0.67	0.71	5.8
	Cadmium	< 0.0020	< 0.0020	NC
	Calcium	390	380	2.6
	Chromium	< 0.0060	< 0.0060	NC
	Cobalt	0.0068	< 0.0060	NC
	Copper	< 0.0060	< 0.0060	NC
	Iron	0.94	0.099	161.9 *
	Lead	< 0.0050	< 0.0050	NC
	Magnesium	47	46	2.2
	Manganese	1.1	1.1	0.0
	Molybdenum	0.024	0.015	46.2 *
	Nickel	< 0.010	< 0.010	NC
	Potassium	18	16	11.8
	Selenium	0.0079	0.011	32.8 *
	Silver	< 0.0050	< 0.0050	NC
	Sodium	3700	3700	0.0
	Thallium	< 0.0050	< 0.0050	NC
	Uranium	< 0.0050	< 0.0050	NC
	Vanadium	< 0.050	< 0.050	NC
	Zinc	0.089	0.023	117.9 *

Notes:

RPD = Relative percent difference; [(difference)/(average)]\* 100

NC = Not calculated; RPD values were not calculated for non-detects

ug/kg-dry = micrograms per kilogram dry

mg/kg-dry = milligrams per kilogram

\* = Field Duplicate RPD Outlier

# TABLE A-4Completeness Summaries

# Table A-4 Completeness Summary - Soil Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Results	Number of Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	1	1	100.0	1	100
	Motor Oil Range Organics (MRO)	1	1	100.0	1	100
	Gasoline Range Organics (GRO)	1	1	100.0	1	100
Metals (mg/kg-dry):	Antimony	21	18 <sup>c</sup>	85.7	21	100
	Copper	21	20 °	95.2	21	100
	Selenium	21	19 <sup>c</sup>	90.5	21	100
	Sulfate	20	18 <sup>b</sup>	90.0	20	100
	Thallium	21	18 <sup>c</sup>	85.7	21	100
	Zinc	21	18 <sup>a</sup>	85.7	21	100
	All remaining metals	21	21	100.0	21	100

#### Notes:

Number of samples used in completeness calculations includes field duplicates but does not include equipment rinsate, field, or trip blanks.

Percent Contractual Compliance = (number of contract compliant results / Number of reported results)\*100

Percent Technical Compliance = (Number of usable results / Number of reported results) \* 100

a = Qualified due to equipment blank detection.

b = Qualified due to detected concentration exceeding the laboratory quanitation limit.

c = Qualified due to low MS/MSD recovery

#### Table A-4 Completeness Summary - Groundwater Background Investigation Report Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Results	Number of Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
Total Metals:	Zinc	2	0 <sup>a</sup>	0.0	2	100
	All remaining metals	2	2	100.0	2	100
				1	1	
Metals (mg/kg-dry):	Zinc	2	0 <sup>a</sup>	0.0	2	100
	All remaining metals	2	2	100.0	2	100
General Chemistry	All analytes	2	2	100.0	2	100

#### Notes:

Number of samples used in completeness calculations includes field duplicates but does not include equipment rinsate, field, or trip blanks.

Percent Contractual Compliance = (number of contract compliant results / Number of reported results)\*100

Percent Technical Compliance = (Number of usable results / Number of reported results) \* 100

a = Qualified due to equipment blank detection.

b = Qualified due to detected concentration exceeding the laboratory quanitation limit.

c = Qualified due to low MS/MSD recovery

Appendix G

**Dixon Outliers Test** 

#### **Dixon's Test**

Dixon's Extreme Value test (1953) can be used to test for statistical outliers when the sample size is less than or equal to 25<sup>1</sup>. It is noted that Dixon's test considers both extreme values that are much smaller than the rest of the data (Case 1) and extreme values that are much larger than the rest of the data (Case 2). This test assumes that the data without the suspected outlier are normally distributed; therefore, it is necessary to perform a test for normality on the data without the suspected outlier before applying this test. This means that the user has to identify (guess) potential outliers that may be present in the data set. One simple way to identify and look at outliers is the use of graphical displays such as a Q-Q plot and box plot. The Dixon test often suffers from masking effects when more than one outlier may be present in the data set. If more than one outlier is suspected, the Dixon test may lead to masking where two or more outliers close in value "hide" one another. As mentioned before, the use of robust and resistant outlier procedures (Singh and Nocerino, 1995, Rousseeuw and Leroy, 1987, and Scout, 1999) is desirable. However, robust and resistant methods are beyond the scope of ProUCL 4.0. Several robust methods are available in Scout (1999) software package, which is currently under revision and upgrade.

Even though Dixon's test finds outliers in both tails (low and high outliers) of the data distribution, it is the identification of high outlying observations (perhaps representing contamination), which is important in environmental applications. The inclusion of high outliers in a data set results in distorted statistics of interest, including estimates and test statistics. The low identified outliers (if any) may be retained in a data set to compute various statistics of interest.

#### Directions for the Dixon's Test

**STEP 1**: Let  $X_{(1)}, X_{(2)}, \ldots, X_{(n)}$  represent the data ordered from smallest to largest. Check that the data without the suspect outlier are normally distributed. If normality fails, then apply a different outlier identification method such as a robust outlier identification procedure. *It is suggested to avoid the use of a transformation such as a log-transformation to achieve normality to be able to use the Dixon test.* All cleanup and remediation decisions are made based upon the data set in raw scale. Therefore, outliers perhaps representing isolated contaminated locations should be identified in the original scale. As mentioned before, the use of a log-transformation tends to hide and accommodate outliers (instead of identifying them).

STEP 2: X<sub>(1)</sub> is a potential outlier (Case 1): Compute the test statistic, *C*, where

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \le n \le 7, \ C = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \text{ for } 11 \le n \le 13,$$
$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \text{ for } 8 \le n \le 10, \ C = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}} \text{ for } 14 \le n \le 25,$$

<sup>&</sup>lt;sup>1</sup> Explanation of Dixon's Test is excerpt from ProUCL Version 4.00.05 Technical Guide (EPA/600/R-07/041), pp. 182-183.

**STEP 3**: If *C* exceeds the critical value for the specified significance level  $\alpha$ , then X<sub>(1)</sub> is an outlier and should be further investigated.

STEP 4: X<sub>(n)</sub> is a potential outlier (Case 2): Compute the test statistic, C, where

$$C = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \le n \le 7, \ C = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}} \text{ for } 11 \le n \le 13,$$
$$C = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}} \text{ for } 8 \le n \le 10, \ C = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}} \text{ for } 14 \le n \le 25,$$

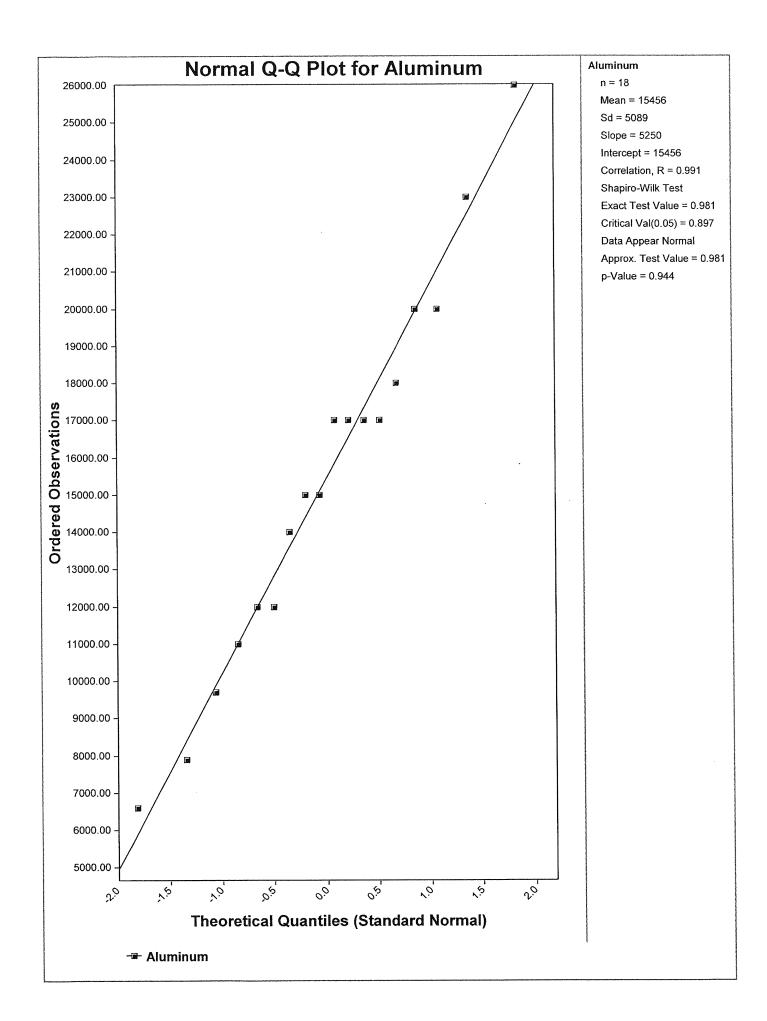
**STEP 5:** If *C* exceeds the critical value for the specified significance level  $\alpha$ , then X<sub>(n)</sub> is an outlier and should be further investigated.

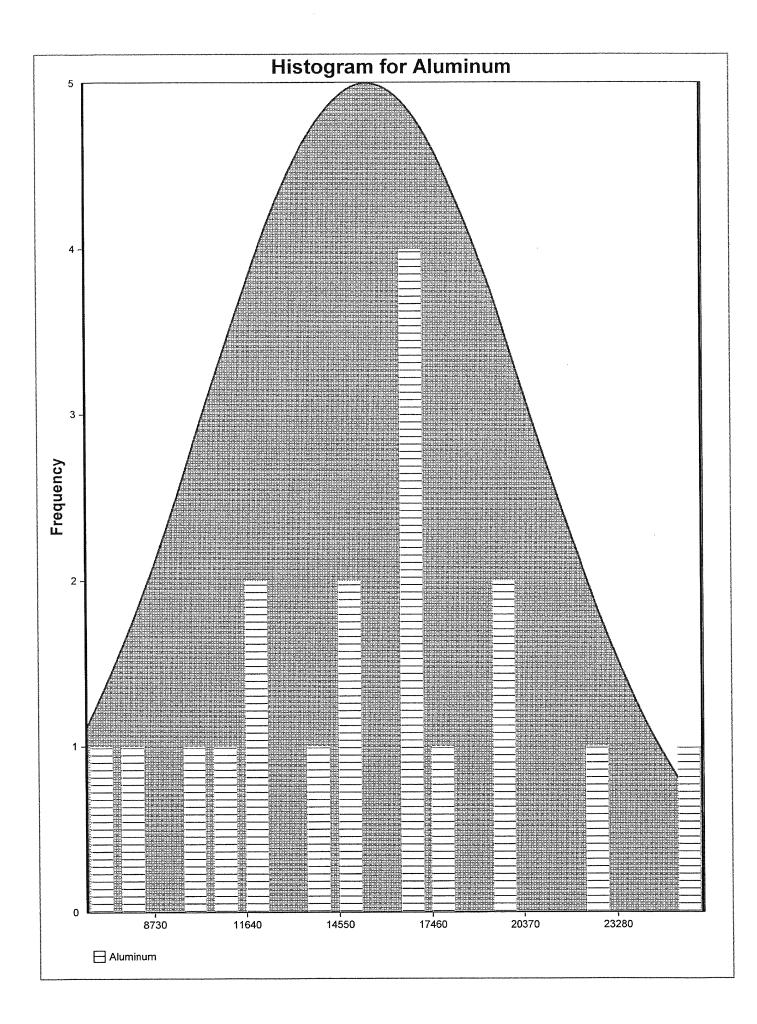
**Appendix H** 

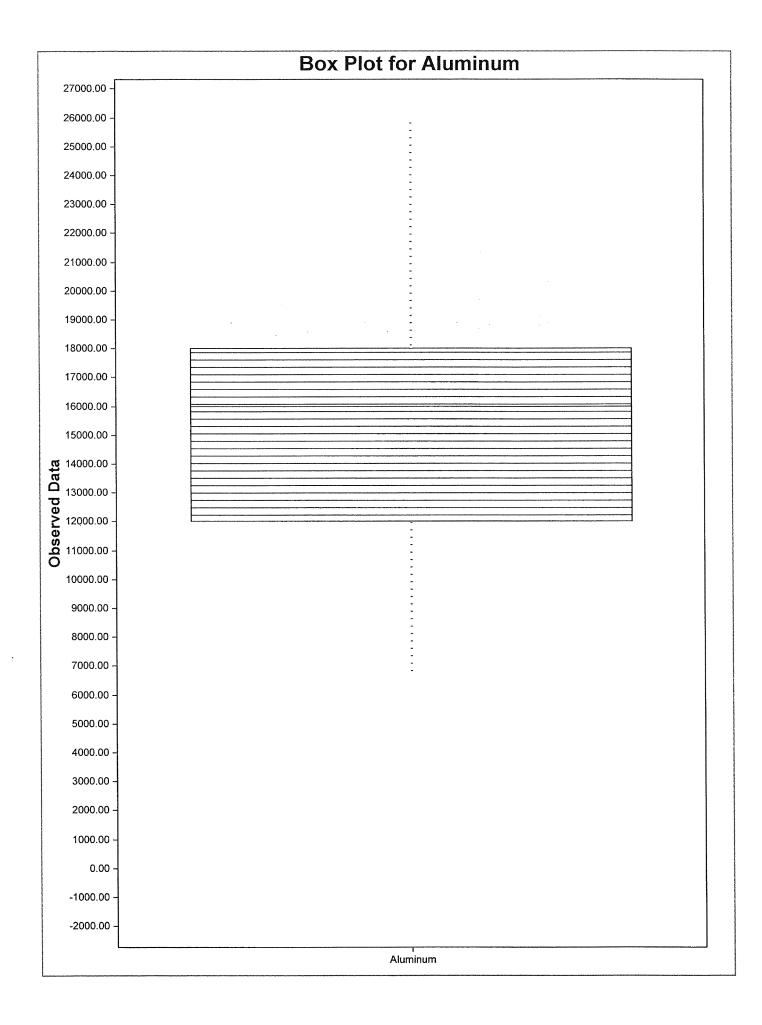
**Statistical Evaluation** 

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1% critical value: 0.561				1)				
1. Data Value 26000 is a Potential Outlier (L	Ipper Tail)?							
Test Statistic: 0.368								
For 10% significance level, 26000 is not an ou	tlier.							
For 5% significance level, 26000 is not an outl	er.							
For 1% significance level, 26000 is not an outl	ier.							**************************************
2. Data Value 6600 is a Potential Outlier (Lov	wer Tail)?							
Test Statistic: 0.231								
For 10% significance level, 6600 is not an outl	ier.							
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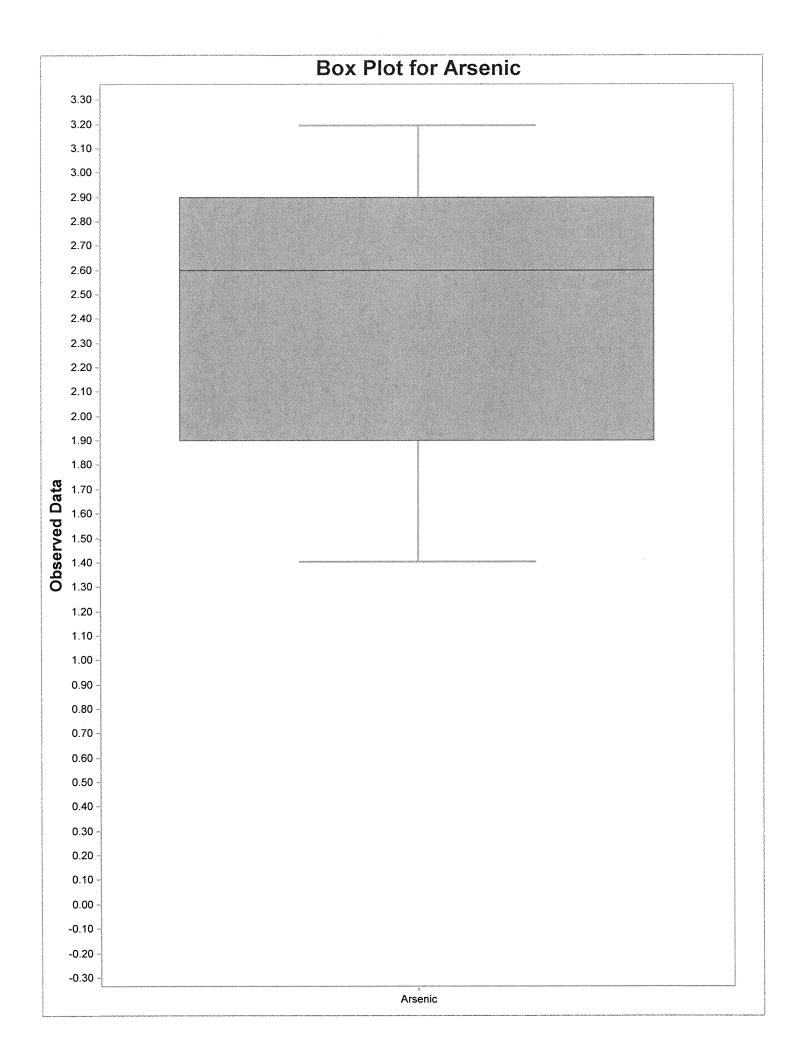


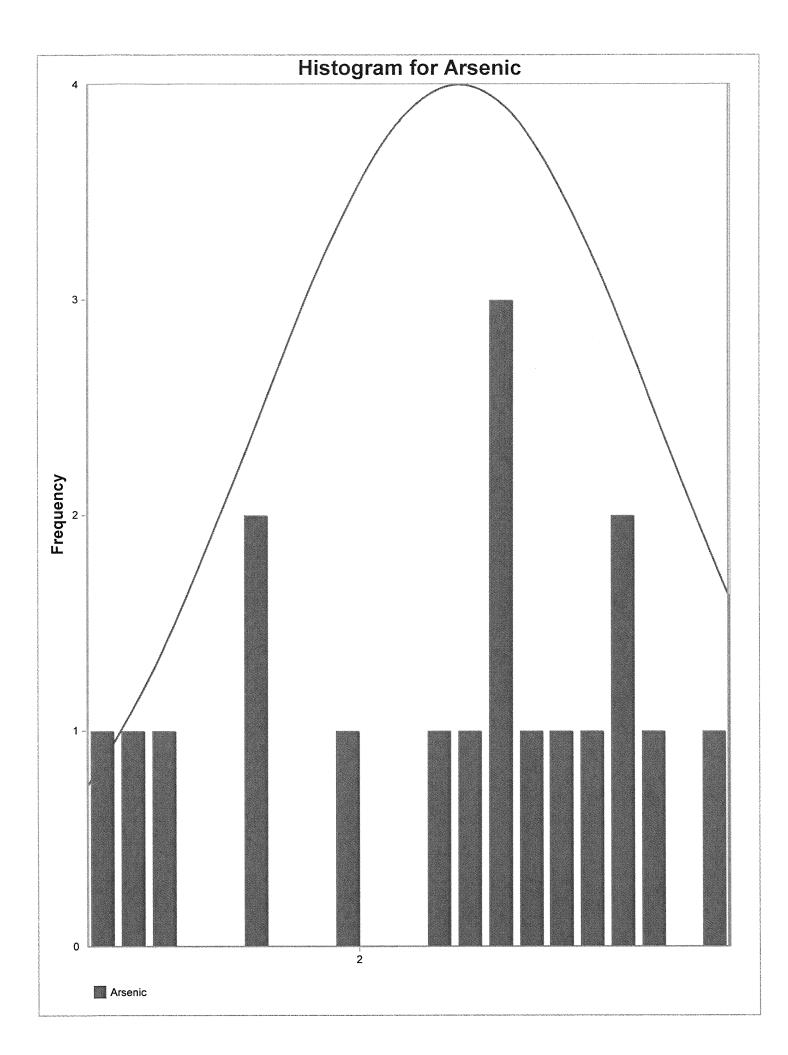
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	Coefficient of Variation	0.232					
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Normal Distr	ibution Test						
Sha	apiro Wilk Test Statistic	0.923		*****		****	
	piro Wilk Critical Value	0.897					
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	90% Percentile (z)	3.164					
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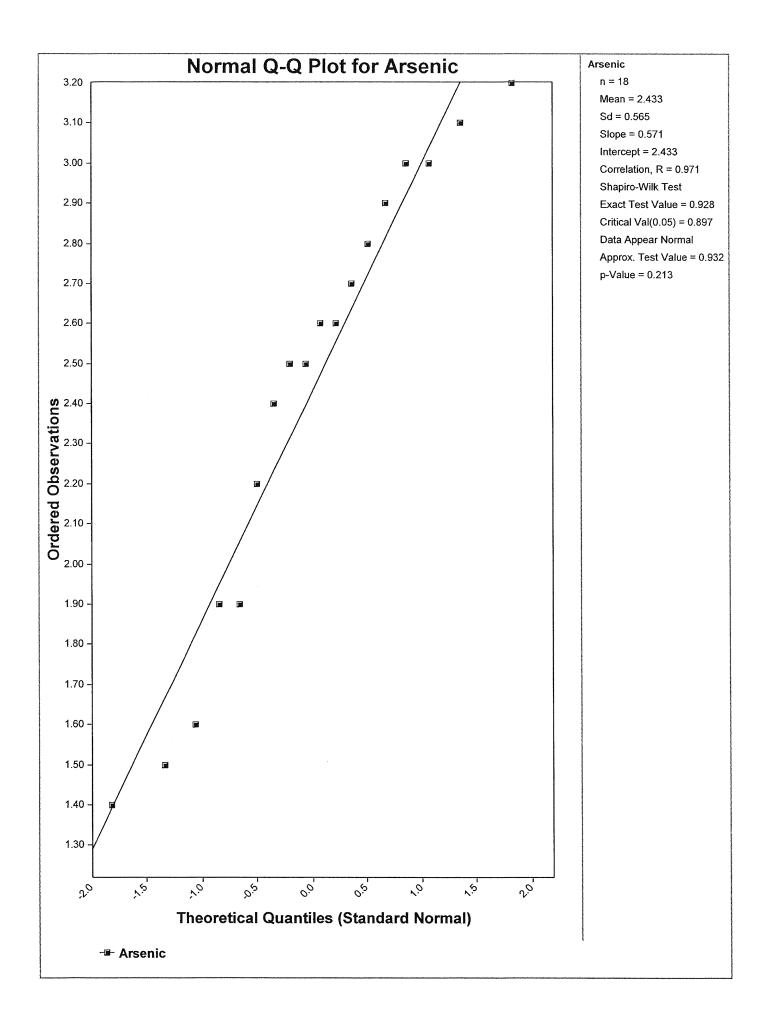
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1. Data Value 3.2 is a Potential Outlier (Uppe	er Tail)?						
Test Statistic: 0.125					a: - 2019 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100		
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For 10% significance level, 3.2 is not an outlier					9.005.000000000000000000000000000000000		
For 5% significance level, 3.2 is not an outlier.							
For 1% significance level, 3.2 is not an outlier.							
2. Data Value 1.4 is a Potential Outlier (Lowe	r Tail)?						
Test Statistic: 0.125							-
For 10% significance level, 1.4 is not an outlier	•	*****					
For 5% significance level, 1.4 is not an outlier.			****				
For 1% significance level, 1.4 is not an outlier.							

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2	1.9	1	1.9	1.9	1.9
3	1.4	1	1.4	1.4	1.4
4	3	1	3	3	3
5	3.1	1	3.1	3.1	3.1
6	3	1	3	3	3
7	2.4	1	2.4	2.4	2.4
8	2.6	1	2.6	2.6	2.6
9	2.6	1	2.6	2.6	2.6
10	2.2	1	2.2	2.2	2.2
11	1.9	1	1.9	1.9	1.9
12	2.7	1	2.7	2.7	2.7
13	3.2	1	3.2	3.2	3.2
14	2.5	1	2.5	2.5	2.5
15	1.6	1	1.6	1.6	1.6
16	2.9	1	2.9	2.9	2.9
17	1.5	1	1.5	1.5	1.5
18	5	0	2.42941176470588	2.35570044302473	2.55607090054673

POS substituted value







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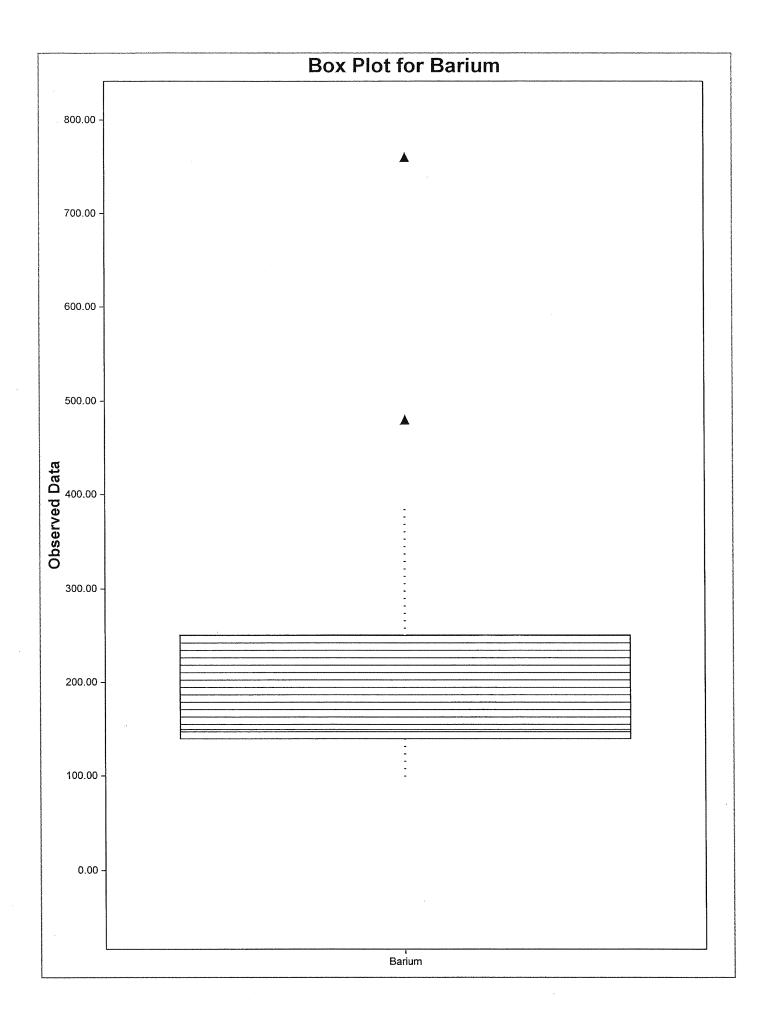
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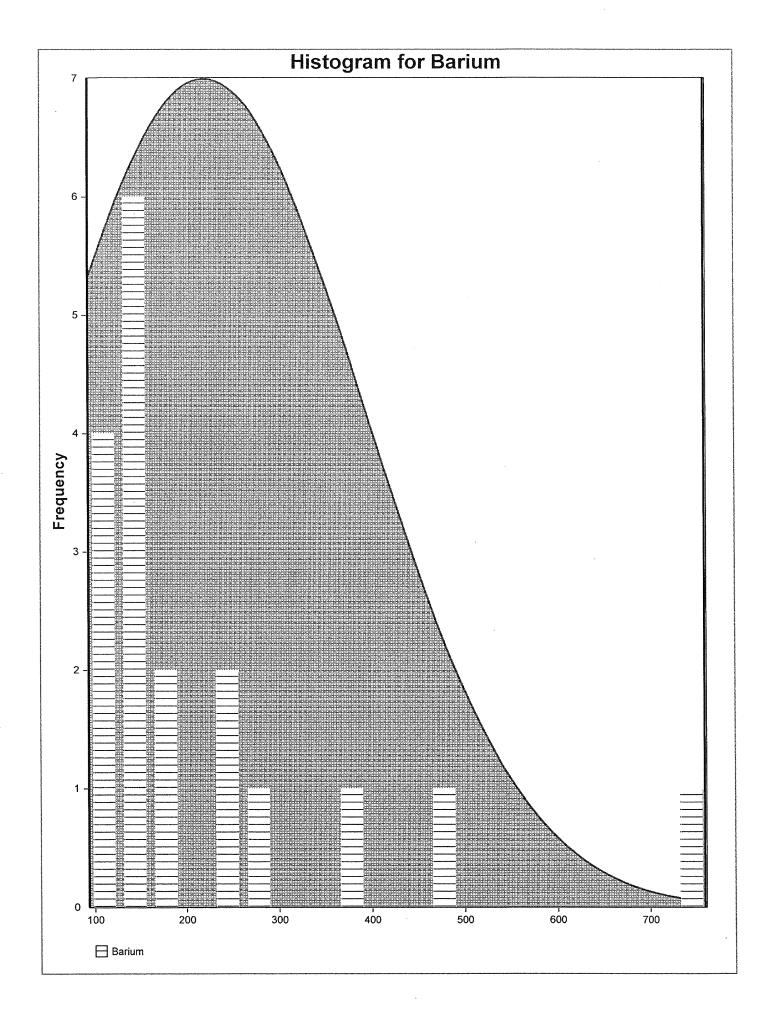
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					nan nan san san san san san		****
	stribution Test	0.001					
	apiro Wilk Test Statistic	0.901	ananananananan oras karanan	1			100 1,0000 A (20 - A01 1,000 - 1,000 A (20 - A01 1,000 A (20 -
	apiro Wilk Critical Value	0.887					
Data appear Lognormal	at 5% Significance Leve						
aanaa ka ka ka maa ka k							
Background Statistics Assu							<b>w</b>
nan na ana ana ana ana ana ana ana ana	90% Percentile (z)	265					
an ann an an an ann an ann an ann an ann an	95% Percentile (z)	308					
an a	99% Percentile (z)	408.2					
a gegegegen waar gemeen waar on a na	95% UPL	329.3					
nna a marta anta nata kata kata kata kata kata ka	Tolerance Factor K	2.524				******	
95% L	JTL with 95% Coverage	442.9					
an a chun an an an ann an ann an ann an ann an a							
Some Nonparametric	Background Statistics						
	95% Chebyshev UPL	529.1					
	JTL with 95% Coverage	390					
95% Percentile Bootstrap L	JTL with 95% Coverage	390					

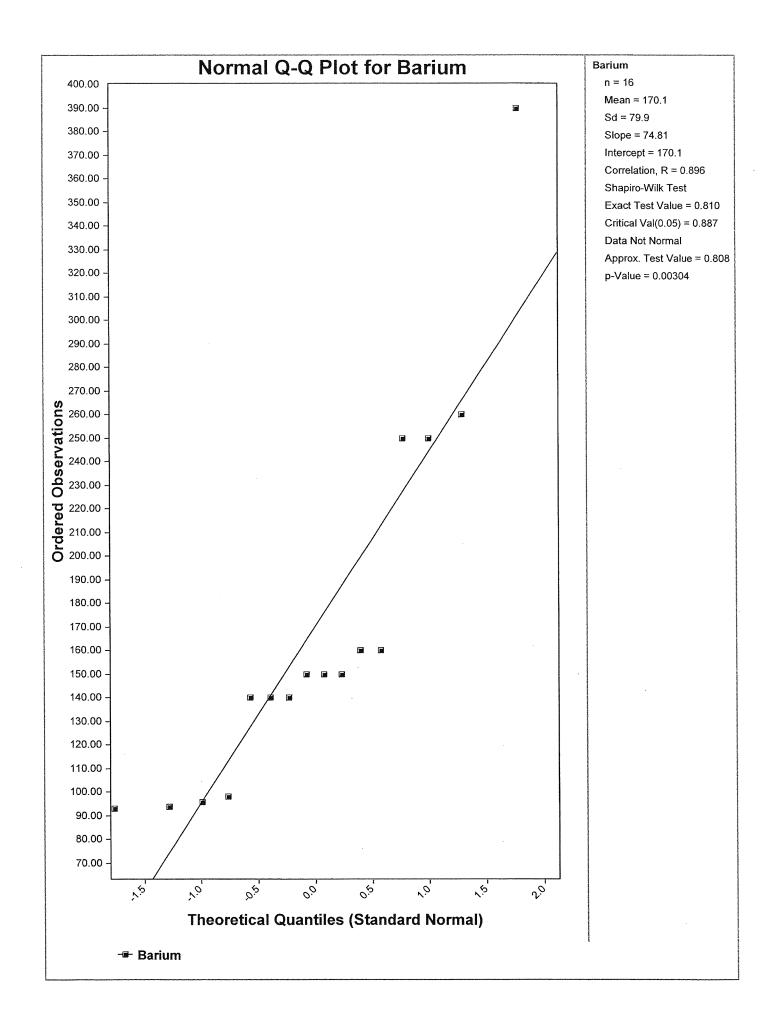
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		ests for Sele	cted Variab	les			1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	
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Test for Suspected Outliers with Dixon test	1					an a cara an se ta ta da da marte da serie da se da se	and the devict the prior of these is prior	
Test for Suspected Outliers with Rosner test	1			****	nan talaha an an talah an talah an talah sa talah sa ta	n naar oo ah dhi niishada ah ah aa ah		ad de histo de la contra de la contra de contra de contra de la contra de la contra de la contra de la contra d
Dixon's Outlier Test for Barium								
Number of data = 18								
10% critical value: 0.424	~~~~							
5% critical value: 0.475	8 87. S. 8 7.5 MAR & A. A. A. M. MARA							
1% critical value: 0.561								
1. Data Value 760 is a Potential Outlier (Upp	er Tail)?							
Test Statistic: 0.557								
For 10% significance level, 760 is an outlier.	an ha baran a sa an							* *******
For 5% significance level, 760 is an outlier.								e
For 1% significance level, 760 is not an outlier.								n
2. Data Value 93 is a Potential Outlier (Lower	<sup>.</sup> Tail)?							
Test Statistic: 0.010	a a sera a sa como con a como							
For 10% significance level, 93 is not an outlier.								
For 5% significance level, 93 is not an outlier.								
For 1% significance level, 93 is not an outlier.	*******						· · · · · · · · · · · · · · · · · · ·	
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n dan menering pana pana pana pana pana pana pana pa	Outlier Tes	ts for Selec	ted Variable	9S	theore a spectra the size of the second s	allen parinaisen eta kara parte eta eta eta eta eta eta eta eta eta e	dhaaxayaa aa ahaa ahaada darii sarka ahaa darii dar	8. yr diwedd o collan a collan Call yr diwedd a collan a coll
User Selected Options								
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Test for Suspected Outliers with Dixon test	1							
Test for Suspected Outliers with Rosner test	1							
	//0.056.0000.00000.0000					synamed a thank and on the second		
Dixon's Outlier Test for Barium								
			*****					
Number of data = 17			anton ana amba amba ar sa maa					
10% critical value: 0.438								
5% critical value: 0.49								*******
1% critical value: 0.577								
1. Data Value 480 is a Potential Outlier (Upp	or Toil\2				fan her e Mala her fan een herete geskinde			
1. Data value 480 is a Potential Outlier (Opp								
Test Statistic: 0.573	2 D MAR, MUSERIC KOLDON 93, NO DA				4.4.4.1.1.1			
				****		1		
For 10% significance level, 480 is an outlier.					44.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4			
For 5% significance level, 480 is an outlier.								
For 1% significance level, 480 is not an outlier.				******				
2. Data Value 93 is a Potential Outlier (Lower	Tail)?							
Test Statistic: 0.018			5.888.993.855.993.858.858.858.577.777.888	****	9 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 2 - 2 - 2			
an a								
For 10% significance level, 93 is not an outlier.								
For 5% significance level, 93 is not an outlier.								
For 1% significance level, 93 is not an outlier.								

	Outlier Tes	ts for Selec	ted Variable	es	la en de la companya	болек солорон (сул руду ландалар на рубор на руб	*****	
User Selected Options					ana a successo and a subsect basis dates of a			
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Test for Suspected Outliers with Dixon test	1							
Test for Suspected Outliers with Rosner test	1							
	1.1000.001.001.001.001.001.001.001.001.							
		and and a second se		****				
Dixon's Outlier Test for Barium					ter bartek tana da bana tarak kata tata			
Number of data = 16				1999 M. A. S.				
10% critical value: 0.454								
5% critical value: 0.507 1% critical value: 0.595					,			
1. Data Value 390 is a Potential Outlier (Upp	or Tail\2							
						- 19 Millio essendedor as 1.1 da mil		
Test Statistic: 0.476								*******
				******				
For 10% significance level, 390 is an outlier.	an tan ann an t-an t-an t-an t-an t-an t							
For 5% significance level, 390 is not an outlier.								
For 1% significance level, 390 is not an outlier.								
2. Data Value 93 is a Potential Outlier (Lower	Tail)?					******		
Test Statistic: 0.019							a fan haar die oorde een de	
a na ana ana ang ang ang ang ang ang ang								
For 10% significance level, 93 is not an outlier.						201 A 18 LAA BAAD BADDADA		
For 5% significance level, 93 is not an outlier.								
For 1% significance level, 93 is not an outlier.								
n an an an ann an an an an an an an an a								



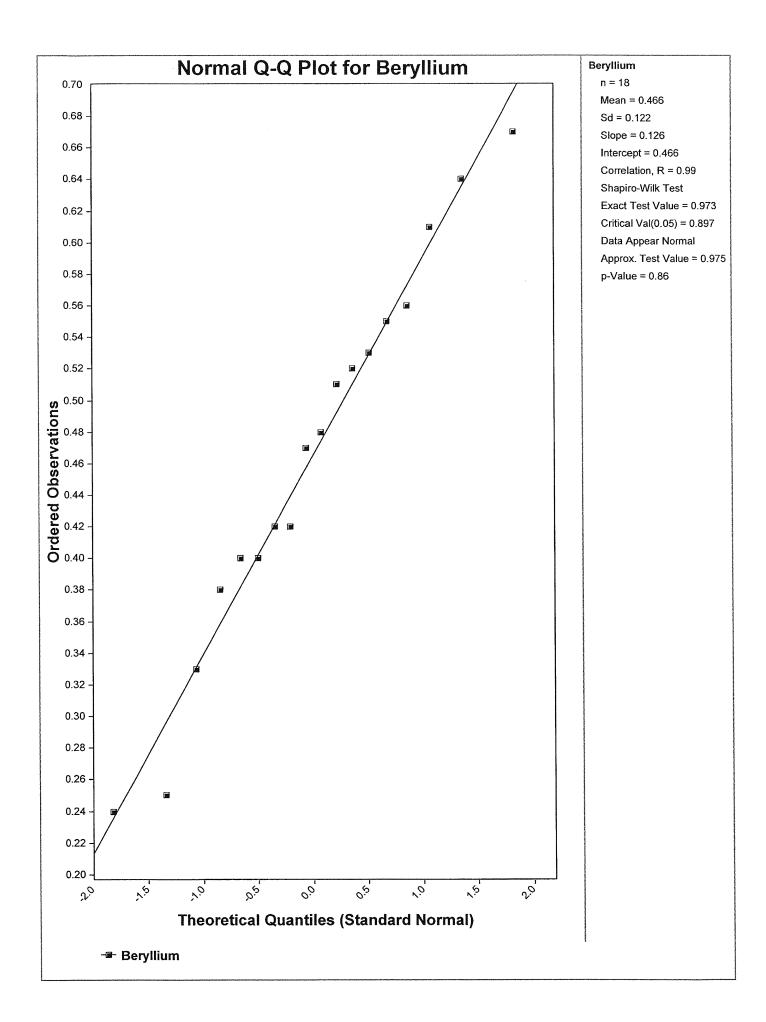


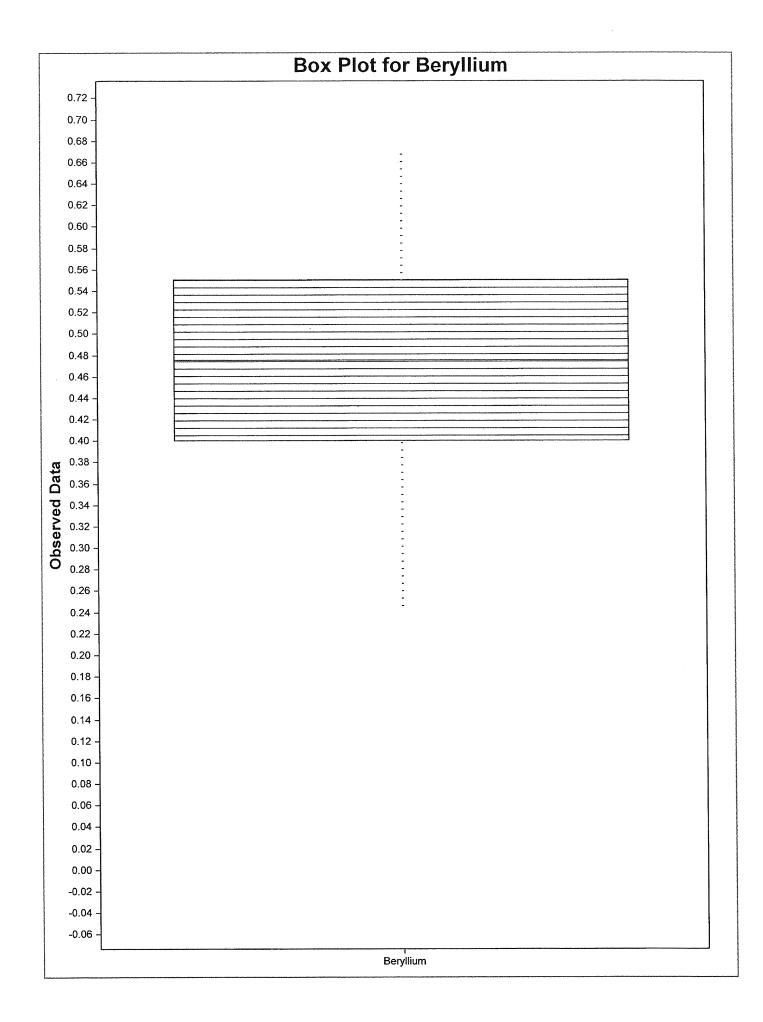


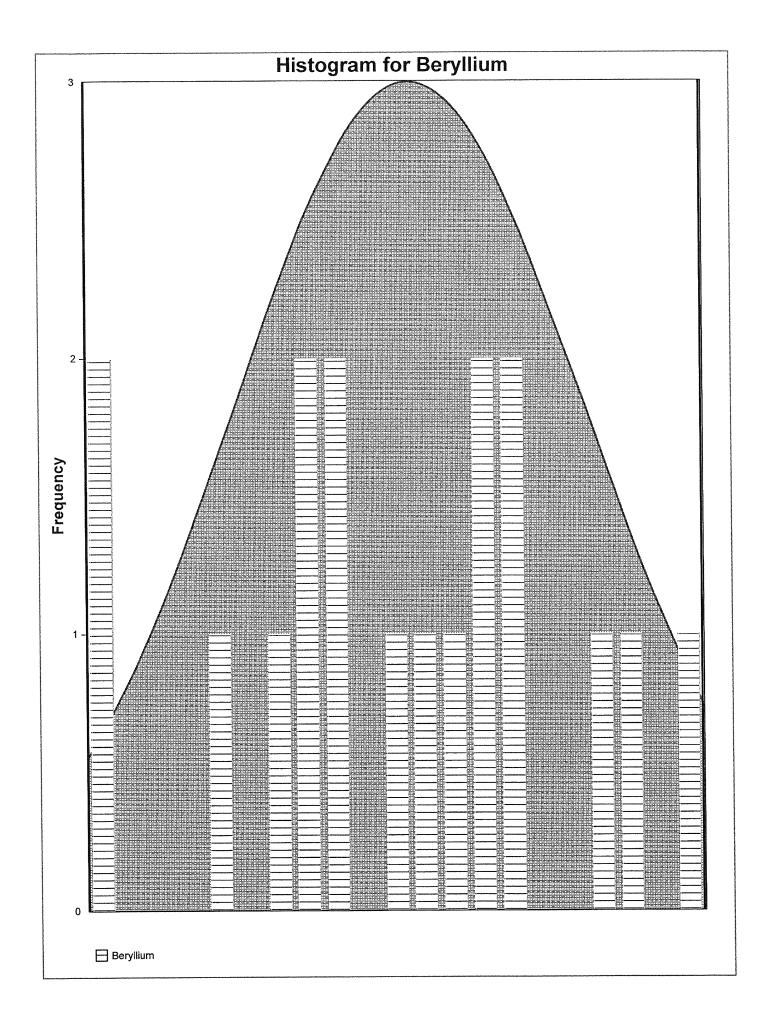
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Full Precision	DFF	*****					an a
Confidence Coefficient	95%		******				
Coverage S	95%	n den destanderenderen er den de son erherenden de son er den son	an an ana dhan an a a ann an an an an			e ta da ke kata da kata da ana ana ana kata ana	
Different or Future K Values	*******		*****************************				
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ryllium	an a sector com a company a sector a se						
Raw Sta		10					
	of Valid Observations	18		A A. S			
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NY 1100 11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Minimum Maximum	0.24 0.67					
	Second Largest	0.67					
na an a	Mean	0.466		•		11. 1. Mar. 1	
a har hein 1991, na star star kan han kan kan kan na star kan menangkan star na star star star star star star s	Geometric Mean	0.449	•••••				a. 1 an a - Garris I. 1 a 176 a a ta
алагмаалар чаа чиликина кинистрала кала колма колалартан объемалорго с	First Quartile	0.4				1018 60.000 00 000000 8 0 000 000 00	
a sanaa a ai ai conse nase na naanan kalanan kalana kacaka a a sana a sana a sa	Median	0.475					
KALI YAR KATA KATA DIN DI DI KATA DAN PANDA DAN PANDA DAN PANANANA KATA PANANANA DAN PANANANA PANANANA PANANANA	Third Quartile	0.545					
	SD	0.122					500
	Coefficient of Variation	0.263					
an ear an an the second and a construction and the second and the second and the second and the second and the	Skewness	-0.236				*****	
?		******					
Normal Distri	bution Test						
	piro Wilk Test Statistic	0.973					
•	iro Wilk Critical Value	0.897					
Data appear Normal at \$	5% Significance Level						
Background Statistics Assu				la e dita tanàna mandritra dia mandritra dia dia mandritra dia dia mandritra dia dia dia dia dia dia dia dia da			
an na san ana ana ana ana ana ana ana an	90% Percentile (z)	0.622					
	95% Percentile (z)	0.667					
• 14-11-11-11-14-15-14-14-14-14-14-14-14-14-14-14-14-14-14-	99% Percentile (z)	0.75					
こうこうごうそうしょう ひとりごう かいろ リカング あいろく ひろう うろ かかかい こうざいあたてん ひろうぶん ひょうしん ちんかん ごう たいせいしゅうれん	Tolerance Factor K	2.453		****	1. 11		
QE0. IIT	L with 95% Coverage	2.453 0.766					
<b>3370 UI</b>		0.700					
en han na ann ann ann an Ann an Ann an Ann ann a	95% UPL (t)	0.684					
na ina ana amin'ny fantsiana amin'ny fisiana amin'ny fisia							
				l.			

		*****	Summarv	Statistics	for Raw Fu	ll Dataset	<b>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</b> ,,,,	Annan I. an ann an			
			,					2020-2		**************************************	
Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Beryllium	18	0.24	0.67	0.466	0.475	0.015	0.122	0.111	-0.236	-0.445	0.26
							λουμαρία μετοποιογολογιατικού το	Èssana anna anna anna anna anna anna ann	а <sub>сама</sub> н талан талар талан талан талан талан т		
			Perce	entiles for	Raw Full Da	itaset					
Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1	)50%ile(Q2)	75%ile(Q3	) 80%ile	90%ile	95%ile	99%il
Beryllium	18	0.249	0.306	0.388	0.4	0.475	0.545	0.556	0.619	0.645	0.66

	Outliar Tec	ts for Selected	Variables			
User Selected Options	]		vanables			 *****
From File	WorkSheel	wst	*_***	****		 *****
Full Precision	OFF					
Test for Suspected Outliers with Dixon test	1		1969), 1 Calebrahitz (C. 1963), 1964, 1964, 1964, 1964, 1974	****		 *****
Test for Suspected Outliers with Rosner test	1					 *****
na na manana sa mana manana pangana sa mana sa mana pangangan da sa tangan manana na mananangan manana manana m	*****					
Dixon's Outlier Test for Beryllium						 
Number of data = 18			**************************************			
10% critical value: 0.424					******	 6/16/2
5% critical value: 0.475	*****					
1% critical value: 0.561						
1. Data Value 0.67 is a Potential Outlier (Up	per Tail)?					
Test Statistic: 0.176						
For 10% significance level, 0.67 is not an outli	er.					
For 5% significance level, 0.67 is not an outlie	Γ.					
For 1% significance level, 0.67 is not an outlie	r.					
2. Data Value 0.24 is a Potential Outlier (Lov	ver Tail)?					
Test Statistic: 0.243						
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
For 10% significance level, 0.24 is not an outli For 5% significance level, 0.24 is not an outlie						 
For 5% significance level, 0.24 is not an outlie For 1% significance level, 0.24 is not an outlie						



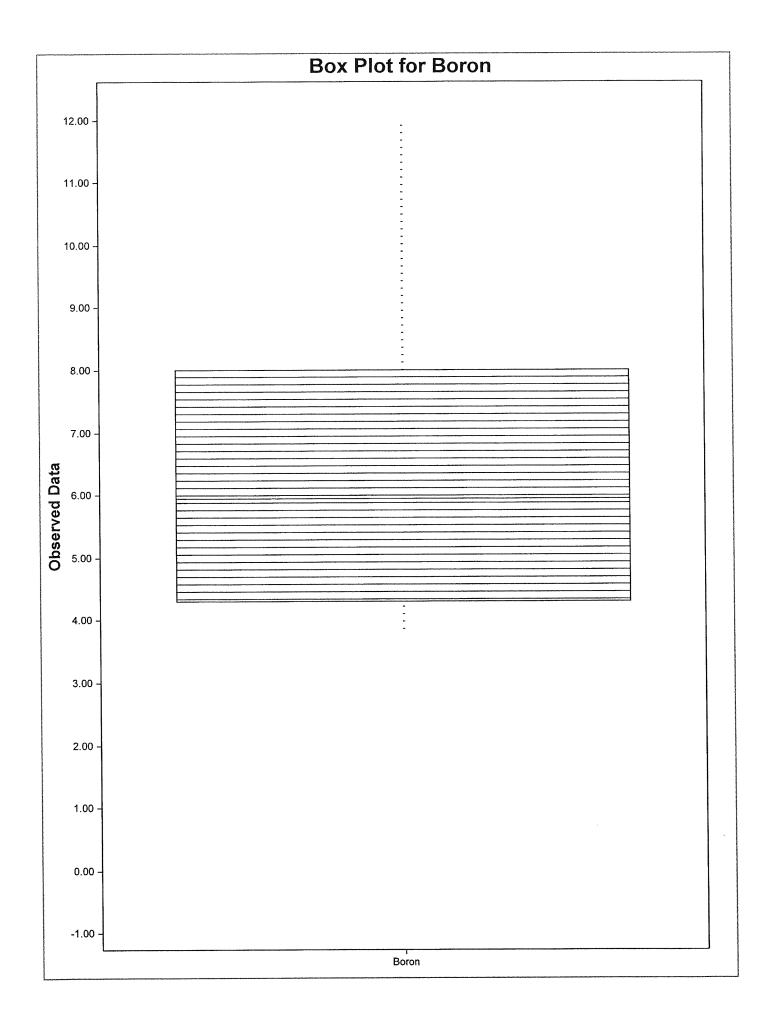


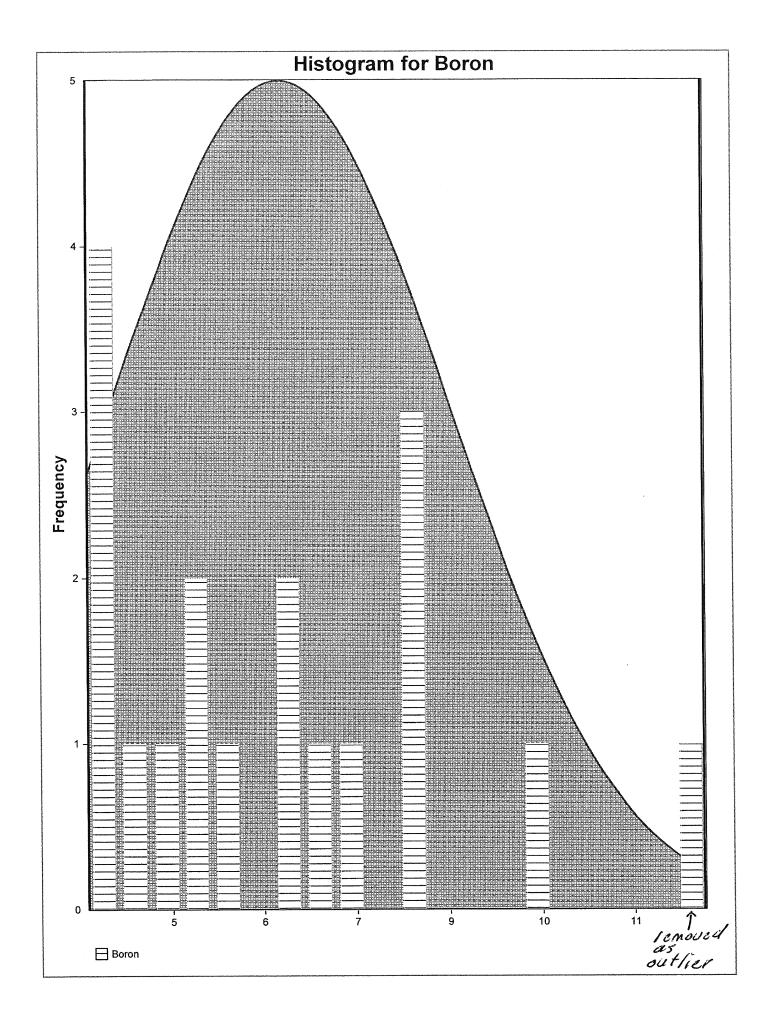


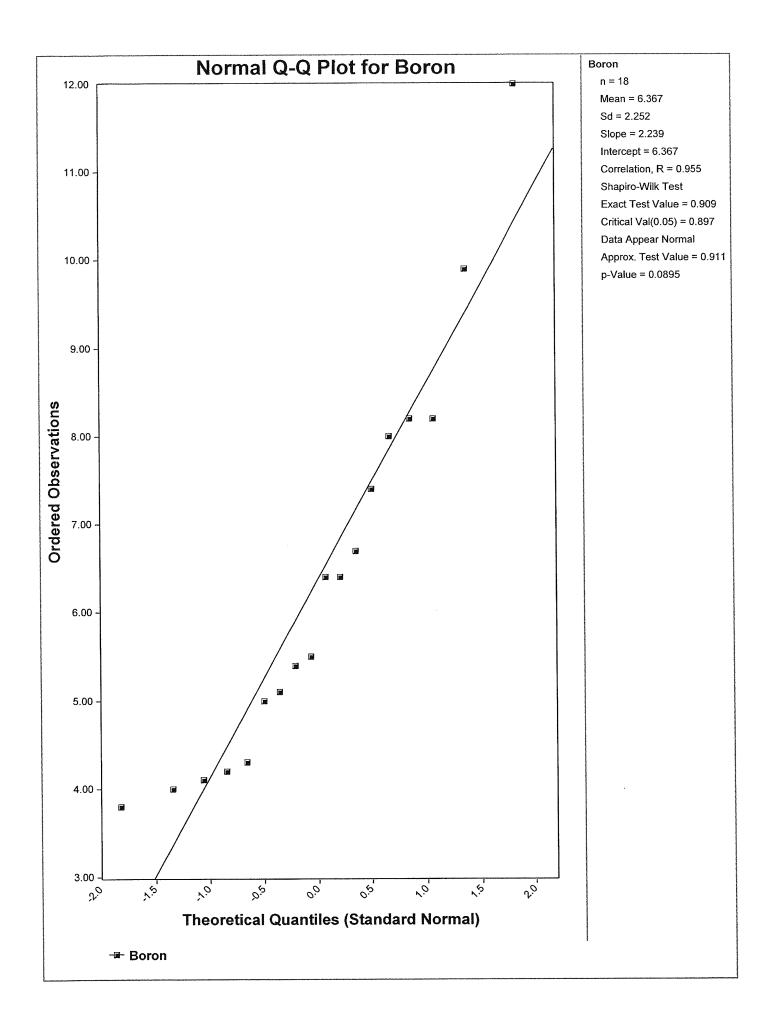
User Selected Options	Normal Background Stat	6					Ara-obhaidean comhaidea
	:\Projects\Western Refin	ing Comr			July 2007 (	Irdarl Sita Paa	karound' I
	OFF	ing Com		DOITHIEIU (INIVIED	July 2007 (	Juensile bac	:kgrouna\j
	95%		*****		*****	e 9999 e 40 pro e e e 998 à berra de 130 à 100	terre en antitat talea estatutada
				*****	Service - No. 2016 S. A.L Revender	and the line to the terminant and the second	
- 1	95%				****	*****	*** *** ******
Different or Future K Values	1		anna - ann an ann ann ann ann ann ann an			an a	
Ön							
Raw Sta	itistics						
	of Valid Observations	17		* *		enter an di manananana ana	
	Distinct Observations	15					
	Minimum	3.8	******				
a hala ka sa sa ka mana ka ka ka ka ka sa sa ka	Maximum	9.9			6660 00 100		
1999 No. 2010 I. M.	Second Largest	8.2	****	101-10-10-10-00-0000			
an air an ann an an an an an an ann an ann an	Mean	6.035				1999, Marine - A Jaka K Maraka Marine A. A.	
under der her der der der der der der der der der d	Geometric Mean	5.789					
an han parta parta kata ana ana ana kata supergenya kata kata panyana ana ana ana ana ana ana ana barbar barbar	First Quartile	4.3				e - andere e e e e e e e e e e e e e e e e e e	
ana hararka ana wakalati bahara wakan kana kana mana karanaka mwanaka mwana karana kara kana kana kana kana ka	Median	5.5					
en ne o ne la renna diversa o nationa ne regella ne no estato estato a secto o secto o secto da secto da secto	Third Quartile	7.4					// Init Sectors
	SD	1.814	**************************************		1 The Although State of the Sta		
	Coefficient of Variation	0.301				**************************************	6
	Skewness	0.569	******		******		
- esta da la al su ema con emergan e contro dan an ore madrines estanema cadista da a com	ander an			19			166.999 ( 1.55.65 1.6.6.6.6
Normal Distri	bution Test			*******			
Sha	piro Wilk Test Statistic	0.929					
5% Shaj	piro Wilk Critical Value	0.892					
Data appear Normal at \$	5% Significance Level				**************************************		
Background Statistics Assu	ming Normal Distribution	ר					10
	90% Percentile (z)	• 8.36					
	95% Percentile (z)	9.019		846579 8 - 65 - 65 - 67 A A A A A A A A A A A A A A A A A A			
na ann an ann an ann an ann an ann an an	99% Percentile (z)	10.25					
anta a centra Tantala ha attaba CRA matala a la la benara e centre entre entre mata a dari Matalam Matala Matala		10.20	******				
na construction na canada in a sing in a sing con a sing and a sing an a sing of a sing of a sing of a sing of a	Tolerance Factor K	2.486			****	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
۵	L with 95% Coverage	2.460					
90% UI		10.54			1989 - 1989 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -		
add dal Nillo do a la calificação de 22.11. de 1999 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1 1	95% UPL (t)	9.294					11-1-11 Contractor March 18
. and the second sec	30% UPL (I)	9.294			NO-2002000000000000000000000000000000000		
			14				

			Summary	Statistics	for Raw Fu	ll Dataset					
Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Boron	17	3.8	9.9	6.035	5.5	3.29	1.814	1.927	0.569	-0.592	0.30 <sup>-</sup>
			Perce	entiles for	Raw Full Da	taset		19. maria, a 1989 Maria and an ann an ann ann an ann ann an ann an	1879 m 1979 m 1979 m 1979 m		
Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1	)50%ile(Q2)	75%ile(Q3	) 80%ile	90%ile	95%ile	99%ile
Boron	17	3.96	4.06	4.22	4.3	5.5	7.4	7.88	8.2	8.54	9.62

							Stational States	
	Outlier Tests for Selected Variables							
User Selected Options								
From File	WorkSheet.wst							
Full Precision	OFF						****	
Test for Suspected Outliers with Dixon test	1					****		
Test for Suspected Outliers with Rosner test	1					an a		400-101 a 401-101-6-10-400-70-10-14-14-14-14
Dixon's Outlier Test for Boron								
Number of data = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561								
1. Data Value 12 is a Potential Outlier (Uppe	er Tail)?							
Test Statistic: 0.481								
For 10% significance level, 12 is an outlier.	en en anter a constant de c							
For 5% significance level, 12 is an outlier.								
For 1% significance level, 12 is not an outlier.	*****							
2. Data Value 3.8 is a Potential Outlier (Lowe	er Tail)?							
Test Statistic: 0.068								
For 10% significance level, 3.8 is not an outlie								
For 5% significance level, 3.8 is not an outlier.								
For 1% significance level, 3.8 is not an outlier.								







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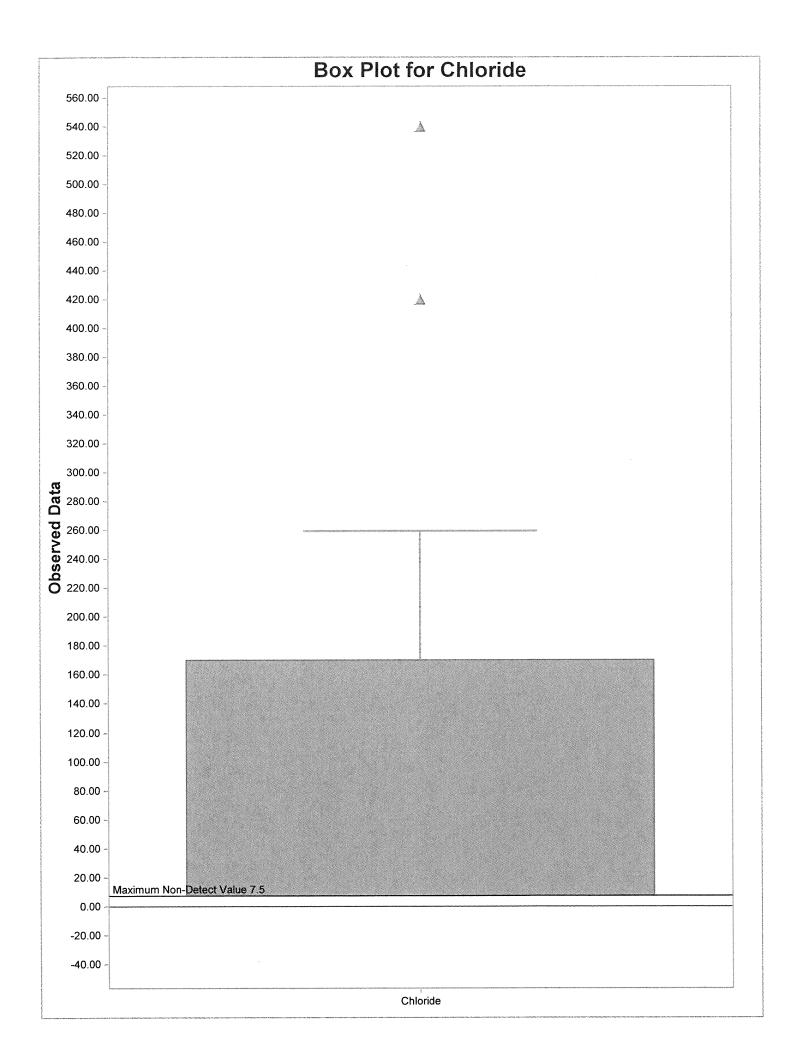
	Lognormal Background	Statistics for I	Data Sets with Non-	Detects						
User Selected Options			anna an		aad aa baad oo oo ah dhii dhii dhadada dhadada dha	rad of the ball of the providence for our of the				
From File	WorkSheet.wst			naine a naimhealtaichta tha an na 19						
Full Precision										
Confidence Coefficient	95%									
Coverage										
Different or Future K Values	95%									
Number of Bootstrap Operations										
	2000									
			****							
	. 5.7.5.7.8.8.9.7.8.9.9.9.9.9.9.9.9.9.9.9.9.9.9		()	****						
	aa amaa waxaa ka amaa baalee ka ahaa kabbii in habiin ahariya ahaa ah									
					••••••••••••••••••••••••••••••••••••••	a				
Log-Iransfo	rmed Statistics									
	Total Number of Data	18								
	mber of Non-Detect Data	10			en men en e					
N	lumber of Detected Data	8	and and the data and the start of the start							
	Minimum Detected	2.565								
	Maximum Detected	6.292								
	Percent Non-Detects	55.56%								
an na ann an Anna an Anna ann an ann an ann an	Minimum Non-detect	2.015								
	Maximum Non-detect	2.015								
	Mean of Detected data	4.552								
a na an	SD of Detected data	1.594			1. 3. 1. 5 <b>4</b> . 40. 9 <b>.</b>	, a construint dan da				
an a										
It is recommen	ded to have 10-15 or mo	re distinct obs	ervations for accura	ate and meanin	gful results.					
Lognormal Distribution Te	st with Dotocted Values O	nlv								
-	hapiro Wilk Test Statistic	0.82			, w/					
	hapiro Wilk Critical Value	0.818								
	apiro wirk Childar value		****							
Data appear Lognorna	rat 5% Significance Level	l				2				
Background Statistics Ass	and a second Distribution	tion								
-	unning cognormal Distribu	uon								
			1							
	itution Method	0 767								
	Mean (Log Scale)	2.757								
a a da panamanan wa wa wa wa wakaza da kata kata kata kata kata kata kata	Mean (Log Scale) SD (Log Scale)	1.943								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K	1.943 2.453								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage	1.943 2.453 1849								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL	1.943 2.453 1849 507.4								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z)	1.943 2.453 1849 507.4 190								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z)	1.943 2.453 1849 507.4 190 384.8								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z)	1.943 2.453 1849 507.4 190								
Note: DL/2 is not a recommended	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z)	1.943 2.453 1849 507.4 190 384.8								
	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z)	1.943 2.453 1849 507.4 190 384.8								
Note: DL/2 is not a recommended	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) d method.	1.943 2.453 1849 507.4 190 384.8								
Note: DL/2 is not a recommended	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) d method.	1.943 2.453 1849 507.4 190 384.8 1446								
Note: DL/2 is not a recommended	Mean (Log Scale) SD (Log Scale) Tolerance Factor K 95% UTL 95% Coverage 95% UPL 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) d method.	1.943 2.453 1849 507.4 190 384.8								

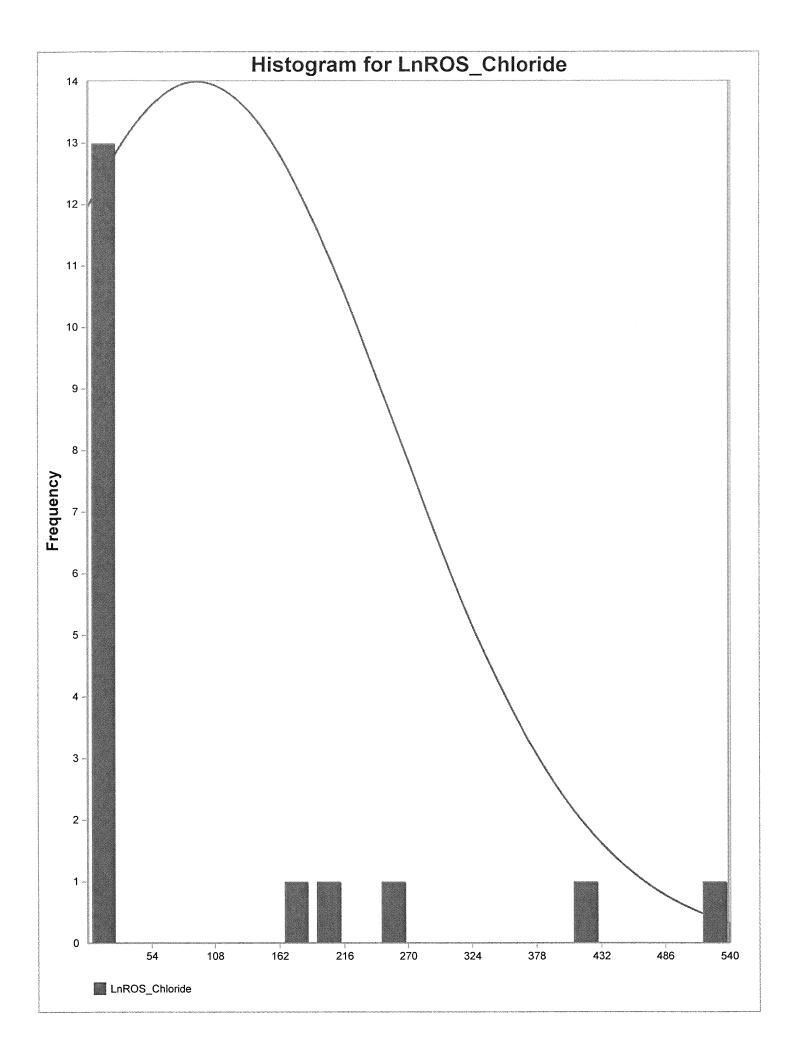
Mean in Orignal Scale	92.56						
SD in Original Scale	163.6						an a
95% UTL 95% Coverage	7500	~~~					
95% BCA UTL with 95% Coverage	540			ann marrer to ar an an ada		n (	
95% Bootstrap (%) UTL with 95% Coverage	540	en en anna e an an de la contrar					
95% UPL (t)	1144						
90% Percentile (z)	274.1	1973), 1973, 1977, 1988, 1977, 1988, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1977, 1					
95% Percentile (z)	764.9	*******					
99% Percentile (z)	5244			ladan centra di de la Trona de de andre de della della Porto			
		annan an an airth da dàide a	**************************************				e e o on en anno ann ann an a
Kaplan Meier (KM) Method							
	98.56					n ( ) and ( and an ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	nt jaten and them
	155.7				una da comune manere en		
SE of Mean	39.22	****					
95% UTL 95% Coverage	480.4						
95% KM Chebyshev UPL	795.6	******					
95% KM UPL (t)	376.8	*****		na 1. j van on zwadno marene	· · · · ·		en fan hender oan header
95% KM Percentile (z)	354.6						

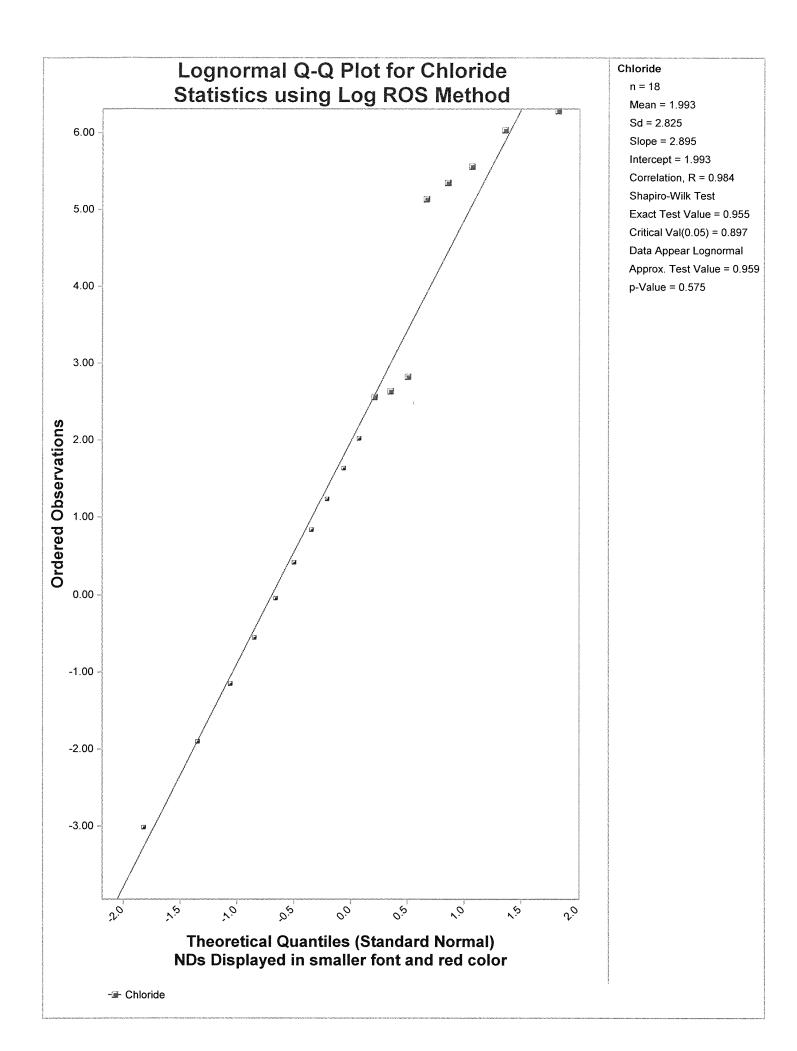
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Dixon's Outlier Test for Chloride						1.1.1.C			
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1% critical value: 0.683									
1. Data Value 540 is a Potential Outlier (Upp	er Tail)?			ar annana - Annances ann an an ar	1964 - MARIN - MARINA MARIA				
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For 5% significance level, 540 is not an outlier.			1015,000,000 - 0.000 province and a second						
For 1% significance level, 540 is not an outlier.				- 6 Mail					
	· Ta:110								
2. Data Value 13 is a Potential Outlier (Lower	1811)?						1		
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Test Statistic: 0.002	Ph16603386260000600								
					e. 1120 yek 198 - 1 " 5 2 4 5 4 6 6 6 7 7 7 7				
For 10% significance level, 13 is not an outlier.	•			6.6.8993.6					
For 5% significance level, 13 is not an outlier. For 1% significance level, 13 is not an outlier.									
For 1% significance level 13 is not an outlier									

	0	1	2	3	4
	Chloride	D_Chloride	NROS_Chloride	LnROS_Chloride	GROS_Chloride
1	7.5	0	-817.791864716548	0.04875660267340470	0.0001
2	17	1	17	17	17
3	420		420	420	420
4	7.5	0	-667.508023935792	0.14825899312805	0.0001
5	13	1	13	13	13
6	7.5	0	-566.044641615993	0.31412876851662	0.0001
7	170	1	170	170	170
8	7.5	0	-485.352020492808	0.570742953275804	0.0001
9	7.5	0	-416.077218694588	0.952968194821624	0.0001
10	7.5	0	-353.819453119948	1.51065276987185	0.0001
11	7.5	0	-296.079698483913	2.31595837944717	0.0001
12	7.5	0	-241.237511463143	3.47523791984090	0.0001
13	540	1	540	540	540
14	260	1	260	260	260
15	210	1	210	210	210
16	7.5	0	-188.117508055599	5.148770318495490	0.0001
17	14	1	14	14	14
18	7.5	0	-135.770051024558	7.58472183515368	0.0001

ROS substition values





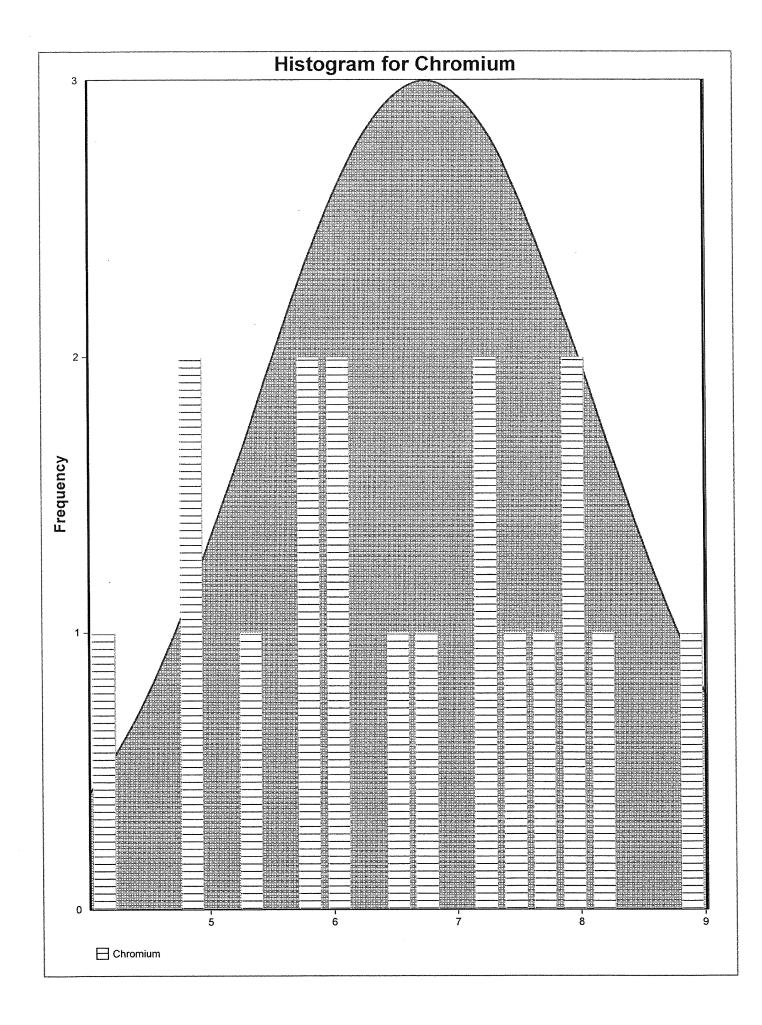


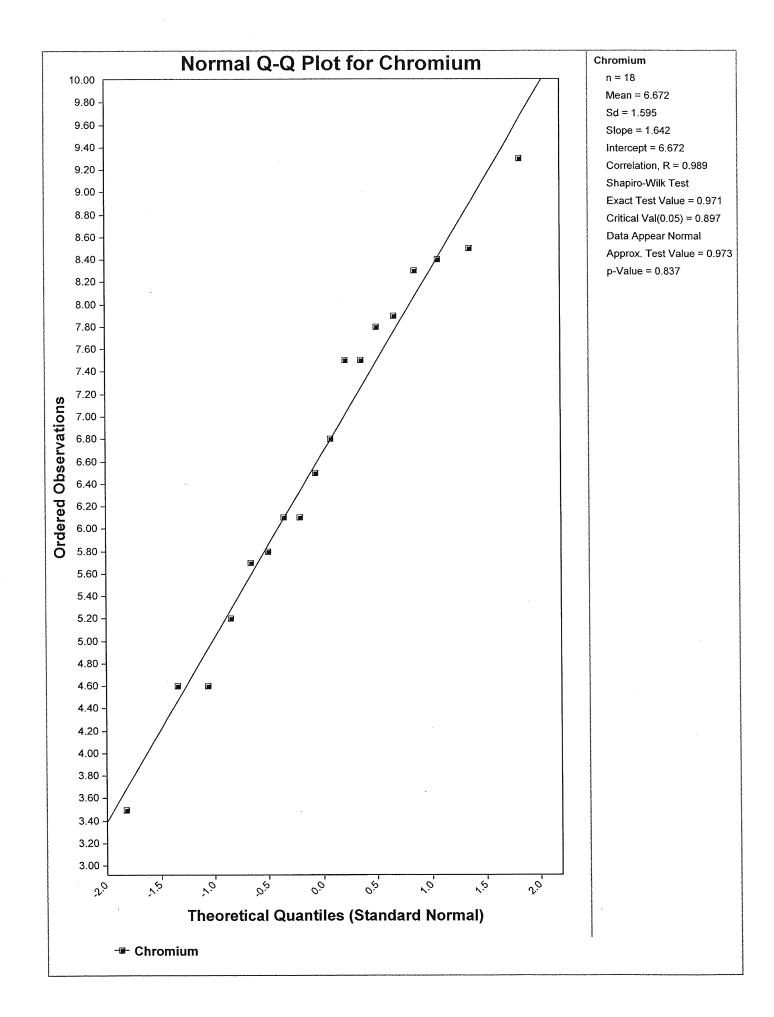
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	of Valid Observations	18					
	Distinct Observations	15					
	Minimum	3.5					
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annaan mahara ina mahar kalamar inta ta'ny bahari taman na halana tanita di kata tanita di kata tanita di kata	Second Largest	8.5					****
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anna a tha an	SD	1.595	******				****
	oefficient of Variation	0.239			1. 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		
andala a shi anan an a	Skewness	-0.273					
ก, 1994 กรรร กรรรรรรรรรรรรรรรรรรรรรรรรรรรรรร	14 june en 16 e	<b></b>					****
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	90% Percentile (z)	8.716					
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an a	99% Percentile (z)	10.38					
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			Summary	Statistics	for Raw Fu	ll Dataset		19			****
Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Chromium	18	3.5	9.3	6.672	6.65	2.544	1.595	1.779	-0.273	-0.711	0.23
		****	Perce	entiles for	Raw Full Da	ataset			001100110-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0		
Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1	)50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Chromium	18	4.435	4.6	5.4	5.725	6.65	7.875	8.14	8.43	8.62	9.16

ante e presidente de la construction de la la construction de la la construction de la construction de la const	Outlier Tes	ts for Selec	ted Variable	:S			
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Test for Suspected Outliers with Rosner test	1				 		
					An and a second s		
Dixon's Outlier Test for Chromium	3				 		12-22-2000 (Internet State S
					 		1
Number of data = 18			formation and the second		 		*****
10% critical value: 0.424					 		
5% critical value: 0.475							
1% critical value: 0.561							
1. Data Value 9.3 is a Potential Outlier (Upp	er Tail)?						
							1
Test Statistic: 0.191	and a second				 		
For 10% significance level, 9.3 is not an outlie					-		
For 5% significance level, 9.3 is not an outlier.						1	
For 1% significance level, 9.3 is not an outlier.							
2. Data Value 3.5 is a Potential Outlier (Low	ar Taill?						1
	51 1011)!				 		
Test Statistic: 0.224							
	1991 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	1					
For 10% significance level, 3.5 is not an outlie				1			
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I OF T / Significance rever, 5.5 is not an Oddier	•				 		-

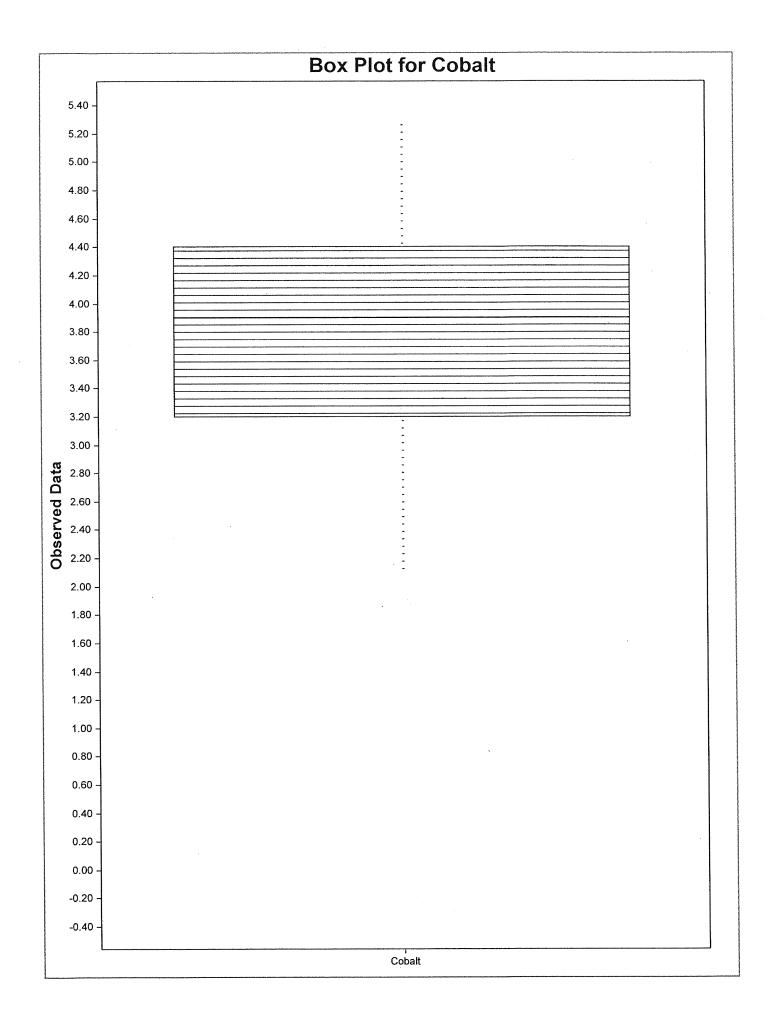
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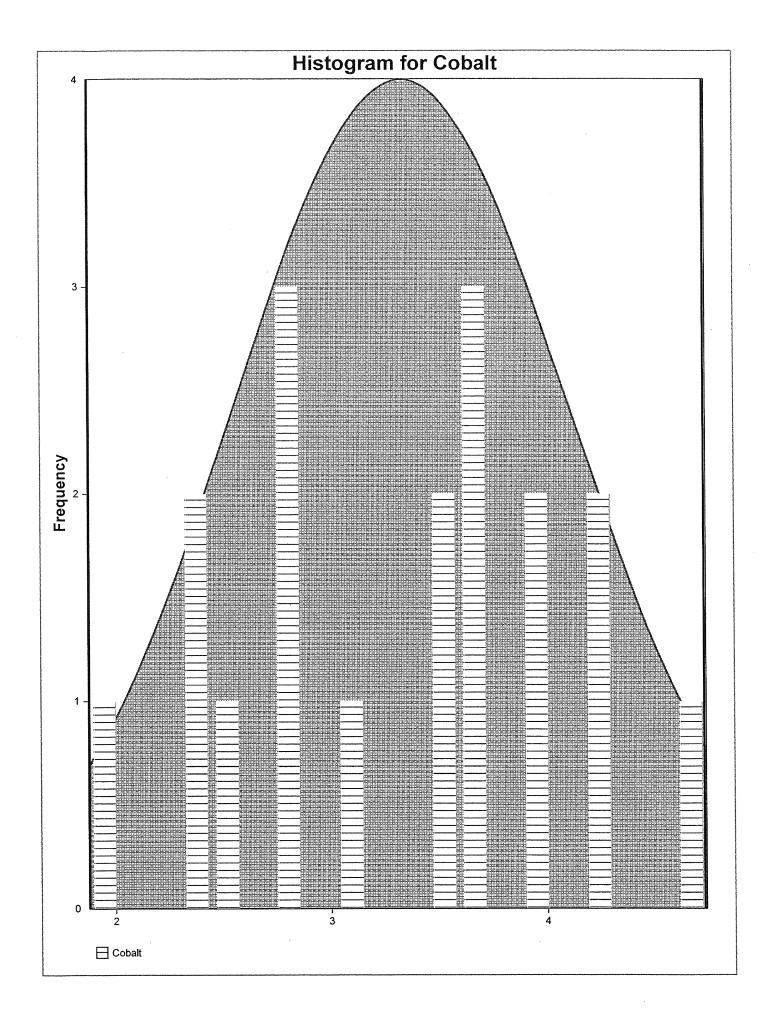


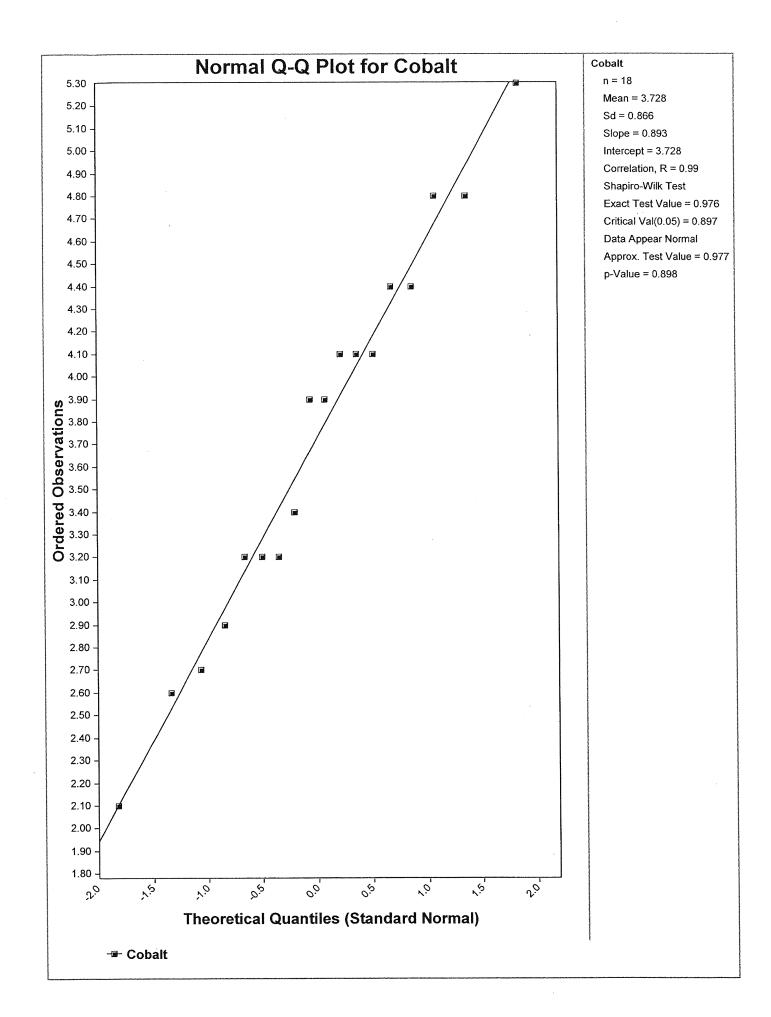


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Number	of Distinct Observations	11					
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angen na ananna a an ninadar an 1996 a bhliad an 1995 in Chathanna an chuaranna an ann	Median	3.9					
n an an an an an an an ann an an ann an	Third Quartile	4.325					
a a de la de la defensión de la	SD	0.866					
und dat die einder die konnennen ook waar oner en kaak dat kan die kaar dat keel dat eerste het. Het en keel ke	Coefficient of Variation	0.232					
uy nananan mahan mahadada kata kata kata bara a sa	Skewness	-0.0766					
saa ha da da waxaa ka ku waxaa ka waxaa waxaa waxaa ku wada Muundada bish ha waxaa da aha da ahaa ahaa ahaa ah							
	tribution Test						
	napiro Wilk Test Statistic	0.976					
	apiro Wilk Critical Value	0.897	****				
Data appear Normal a	t 5% Significance Level						
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Background Statistics As							
na a successive a new contract of the contract	90% Percentile (z)	4.838					
	95% Percentile (z)	5.153					
aan ay daha ahaa ahaa ahaa ahaa ahaa ahaa a	99% Percentile (z)	5.743					
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	Tolerance Factor K	2.453					
95% l	JTL with 95% Coverage	5.853					
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	95% UPL (t)	5.276					
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Full Precision	OFF					
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Test for Suspected Outliers with Rosner test	1					
Dixon's Outlier Test for Cobalt					-	
Number of data = 18	*****					
10% critical value: 0.424						
5% critical value: 0.475	***************************************					
1% critical value: 0.561						
1. Data Value 5.3 is a Potential Outlier (Upp	er Tail)?					
Test Statistic: 0.192						
For 10% significance level, 5.3 is not an outlier						
For 5% significance level, 5.3 is not an outlier.					1	
For 1% significance level, 5.3 is not an outlier.				 		
2. Data Value 2.1 is a Potential Outlier (Lowe	er Tail)?					
Test Statistic: 0.222						
For 10% significance level, 2.1 is not an outlier				 		
For 5% significance level, 2.1 is not an outlier.				 1		
For 1% significance level, 2.1 is not an outlier.				 <u> </u>		

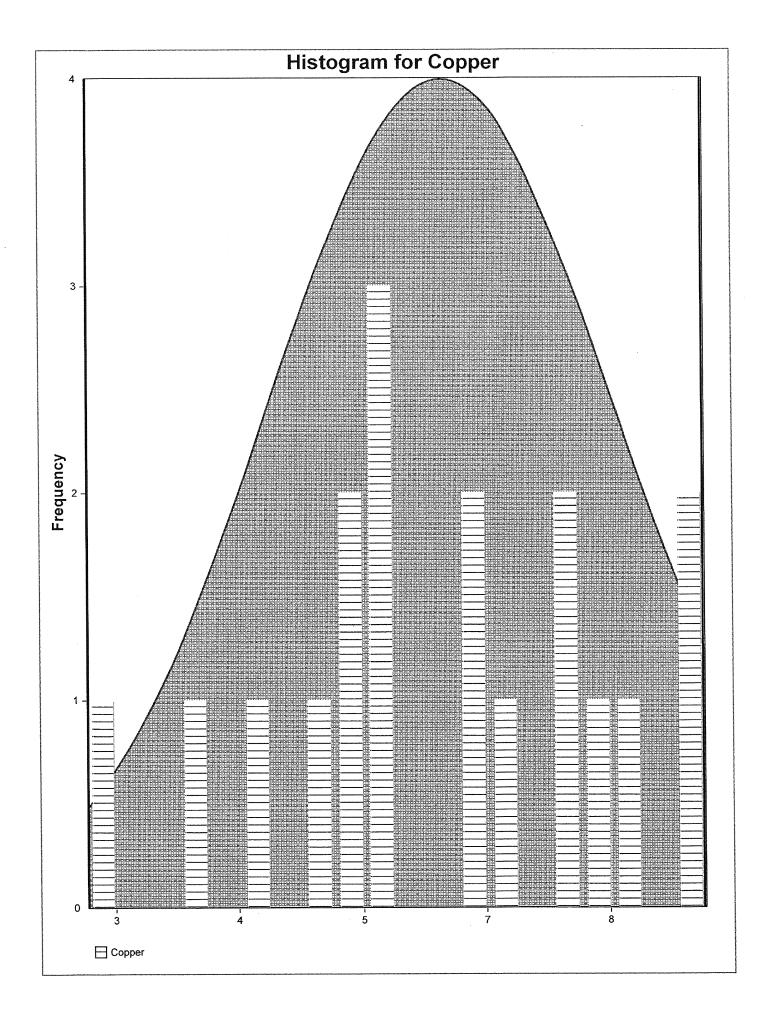


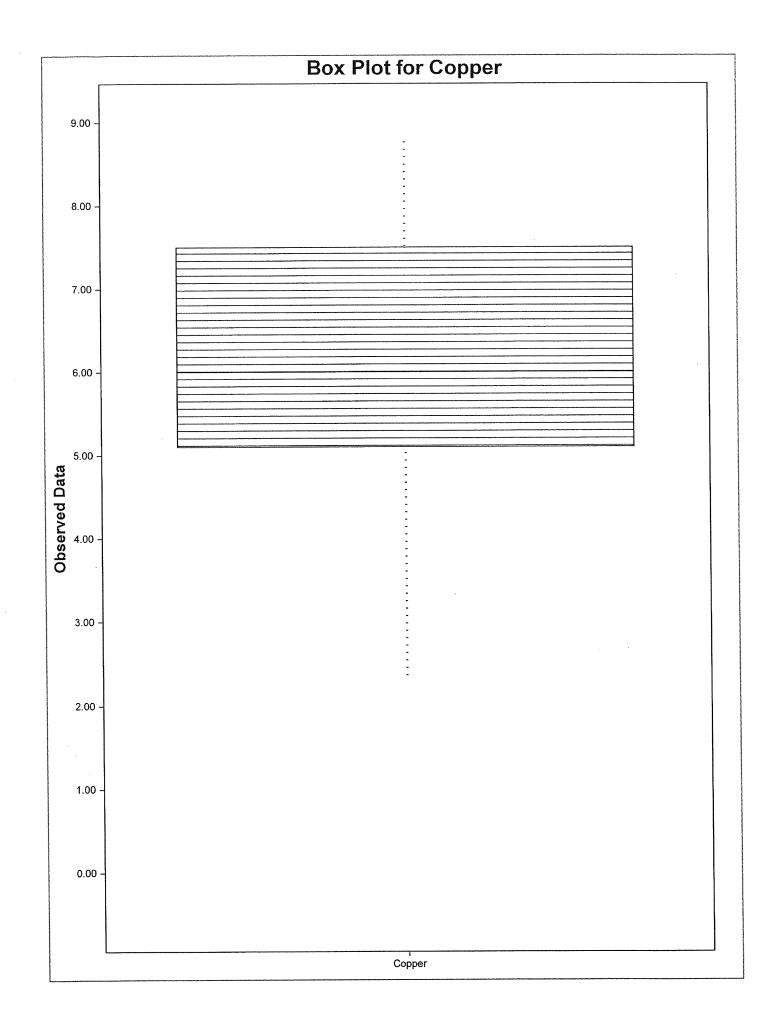


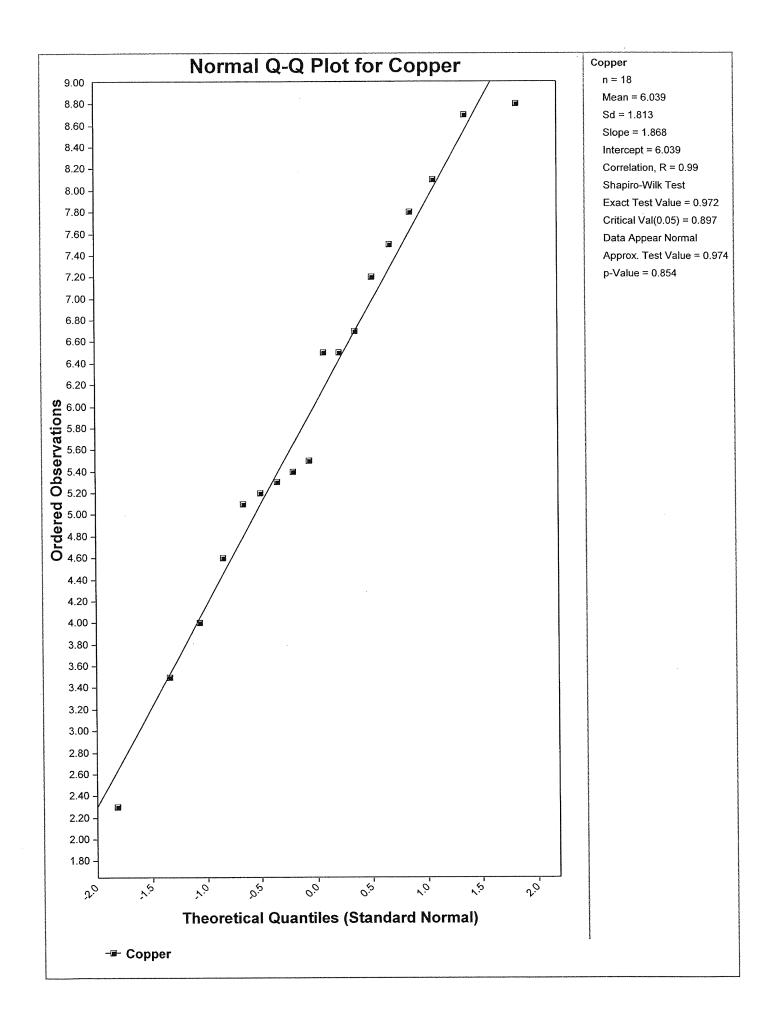


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	er of Valid Observations	18						
Number	of Distinct Observations	17					aa kaa ahaa kaa ahaa ahaa ahaa ahaa aha	
s v Su namin y Malagaan Sunan Akkeeminin y Kinana midan keemina widda keemin a Malaberro (1907)	Minimum	2.3						
	Maximum	8.8					****	
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	Coefficient of Variation	0.3 -0.256	46.1.486.5.1174.00114.0014.001					
	Skewness	-0.256						
Normal Dic	tribution Test		****					
	apiro Wilk Test Statistic	0.972				*****		
	apiro Wilk Critical Value	0.897						
	t 5% Significance Level	0.007				en de la construcción de la constru		
				00.00.00 - 00.00 - 00.00 - 00.00 - 00.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00 - 0.00				
Background Statistics As	suming Normal Distributio	n		****	a ad deserves the same destination of the			
	90% Percentile (z)	 8.362						
an a	95% Percentile (z)	9.021				an 1999 - an 1980 a 1997 Ann an Anna an		
nda, dalar olah karaka disebak dikisi dara seri dan menangkan karaka karaka karaka karaka karaka karaka karaka Man	99% Percentile (z)	10.26						
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95% L	JTL with 95% Coverage	10.49				an ar a hanna an an an an ann ann an a		
a waa walaada waala laha laha laha kata kata kata ahaa ahaa ahaa kata kat	- I							
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Test for Suspected Outliers with Rosner test	1	*****			*******			
Dixon's Outlier Test for Copper								
Number of data = 18								
10% critical value: 0.424								
5% critical value: 0.475						1949-1949-1949-1949-1947-1949-1949-1949-		
1% critical value: 0.561	******							
1. Data Value 8.8 is a Potential Outlier (Upp	er Tail)?							
Test Statistic: 0.146								
For 10% significance level, 8.8 is not an outlie	r.							
For 5% significance level, 8.8 is not an outlier	ay annonen an anna an							
For 1% significance level, 8.8 is not an outlier	****							
2. Data Value 2.3 is a Potential Outlier (Low	er Tail)?		****					
			*****					
Test Statistic: 0.293								
For 10% significance level, 2.3 is not an outlie	r.			1				
For 5% significance level, 2.3 is not an outlier								
For 1% significance level, 2.3 is not an outlier								
₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩		1						







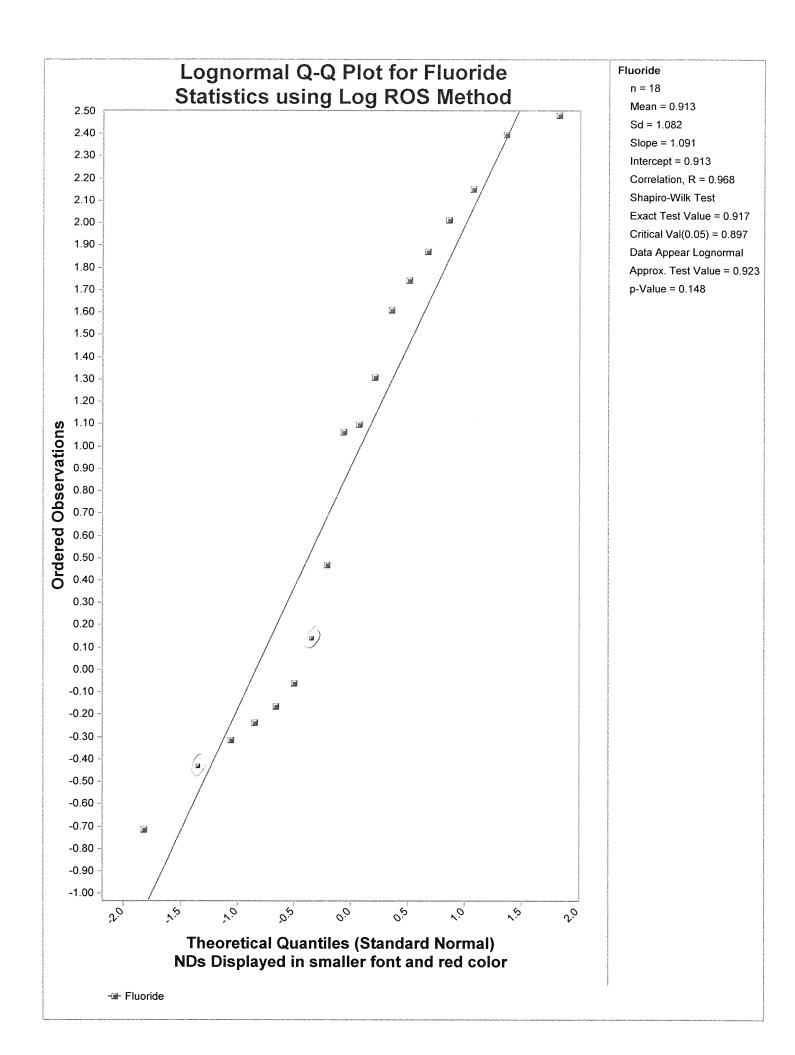
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	5% UTL 95% Coverage	35.43					
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	95% UPL (t) 90% Percentile (z)	17.24 9.972					

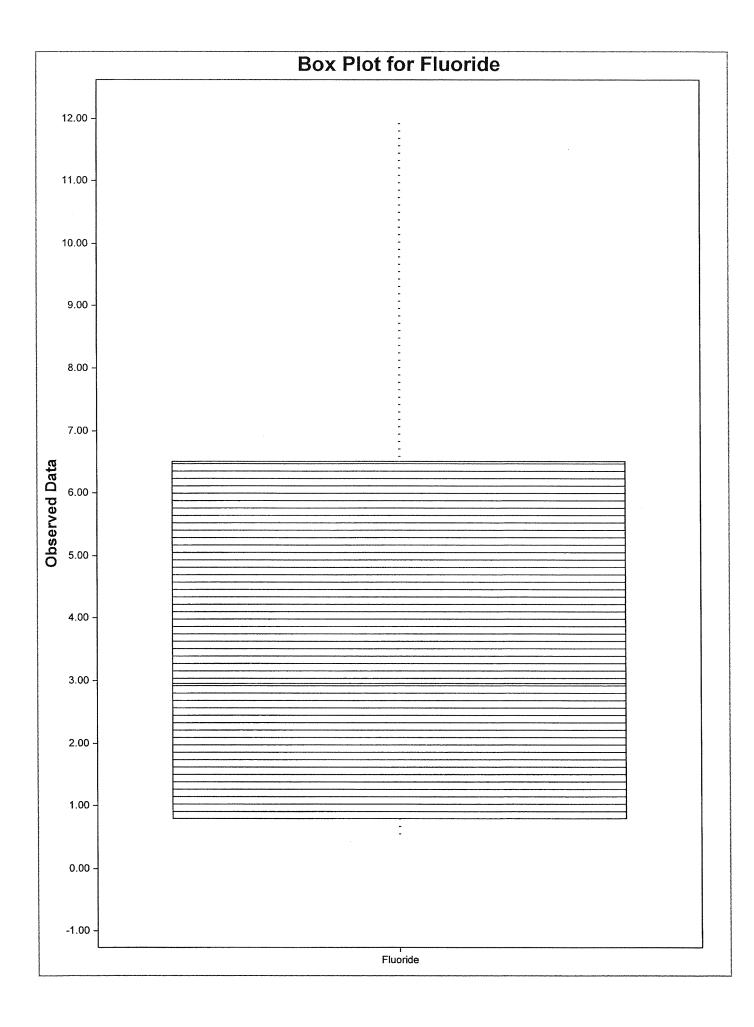
95% Percentile (z)	14.78					adhrin ( ceanaidh a riostiúin i ni ceann a br	infloren in an har de se
99% Percentile (z)	30.89						
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$\mathbb{S}^{(2)}$	3.638						
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95% UTL 95% Coverage	12.97						
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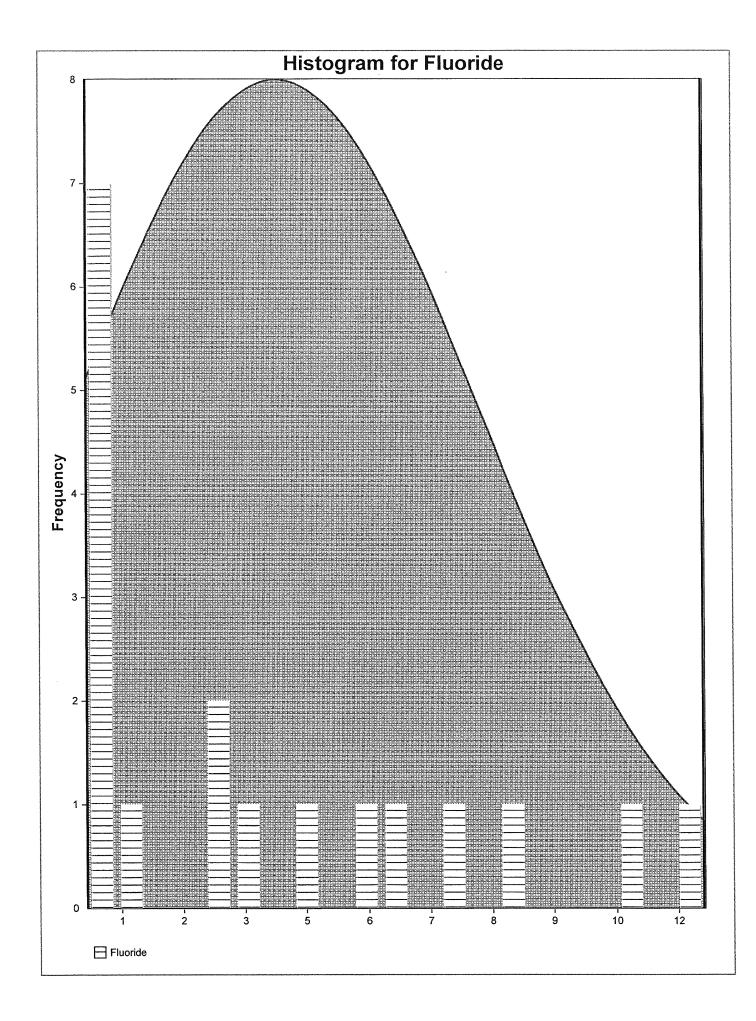
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Dixon's Outlier Test for Fluoride					-		
Number of data = 18			1890				
10% critical value: 0.424							
5% critical value: 0.424							
1% critical value: 0.561		alana katalan dari katalan katalan di katala					
1. Data Value 12 is a Potential Outlier (Upper	Tail)?						[ 
Test Statistic: 0.302							
For 10% significance level, 12 is not an outlier.							
For 5% significance level, 12 is not an outlier.		~~~~~					
For 1% significance level, 12 is not an outlier.							
2. Data Value 0.49 is a Potential Outlier (Low	er Tail)?					 	
Test Statistic: 0.032						 	
For 10% significance level, 0.49 is not an outlie	\r						
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For 5% significance level, 0.49 is not an outlier For 1% significance level, 0.49 is not an outlier				1		 	
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	Fluoride	D_Fluoride	NROS_Fluoride	LnROS_Fluoride	GROS_Fluoride
1	0.94	1	0.94	0.94	0.94
2	11	1	11	11	11
3	1.5	0	-0.559740528989136	0.649056568645270	0.0001
4	8.6	1	8.6	8.6	8.6
5	1.6	1	1.6	1.6	1.6
6	7.5	1	7.5	7.5	7.5
7	0.73	1	0.73	0.73	0.73
8	6.5	1	6.5	6.5	6.5
9	0.49	1	0.49	0.49	0.49
10	5	1	5	5	5
11	0.79	1	0.79	0.79	0.79
12	5.7	1	5.7	5.7	5.7
13	1.5	0	1.38585945013217	1.15127130338858	0.98005433455784
14	2.9	1	2.9	2.9	2.9
15	0.85	1	0.85	0.85	0.85
16	12	1	12	12	12
-17	3.7	1	3.7	3.7	3.7
18	3	1	3	3	3

Selected Substition Method

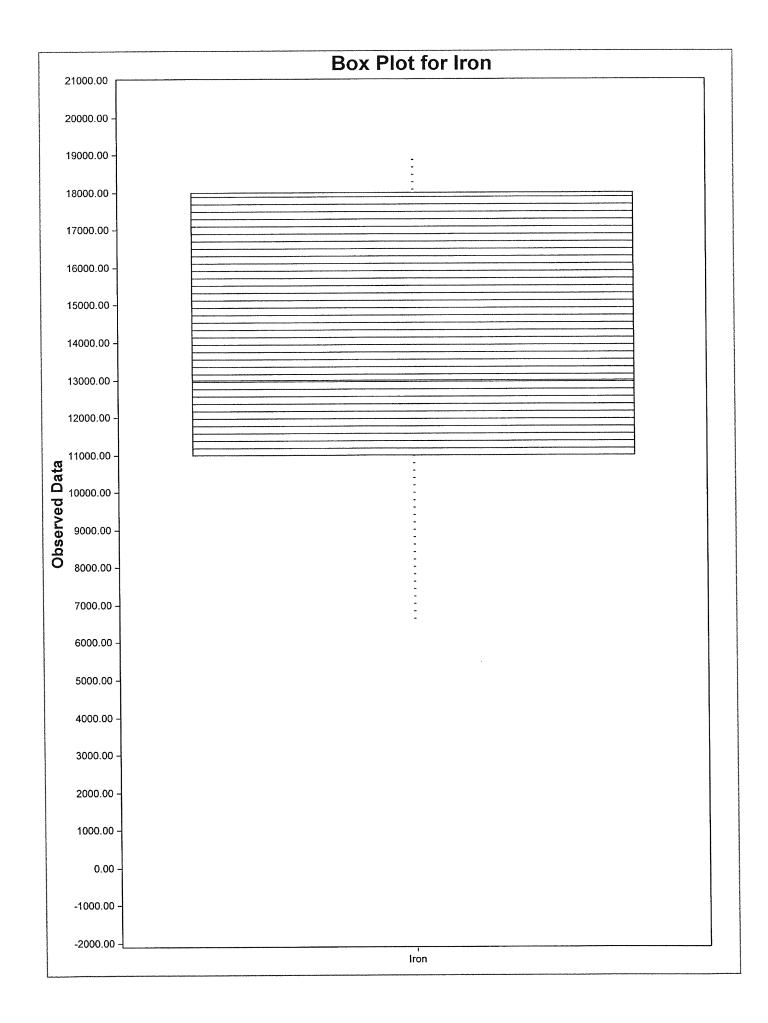


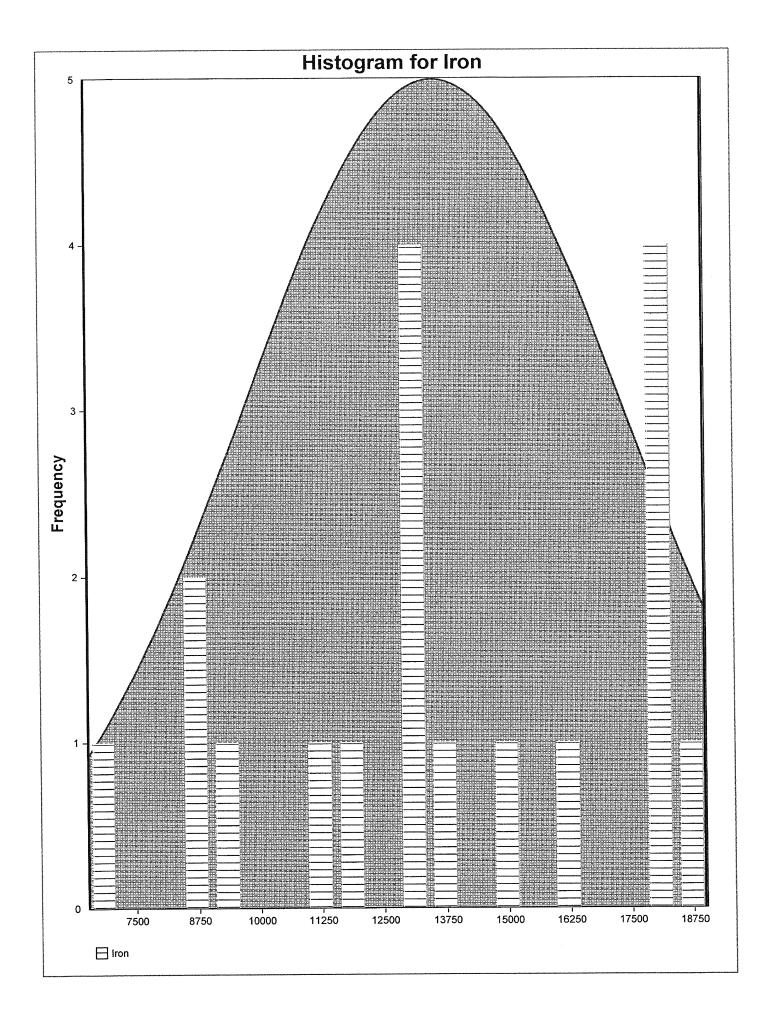


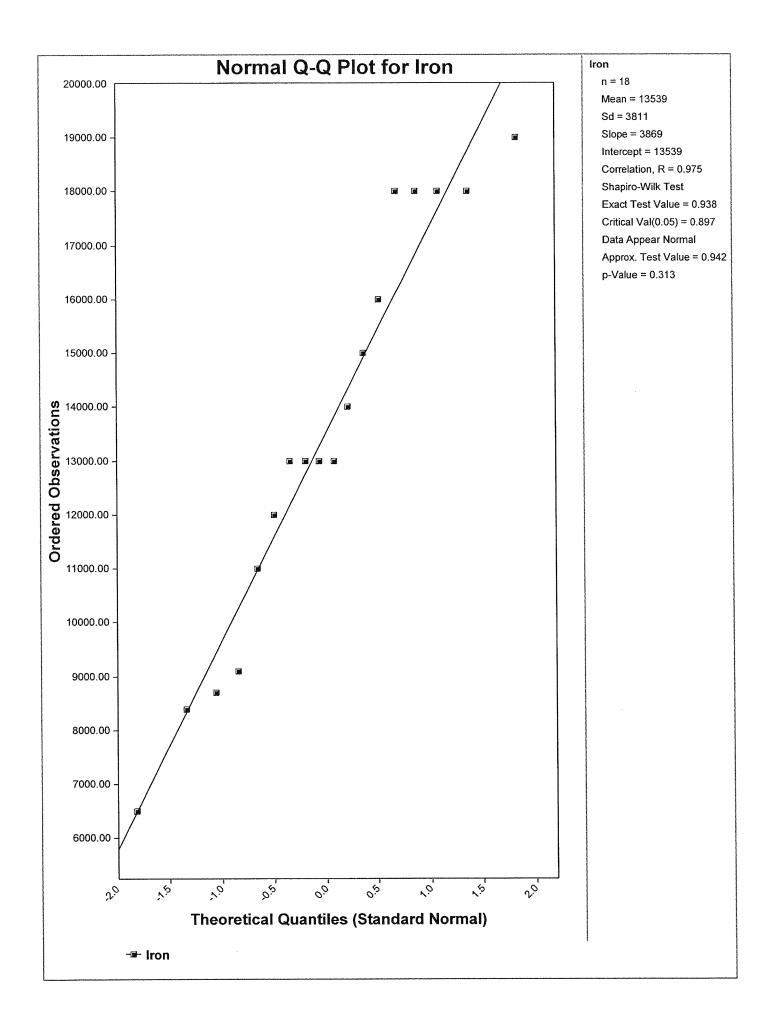


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	Coefficient of Variation	0.281					
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Number of data = 18			-						
10% critical value: 0.424									
5% critical value: 0.475							<u> </u>		
1% critical value: 0.561	20202000000000000000000000000000000000								
1. Data Value 19000 is a Potential Outlier (U									
1. Data value 19000 is a Potential Outlief (0	ipper rail):		1						
Test Statistic: 0.097		1							
For 10% significance level, 19000 is not an out	tlier.	1							
For 5% significance level, 19000 is not an outlier.									
For 1% significance level, 19000 is not an outli				-					
2. Data Value 6500 is a Potential Outlier (Lower Tail)?									
	*****								
Test Statistic: 0.191									
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For 10% significance level, 6500 is not an outl	ier.								
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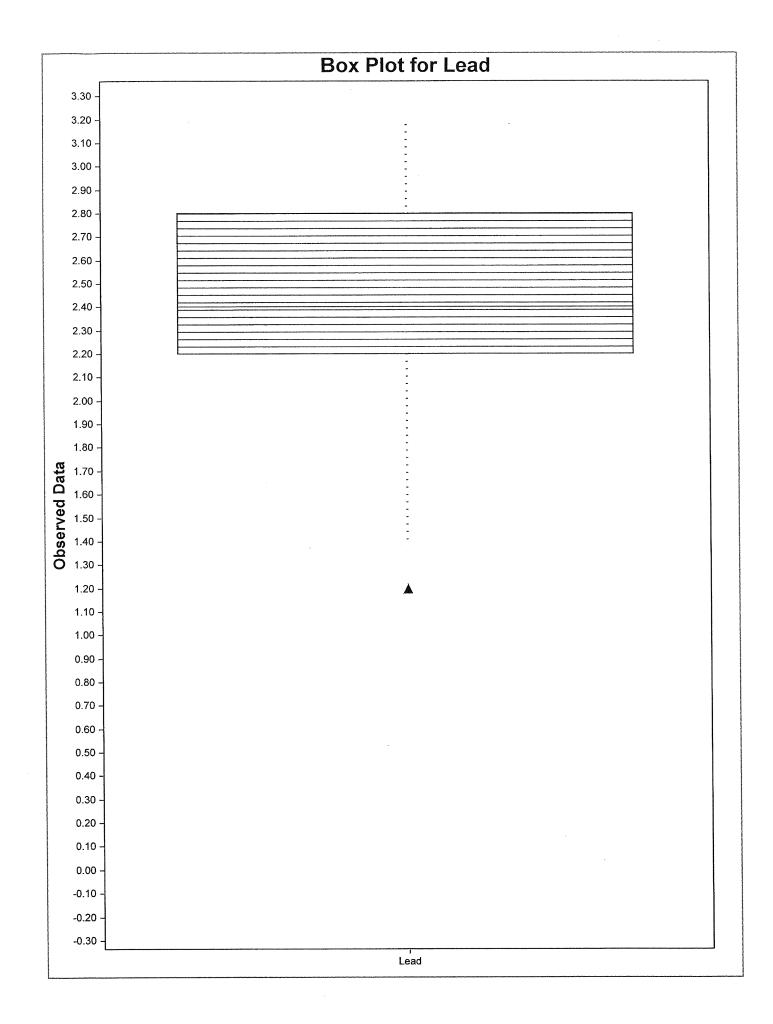


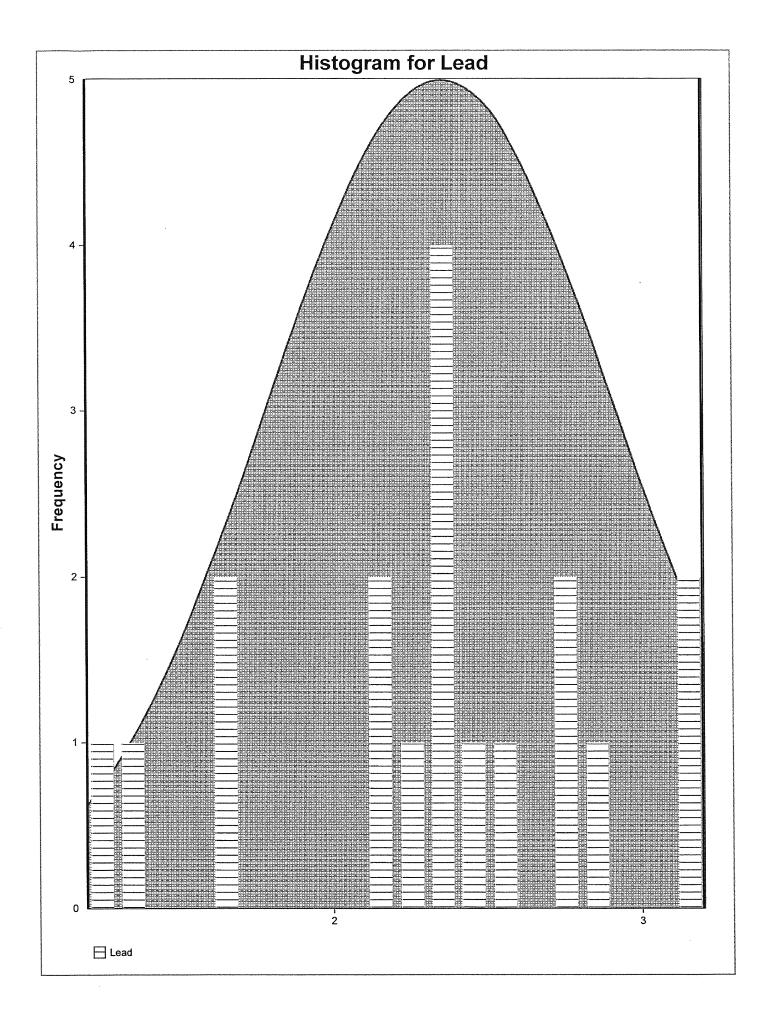


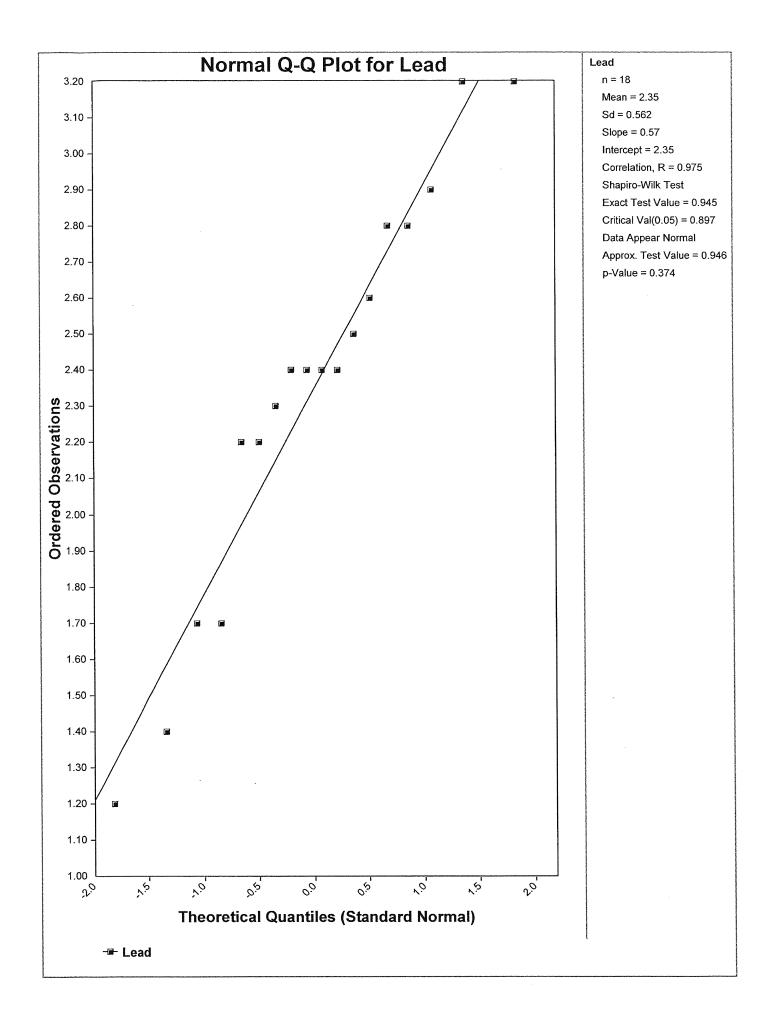
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Dixon's Outlier Test for Lead									
Number of data = 18									
10% critical value: 0.424									
5% critical value: 0.475									
1% critical value: 0.561									
1. Data Value 3.2 is a Potential Outlier (Uppe	er Tail)?						·		
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For 10% significance level, 3.2 is not an outlier	•							1	
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2. Data Value 1.2 is a Potential Outlier (Lowe	er rail)?								
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Test Statistic: 0.294									
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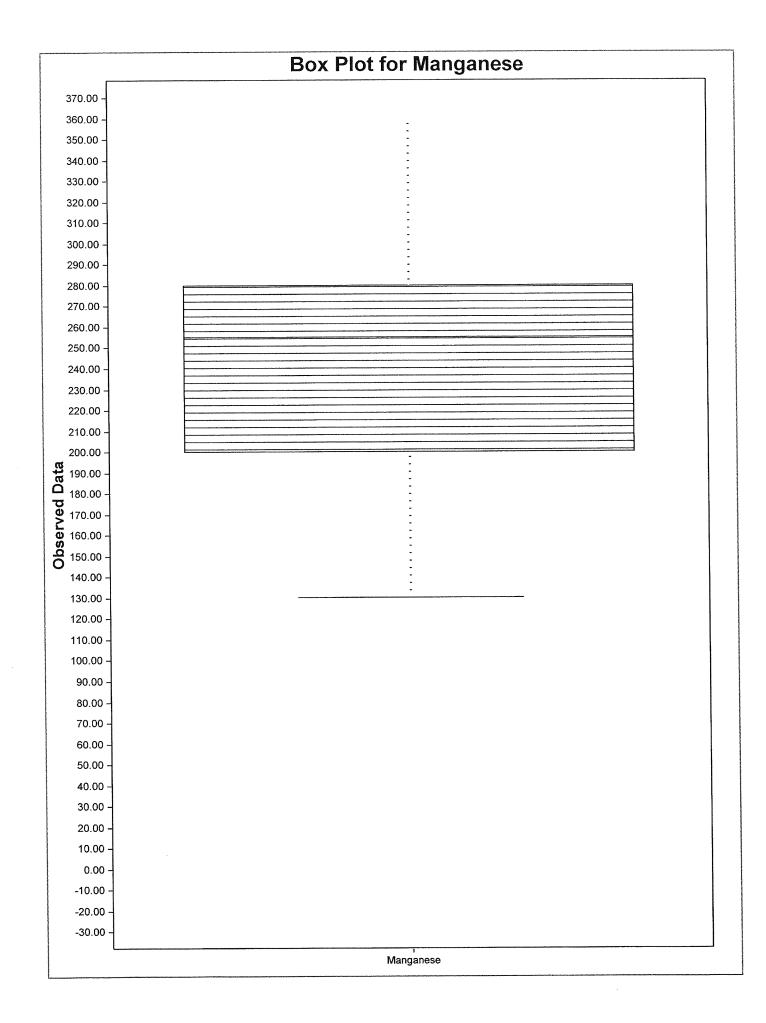


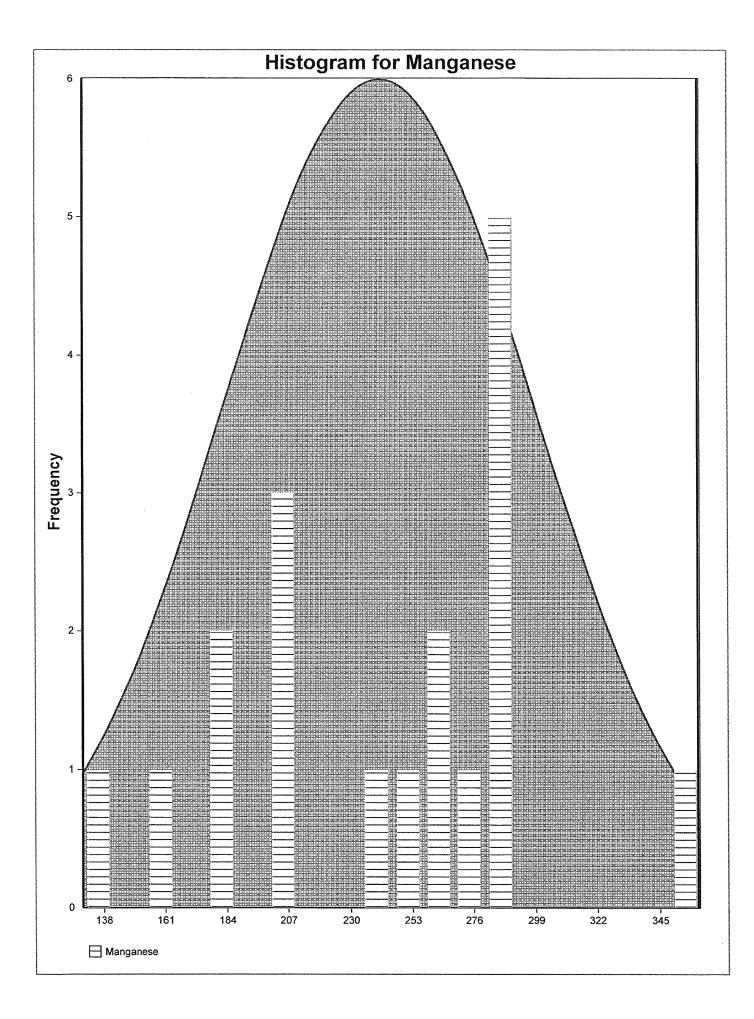


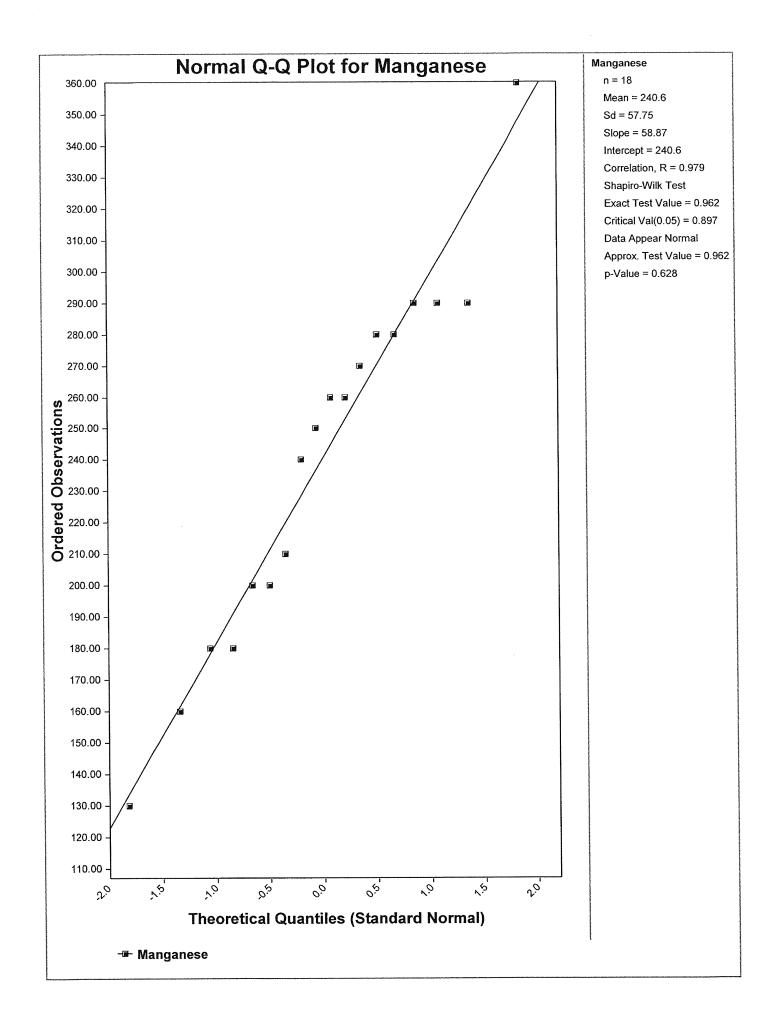


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an an de de castal de la secta de la companya de companya de companya de companya de de companya de la companya	Coefficient of Variation	0.24	*****					
an na an an ann an ann an ann an ann an	Skewness	-0.0857	an weed a construction of the second s		ereddael de het he e - e e het han			
Normal Die	tribution Test							
	hapiro Wilk Test Statistic	0.962	18.5 MA A AMAGA ASPENDE (19.444)					
	apiro Wilk Critical Value	0.897			*****			
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na n	99% Percentile (z)	374.9	en constante en como activa					
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aan ah	Tolerance Factor K	2.453	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -					
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Dixon's Outlier Test for Manganese	9							
Number of data = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561		-						
1. Data Value 360 is a Potential Outlier (Upp	er Tail)?							
Test Statistic: 0.389								
For 10% significance level, 360 is not an outlie	r.							
For 5% significance level, 360 is not an outlier.					ļ			
For 1% significance level, 360 is not an outlier.								
2. Data Value 130 is a Potential Outlier (Lowe	er Tail)?							
Test Statistic: 0.313								
For 10% significance level, 130 is not an outlie	٢.							
For 5% significance level, 130 is not an outlier.			1					
For 1% significance level, 130 is not an outlier.						<u> </u>		







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an se se se salatata e tan na se tan tan na se na	Third Quartile	0.0133						
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	Coefficient of Variation	0.346						
	Skewness	-0.713						
	tribution Test							
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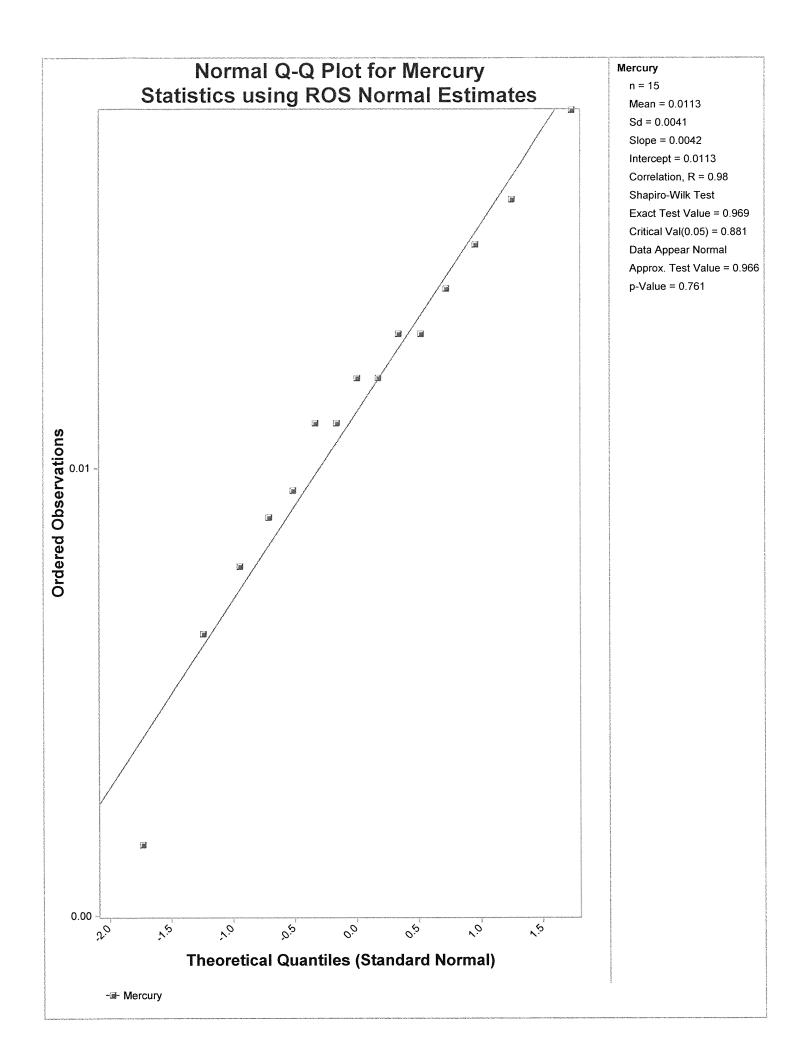
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1% critical value: 0.595		a bahar man a seria sindari sarta a mata a sarta.		- 1997 - A. M.				
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1. Data Value 0.12 is a Potential Outlier (Upp	per Tail)?	an karanan wana menanana						
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Test Statistic: 0.927								
For 10% significance level, 0.12 is an outlier.		******						*****
For 5% significance level, 0.12 is an outlier.								
For 1% significance level, 0.12 is an outlier.								
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For 5% significance level, 0.0016 is not an outline								
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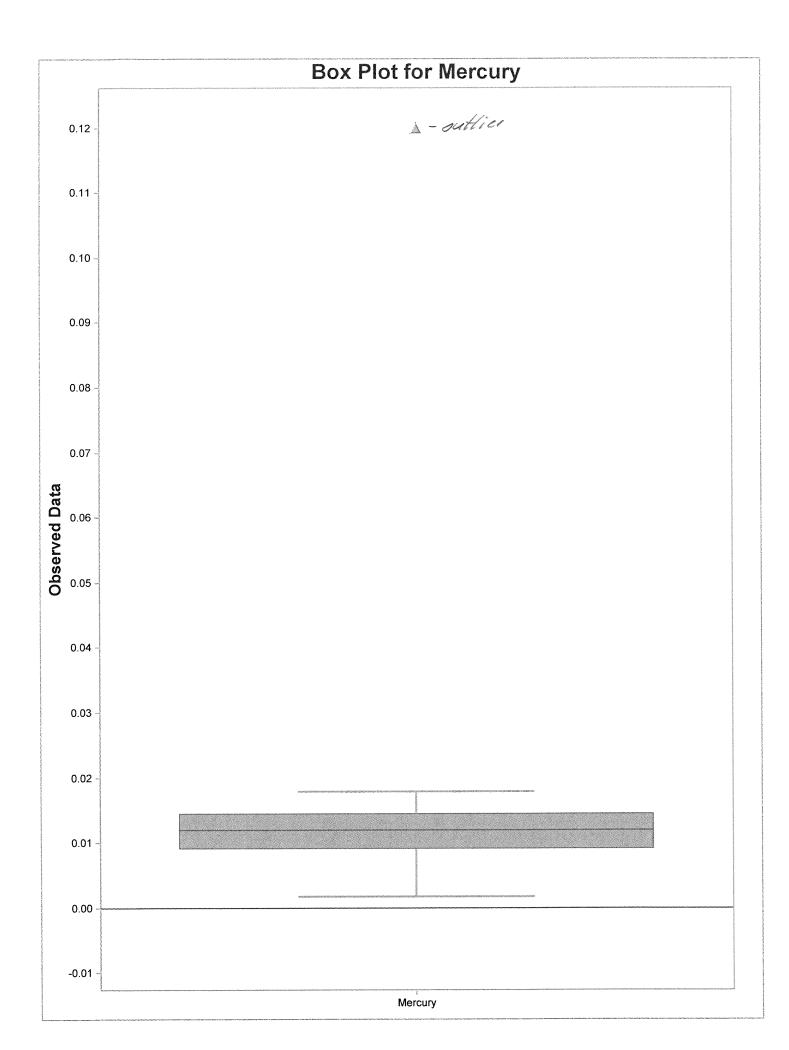
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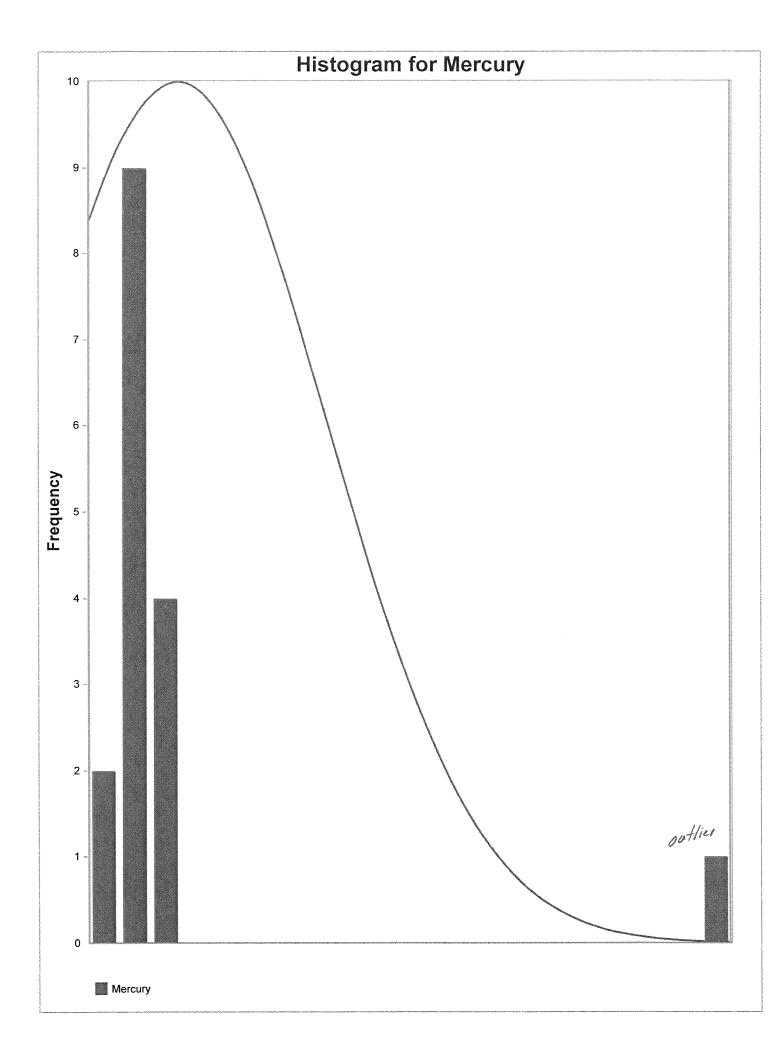
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Dixon's Outlier Test for Mercury								
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10% critical value: 0.472								
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1. Data value 0.018 is a Potential Outlier (O	pper rain)?							
Test Statistic: 0.294								
For 10% significance level, 0.018 is not an out	lier.							
For 5% significance level, 0.018 is not an outlie		galable des sin de in-outout				-	· · · · · · · · · · · · · · · · · · ·	
For 1% significance level, 0.018 is not an outlie				a.,		1		
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2. Data Value 0.0016 is a Potential Outlier (L	ower Tail)?							
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Test Statistic: 0.463						1. 2000 h 0.1 k 0.1 m 0 m 0 h 1 1 1 1 1 1 h 1		
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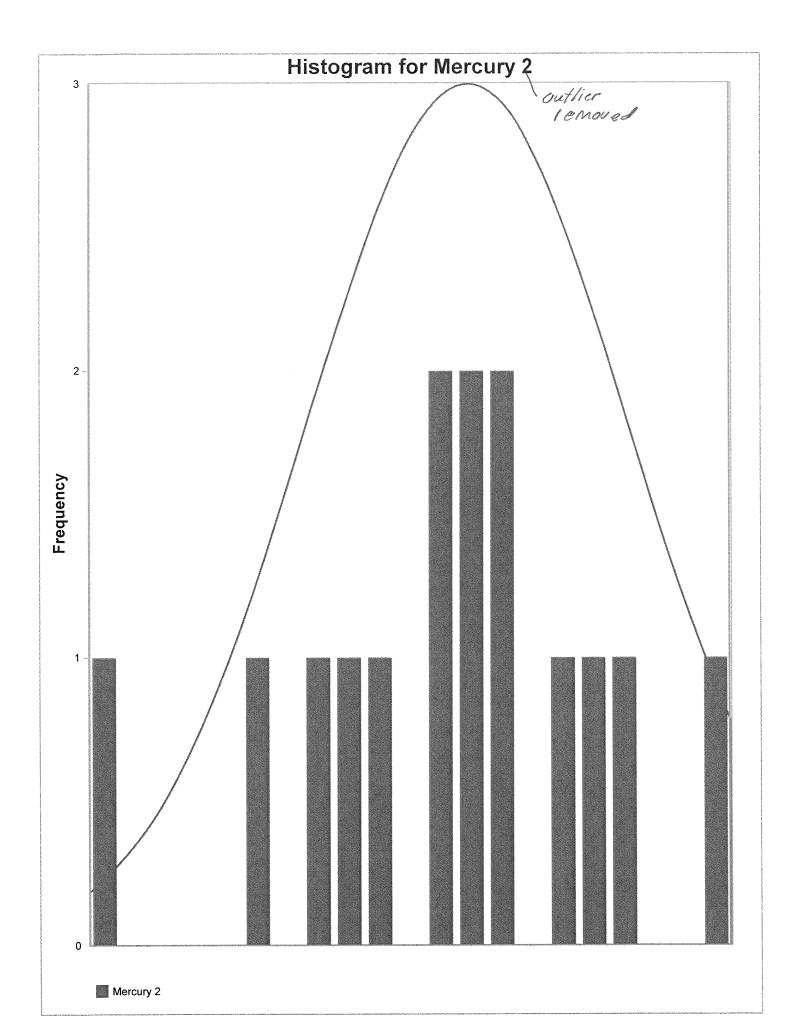
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	Mercury	D_Mercury	NROS_Mercury	LnROS_Mercury	GROS_Mercury
1	0.012	1	0.012	0.012	0.012
2	0.018	1	0.018	0.018	0.018
3	0.0095	1	0.0095	0.0095	0.0095
4	0.016	1	0.016	0.016	0.016
5	0.011	1	0.011	0.011	0.011
6	0.011	1	0.011	0.011	0.011
7	0.014	1	0.014	0.014	0.014
8	0.013	1	0.013	0.013	0.013
9	0.015	1	0.015	0.015	0.015
10	0.0078	1	0.0078	0.0078	0.0078
11	0.0016	1	0.0016	0.0016	0.0016
12	0.012	1	0.012	0.012	0.012
13	0.013	1	0.013	0.013	0.013
14	0.0089	1	0.0089	0.0089	0.0089
15	< 0.033	0	0.00929043670754515	0.00795440704374851	0.0096747048893058
16	0.0063	1	0.0063	0.0063	0.0063
17	<0.033	0	0.0132562299591215	0.0128578257294059	0.0138729664471379

Normal distribution data used for substitution







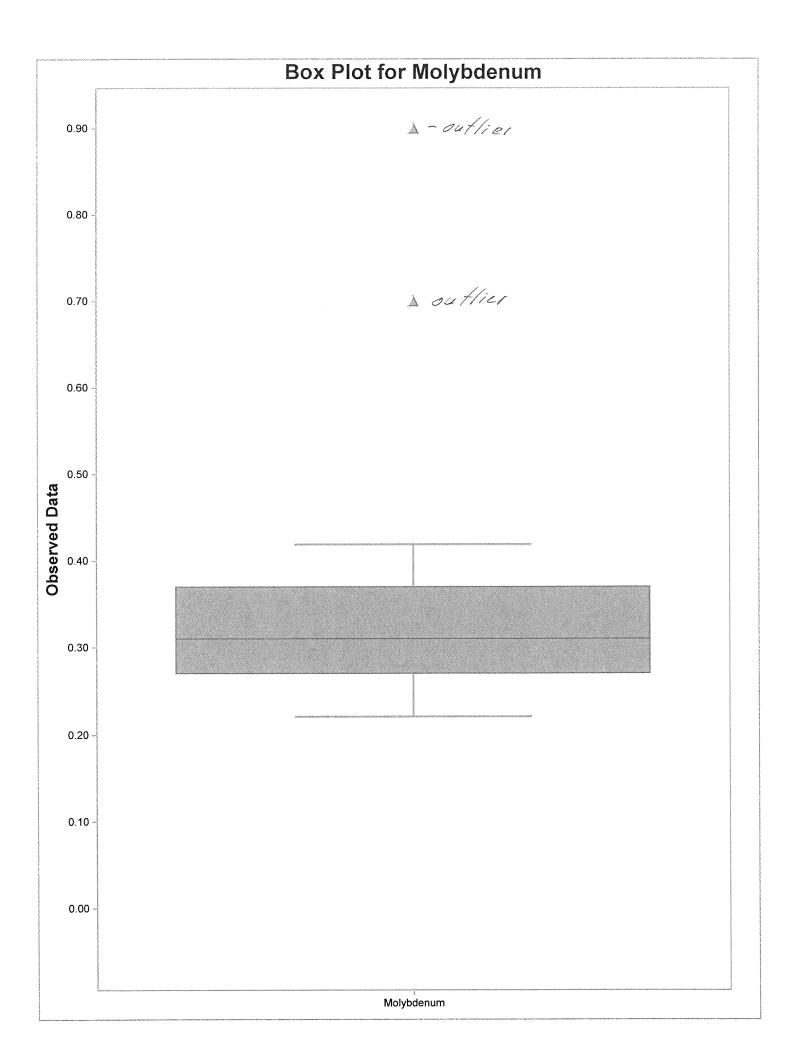


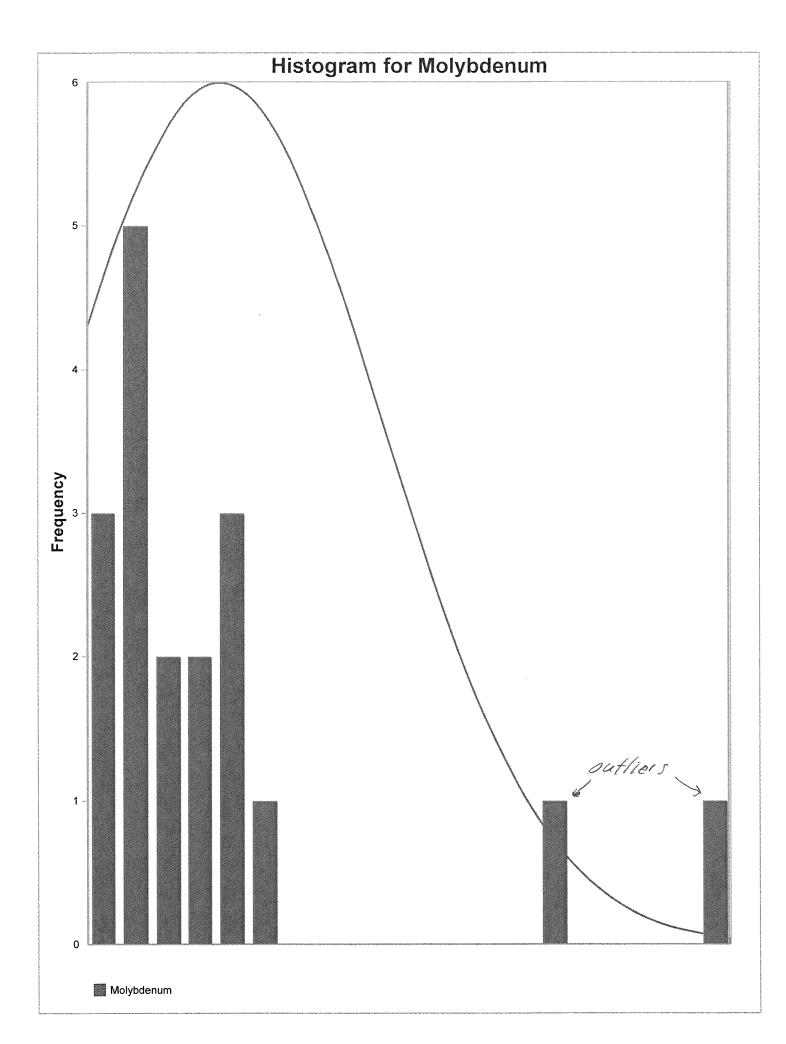
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	Mean	0.306					1000 F0 0.00 1 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Geometric Mean	0.301			1		
	First Quartile	0.27					
	Median	0.295					
	Third Quartile	0.338					
	SD	0.0546					
(	Coefficient of Variation	0.179					
annaan ar	Skewness	0.465		1.4 / A. and a 1.00 - 2 and -			
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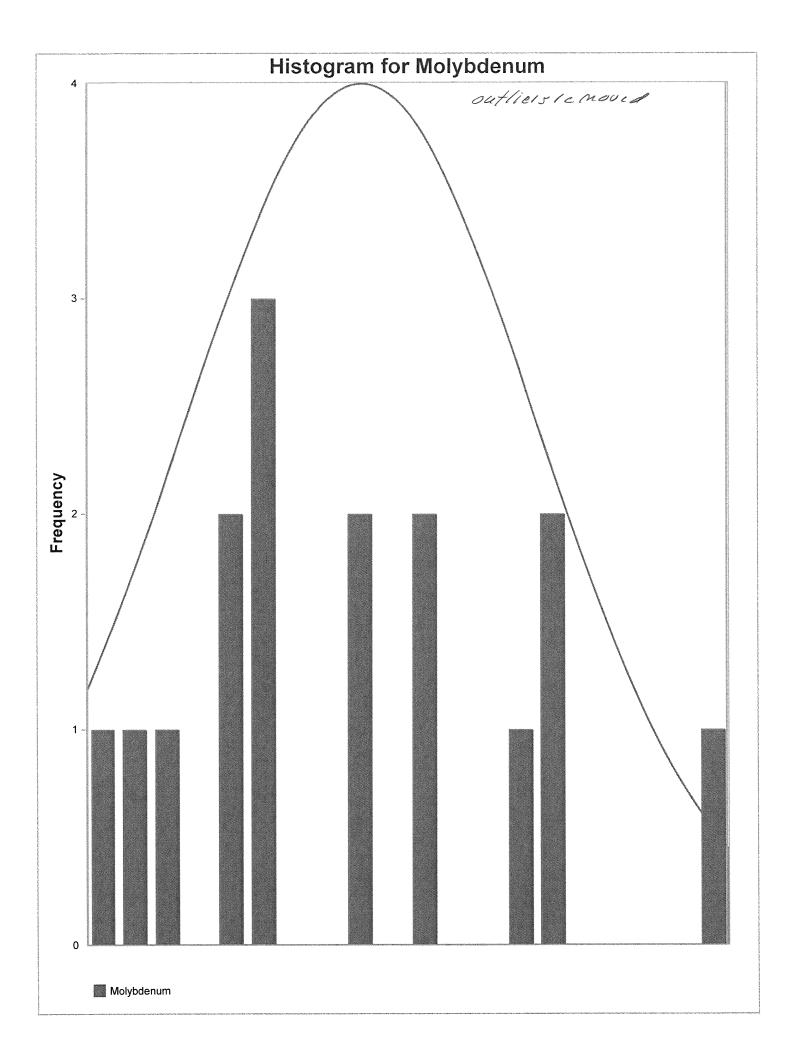
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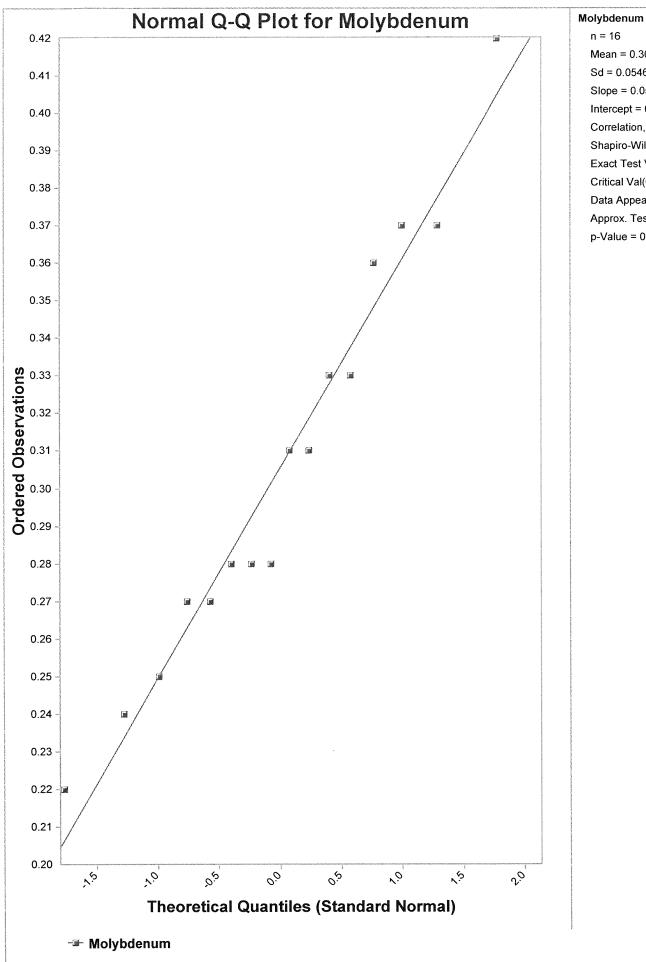
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Test for Suspected Outliers with Rosner test	1			001.047F 54689.0566.0666.7560.0000.00	an a		********
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Dixon's Outlier Test for Molybdenu	m						
Number of data = 17					1.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
10% critical value: 0.438							
5% critical value: 0.49					5.5.5.5.8.8.8.8.8.8.5.5.5.5.5.5.5.5.5.5		
1% critical value: 0.577	aan a daa daddad daa daddad dadd adda adda			*****			
va halinna "har na naghair ng	5						
1. Data Value 0.7 is a Potential Outlier (Upp	er Tail)?						a
Test Statistic: 0.733				*****		E. 3 P. 4 P. 10 P.	
						en wardet of backs of barres and	****
For 10% significance level, 0.7 is an outlier.	an anna a an an an Anna Anna An						
For 5% significance level, 0.7 is an outlier.							
For 1% significance level, 0.7 is an outlier.	******			*****			
	<b>T</b> iNO						
2. Data Value 0.22 is a Potential Outlier (Low	/er iaii)?			······	****		
Test Statistic: 0.200	*****		14.701 2004 8 14.000 Million - 16.712 Fran				
				******			
For 10% significance level, 0.22 is not an outli							
For 5% significance level, 0.22 is not an outlie							
For 1% significance level, 0.22 is not an outlier	r.		1				

an a	Outlier Te	sts for Sele	cted Variab	les			 
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From File	WorkShee	et.wst		540.01.00.000.000.000.0000.000	**********		 
Full Precision	OFF				*****		 
Test for Suspected Outliers with Dixon test	1				** **************************	an a	an a
Test for Suspected Outliers with Rosner test	1						 
					na ba pares a tra tra transferencia		 
Dixon's Outlier Test for Molybdenu	<b>m</b>						
Number of data = 16							 a for a state of the second states
Number of data = $16$ 10% critical value: 0.454						and the second states of the second	 
5% critical value: 0.434							
1% critical value: 0.595							
1. Data Value 0.42 is a Potential Outlier (Up	per Tail)?						
Test Statistic: 0.294							
For 10% significance level, 0.42 is not an outlie	er.						
For 5% significance level, 0.42 is not an outlier	•			17 - NA NATAGAN GAN			
For 1% significance level, 0.42 is not an outlier							 
2. Data Value 0.22 is a Potential Outlier (Low	ver Tail)?						 
Test Statistic: 0.200							
		*****************			A.0004 & S.1004 A.0.0 A. 000. 000 A.0.0 A.		 
For 10% significance level, 0.22 is not an outlie						-	 
For 5% significance level, 0.22 is not an outlier						1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	 
For 1% significance level, 0.22 is not an outlier	<b>.</b>	2					





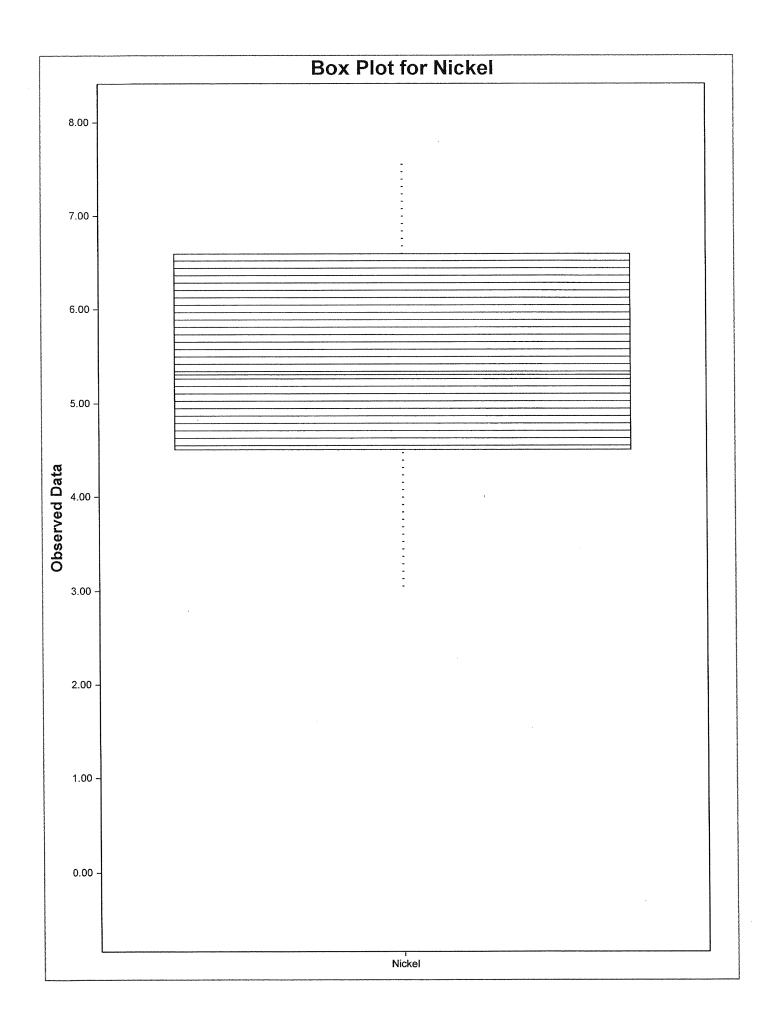


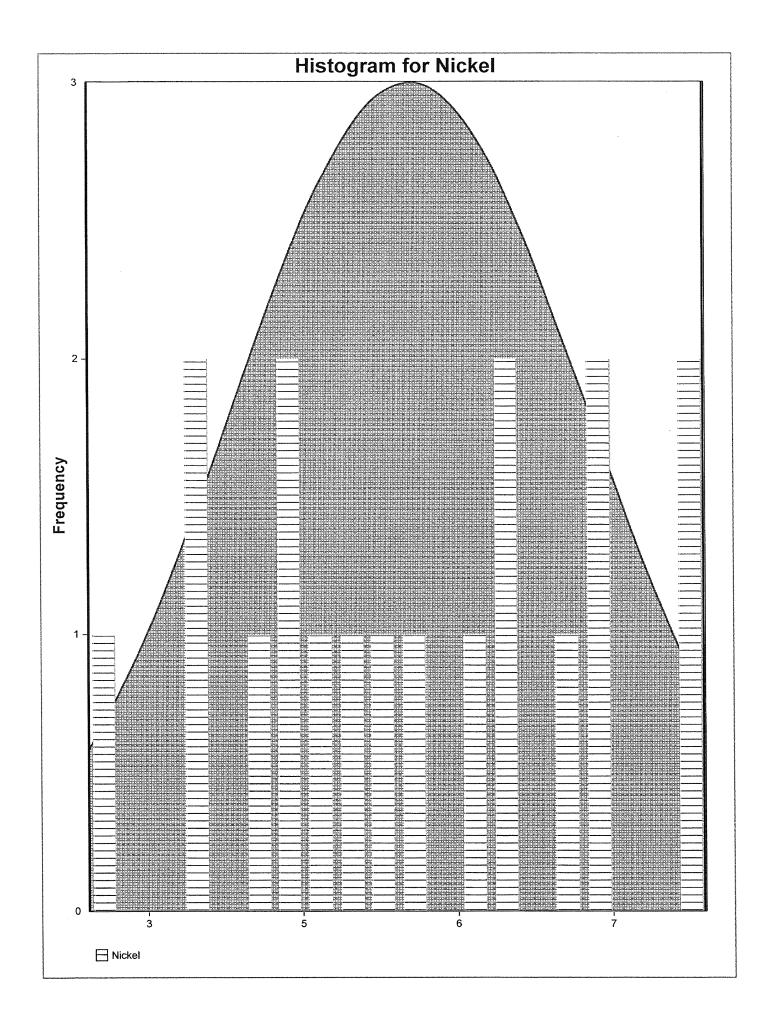


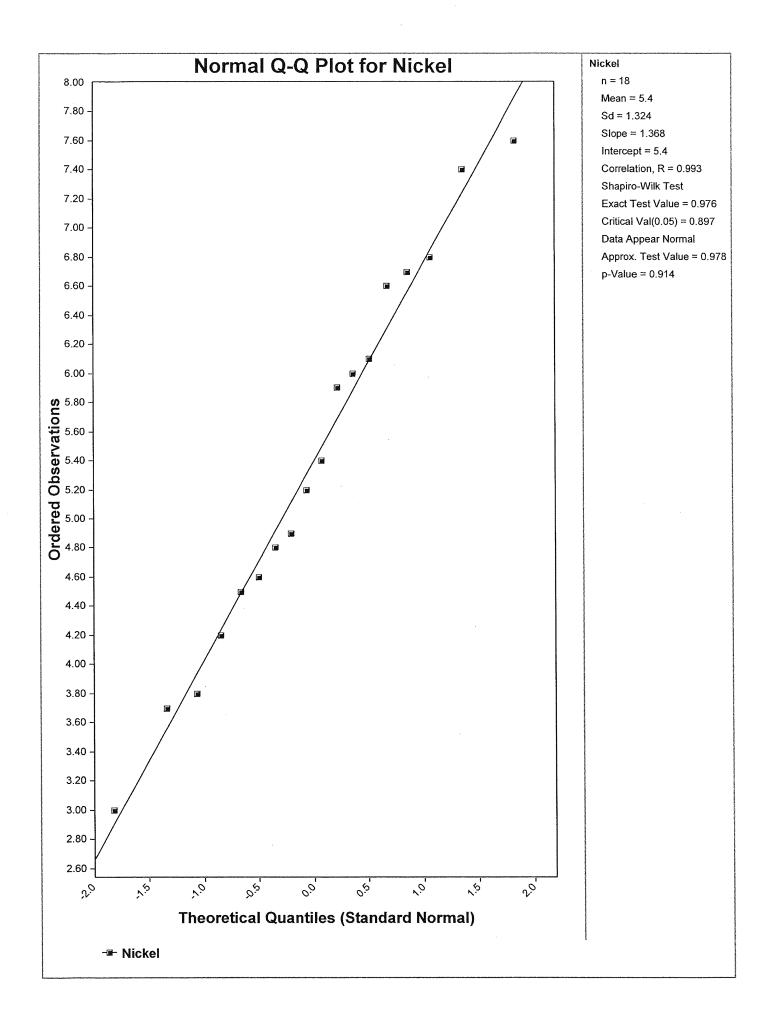
## olybdenum n = 16Mean = 0.306 Sd = 0.0546 Slope = 0.0561 Intercept = 0.306 Correlation, R = 0.983 Shapiro-Wilk Test Exact Test Value = 0.963 Critical Val(0.05) = 0.887 Data Appear Normal Approx. Test Value = 0.965 p-Value = 0.717

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95% UT	L with 95% Coverage	8.647					
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Background Statistics Assu	90% Percentile (z)	on 7.096					
	ming Normal Distributi	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
Data appear Normal at	5% Significance Level						
	piro Wilk Critical Value	0.897					
s how we have a second s	piro Wilk Test Statistic	0.976					120 - 67 - 1830 6 0 6 0 9 0 9 0 0 1 - 1
Normal Distri	bution Test						
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	Coefficient of Variation	0.245					
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	Geometric Mean First Quartile	5.239	******				
and a second	Mean	5.4					
	Second Largest	7.4					
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a na an	Minimum	3					
Number of	f Distinct Observations	18		*****	ana ana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny		
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Test for Suspected Outliers with Rosner test	1				******	
Dixon's Outlier Test for Nickel						
		******				
Number of data = 18		********				
10% critical value: 0.424						
5% critical value: 0.475						
1% critical value: 0.561						
1. Data Value 7.6 is a Potential Outlier (Upp	er Tail)?					
Test Statistic: 0.211						
For 10% significance level, 7.6 is not an outlier						
For 5% significance level, 7.6 is not an outlier.						
For 1% significance level, 7.6 is not an outlier.						
2. Data Value 3 is a Potential Outlier (Lower	Tail\2					
Test Statistic: 0.211						
For 10% significance level, 3 is not an outlier.						
For 5% significance level, 3 is not an outlier.						
For 1% significance level, 3 is not an outlier.						
			1			

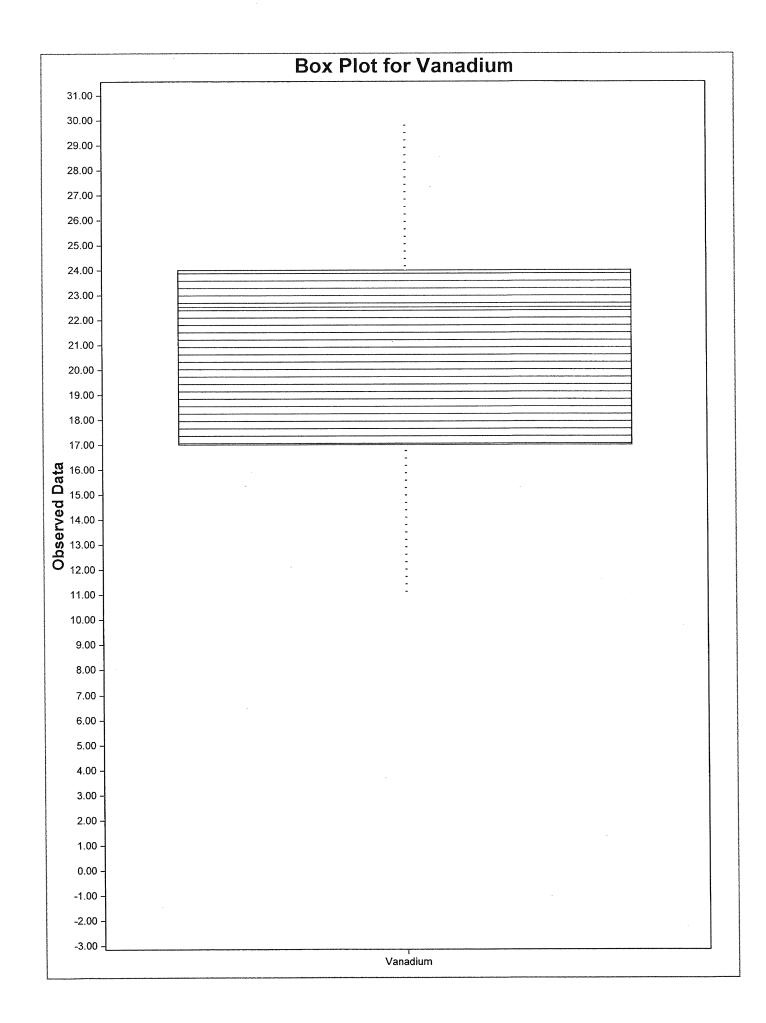


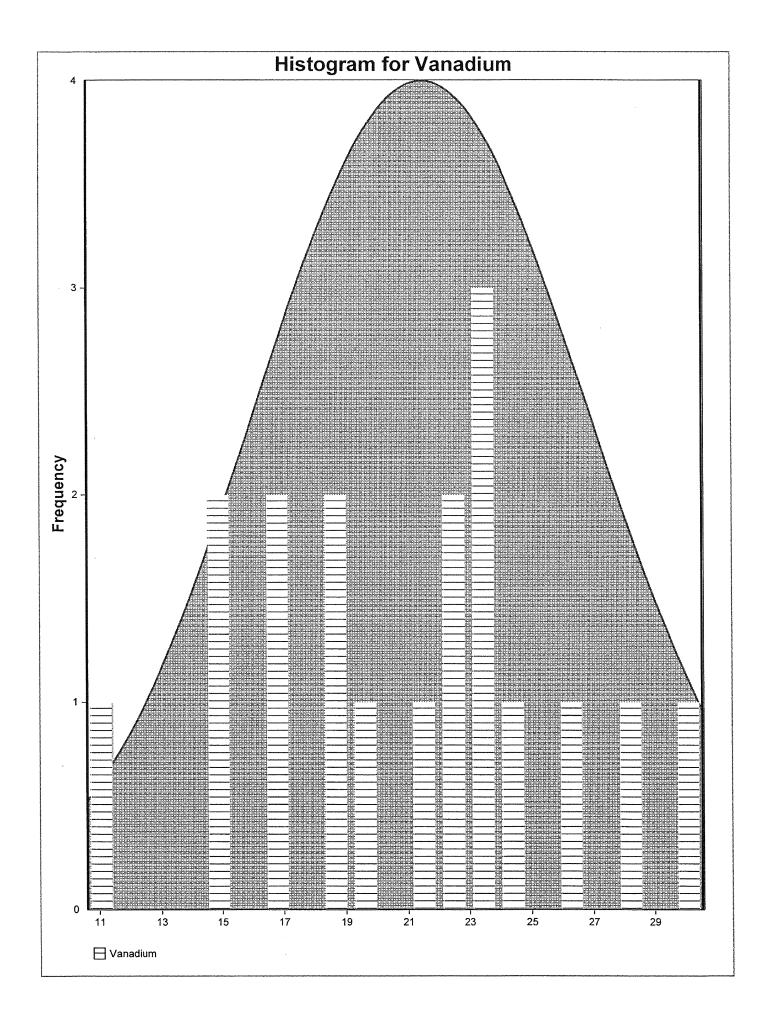


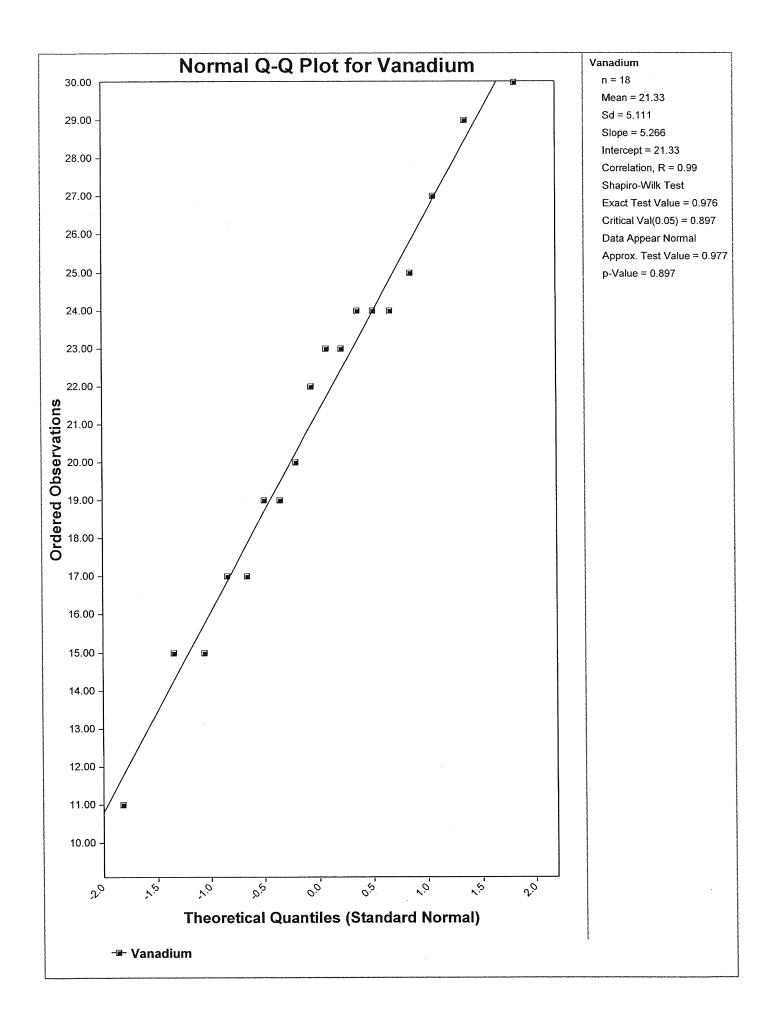


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of Distinct Observations	12		*****	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.			
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Third Quartile	24	**************************************					
SD	5.111						
Coefficient of Variation							
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	Outlier Tests for Selected Variables								
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From File	WorkSheet	WorkSheet.wst							
Full Precision	OFF	OFF							
Test for Suspected Outliers with Dixon test	1								
Test for Suspected Outliers with Rosner test	1			an a				****	
				****					
Dixon's Outlier Test for Vanadium	)								
Number of data = 18				ana ana amin'ny soratra dia mampika amin'ny fanisa dia dia dia dia dia dia dia dia dia di					
10% critical value: 0.424	4828 - 10-2012 - 10900 - 10900 - 10900 - 10900 - 1090								
5% critical value: 0.475									
1% critical value: 0.561									
1. Data Value 30 is a Potential Outlier (Uppe	er Tail)?								
Test Statistic: 0.200									
For 10% significance level, 30 is not an outlier	•								
For 5% significance level, 30 is not an outlier.									
For 1% significance level, 30 is not an outlier.	****					*			
2. Data Value 11 is a Potential Outlier (Lowe	r Tail)?								
Test Statistic: 0.250									
For 10% significance level, 11 is not an outlier									
For 5% significance level, 11 is not an outlier.									
For 1% significance level, 11 is not an outlier.									







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	18									
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Maximum	30									
Second Largest	29									
Mean	21.44									
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99% Percentile (z)	33.63									
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L with 95% Coverage	34.29									
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	Maximum Second Largest Mean Geometric Mean First Quartile Median Third Quartile SD Coefficient of Variation Skewness bution Test piro Wilk Test Statistic piro Wilk Critical Value 5% Significance Level	atistics of Valid Observations 18 f Distinct Observations 13 Minimum 12 Maximum 30 Second Largest 29 Mean 21.44 Geometric Mean 20.8 First Quartile 19 Median 21 Third Quartile 25.75 SD 5.238 Coefficient of Variation 0.244 Skewness -0.0596 ibution Test piro Wilk Test Statistic 0.967 piro Wilk Test Statistic 0.967 piro Wilk Critical Value 0.897 5% Significance Level uming Normal Distribution 90% Percentile (z) 28.16 95% Percentile (z) 30.06 99% Percentile (z) 33.63 Tolerance Factor K 2.453 Tolerance Factor K 2.453	atisticsof Valid Observations18f Distinct Observations13Minimum12Maximum30Second Largest29Mean21.44Geometric Mean20.8First Quartile19Median21Third Quartile25.75SD5.238Coefficient of Variation0.244Skewness-0.0596Ibution Test0.967piro Wilk Test Statistic0.967piro Wilk Critical Value0.8975% Significance Level30.0699% Percentile (z)33.63Tolerance Factor K2.453L with 95% Coverage34.29	ntistics of Valid Observations I Distinct Observations Minimum 12 Maximum 30 Second Largest 29 Mean 21.44 Geometric Mean 20.8 First Quartile 19 Median 21 Median 21 Third Quartile 25.75 SD 5.238 Coefficient of Variation 0.244 Skewness -0.0596 Skewness -0.0596 Skewness -0.0596 Skewness -0.0596 Skewness -0.0596 Skewness -0.0596	atistics       18         of Valid Observations       18         f Distinct Observations       13         Minimum       12         Maximum       30         Second Largest       29         Mean       21.44         Geometric Mean       20.8         First Quartile       19         Median       21         Third Quartile       25.75         SD       5.238         Coefficient of Variation       0.244         Skewness       -0.0596         bution Test       -         piro Wilk Test Statistic       0.967         piro Wilk Critical Value       0.897         5% Significance Level       -         uming Normal Distribution       -         90% Percentile (z)       30.06         99% Percentile (z)       33.63         Tolerance Factor K       2.453         Tolerance Factor K       2.453         Tolerance Factor K       2.453	stistics       18         of Valid Observations       18         f Distinct Observations       13         Minimum       12         Maximum       30         Second Largest       29         Mean       21.44         Geometric Mean       20.8         First Quartile       19         Median       21         Third Quartile       25.75         SD       5.238         Coefficient of Variation       0.244         Skewness       -0.0596         Ibution Test       90% Percentile         piro Wilk Critical Value       0.897         5% Significance Level       33.63         Tolerance Factor K       2.453         Tolerance Factor K       2.453	titistics of Valid Observations f Distinct Observations f Distinct Observations f Distinct Observations f Distinct Observations Minimum 12 Maximum 30 Second Largest 29 Mean 21.44 Geometric Mean 21.44 Geometric Mean 21.44 22.57 23.63 23.63 24.29 24.			

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From File	WorkSheet.wst								
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Test for Suspected Outliers with Dixon test	1								
Test for Suspected Outliers with Rosner test	1								
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Dixon's Outlier Test for Zinc									
Number of data = 18		1		1	1	1	1		
10% critical value: 0.424		1							
5% critical value: 0.475						-			
1% critical value: 0.561									
1. Data Value 30 is a Potential Outlier (Uppe	- T-:1)2			1			1		
1. Data value 30 is a Potential Outlier (Oppe	:1 1 311) :								
Test Statistic: 0.133									
For 10% significance level, 30 is not an outlier.									
For 5% significance level, 30 is not an outlier.	- 								
For 1% significance level, 30 is not an outlier.									
			-						
2. Data Value 12 is a Potential Outlier (Lowe	r Tail)?								
					1	-			
Test Statistic: 0.188			*						
				5					
For 10% significance level, 12 is not an outlier	•		******						
For 5% significance level, 12 is not an outlier.		***************************************							
For 1% significance level, 12 is not an outlier.									

