AP-111 1 of 4

BINDER 1

Annual Ground Water Monitoring Report: Gallup Refinery – 2012

Western Refining

Gallup, New Mexico

April 17, 2012

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Carl Chavez, Environmental Engineer
Oil Conservation Division
1220 S. Saint Francis
Santa Fe, NM 87505

Mr. John E. Kieling, Chief
NMED - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303

RE: 2012 Annual Ground Water Monitoring Report and AP-111.
Western Refining Company, Southwest Inc. - Gallup Refinery
EPA ID # NMD000333211

Dear Mr. Chavez and Mr. Kieling:

Western Refining Southwest, Gallup Refinery is pleased to submit the Annual Ground Water Monitoring Report for 2012. This report is being submitted to comply with the existing requirements under the old Discharge Permit 32 which is now listed as case number AP-111.

The new Waste Water Treatment Plant (WWTP) was put into service in the second quarter of 2012 and will affect the sampling requirements for the influents, effluents at the aeration lagoons, and pond 1 under the old Discharge Permit 32. The waste water is now going to our new waste water treatment plant and into a new pond STP-1. Western is currently sampling the new WWTP under the start up requirements stated in NMED's Approval with Modifications Process Design Report for the Waste Water Treatment Plant, Dated May 24, 2010, until further notice.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Ed Riege, Environmental Manager
(505) 722-0217
ed.riege@wnr.com

cc: K. Van Horn, NMED HWB
C. Johnson, Gallup

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Ed Riege, MPH
Environmental Manager

Prepared by:

Cheryl Johnson
Environmental Specialist

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APPENDICES

LIST OF ACRONYMS

AC	Alternating Current
AL	Aeration Lagoon
API	American Petroleum Institute
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
BW	Boundary Well
COC	Chain of Custody
COD	Chemical Oxygen Demand
DC	Direct Current
DGF	Dissolved Gas Flotation
DO	Dissolved Oxygen
DRO	Diesel Range Organics
DTB	Depth to Bottom
DTP	Depth to Product
DTW	Depth to Water
EP	Evaporation Pond
EPA	Environmental Protection Agency
FT	Foot/Feet
FWGWMP	Facility Wide Ground Water Monitoring Plan
GPM	Gallons per minute
GRO	Gasoline Range Organics
GWM	Ground Water Monitoring Well
HP	Horse Power
HWB	Hazardous Waste Bureau

LIST OF ACRONYMS – CONTINUED

IDW	Investigation Derived Waste
ISE	Ion Selective Electrode
LDU	Leak Detection Unit
LTU	Land Treatment Unit
MCL	Maximum Contaminant Level
MPPE	Macro Porous Polymer Extraction
MRO	Motor Oil Range Organics
MTBE	Methyl Tert Butyl Ether
mg/L	Milligrams/liter
mV	Millivolts
MW	Monitoring Well
NAIC	North American Industry Classification System
NAPIS	New American Petroleum Institute Separator
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NOD	Notice of Disapproval
NPDES	National Pollutant Discharge Elimination System
OBSM	Oil Bearing Secondary Material
OCD	Oil Conservation Division
OW	Observation Well
ORP	Oxidation Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbon
PSTB	Petroleum Storage Tank Bureau
PW	Process Well

LIST OF ACRONYMS – CONTINUED

RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RW	Recovery Well
SMW	Shallow Monitoring Well
SPH	Separate Phase Hydrocarbon
STP	Sanitary Treatment Pond
SVOC	Semi-volatile Organic Compound
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution and Prevention Plan
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbon
µm	Micrometer
UPS	United Parcel Service
VOC	Volatile Organic Compounds
WQCC	Water Quality Control Commission
WWTP	Waste Water Treatment Plant
YTD	Year to Date

EXECUTIVE SUMMARY

The Annual Ground Water Monitoring Report for 2012 (Report) incorporates all of the field monitoring, sampling and inspection of all active wells located on the facility. Analytical data and field notes are incorporated into this report to show any changes or discoveries of various constituents found in the ground water collected for sampling. On February 15, 2012, Ground Water Discharge Permit GW-032 was rescinded by the Oil Conservation Division (OCD) of New Mexico (NM). We are however required to continue to abate pollution of ground water pursuant to 19.15.30 NMAC (Remediation) under case number AP-111 with remediation activities already in place under Ground Water Discharge Permit GW-032. Monitoring and field work activities conducted for 2012 followed the guidelines of the approved 2010 Facility Wide Ground Water Monitoring Plan (FWGWMP) (approved with modifications on August 25, 2010).

GROUND WATER MONITORING

There are a total of forty monitoring wells distributed within the boundaries of the refinery of which, seventeen monitoring wells are located along the perimeter of the aeration lagoons and evaporation ponds. The ground water program consists of a number of sampling locations, target analytes, and monitoring frequencies which are monitored on a quarterly, semi-annual, and annual basis. There are two major sections of the refinery which have been defined as the East and the West side for periodic monitoring.

EAST SIDE GROUND WATER

Ground water monitoring activities on the East side have shown the presence of methyl tert-butyl ether (MTBE) in four observation wells (OW) (OW-13, OW-14, OW-29, OW-30) located on the

northeast corner of the active refinery perimeter (but not the refinery property as a whole). In OW-14, OW-29, and OW-30, three organic constituents (benzene, ethyl benzene and MTBE) were detected in the ground water samples at concentration levels above the current screening levels.

In wells (OW-50 and OW-52) which are down-gradient of OW-30 and OW-29, ground water samples for 2012 detected New Mexico Water Quality Control Commission (WQCC) metals (iron and arsenic) at levels above the current screening levels for 2012. These wells were installed in October 2009 per New Mexico Environmental Department (NMED) requirement dated May 28, 2009 to "determine if contamination has migrated north, northwest of the refinery and potentially offsite" from up gradient wells OW-13 and OW-29.

Within the perimeter of the active refinery in this north-east section, there are four shallow recovery wells (RW-1, RW-2, RW-5, and RW-6) from which separate-phase hydrocarbons (SPH) have been recovered. Recovery through hand bailing continues on a quarterly basis in RW-5 and RW-6 and a portable drop in submersible pump is used in RW-1. The volume of SPH has continued to drop substantially from year to year in RW-1, RW-5 and RW-6. In 2012 only Recovery Well (RW-1) had a measureable hydrocarbon level. No measureable hydrocarbon levels were detected in RW-2, RW-5, and RW-6.

There are a total of three production/process wells (PW) located on the refinery property which are operated to provide the refinery's process water, drinking water to the refinery and company housing and also to the Pilot Travel Center. PW-3 is located on the east side at a depth of 1000 feet. In one sampling event in 2008, two organic constituents were detected in PW-3 (1-Methylaphthalene and phenol) at concentration levels above the current detectable concentration standards. Due to the detection of these two organic constituents, PW-3 was placed on an annual sampling schedule as directed per NMED's Comment 12 of the May 16, 2011 Notice Of Disapproval (NOD) (May 2011 NOD) for the Annual Ground Water Monitoring Report: Gallup Refinery 2009. Annual sampling results since 2009 have indicated no detectable organic constituents in this well. PW-3 continues to be sampled on an annual basis.

WEST SIDE GROUND WATER

The West side consists of ground water monitoring (GWM) wells located around the aeration lagoons (AL), the new American Petroleum Institute separator (NAPIS), and alongside a series of large evaporation ponds (EP).

At the aeration basin, ground water monitoring well GWM-1, three organic constituents (benzene, ethyl benzene, and 1-Methylnaphthalene) were detected in the ground water samples at concentration levels above the current applicable standards. Fluoride, chloride, diesel range organics (DRO) and four metals (arsenic, barium, iron and manganese) were also detected at concentration levels above the applicable standards. GWM-2 and GWM-3 also had measureable water levels in all four quarters in 2012. Both of these wells were dry wells upon installation in 2005 and beginning in 2010 continued to have a measureable water level. Ground water sample results have indicated non-detectable and/or concentration levels below the applicable standards. Chloride, fluoride, nitrate, sulfate and DRO also had detectable concentration levels for 2012. Metals detected include arsenic, iron, manganese and also uranium at levels above the applicable standards.

In July 2012, a new well was installed OAPIS-1 at the aeration basin on the northwest side of Aeration Lagoon 1 (AL-1). The development of this well was a result of a site investigation conducted by Enviro-Drill, Inc., and RPS on ground water and soils surrounding the aeration basin on Solid Waste Management Units (SWMU), SWMU No. 1 Aeration Basin and SWMU No. 14 Old API Separator. The Investigation Work Plan was implemented to determine if there has been a release to the environment and to delineate any such releases at the aeration basin. Information collected from this site investigation will also be used to help determine the source of ground water that has been observed in monitoring wells GWM-2 and GWM-3 since 2010.

Located down gradient of the NAPIS on the west side, are three wells (NAPIS-2, NAPIS-3, KA-3). Of the three wells, NAPIS-2 and KA-3 had detectable concentration levels of organic constituents (benzene, ethyl benzene, MTBE, 1-Methylnaphthalene, naphthalene, and phenol). Five metal constituents were also detected in this well, (arsenic, barium, iron, manganese and uranium. On the east side of the NAPIS, NAPIS-1 ground water samples had non-detectable levels of organic constituents for 2012. Fluoride and metals (arsenic, iron, manganese and uranium) were at detectable concentration levels.

The new waste water treatment plant (WWTP) and the new holding pond Sanitary Treatment Pond (STP-1) were completed and put in service in May of 2012. The start up of the new WWTP resulted in the intermittent use of the benzene strippers and also the sampling locations at the outfalls at the aeration basin. In November of 2012, the benzene strippers were taken off line permanently and removal of the strippers for demolition was completed in January 2013. Waste water effluent is now routed to the WWTP via the NAPIS and the only effluent going into the aeration basin is the Pilot Effluent.

Located on the West side are a series of boundary (BW), observation (OW), monitoring (MW), process (PW) and shallow monitoring (SMW) wells. Among the wells on the far west side are two deep production/process water wells identified as PW-2 and PW-4 which provide process and drinking water for the refinery, refinery owned houses and also for the Pilot Travel Center. Both of these wells are sampled every three years and sampling results have indicated non-detectable levels of organic constituents.

Also on the west side are SMW-2 and SMW-4 which have shown trace levels of seven organic constituents from 2008 through 2012 (MTBE, acetone, bis (2-ethylhexyl) phthalate, diethyl phthalate, phenol, and benzenethiol was detected at levels below the applicable detection standards. 1,4-Dioxane was detected in SMW-2 in 2008 and has not shown any detection levels since then. Several metal constituents were also detected at concentration levels above the current applicable standards and are listed as follows: Arsenic, chromium, iron, manganese, uranium and also cyanide. SMW-2 has also shown levels of chloride and sulfate above the WQCC standards and fluoride levels were above the applicable standards for SMW-4.). 1,4-Dioxane

There are a total of nine boundary wells located on the northwest end of the refinery property alongside a series of evaporation ponds. Three of the seven wells inspected continue to indicate no water level (BW-1A, BW-1B, and BW-3A). Of the seven, only BW-3B and BW-3C had an organic constituent (bis (2-ethylhexyl) phthalate) detected in BW-3B in 2009 and in BW-3C in 2011. 2012 annual sampling results indicate non-detectable levels of bis (2-ethylhexyl) phthalate in both wells. Several metals were at detectable levels which include arsenic, cadmium, chromium, and iron in all of the boundary wells that were sampled. Fluoride levels were also above the applicable standards in all boundary wells and in BW-2A and BW-3B, phosphorous was at detectable levels.

ADDITIONAL MONITORING AND REPORTING

On February 15, 2012, Ground Water Discharge Permit GW-032 was rescinded by OCD. We are however required to continue to abate pollution of ground water pursuant to 19.15.30 NMAC (Remediation) under case number AP-111with remediation activities already in place. This report includes:

- Monitoring of the aeration lagoons, ponds, and outfalls between the lagoons and ponds on a quarterly, semi-annual and annual basis.
- Summary of all EPA/NMED/RCRA Activity
- Major Refinery Activities and Events
- Summary of all Leaks, Spills and Releases
- Perimeter Inspections
- Temporary Land Farm Monitoring

With the start up of the new WWTP, and dismantling of the benzene strippers, waste water flow was redirected via the NAPIS to the WWTP and sample locations at the aeration lagoons have changed. Sampling is conducted according to Comment 17 of NMED's "Approval with Modifications, Process Design Report for the Waste water Treatment Plant Work Plan (Alternative Design, Revision A)", dated May 24, 2010.

The evaporation ponds are sampled semi-annually and four organic constituents were detected in 2012 (carbon disulfide, aniline, phenol and 2-Methylphenol). Fluoride and chloride levels were all above the applicable standards in all of the ponds sampled. Figure 2, a topographic map and Figure 3, an aerial photograph, depict the area topography and the general layout of the refinery.

SECTION 1
INTRODUCTION

The 2012 Annual Ground Water Monitoring Report has been prepared to describe monitoring and remediation activities undertaken throughout 2012. Ground water sampling is performed on a quarterly, semi-annual and annual basis and also includes sampling of the evaporation ponds located on the northwest section of the refinery property. The activities completed includes analysis of all active monitoring wells and evaporation ponds and the data generated is used to characterize the nature and extent of impacts to the ground water at the refinery from historical releases and to monitor any levels of constituents that exceed applicable standards.

This report presents the results of the ground water monitoring activities and contains the following information:

- Scope of activities
- Sampling methods and procedures
- Ground water elevation surveys;
- Regulatory criteria
- Ground water monitoring results
- Conclusions and recommendations.

1.1 FACILITY OWNERSHIP, OPERATION AND LOCATION

This report pertains to the Western Refining Southwest Inc. Gallup Refinery located at Exit 39 on Interstate I-40, approximately 17 miles east of Gallup, New Mexico in Jamestown, New Mexico. Figure 1 shows the regional location of the refinery.

Owner:	Western Refining 123 West Mills Avenue El Paso, TX 79901	(Parent Corporation)
Operator:	Western Refining Southwest, Inc.	(Postal address)

Route 3, Box 7
Gallup, New Mexico 87301
Western Refining Southwest, Inc. (Physical address)
I-40, Exit 39
Jamestown, New Mexico 87347

The following regulatory identification and permit governs the Gallup Refinery:

- SIC code 2911 (Petroleum Refining) applies to the Gallup Refinery
- U.S. EPA ID Number NMD000333211
- OCD Discharge Permit No. GW-032 was rescinded on February 15, 2012. We are required to continue to abate pollution of ground water pursuant to 19.15.30 NMAC (Remediation) under case number AP-111.

The refinery status is corrective action/compliance. Annual, semi-annual and quarterly ground water sampling is conducted at the refinery to evaluate present conditions. The refinery is situated on an 810 acre irregular shaped tract of land that is substantially located within the lower one quarter of Section 28 and throughout Section 33 of Township 15 North, Range 15 West of the New Mexico Prime Meridian. A small component of the property lies within the northeastern one quarter of Section 4 of Township 14 North, Range 15 West. Figure 2 is a topographic map showing the general layout of the refinery in comparison to the local topography.

1.2 BACKGROUND INFORMATION

The refinery primarily receives crude oil via two 6 inch diameter pipelines; two pipelines from the Four Corners Area enter the refinery property from the north. In addition, the refinery also receives natural gasoline feed stocks via a 4-inch diameter pipeline that comes in from the west along the Interstate 40 corridor from the Conoco gas plant. Crude oil and other products also arrive at the site via railroad cars. These feed stocks are then stored in tanks until refined into products.

The refinery incorporates various processing units that refine crude oil and natural gasoline into finished products. These units are briefly described as follows.

- Crude Distillation Unit separates crude oil into various fractions; including gas, naphtha, light oil, heavy oil, and residuum.

- Fluidized Catalytic Cracking Unit (FCCU) dissociates long-chain hydrocarbon molecules into smaller molecules, and essentially converts heavier oils into naphtha and lighter oils.
- Alkylation Unit combines specific types of hydrocarbon molecules into a high octane gasoline blending component.
- Reforming Unit breaks up and reforms low octane naphtha molecules to form high octane naphtha.
- Hydro Treating Unit removes undesirable sulfur and nitrogen compounds from intermediate feed stocks, and also saturates the feed stocks with hydrogen to make diesel fuel.
- Additional Treater Units also remove impurities from various intermediate and blending feed stocks to produce finished products that comply with sales specifications.
- Isomerization Unit converts low octane hydrocarbon molecules into high octane molecules.
- A set of Acid Gas Treating and Sulfur Recovery Units convert and recover various sulfur compounds from other processing units in order to produce either ammonium thiosulfate or a solid elemental sulfur byproduct.

As a result of these processing steps, the refinery produces a wide range of petroleum products including propane, butane, unleaded gasoline, diesel, kerosene, and residual fuel. In addition to the aforementioned processing units, various other equipment and systems support the operation of the refinery and are briefly described as follows.

Storage tanks are used throughout the refinery to hold and store crude oil, natural gasoline, intermediate feeds tocks, finished products, chemicals, and water. These tanks are all located aboveground. Capacity of these tanks range in size from 80,000 barrels to less than a 1,000 barrels.

Pumps, valves, and piping systems are used throughout the refinery to transfer various liquids among storage tanks and processing units. A railroad spur track and a railcar loading rack are used to transfer feed stocks and products from refinery storage tanks into and out of railcars.

Several tank truck loading racks are used at the refinery to load out finished products and also may receive crude oil, other feed stocks, additives, and chemicals. Gasoline and diesel is delivered to the Pilot Travel Center via tanker truck. An underground diesel pipeline exists between the refinery and the Pilot Travel Center. As a result of an off-refinery release in 2011,

the pipeline was purged of product, filled with nitrogen and temporarily taken out of service. Western is working with the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) to place this line back into service.

A designated training area is used to conduct employee firefighting training. During these training activities waste water and/or wash water drains directly into a dedicated tank that is located in the vicinity. The waste water is removed via a vacuum truck and drained into a process sewer leading to the NAPIS. Oily water and sludge is transferred via vacuum truck to the NAPIS for processing and oil-water separation.

The process waste water system is a network of curbing, paving, catch basins, and underground piping that collects waste water effluent from various processing areas within the refinery. The waste water effluent flows into T-27, T-28 and into T-35, which works in parallel to T-27 and T-28 and into the NAPIS which provides the first stage oil-water separation where the removal of free oil is separated from waste water by gravity. The clarified water is routed to the new waste water treatment plant (WWTP) Dissolved Gas Flotation (DGF) system which provides the second stage oil-water separation process. The DGF process involves the pressurization of waste water in the presence of air or nitrogen, creating a super-saturated solution called coagules that are carried to the surface. The float is removed to disposal by mechanical float scrapers and the effluent is recycled back to the flotation chamber. The skimmed float is sent to the DGF float management system, "float tanks". Oily solids collected in the float tanks is recycled through the refining process (on-site) or handled as a K048 listed hazardous waste for proper disposal.

The clarified effluent from the DGF system then flows to the Macro Porous Polymer Extraction (MPPE) system. The MPPE system removes dissolved and dispersed hydrocarbons from the waste water which includes aromatics, polyaromatic hydrocarbons (PAH) through a liquid-liquid extraction process where waste water is passed through a column packed with MPPE particles (porous polymer beads) that contain the extraction liquid suitable for removal of aromatic hydrocarbons and PAHs. The waste water that passes through the MPPE column discharges into holding pond STP-1. The hydrocarbon-water mixture will be recycled and sent back to the refinery for reprocessing.

STP-1 has two bays, north and south and each bay is equipped with five aerators. The treated waste water is mixed with air in order to oxidize any remaining organic constituents and increase the dissolved oxygen concentration available in the water for growth of bacteria and other

microbial organisms. The microbes degrade most of the hydrocarbons into carbon dioxide and water. Five 15-hp mechanical aerators provide aeration in each bay (North and South) in STP-1. Effluent from STP-1 then flows onward into evaporation pond 2 (EP-2) and gravitated to the rest of the ponds.

The new WWTP was completed and put online in May of 2012 which resulted in the decommissioning of Benzene Strippers 1, 2 and 3, and the Aeration Lagoons 1 and 2 (AL-1 and AL-2). In November of 2012, the benzene strippers were taken off line permanently and removal of the strippers for demolition was completed in January of 2013.

At the evaporation ponds, waste water is converted into vapor via solar and mechanical wind-effect evaporation. No waste water is discharged from the refinery to surface waters of the state. All treated waste water is routed to several evaporation ponds which have large surface areas that are designed to efficiently evaporate water by sunlight and exposure to the changing ambient temperatures. The refinery does have a National Pollutant Discharge Elimination System (NPDES) Permit for storm water discharge.

The storm water system is a network of valves, gates, berms, embankments, culverts, trenches, ditches, natural arroyos, and retention ponds that collect, convey, control, treat, and release storm water that falls within or passes through refinery property. Storm water that falls within the processing areas is considered equivalent to process waste water and is sent to tanks T-27, T-28 and T-35 before it reaches the NAPIS, WWTP, STP-1 and into EP-2 where flow is gravitated to the rest of the ponds.

Storm water discharge from the refinery is infrequent due to the arid desert-like nature of the surrounding geographical area. Gallup Refinery maintains a Storm Water Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) for effective storm water pollution prevention and control. The refinery has constructed several berms in various areas and improved outfalls (installed barrier dams equipped with gate valves) to minimize the possibility of potentially impacted runoff leaving the refinery property.

1.3 SITE CHARACTERISTICS

Built in the 1950's, the refinery is located within a rural and sparsely populated section of McKinley County in Jamestown, New Mexico, 17 miles east of Gallup, New Mexico. The setting is a high desert plain on the western slope of the Continental Divide. The surrounding land is comprised primarily of public lands and is used for cattle and sheep grazing at a density of less than six cattle or 30 sheep per section. The nearest population centers are the Pilot Travel Center (formerly Giant) refueling plaza, the Interstate 40 highway corridor, and a small cluster of residential homes located on the south side of Interstate 40 approximately 2 miles southwest of the refinery (Jamestown). Surface vegetation consists of native xerophytic vegetation including grasses, shrubs, small junipers and some prickly pear cacti. Average yearly rainfall is less than ten inches per year with the maximum average precipitation occurring in the month of August.

Local topography consists of an inclined down-slope from high ground in the southeast to a lowland fluvial plain in the northwest. The highest point on refinery property is located at the southeast corner boundary (elevation approximately 7,040 feet) and the lowest point is located at the northwest corner boundary (elevation approximately 6,860 feet). The refinery processing facility is located on a flat man-made terrace at an elevation of approximately 6,950 feet.

Surface water in this region consists of man-made evaporation ponds and aeration basins located within the refinery, a livestock watering pond (Jon Myer's Pond) located one mile east of the refinery, two small unnamed spring fed ponds located south of the refinery, and the South Fork of the Puerco River and its tributary arroyos. The various ponds and basins typically contain water consistently throughout the year. The South Fork of the Puerco River and its tributaries are intermittent and generally contain water only during, and immediately after, the occurrence of precipitation.

The 810 acre refinery property site is located on a layered geologic formation. Surface soils generally consist of fluvial and alluvial deposits; primarily clay and silt with minor inter-bedded sand layers. Below this surface layer is the Chinle Formation, which consists of very low permeability clay stones and siltstones that comprise the shale of this formation. As such, the Chinle Formation effectively serves as an aquiclude. Inter-bedded within the Chinle Formation is the Sonsela Sandstone bed, which represents the uppermost potential aquifer in the region. The Sonsela Sandstone bed lies within and parallels the dip of the Chinle Formation. As such, its high

point is located southeast of the refinery and it slopes downward to the northwest as it passes under the refinery. Due to the confinement of the Chinle Formation aquiclude, the Sonsela Sandstone bed acts as a water-bearing reservoir and is artesian at its lower extremis. Artesian conditions exist through much of the central and western portions of the refinery property.

Ground water flow within the Chinle Formation is extremely slow and typically averages less than 10^{-10} centimeters per second (less than 0.01 feet per year). Ground water flow within the surface soil layer above the Chinle Formation is highly variable due to the presence of complex and irregular stratigraphy; including sand stringers, cobble beds, and dense clay layers. As such, hydraulic conductivity may range from 10^{-8} centimeters per second in the clay soil layers located near the surface up to 10^{-2} centimeters per second in the gravelly sands immediately overlying the Chinle Formation. Figure 4 depicts the regional surface water flows are in a westerly direction. Figure 5 depicts surface water bodies and flow lines.

Shallow ground water located under refinery property generally flows along the upper contact of the Chinle Formation. Although the prevailing flow direction is from the southeast and toward the northwest; a subsurface ridge has been identified and is thought to deflect some flow in a northeasterly direction in the vicinity of the refinery tank farm.

SECTION 2
SCOPE OF ACTIVITIES 2012

The 2012 quarterly and annual ground water sampling was conducted by Trihydro Corporation and the semi-annual pond sampling was conducted by Western. The third quarter ground water sampling was combined with the annual sampling event per approval from NMED and OCD and conducted the week of August 20, 2012. The following is a list of monitoring and inspections completed for 2012.

- Separate Phase Hydrocarbon Recovery Logs – Appendix A
- Field Inspection logs – Appendix C
- Treatment System Monitoring – Monthly Flow Rate – Appendix D
- New Well Installation OAPIS-1 – Appendix F
- Spill Reporting – Appendix H
- Perimeter Inspections - Appendix I
- Temporary Land Farm Semi-Annual Sampling – Appendix J
- Laboratory Analytical Data – Section 8
- Well Data Summary Table (Elevations) – Section 9
- Quarterly, semi-annual, annual inspections summary – Section 10

2.1 MONITORING AND SAMPLING PROGRAM

The primary objective of ground water monitoring is to analyze ground water samples collected and use data to assess ground water quality at and near the refinery. Ground water elevation data is collected to evaluate ground water flow conditions. The ground water monitoring program for the refinery consists of sample collection and analysis from a series of monitoring, recovery, boundary, process and shallow monitoring wells, including evaporation pond locations and influents/effluents at the aeration basin.

The monitoring network is divided into two investigation areas (East Side and West Side). The sampling frequency, analyses and target analytes vary for each investigation area and well/outfall/evaporation pond location. The combined data from these investigation areas is used

to assess ground water quality beneath and immediately down-gradient of the refinery, and also evaluate local ground water flow conditions. Samples are collected annually from monitoring wells that have measurable separate phase hydrocarbon (SPH) levels. For wells that are purged dry, samples are collected if recharge volume is sufficient for sample collection within 24 hours. Wells not sampled due to insufficient recharge will be documented in the field log.

Daily field activities, including observations and field procedures, will be recorded for each activity and maintained at the Gallup Refinery. Field logs will include the following information

- Sample Location Identification
- Date
- Start and finish sampling time
- Field team members, including visitors
- Weather conditions
- Daily activities and times conducted
- Observations
- Record of samples collected with sample designations
- Photo log (if needed)
- Field monitoring data, including health and safety monitoring (if needed)
- Equipment used and calibration records, if appropriate
- List of additional data sheets and maps completed
- An inventory of the waste generated and the method of storage or disposal
- Signature of personnel completing the field record

All samples collected for analysis will be recorded in the field report or data sheets. Chain-of-Custody (COC) forms will be completed at the end of each sampling day, prior to the transfer of samples off site, and will accompany the samples during shipment to the laboratory. A custody seal will be affixed to the lid of the shipping container. Copies of all COC forms generated are kept on site.

Field duplicates and trip blanks may be obtained for quality assurance during sampling activities at a frequency of one for each shipping event involving twenty or more samples.

2.2 SAMPLING METHODS AND PROCEDURES

Each monitoring well is gauged for depth to water (DTW) and or depth to product (DTP) measurement to determine the amount of water to purge. A minimum of two well volumes are purged from each well prior to sampling. If water level is at a minimum or the well has low recharge rate, then the well is allowed to recharge within 24 hours before sample is collected. For

wells that are not supplied with dedicated pumps, a portable pump is lowered slowly into the well to minimize disturbance to a depth of the midpoint of the screened interval of the well. The pump controller is started at a slow rate and gradually increased until water is discharged. Field water quality measurements must stabilize for a minimum of three consecutive readings taken at 2 to 5 minute intervals and are within the following limits before purging will be discontinued and sampling may begin: Dissolved Oxygen (DO) (10%), Specific Conductance (3%), Temperature (3%), pH (+/- 10 mV).

Ground water samples are obtained from each well within 24 hours of the completion of well purging. The samples are transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample collection methods are documented in the field monitoring reports. Weather conditions, the volume of ground water purged, the instruments used, and the readings obtained at each interval are recorded on the field-monitoring log.

Well purging and sampling are performed using disposable polyethylene bailers and/or appropriate portable sampling pumps where applicable. Some of the wells have dedicated pumps installed where a controller is used to power the submersible pump to purge water. In shallow wells, new disposable bailers are used for each well to hand bail purge water and retrieve water samples.

All purged ground water from monitoring wells is collected in 55 gallon drum(s) and/or 5 gallon bucket(s) and drained into the refinery waste water treatment system upstream of the NAPIS.

Ground water samples intended for metals analysis are submitted to the laboratory as total and dissolved metals samples.

At a minimum, the following procedures are used when collecting/shipping samples.

- Protective eye wear (safety glasses, goggles and or face shield)
- Neoprene, nitrile, or other protective gloves are worn when collecting samples. New disposable gloves are used to collect sample at each sample point.
- All samples collected for chemical analysis are transferred into clean sample containers supplied by the analytical laboratory. The sample container is clearly marked and labeled.
- Ground water samples obtained for dissolved metals analysis are filtered through a 0.45 μm (micrometer) mesh size disposable filter.

- Samples are labeled, sealed, placed in cooler with ice until they are shipped via United Parcel Service (UPS) Red, Federal Express Overnight or personally delivered to the analytical laboratory.
- Standard COC procedures are followed for all samples collected. The COC form and sample request form are shipped inside the sealed storage container to be delivered to the laboratory, signed and dated.
- Field duplicates and trip blanks may be obtained for quality assurance during sampling activities. Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for volatile organic compound (VOC) analyses. Trip blanks will consist of a sample of analyte free de-ionized water placed in an appropriate sample container. Trip blanks will be analyzed at a frequency of one for each shipping event involving twenty or more samples.

In order to prevent cross-contamination, field equipment that comes into contact with water or soil is decontaminated before each sampling event. The decontamination procedure for the portable pump consists of rinsing/washing the equipment with a detergent water mixture followed by two rinses before use in another well. Any equipment that comes in contact with each well, such as data loggers or tape measure, is decontaminated with a detergent water mixture and rinsed with distilled water before each use. Decontamination of equipment when feasible is done at the bundle pad where decontamination water is drained into the sewer system. Decontamination water from field work is caught in appropriate container and drained into the sewer system upstream of the NAPIS.

2.2.1 EQUIPMENT

- A submersible bladder pump 2 inch, 115 volt AC to DC converter, Grundfos Redi-flo2 constructed of stainless steel with check valve and 1/2 in. Teflon tubing, adjustable rate controller powered by a gas generator is used to purge ground water from monitoring wells. Equipment is located downwind and at least 20 feet from the well so that exhaust fumes do not cross contaminate the samples.
- Water level instrument used is a Heron Instrument 100 feet DipperT electric water depth tape complying with US GGG-T-106E, EEC, Class II. This instrument measures water level, indication is a steady audible tone and hydrocarbon indication is an erratic audible tone.
- Parameter Instrument – YSI Model 556 MPS Multi Probe System which simultaneously measures DO, conductivity, temperature, and optional pH and ORP (Oxidation Reduction Potential). As a backup, we also have an IQ Scientific Instrument, Model IQ180GLP

which measures pH, DO, TDS (Total Dissolved Solids), Conductivity, salinity, ISE (Ion Selective Electrode), mV (Millivolts) and temperature.

- Disposable Bailers – Polyethylene bailer (1.5 inches X 36 inches) overall length (OAL); capacity approximately 1 liter). Individually sealed packaging, single check valve bailer with slide in angle cut nozzle for sample removal. A new bailer is used for each well that requires hand bailing for purging and sample retrieval.
- Field equipment parameter instruments are calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration checks are conducted before use and the instruments recalibrated if necessary. Calibration of equipment is noted in the daily field logs.
- If field equipment becomes inoperable, a properly calibrated replacement instrument is used in the interim. Instrumentation used during a sampling event is recorded in the daily field logs.

2.3 COLLECTION AND MANAGEMENT OF INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during each ground water sampling event may include purge water, decontamination water, excess sample material, and disposable sampling equipment. All water purged from monitoring wells generated during sampling and decontamination activities is temporarily stored in a labeled 55-gallon drum(s) and/or 5 gallon bucket(s) and then drained into the refinery sewer system upstream of the NAPIS.

2.4 COLLECTION OF SURFACE WATER SAMPLES

At the evaporation ponds, samples are collected near the inlets, and are a grab sample at the pond edge near the inlet. This location is noted in the field notebooks. For outfalls, a grab sample is collected at the pipe end, and recorded.

2.5 ANALYTICAL METHODS

Ground water and surface water samples collected during the monitoring events are analyzed for the constituents listed in Table 1, Section 9.0. In addition, the WQCC standard is used for total and dissolved metals analysis.

2.6 PERIMETER SEARCH

The refinery conducts a perimeter search of the refinery property on a bi-monthly basis starting in December 2004. The inspection focuses on hydrocarbon staining or any release that could result in material leaving the property boundary. Western Refining has prepared an inspection checklist to be completed and signed by an environmental employee conducting the inspection. See Appendix I for copies of the inspection records.

2.7 REMEDIATION ACTIVITIES

SPH has been found in wells RW-1, RW-5 and RW-6. SPH is recovered from these wells using a submersible bladder pump, or hand-bailing using a disposable polyethylene bailer. Table 2A through 2D in Appendix A summarizes measurements, volume of product and water purged and also provides year to date (YTD) product purged from each well. RW-2 is also listed as a recovery well but to date no visible hydrocarbon layer has been observed or measured in this well during quarterly inspections. In 2012 product recovered is estimated to be 0.97 gallons from RW-1. RW-5 has shown a decline in SPH levels beginning in the second quarter of 2009 through 2012, and no indication of a SPH thickness level during quarterly inspections has been observed. Purging continues in RW-5 despite the lack of a measureable layer of product in the purged water. RW-6 continues to show a decline in SPH levels from a level of 0.16 feet in the first quarter of 2009 to no measureable product level in 2012. Although there was no measureable product level in RW-6 for 2012, purging of water continued as there was a visible sheen observed in the water purged and an odor detected.

In RW-1 a bladder pump is used to pump out SPH on a quarterly basis into a labeled 55 gallon drum. Visible layer of product on the top is then measured with a tape measure and calculated as best as possible for volume of product recovered. In RW-5 and RW-6, a 3 foot disposable hand bailer is used to extract product and water from the wells. Bailed water is collected in a 5 gallon bucket and the visible layer of floating product is then measured as best as possible for estimated volume. The purged water is then drained into the refinery waste water treatment system upstream of the NAPIS.

SECTION 3
GROUND WATER ELEVATION DATA

Ground water elevation data is collected from the wells listed in Table 1, Section 10.0. Summary of field measurements (DTW, DTP) taken during the quarterly, semi-annual and annual inspections is listed in Section 9. Ground water levels and SPH thickness measurements (from the RW series of wells) are collected quarterly to monitor ground water elevation and product thickness fluctuations over time. Maps were generated in March 2013 using elevation data collected from the survey conducted by DePauli Engineering on June 6, 2011 and from field inspection logs. Resurvey of active wells was required by NMED on June 6, 2011 due to elevation discrepancies found on the 2009 Well Data Summary Table. Western received the "Approval with Modifications – Requirement to Resurvey Groundwater Monitoring Wells and Recovery Wells", from NMED on September 24, 2012, a copy of which is included in this report as Appendix E.

Field notes and measurement data is recorded in field logs from each well for 2012 and is attached as Appendix C. The depth to ground water and SPH thickness levels are measured to the nearest 0.01 ft. The depth to ground water and SPH thickness are recorded relative to the surveyed well casing rim or other surveyed datum. A corrected water table elevation is provided in wells containing SPH by adding 0.8 times the measured SPH thickness to the measured water table elevation (Section 9).

All water/product levels are measured to an accuracy of the nearest 0.01 ft. using an electrical conductivity based meter, the Heron Instruments 100 ft. DipperT electric water depth tape complying with US GGG-T-106E, EEC Class II. After water level is determined, the well volume is calculated using the height of the liquid column and the internal cross sectional area of the well. The purge volume is a minimum of two times the well volume.

Ground water and SPH levels are measured in all wells within 48 hours of the start of ground water sampling activities. All manual extraction of SPH and water from recovery wells,

observation wells, and collection wells is discontinued for 48 hours prior to the measurement of water and SPH levels.

Figure 6 (Section 11) shows the locations of all the active wells

SECTION 4
REGULATORY CRITERIA

We compare our data to the following most recent regulatory standards (Appendix B) at time of submission of report.

- New Mexico 20NMAC 20.6.2.3103 (WQCC). Standards for Ground Water of 10,000 mg/l TDS Concentration or Less.
- EPA 40 CFR 141.62. National Primary Drinking Water Regulations (Updated June 8, 2012) (EPA MCL).
- EPA Regional Screening Levels set for Residential Risk-Based Screening Levels (EPA RSL) for Tap Water (Ross) (April 2012).
- NMED Table 6.2 (unknown oil). Total petroleum hydrocarbon (TPH) screening guidelines for Potable Ground water (GW-1), (June 2012).
- NMED Tap Water Screening Levels (April 2012)

SECTION 5
GROUND WATER ELEVATIONS

5.1 POTENTIOMETRIC MAP

Figure 7 (Section 11) presents a south-north geologic profile (East Side) showing contours of monitoring wells with reference to stratigraphic locations in which the water bearing zones are located. Figure 8 (Section 11) presents a south-north section on the West Side showing contours of monitoring wells with reference to stratigraphic locations in which the water bearing zones are located and Figure 14 (Section 11) represents geologic profile for West-East locations. Maps were generated in March 2012 using elevation data from the survey conducted by DePauli Engineering on June 7, 2011 and field inspection logs for 2012.

SECTION 6
GROUND WATER MONITORING RESULTS

Section 8 contains the Ground Water Analytical Data Tables for 2012. Only constituents above levels of detection are generally described. Bold and highlighted values indicate that a constituent exceeds one or more of the standards listed. Appendix K (Binder 2) contains the laboratory analytical data reports. The following is a list of reporting requirements included in this report.

- Monitoring of the aeration lagoons, ponds and outfalls between the lagoons and ponds on a quarterly, semi-annual and annual basis. (Section 8)
- Summary of Monthly Waste Water Flow Rate (Appendix D)
- New Well – OAPIS-1 (Appendix F)
- Major Refinery Activities and Events (Summary EPA/NMED/RCRA Activity) (Appendix G)
- Summary of All Leaks, Spills and Releases (Appendix H)
- Perimeter Inspections (Appendix I)
- Temporary Land Farm Analytical Results (Appendix J)

6.1 MONITORING WELLS THAT HAVE CONSTITUENT LEVELS ABOVE STANDARDS.

6.1.1 BW-1C, 2A, 2B, 2C, 3B, 3C

The boundary wells are sampled on an annual basis. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenol and WQCC metals (Total and dissolved). The boundary wells were sampled on the following dates:

- BW-1C: 8/24/12
- BW-2A: 8/24/12
- BW-2B: 8/24/12
- BW-2C: 8/24/12
- BW-3B: 8/23/12
- BW-3C: 8/23/12

Analytical results indicate concentration levels of fluoride were above the current WQCC and Environmental Protection Agency Regional Screening Level (EPA RSL) standards of 1.6 mg/L and 0.93 mg/L in all of the above listed BW wells for the annual sampling conducted for 2012. In BW-3B, concentration level of phosphorous (0.82 mg/L) was detected above the EPA RSL standard of 3.1E-04 mg/L.

Total metals detected above the WQCC and/or EPA RSL standards included the following metals; chromium at 0.22 mg/L in BW-1C; arsenic at 7.2E-03 mg/L in BW-2A; cadmium at 0.013 mg/L and iron at 2.9 mg/L in BW-2C; arsenic at 4.4E-03 mg/L, iron at 3.6 mg/L and manganese at 0.22 mg/L in BW-3B. Dissolved metals detected above the applicable standards include arsenic at 7.2E-03 mg/L in BW-2A; 1.1E-03 mg/L of arsenic in BW-2B; iron at 3.0 mg/L in BW-2C; arsenic at 4.9E-03 mg/L in BW-3B and 2.2E-03 mg/L in BW-3C.

6.1.2 GWM-1

Ground water samples are collected on a quarterly basis. Prior to 2010, this well was on an annual sampling schedule. Third quarter sampling was combined with the annual sampling event

per approval from NMED and OCD. Ground water samples were analyzed for the following parameters: Major cations, anions, 8260B plus MTBE, 8015B and WQCC metals. Quarterly water level measurement inspections and sampling were completed on the following dates:

- GWM-1: 3/20/12, 6/12/12, 8/21/12, 11/28/12

Benzene, toluene, ethyl benzene and total xylene (BTEX) constituents analyzed in this well are as follows: Benzene first quarter results indicated detectable concentration levels above the applicable standards at 5.7E-03 mg/L, second quarter results at 5.3E-03 mg/L, and third quarter results at 7.8E-03 mg/L. See Graph 1 in Section 12 for 2006 through 2012 benzene trend.

Ethyl benzene analytical results are as follows for 2012: First quarter 1.9E-03 mg/L, second quarter 2.5E-03 mg/L and third quarter results of 3.5E-03 mg/L. See Graph 2 in Section 12 for 2008 through 2012 ethyl benzene trend.

MTBE analytical results are as follows for 2012: First quarter 0.054 mg/L, second quarter 0.04 mg/L, third quarter 0.044 mg/L and fourth quarter at 0.052 mg/L which are at concentrations levels below the NMED Tap Water standard of 0.125 mg/L. See Graph 3 for MTBE trend in Section 12 for 2006 through 2012.

Fluoride and chloride levels were also above the applicable standards for 2012 in all four quarters. Fluoride ranged from first quarter of 3.6 mg/L to 3.2 mg/L in the fourth quarter. Chloride concentration levels were also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 1200 mg/L to fourth quarter of 1000 mg/L. See Graphs 4 and 5 in Section 12 for 2006 through 2012 fluoride and chloride trend.

Diesel range organics (DRO) concentration levels were also above the NMED Table 6.2 TPH Screening Guidelines for Potable Water (GW-1) (June 2012) for the first (3.5 mg/L) and fourth quarter (1.6 mg/L) of 2012.

Total metals analysis indicated detection levels above the applicable standards for the following constituents for 2012: Arsenic, iron and manganese. Barium was detected at concentration levels above the applicable standards in the first and third quarter at 1.1 mg/L. Dissolved metals analytical results indicated detectable concentration levels in all four quarters in 2012 for the following metals: arsenic, iron and manganese. Barium was detected in the third and fourth quarter at 1.1 mg/L. See Graph 6 for trend of arsenic levels from 2006 through 2012.

Volatile organic compounds (VOC) detected in 2012 that were above the applicable standards included the following organic constituents: 1-Methylnaphthalene at 6.3E-03 mg/L in the second quarter and 0.013 mg/L in the third quarter.

6.1.3 GWM-2, GWM-3

GWM-2 and GWM-3 are inspected on a quarterly basis. If either one of these wells indicate a water level during a quarterly inspection, the information is reported to NMED and OCD within 24 hours of discovery. Samples are collected only if there is an adequate water level for retrieval. After samples are collected, well is bailed of remaining water and depth to water is measured to determine remaining water level after purging. The wells were installed in 2005 and have been dry until 2008 when water was detected in the first quarter in GWM-2 with a depth to water measurement of 18.45 feet. NMED and OCD were notified of finding within the 24 hour requirement. Per NMED, well was bailed dry to monitor recharge rate which was minimal after samples were collected. After GWM-2 was purged dry, the well did not recharge and future quarterly inspections verified no presence of water until the second quarter of 2010 when water was detected in GWM-2 with a water thickness level of 1.5 feet. 24 hour notification given and no samples were collected at this time as there was not enough water for sample collection. Inspection of GWM-3 also indicated a water thickness level of 0.88 feet and no samples were collected due to low water level. Water was purged from each well with a disposable bailer of remaining water, gauged and recorded on the field log. Both wells were re-checked on June 4, 2010 and found to be dry. No further action was taken until the next quarterly inspection. Water was detected in the third and fourth quarter of 2010 and notification was given to NMED and OCD within 24 hours of finding. Weekly inspections were done to monitor recharge rate on both wells and ground water samples were collected from both wells in September and October of 2010.

GWM-2 and GWM-3 continue to indicate a water level during quarterly inspections in 2011. 24 hour notification and sampling requirements were followed for 2011. Per NMED's instructions, Gallup Refinery was instructed to take monthly measurements of both wells from February thru June of 2011. Recharge rate remained steady and no significant water level increase was observed in GWM-2 or GWM-3 during this period. Monthly checks were discontinued in July

2011. DTW measurements in GWM-2 fluctuated in the first quarter from 17.48 feet to 15.08 feet. Second quarter DTW measurements remained constant around 14.5 feet and third and fourth quarters remained around 15.7 feet.

In GWM-3 first quarter (2011) DTW measurements fluctuated from a high of 16.99 feet to a low of 14.4 feet in the first quarter. DTW measurements remained constant around 12.5 feet in the second quarter. Third and fourth quarter DTW measurements increased from 16.39 feet to 14.35 feet in the fourth quarter.

2012 quarterly inspections of GWM-2 and GWM-3 continued to indicate the presence of water in all four quarters and 24 hour notification and sampling requirements were followed. GWM-2 water thickness levels varied from first quarter of 5.23 feet to fourth quarter of 4.98 feet. Water thickness level in GWM-3 ranged from 4.85 feet in the first quarter to 4.2 feet in the fourth quarter.

Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD and conducted in August 2012. Ground water samples were analyzed for the following analytes: 8021B plus MTBE, GRO/DRO extended and major cations/anions. WQCC metals analysis was a requirement for the annual sampling only. Inspections and sampling were performed on the following dates.

- GWM-2: 3/20/12, 6/12/13, 8/21/12, 11/28/12
- GWM-3: 3/20/12, 6/12/13, 8/21/12, 11/28/12

Fluoride and chloride levels were above the applicable standards for 2012 in all four quarters for both wells. In GWM-2, fluoride ranged from first quarter of 3.6 mg/L to 3.8 mg/L in the fourth quarter. Chloride concentration levels were also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 1500 mg/L to fourth quarter of 1000 mg/L. Sulfate concentration level was also above the WQCC standard of 600 mg/L in all four quarters ranging from 1300 mg/L first quarter to 1500 mg/L in the fourth quarter. Nitrate concentration level was also above the WQCC standards for all four quarters ranging from 38 mg/L to 15 mg/L in the fourth quarter. Diesel range organics (DRO) was only detected in the first quarter at 2.4 mg/L at a concentration level above the NMED Table 6.2 TPH Screening Guidelines for Potable Water (GW-1) (June 2012).

Total and dissolved metals analysis was run for the first time as a sampling requirement for the annual sampling event completed in August 2012. GWM-2 sample analysis indicated detection levels above the applicable standards for the following constituents; arsenic, manganese and uranium.

GWM-3, fluoride ranged from first quarter of 4.9 mg/L to 5.6 mg/L in the fourth quarter. Chloride concentration level was also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 1300 mg/L to fourth quarter of 1200 mg/L. Sulfate concentration level was also above the WQCC standard of 600.0 mg/L in all four quarters ranging from 1600 mg/L first quarter to 1500 mg/L in the fourth quarter. Nitrate concentration level was also above the WQCC standards in the first quarter at 18 mg/L to third quarter results of 43 mg/L.

Diesel range organics (DRO) concentration level was also above the NMED Table 6.2 TPH Screening Guidelines for Potable Water (GW-1) (June 2012) for the first quarter at 2.7 mg/L.

Total and dissolved metals analysis was run for the first time as a sampling requirement for the annual sampling event completed in August 2012. GWM-3 sample analysis indicated detection levels above the applicable standards for the following constituents; arsenic, iron, lead, manganese and uranium.

6.1.4 MW-1, MW-2, MW-4, MW-5

The monitoring wells are sampled on an annual basis. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260 plus MTBE, WQCC Metals and 8015B. Annual sampling and inspections were completed on the following dates:

- MW-1: 8/24/12
- MW-2: 8/24/12
- MW-4: 8/21/12
- MW-5: 8/23/12

The MW series of wells are also sampled every 10 years per our Resource Conservation Recovery Act (RCRA) Post Closure Permit for the following analytes: General chemistry, Modified Skinner List Metals (total and dissolved) including mercury and cyanide and Modified

Skinner List VOC, SVOC, and total petroleum hydrocarbons (TPH). The next scheduled 10 year sampling event is to occur in year 2019.

Dissolved metals analysis indicated a detectable concentration level above the EPA RSL standard (4.5E-05 mg/L) for arsenic at 1.3E-03 mg/L in MW-1.

6.1.5 NAPIS-1, NAPIS-2, NAPIS-3, KA-3

NAPIS wells are sampled on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: Major cations/anions, 8021B plus MTBE, 8270 plus phenol, 8015B, and WQCC Metals. Method 8270 analysis was missed during the fourth quarter sampling event conducted in November and samples were collected on December 5, 2012. NAPIS Wells were sampled on the following dates:

- NAPIS-1: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12
- NAPIS-2: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12
- NAPIS-3; 3/20/12, 6/12/12, 10/2/12, 11/28/12
- Resampled: 12/5/12
- KA-3: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12

These shallow wells are located around the NAPIS. NAPIS-1 is an up gradient well located on the southeast side and NAPIS-2 is located immediately down gradient on the southwest side of the NAPIS. KA-3 and NAPIS-3 are located on the west side at the north end of the NAPIS. All NAPIS and KA wells are situated at or below ground level to allow vehicle/equipment access into and around the NAPIS area.

In NAPIS-1, BTEX and MTBE constituents were at non-detectable levels from 2008 through 2012. Fluoride was detected at a concentration level above the EPA RSL standard of 0.93 mg/L in the fourth quarter of 2012 at 1.1 mg/L. Chloride, bromide, nitrate, and sulfate concentration levels were all below applicable standards. Total metals analysis indicated concentration levels above the applicable standards for the following constituents: Second quarter , arsenic at 3.1E-03 mg/L; iron at 7.5 mg/L, manganese at 0.36 mg/L and uranium at 0.032 mg/L. In the fourth

quarter, iron at 1.1 mg/L and uranium at 0.03 mg/L. Dissolved metals analysis indicated a detectable level of arsenic in all four quarters of 2012: First quarter = 1.8E-03 mg/L; second quarter = 2.3E-03 mg/L, third quarter = 2.1E-03 mg/L and fourth quarter = 1.9E-03 mg/L. Total metals analysis indicated detectable concentration levels of the following metal constituents below applicable standards: barium, chromium, selenium, and zinc. Dissolved metals analysis indicated the following metal constituents: barium, calcium, iron, magnesium, manganese, selenium, sodium, uranium and zinc at concentration levels below the applicable standards. No organic compounds were detected in NAPIS-1 from 2009 through 2012.

In NAPIS-2, BTEX constituents analyzed with concentration levels above the applicable standards are as follows: Benzene, first quarter = 0.019 mg/L, second quarter = 0.018 mg/L, third quarter = 0.01 mg/L and fourth quarter = 0.016 mg/L. See Graph 7 in Section 12 for 2008 through 2012 benzene trend. Toluene and total xylene analytical results were all at non-detectable levels. MTBE was also detected at concentration levels above the NMED Tap Water standard of 0.125 mg/L in all four quarters of 2012. Results are as follows: First quarter = 0.37 mg/L; Second Quarter = 0.34 mg/L, third quarter = 0.16 mg/L and fourth quarter results were 0.36 mg/L. See Graph 8 in Section 12 for 2008 through 2012 MTBE trend.

Fluoride and chloride levels were also above the applicable standards for 2012 in all four quarters. Fluoride results for second quarter = 1.7 mg/L; third quarter = 1.6 mg/L and fourth quarter = 1.7 mg/L. Chloride concentration levels were also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 330 mg/L to fourth quarter of 370 mg/L. Bromide and sulfates were also detected but at concentration levels below the applicable standards.

DRO was only detected in the first quarter at 4.7 mg/L at a concentration level above the NMED Table 6.2 TPH Screening Guidelines for Potable Water (GW-1) (June 2012). Gasoline Range Organics (GRO) was also detected in the ground water samples collected from 2008 through 2012 ranging from 1.4 mg/L in the first quarter to 0.52 mg/L in the fourth quarter.

Total metals analysis indicated concentration levels above the applicable standards for the following constituents: Arsenic, first quarter = 0.011 mg/L, second quarter = 0.01 mg/L and third quarter = 9.7E-03 mg/L. Barium, first quarter = 2.1 mg/L, second quarter = 1.9 mg/L and third and fourth quarter = 1.7 mg/L. Iron, first quarter = 5.0 mg/L, second quarter 3.8 mg/L, third quarter = 3.1 mg/L and fourth quarter = 1.1 mg/L. Manganese, first quarter = 1.6 mg/L, second

quarter = 1.9 mg/L and third quarter = 1.7 mg/L. Uranium had a detectable concentration level in the fourth quarter at 0.03 mg/L. Selenium, zinc and copper were also detected but at concentration levels below the applicable standards.

Dissolved metals analysis indicated concentration levels above the applicable standards for the following constituents: Arsenic, first quarter = 9.3E-03 mg/L, second quarter = 8.9E-03 mg/L, third quarter = 0.014 mg/L and fourth quarter = 1.9E-03 mg/L. Barium, first and second quarter = 1.8 mg/L, third quarter = 2.7 mg/L and fourth quarter = 1.7 mg/L. Iron, first quarter = 3.0 mg/L, second quarter = 2.7 mg/L, third quarter = 1.9 mg/L and fourth quarter = 2.9 mg/L. Manganese, first quarter = 1.5 mg/L; second and third quarter = 1.6 mg/L and fourth quarter = 1.8 mg/L. Calcium, magnesium, selenium, sodium, uranium and zinc were also detected at concentration levels below the applicable standards.

Method 8270C analysis indicated detectable concentration levels above the applicable standards of 1-Methylnaphthalene as follows: First quarter 2012 at 0.015 mg/L; second quarter of 2009 at 4.2E-03 mg/L; second quarter 2010 at 0.033 mg/L; third and fourth quarters of 2011 at concentration levels of 0.012 mg/L and 0.01 mg/L. Phenol was detected for the first time in NAPIS-2 during the first quarter sampling event at 0.078 mg/L and again in the second quarter at 0.016 mg/L. Third and fourth quarter of 2012 indicated non-detectable levels.

Although naphthalene had non-detectable concentration levels for 2012, this constituent was first detected in the second quarter of 2009 at 0.03 mg/L. Subsequent sampling indicated detectable levels in the fourth quarter of 2009, first and second quarter of 2010 and in the first quarter of 2011.

In NAPIS-3, BTEX and MTBE were at non-detectable levels from 2008 through 2009 and fourth quarter 2010 through 2012. NAPIS-3 chloride levels were also above the applicable standards for 2012 in all four quarters. Fluoride was also detected at levels below the applicable standards. First quarter = 970 mg/L, second quarter 1000 mg/L, third quarter = 990 mg/L and fourth quarter results were 880 mg/L. Nitrate concentration levels were also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 19 mg/L to fourth quarter of 14 mg/L. Bromide and sulfates were also detected but at concentration levels below the applicable standards.

Total metals analysis indicated concentration levels above the applicable standards for the following constituents in NAPIS-3: Arsenic, first quarter = 0.006 mg/L, second quarter = 5.1E-

03mg/L, third quarter = 4.2E-03 mg/L and fourth quarter results 4.8E-03 mg/L. Iron, first quarter = 5.5 mg/L, second quarter = 2.4 mg/L, third quarter = 1.8 mg/L and fourth quarter = 9.9 mg/L. Manganese, fourth quarter = 0.46 mg/L. Uranium, first quarter 0.038 mg/L, second quarter 0.041 mg/L, third quarter 0.037 mg/L and fourth quarter 0.04 mg/L. Barium, chromium, copper, lead selenium, and zinc also had a detectable concentration level but all were below the applicable standards.

Dissolved metals analysis indicated concentration levels above the applicable standards for the following constituents: Arsenic, first quarter = 3.9E-03 mg/L, second quarter = 0.005 mg/L, third quarter = 0.004 mg/L and fourth quarter = 5.2E-03 mg/L. Iron, third quarter = 3.2 mg/L and fourth quarter = 15 mg/L. Manganese, fourth quarter = 0.39 mg/L. Uranium, first quarter = 0.032 mg/L, second quarter = 0.039 mg/L, third quarter = 0.038 mg/L and fourth quarter = 0.035 mg/L. Barium, calcium, chromium, copper, lead, magnesium, potassium, selenium, sodium and zinc also had a detectable concentration level but all were below the applicable standards.

In NAPIS-3 no SVOCs or VOCs were detected for 2012. In the past, two organic constituents 1-Methylnaphthalene (0.05 mg/L) and naphthalene (0.045 mg/L) were detected only in the second quarter of 2010 at concentration levels above the applicable standards.

In KA-3, BTEX constituents analyzed with concentration levels above the applicable standards are as follows: Benzene, first quarter = 0.015 mg/L and second quarter = 0.013 mg/L. Ethyl benzene, first quarter = 4.2E-03 mg/L and second quarter = 4.5E-03 mg/L.

MTBE for 2012 were at non-detectable concentration levels. In 2008 and 2009 sampling results indicated detectable concentration levels above the NMED Tap Water standard of 0.125 mg/L in the fourth quarter of 2008 at 0.13 mg/L and again in the second quarter of 2009 at 0.13 mg/L and in the third quarter at 0.17 mg/L. Toluene and total xylene were at non-detectable levels.

Fluoride and chloride levels were also above the applicable standards for 2012. Fluoride results for first quarter = 2.0 mg/L, second quarter = 1.3 mg/L and fourth quarter = 0.98 mg/L. Chloride concentration levels were also above the WQCC standards in all four quarters of 2012 ranging from first quarter of 440 mg/L to fourth quarter of 870 mg/L.

Nitrite and nitrates were also above the applicable standards. Nitrite, second quarter = 2.1 mg/L and fourth quarter 2.8 mg/L. Nitrate, first quarter 15 mg/L and second quarter = 11 mg/L.

Bromide, sulfate and GRO were also detected at concentration levels below the applicable standards.

Total metals analysis indicated concentration levels above the applicable standards for the following constituents in KA-3: Arsenic, first quarter = 6.5E-03 mg/L, second quarter = 5.7E-03mg/L, third quarter = 2.8E-03 mg/L and fourth quarter results of 0.006 mg/L. Barium was detected in the fourth quarter at 1.3 mg/L. Iron, first quarter = 24 mg/L, second quarter = 15 mg/L and fourth quarter = 30 mg/L. Manganese, first quarter = 1.8 mg/L, second quarter 0.93 mg/L, third quarter = 0.81 mg/L and fourth quarter = 1.7 mg/L. Uranium was detected in the fourth quarter at 0.032 mg/L. Chromium, copper, selenium and zinc were also detected at concentration levels below the applicable standards.

Dissolved metals analysis indicated concentration levels above the applicable standards for the following constituents: Arsenic, first quarter = 3.3E-03 mg/L, second quarter = 3.8E-03 mg/L, third quarter = 3.1E-03 mg/L and fourth quarter = 4.6E-03 mg/L. Iron, fourth quarter = 4.2 mg/L. Manganese, first quarter = 0.35 mg/L, second quarter = 0.38 mg/L, third quarter 0.39 mg/L and fourth quarter = 0.61 mg/L. Barium, calcium, chromium, lead, magnesium, potassium, selenium, sodium, uranium and zinc were also detected at concentration levels below the applicable standards.

In KA-3 no SVOCs or VOCs were detected for 2012. In the past, two analytes were detected at concentration levels above the applicable standards in the second and fourth quarter of 2009 which are 1-Methylnaphthalene and naphthalene and have shown up in 2010 and fourth quarter 2011 sampling activities.

6.1.6 OW-1, OW-10

OW-1 and OW-10 are sampled on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8015B and WQCC Metals. Ground water samples were taken on the following dates:

- OW-1: 3/22/12, 6/13/12, 8/22/12, 11/27/12
- OW-10, 3/22/12, 6/13/12, 8/22/12, 11/27/12

OW-1 total metals analysis indicated concentration levels above the applicable standards for the following constituents: Uranium, first quarter 0.041 mg/L, second quarter = 0.039 mg/L, third quarter = 0.04 mg/L and fourth quarter 0.045 mg/L. Dissolved metals analysis indicated the detection of the following constituents: Arsenic, fourth quarter 1.2E-03 mg/L. Uranium, first quarter = 0.039 mg/L, second quarter 0.043 mg/L, third quarter 0.041 mg/L and fourth quarter 0.043 mg/L.

In OW-10, MTBE was also detected in the fourth quarter at 0.23 mg/L which is above the NMED Tap water standard of 0.125 mg/L. Chloride was also detected at a concentration level above the applicable standard in all four quarters. Results are as follows; first quarter = 260 mg/L, second quarter = 980 mg/L, third quarter = 280 mg/L and four quarter 2100 mg/L.

Total metals analysis indicated concentration levels above the applicable standards for the following constituents in OW-10: Uranium, first quarter 0.051 mg/L, second quarter = 0.062 mg/L, third quarter = 0.049 mg/L and fourth quarter 0.087 mg/L. Dissolved metals analysis indicated the following analytes: Arsenic, third quarter = 0.001 mg/L and fourth quarter 1.7E-03 mg/L. Uranium, first quarter = 0.048 mg/L, second quarter 0.067 mg/L, third quarter 0.05 mg/L and fourth quarter 0.078 mg/L.

6.1.7 OW-11

OW-11 is sampled on an annual basis. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenol, and WQCC Metals. Well was sampled on the following date:

- OW-11: 8/22/12

Fluoride and sulfate concentration levels were above the applicable standards for 2012. Fluoride concentration level was 1.7 mg/L and sulfate was detected at 940 mg/L. Total metals analysis indicated detectable levels of uranium (0.22 mg/L) for 2012 which is above the WQCC standard. Dissolved metals analysis also indicated uranium at a detectable concentration level of 0.21 mg/L for 2012.

6.1.8 OW-13, OW-14, OW-29, OW-30

These wells are sampled on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: 8260B plus MTBE. These wells were sampled quarterly on the following dates:

- OW-13: 3/21/12, 6/14/12, 8/23/12, 11/27/12
- OW-14: 3/21/12, 6/14/12, 8/23/12, 11/27/12
- OW-29: 3/21/12, 6/13/12, 8/23/12, 11/27/12
- OW-30: 3/21/12, 6/14/12, 8/23/12, 11/27/12

In this group of wells OW-14 is the only well that has concentration levels above the WQCC standards for benzene, ethyl benzene and MTBE. Since its detection in 2006, concentration levels of benzene have slowly been on the rise. In 2006, benzene was detected at 3.4E-03 mg/L and in the last quarter of 2012, benzene concentration level was detected at 2.7 mg/L. A trend of benzene levels over the years can be seen in Section 12, Graph 9. Ethyl benzene was also detected in all four quarters of 2012 with first quarter at 0.051 mg/L, second quarter at 0.053 mg/L, third quarter at 0.037 mg/L and fourth quarter at 0.056 mg/L, which are all at levels above the WQCC standards. Trend of ethyl benzene is located on Graph 10, Section 12. MTBE was first detected in 2006 at a concentration level of 0.016 mg/L and has been on a steady incline through 2009 reaching its highest concentration level of 1.3 mg/L in the third quarter. 2010 highest concentration level was detected in the first quarter at 1.5 mg/L and the highest detected for 2011 was in the second quarter with a concentration level of 1.6 mg/L. 2012 sampling analyses indicate that the third quarter had the highest concentration level of MTBE for 2012 reaching 1.6 mg/L. See Graph 12, Section 12 for MTBE trend.

Method 8260B analysis indicated non-detectable levels of VOCs for 2012 for OW-14. However in the second half of 2009, three analytes were detected at concentration levels above the applicable standards and these are: 1,2-Dichloroethane, naphthalene and 1-Methylnaphthalene in OW-14.

In OW-29, MTBE was detected in all four quarters of 2012 at concentration levels above the NMED Tap Water standard of 0.125 mg/L and are listed as follows: First quarter = 0.62 mg/L, second quarter = 0.47 mg/L, third quarter = 1.0 mg/L and fourth quarter = 0.9 mg/L. MTBE

concentration levels have slowly been increasing since its detection in 2007 at 4.3E-03 mg/L. See Graph 11, Section 13 for MTBE trend.

No VOCs were detected in OW-29 for years 2012 through 2009. In one sampling event in the fourth quarter of 2008, one analyte, 1,2-Dichloroethane was detected in the fourth quarter of 2008 at 1.0E-03 mg/L.

In OW-30 MTBE was detected in all four quarters of 2012 at concentration levels above the NMED Tap Water standard of 0.125 mg/L. First quarter = 1.6 mg/L, second quarter = 1.5 mg/L, third quarter = 2.3 mg/L and fourth quarter = 2.2 mg/L. MTBE concentration levels in this particular well have also been increasing since its first detection in 2007 at 0.29 mg/L. See Graph 12, Section 12 for MTBE trend.

No VOCs were detected in OW-30 for years 2012 through 2010. 1,2-Dichloroethane was first detected in December 2007 at 1.2E-03 mg/L and again in 2008 and 2009 at 1.3E-03 mg/L.

6.1.9 OW-50, OW-52

OW-50 and OW-52 were installed in October 2009 to monitor the possible migration of MTBE from up-gradient wells OW-14, 29 and 30. These wells are sampled on a quarterly basis and third quarter was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: 8260B plus MTBE, 8270 plus phenol, 8015B, General Chemistry and WQCC Metals. These wells were resampled on 12/5/12 for SVOCs only as this particular suite was missed during the November sampling event. Wells were sampled on the following dates:

- OW-50: 3/22/12, 6/13/12, 8/23/12, 11/27/12
- Resampled: 12/5/12
- OW-52: 3/22/12, 6/13/12, 8/23/12, 11/27/12
- Resampled: 12/5/12

In the total metals category, iron was the only metal that had a detectable concentration level above the applicable WQCC standard in the fourth quarter at 1.3 mg/L. In the dissolved metals category, arsenic was the only constituent detected at concentration levels above the WQCC standard for all four quarters of 2012 at 1.9E-03 mg/L in OW-50.

No SVOCs were detected in 2012 and 2011. In the first quarter of 2010, bis (2-ethylhexyl) phthalate was detected at a concentration level of 0.011 mg/L. OW-52 had no detectable levels for BTEX, general chemistry, WQCC metals or SVOCs for 2012.

6.1.10 SMW-2, SMW-4

SMW-2 is located on the southeast corner of the closed Land Treatment Unit (LTU) and SMW-4 is located on the north side of the closed LTU. SMW-2 and SMW-4 are sampled on an annual basis. Ground water samples were analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8015B, WQCC metals. Annual sampling was conducted on the following dates:

- SMW-2: 8/23/12
- SMW-4: 8/24/12

Both of these wells are also sampled every 10 years per our RCRA Post Closure Permit for the following parameters: General chemistry, Modified Skinner List Metals (total and dissolved) including mercury and cyanide and Modified Skinner List VOC, SVOC, and TPH. The next scheduled 10 year sampling event is to occur in year 2019.

Analytical laboratory analyses for BTEX indicate non-detectable levels in both SMW-2 and SMW-4 from 2007 through 2012. MTBE was detected in SMW-2 in 2008, 2010, 2011 and 2012 at concentration levels below the NMED Tap Water standard of 0.125 mg/L and none detected in SMW-4.

SMW-2 annual sampling analytical results indicated the detection of chloride (2400 mg/L) and sulfate (1600 mg/L) at concentration levels above the WQCC standard. Fluoride and bromide were also detected at concentration levels below the applicable standards. Gasoline Range Organics (GRO) was also detected at a concentration level of 0.28 mg/L. Total metals analysis indicated detectable concentration levels of the following metals: Arsenic at 0.005 mg/L, chromium at 0.17 mg/L, iron at 1.5 mg/L, manganese at 0.25 mg/L and uranium at 0.11 mg/L. Barium, selenium and zinc were also detected at concentration levels below the applicable standards. For dissolved metals, manganese had a concentration level of 0.22 mg/L and uranium

at 0.1 mg/L for 2012. Barium, calcium, iron, magnesium, potassium, sodium, selenium and zinc were also detected at levels below the applicable standards.

No VOCs or SVOCs were detected in 2012 and 2011. However in 2008, 1,4-Dioxane was detected at a concentration level of 1.48E-02 mg/L which is above the EPA RSL standard. 1,4-Dioxane was also detected in ground water samples collected for the 2008 annual sampling event in August 2008 with results of 1.36E-02 mg/L. This well was sampled again in November 2008 to confirm presence of the organic compound and results indicated no detectable levels.

In SMW-4 fluoride was detected at 1.0 mg/L which is above the EPA RSL standard of 0.93 mg/L. Chloride, bromide, and sulfates were also detected at concentration levels below the applicable standards. Total metals analysis indicated detectable concentration levels of the following metals: Arsenic at 3.3E-03 mg/L and uranium at 0.033 mg/L. Trace levels of barium, iron and manganese were also detected which are at levels below the applicable standards. For dissolved metals, arsenic had a concentration level of 2.8E-03 mg/L and uranium at 0.03 mg/L for 2012. Trace levels of barium, calcium and sodium were also detected which were below the applicable standards.

No VOCs or SVOCs were detected in 2012.

6.1.11 PW-3

PW-3 is a process/production well located directly north of the maintenance shop. Prior to 2009, this well was on a three year sampling schedule. Due to the detection of an organic compound, the sampling of this well was changed to annual pursuant to NMED's Comment 12 of the May 16, 2011 NOD (May 2011 NOD) for the Annual Ground Water Monitoring Report 2009, annual sampling is required for PW-3 until otherwise directed by NMED. Ground water samples were analyzed for the following analytes. 8260B plus MTBE, 8270 plus phenol, WQCC Metals, cyanide and nitrates. The well was sampled on the following date:

- PW-3: 8-24-12

Total metals analysis indicated concentration levels above the EPA RSL standard for arsenic at 0.004 mg/L and dissolved metals was detected at 3.4E-03 mg/L. No VOCs or SVOCs were

detected during the 2012 annual sampling. During the annual sampling in 2007 which was conducted on 1/1/08, analytical data indicated the presence of 2-Methylnaphthalene at a concentration level of 0.032 mg/L and phenol at 0.8 mg/L. PW-3 was re-sampled in August 2008 along with a blind duplicate and analytical results confirmed no detectable concentration levels. Detection of these two analytes are suspect and may possibly be picked up from contamination by field or lab personnel as future samples have not indicated any detection of these two organic constituents since its discovery in 2008.

6.1.12 RW-1, RW-2, RW-5, RW-6

The RW series of wells are shallow recovery wells from which separate-phase hydrocarbons (SPH) have been recovered on a quarterly basis. Previously these wells were only inspected quarterly and no sampling was required. These wells were added to the annual sampling schedule per Approval with Modifications, 2010 Facility Wide Ground Water Monitoring Work Plan dated August 25, 2010 which requires all wells including the recovery wells containing separate phase hydrocarbons for sample collection. Annual sampling was conducted for the first time for the RW series of wells in 2011. The wells are sampled for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenols and WQCC metals. The wells were inspected and sampled on the following dates:

- RW-1: 3/15/12, 6/4/12, 8/3/12, 10/8/12
- Sampled: 8/23/12
- RW-2: 3/15/12, 6/4/12, 8/13/12, 10/8/12
- Sampled: 8/24/12
- RW-5: 3/15/12, 6/4/12, 8/3/12, 10/8/12
- Sampled: 8/23/12
- RW-6: 3/15/12, 6/4/12, 8/13/12, 10/8/12
- Sampled: 8/23/12

RW-1 lab analysis indicated concentration levels above the WQCC standards for benzene, toluene, ethyl benzene, total xylene and MTBE for 2012 and 2011. Benzene was detected at 45 mg/L, toluene at 82 mg/L, ethyl benzene at 4.9 mg/L, total xylene at 31 mg/L and MTBE at 3.1 mg/L which are at concentration levels slightly higher than 2011 results. Chloride was the only anion detected at a concentration level above the WQCC standard with results at 380 mg/L. Bromide was also detected at a concentration level of 3.8 mg/L.

Total metals concentration levels detected above the applicable standard are as follows: Arsenic at 0.01 mg/L, barium at 3.7 mg/L, iron at 6.9 mg/L and manganese at 3.6 mg/L. Trace levels of selenium and uranium were also detected. Dissolved metals detected are as follows: Arsenic at 0.009 mg/L, barium at 3.6 mg/L, iron at 7.6 mg/L and manganese at 3.6 mg/L. Calcium, magnesium, potassium, selenium, sodium, uranium and zinc were also detected at concentration levels below the applicable standards.

VOCs and SVOCs detected in RW-1 above the applicable standards are as follows: 1,2,4-Trimethylbenzene at 2.8 mg/L, aniline at 0.16 mg/L, 2-Methylnaphthalene at 0.61 mg/L, 1-Methylnaphthalene at 0.3 mg/L, naphthalene at 0.89 mg/L, phenol at 0.11 mg/L and pyridine at 0.031 mg/L.

In RW-2, lab analysis indicated concentration levels above the WQCC standards for benzene, toluene, ethyl benzene, total xylene and MTBE for 2012 and 2011. Benzene was detected at 42 mg/L, toluene at 2.6 mg/L, ethyl benzene at 0.59 mg/L, total xylene at 1.7 mg/L and MTBE at 3.3 mg/L. General chemistry parameters were all at non-detectable levels for fluoride, nitrates, phosphorous and nitrates. Bromide was detected at 3.8 mg/L.

Total metals concentration levels detected above the applicable standard are as follows: Arsenic at 6.9E-03 mg/L, barium at 3.7 mg/L, iron at 10 mg/L and manganese at 2.1 mg/L. Trace levels of selenium was also detected in 2012. Dissolved metals detected are as follows: Arsenic at 7.3E-03 mg/L, barium at 3.5 mg/L, iron at 10 mg/L and manganese at 2.1 mg/L. Calcium, magnesium, selenium, sodium and zinc were also detected at concentration levels below the applicable standards.

SVOCs detected in RW-2 above the applicable standards are as follows: Aniline at 0.21 mg/L, 1-Methylnaphthalene at 0.043 mg/L, naphthalene at 0.043 mg/L and phenol at 0.091 mg/L.

In RW-5, lab analysis indicated concentration levels above the WQCC standards for benzene and ethyl benzene 2012 and 2011. Benzene was detected at 0.19 mg/L and ethyl benzene at 0.26 mg/L. Toluene was non-detect while total xylene was detected at 0.091 mg/L and MTBE was detected at 0.032 mg/L which are concentration levels below the applicable standard. General chemistry parameters were all undetectable and/or below the applicable standards for 2012.

Total metals concentration levels detected above the applicable standard are as follows: Arsenic at 3.3E-03 mg/L, barium at 3.1 mg/L, iron at 5.0 mg/L and manganese at 0.76 mg/L. Dissolved

metals detected are as follows: Arsenic at 2.2E-03 mg/L, barium at 2.7 mg/L, iron at 3.7 mg/L and manganese at 0.7 mg/L. Calcium, magnesium, selenium, sodium and zinc were also detected at concentration levels below the applicable standards.

VOCs and SVOCs detected in RW-5 above the applicable standards are as follows: 1,2,4-Trimethylbenzene at 0.054 mg/L, naphthalene at 0.11 mg/L, 1-Methylnaphthalene at 0.11 mg/L and 2-Methylnaphthalene at 0.17 mg/L.

In RW-6, lab analysis indicated concentration levels above the WQCC standards for benzene and ethyl benzene and total xylene for 2012. Benzene was detected at 0.74 mg/L, ethyl benzene at 0.4 mg/L and total xylene at 1.6 mg/L. Trace levels of toluene (0.052 mg/L) and MTBE (0.073 mg/L) were also detected at concentration levels below the applicable standards. General chemistry parameters were all at undetectable and or concentration levels below the applicable standards.

Total metals concentration levels detected above the applicable standard are as follows: Arsenic at 0.015 mg/L, barium at 3.7 mg/L, iron at 7.4 mg/L and manganese at 0.89 mg/L. Lead was also detected at a concentration level below the applicable standard. Dissolved metals detected are as follows: Arsenic at 0.015 mg/L, barium at 3.7 mg/L, iron at 8.3 mg/L and manganese at 0.92 mg/L. Calcium, lead, magnesium, selenium, sodium and zinc were also detected at concentration levels below the applicable standards.

VOCs and SVOCs detected in RW-6 above the applicable standards are as follows: 1,2,4-Trimethylbenzene at 0.38 mg/L, 1,3,5-Trimethylbenzene at 0.17 mg/L, naphthalene at 0.58 mg/L, 1-Methylnaphthalene at 0.22 mg/L and 2-Methylnaphthalene at 0.36 mg/L.

Quarterly inspections for RW-1 include product recovery which is conducted using a portable 2-inch bladder pump which is then lowered into the well. Purge water is collected in a 55 gallon drum or a 5 gallon bucket and the top visible layer of hydrocarbon is measured in inches before it is disposed of upstream of the NAPIS. Calculations are an estimated value based on the sampler's field notes. The purged water is disposed of upstream of the NAPIS.

RW-1 has shown a steady decrease of hydrocarbon levels from 2005 to 2012. Total hydrocarbon recovery for 2012 is 0.97 gallons compared to 2005 where 431.5 gallons of hydrocarbons was recovered from RW-1. RW-2 has not shown any hydrocarbon levels during quarterly inspections and therefore no product recovery is done at this well only DTW measurement is recorded. In

RW-5 and RW-6, water is purged using a 3 foot disposable bailer. Purge water is collected in a 5 gallon bucket and disposed of upstream of the NAPIS. Visible layer of hydrocarbon is measured as best as practical in inches and recorded in the field log and calculations are based on estimated values. RW-5 has shown a steady decrease of hydrocarbon levels compared to 2005 where 17 gallons was recovered and in 2012 there was no measurable product to recover. RW-6 has also shown a decrease in product recovery compared to 2005 where 17 gallons of product was recovered and 0.22 gallons of product was estimated to have been recovered 2011 and in 2012 there was no measurable product to recover. 2012 through 2010 inspections in RW-5 indicate no measureable hydrocarbon layer in this well. Total year to date hydrocarbon recovery from RW-6 was 0 gallons compared to 2011 where 0.22 gallons was recovered. Although no measureable hydrocarbon level is detected in RW-5 and RW-6, both wells continue to be purged. A slight odor can be detected when the well cap is removed and also in the purged water, an oily sheen is observed.

6.2 WELLS WITH CONSTITUENT LEVELS BELOW STANDARDS

6.2.1 BW-1A, BW-1B, BW-1C

The boundary wells are sampled on an annual basis. Ground water samples were analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenol and WQCC Metals. The boundary wells were inspected and sampled on the following dates:

- BW-1A: 8/23/12
- BW-1B: 8/23/12
- BW-1C: 8/24/12

BW-1A and BW-1B annual inspection indicated that both of these wells were dry. There was no indication of a water level when DTW measurements were taken and therefore no samples were collected from BW-1A and BW-1B.

BW-1C continues to show non-detectable levels of BTEX plus MTBE since 2006.. Chloride and sulfates were detected but at concentration levels below the applicable standards for 2012, as well as bromide. Total metals detected at concentration levels below the applicable standards are as

follows: Barium, copper, iron, manganese, uranium and zinc. Dissolved metals detected are as follows also at concentration levels below the applicable standards: Barium, calcium, manganese, potassium, sodium and uranium. No VOCs or SVOCs were detected in this well.

6.2.2 BW-2A, BW-2B, BW-2C

The boundary wells are sampled on an annual basis. Ground water samples were analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenol and WQCC Metals. The boundary wells were inspected and sampled on the following dates:

- BW-2A: 8/24/12
- BW-2B: 8/24/12
- BW-2C: 8/24/12

All three wells in this group have shown non-detectable levels of BTEX plus MTBE since 2006. Chloride, bromide, nitrate, and sulfate were all detected in all three of the wells but at concentration levels below the applicable standard. The following total metals were detected at concentration levels below the applicable standards in BW-2A through 2C: Barium, iron, and manganese. Chromium, uranium and zinc were found in BW-2C at concentration levels below the applicable standards. Dissolved metals detected in BW-2A through 2C at concentration levels below the applicable standards are as follows: Barium, calcium, iron, magnesium, manganese and sodium. Potassium, selenium, uranium and zinc were detected at concentration levels below the applicable standards in BW-2B. In BW-2C cadmium, potassium, uranium and zinc were also detected at concentration levels below the applicable standard. No VOCs or SVOCs were detected in either of these wells.

6.2.3 BW-3A, 3B, 3C

The boundary wells are sampled on an annual basis. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus phenol and WQCC Metals. The boundary wells were inspected and sampled on the following dates:

- BW-3A: 8/23/12
- BW-3B: 8/23/12
- BW-3C: 8/23/12

In BW-3A annual inspection indicated no indication of a water level when DTW measurements were taken and therefore no samples were collected for 2012. BW-3B and BW-3C in this group have shown non-detectable levels of BTEX plus MTBE since 2006. Chloride, bromide and sulfates were detected in both wells at concentration levels below the applicable standards. The following metals were detected at concentration levels below the applicable standards: Barium, iron, and zinc. Chromium was found in BW-3B and manganese in BW-3C at concentration levels below the applicable standards. Dissolved metals detected are as follows also at concentration levels below the applicable standards: Barium, Calcium, iron, and manganese. Magnesium and selenium in BW-3B and potassium, uranium and zinc in BW-3C, all detected at concentration levels below the applicable standards. In 2009 the organic compound, bis (2-ethylhexyl) phthalate was detected in BW-3B at a concentration level of 0.01 mg/L for the first time and also in BW-3C in 2011 at a concentration level of 0.014 mg/L. Subsequent sampling has indicated non-detectable levels of this organic compound since its first detection.

6.2.4 GWM-2, GWM-3

GWM-2 and GWM-3 are inspected on a quarterly basis. If either one of these wells indicate a water level during a quarterly inspection, the information is reported to NMED and OCD within 24 hours of finding. If there is a sufficient water level, samples are then collected and analyzed for 8260B plus MTBE, 8015B, and major cations/anions. Quarterly water level measurement inspections and sampling were completed on the following dates:

- GWM-2: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- GWM-3: 3/20/12, 6/12/12, 8/21/12, 11/28/12

2012 quarterly inspections of both of these wells continued to indicate a measureable water level in all four quarters of 2012. Notification to NMED and OCD procedures were followed and no special bailing or monitoring was required by NMED. After samples were collected, both wells were purged of remaining water.

GWM-2 had non-detectable levels of benzene, toluene, ethyl benzene and total xylene since 2008. There were detectable concentration levels of MTBE since 2008 but at levels below the NMED Tap Water standard of 0.125 mg/L. Bromide was also detected at 7.5 mg/L. Total and dissolved metals analysis was run for the first time as a sampling requirement for the annual sampling event completed in August 2012. The following total metals were detected at concentration levels below the applicable standards in GWM-2: barium, copper, iron, lead, selenium and zinc. Dissolved metals and cations are as follows: barium, calcium, copper, iron, lead, magnesium, potassium, selenium, sodium and zinc.

GWM-3 had non-detectable levels of benzene, toluene, ethyl benzene and total xylene since 2008. There were detectable concentration levels of MTBE since 2008 but at levels below the NM Tap Water RSL standard of 0.125 mg/L. Bromide and nitrate were also detected at concentration levels below the applicable standard and also a detection of GRO at 0.088 mg/L which was detected in the fourth quarter in GWM-3. Total and dissolved metals analysis was run for the first time as a sampling requirement for the annual sampling event completed in August 2012. The following total metals were detected at concentration levels below the applicable standards in GWM-3: barium, copper, iron, lead, selenium and zinc. Dissolved metals and cations are as follows: barium, calcium, copper, iron, magnesium, potassium, selenium, sodium and zinc.

6.2.5 MW-1, MW-2, MW-4, MW-5

The monitoring wells (MW) are sampled on an annual basis. Ground water samples were analyzed for the following analytes: Major cations/anions, 8260B plus MTBE and WQCC Metals. The monitoring wells were inspected and sampled on the following dates:

- MW-1: 8/24/12
- MW-2: 8/24/12
- MW-4: 8/21/12
- MW-5: 8/23/12

BTEX plus MTBE and method 8015B analysis indicated non-detectable levels for all four wells during the annual sampling event. Fluoride, chloride, bromide and sulfate were detected at concentration levels below the applicable standards in all four wells. DRO and GRO were all at undetectable concentration levels. Total metals and cations were detected in all four wells at

concentration levels below the applicable standards. The following is a list of the total metals detected: Barium, iron, manganese and uranium. Dissolved metals and cations were detected in all four wells at concentration levels below the applicable standards. The following is a list of the dissolved metals detected in all four wells: Barium, calcium, manganese, sodium, uranium and zinc and potassium in MW-1.

6.2.6 OW-1 AND OW-10

In the approved 2010 FWGWMP (August 25, 2010), inspection requirements were modified on both of these wells to include sampling on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: Major cations/anions, 8260B plus MTBE, 8015B and WQCC Metals. Ground water samples were taken on the following dates:

- OW-1: 3/22/12, 6/13/12, 8/22/12, 11/27/12
- OW-10: 3/22/12, 6/13/12, 8/22/12, 11/27/12

BTEX results indicated non-detectable concentration levels for both OW-1 and OW-10 from 2010 to 2012. In OW-1, MTBE was detected in the first, second and third quarter at concentration levels below the NMED Tap Water standard of 0.125 mg/L. Trace levels of fluoride, chloride, bromide and sulfate was detected at concentration levels below the applicable standards. The following metals were also detected at concentration levels below the applicable standards: Barium, iron, manganese, and selenium. Dissolved metals detected also at concentration levels below the applicable standards are as follows: Barium, calcium, manganese, potassium, selenium, sodium and zinc. No VOCs have ever been detected in OW-1.

OW-10 had detectable concentration levels of fluoride, bromide, nitrates and sulfates at concentration levels below the applicable standards. GRO was also detected in the first, second and fourth quarter. Total metals detected at concentration levels below the applicable standards are as follows: Barium, iron, manganese and selenium. Dissolved metals indicated the following detectable concentration levels below the applicable standards: Barium, calcium, manganese, potassium, selenium, sodium and zinc. The organic constituent 1,1-Dichloroethane was detected for the first time at a concentration level of 1.3E-03 mg/L and again in November 2012 at a concentration level of 1.6E-03 mg/L. Two other organic compounds 1,2-Dichloroethane (EDC) and 1,1-Dichloroethene were detected for the first time at concentration levels below the

applicable standards in the fourth quarter with results of 1.1E-03 mg/L for 1,2-Dichloroethane (EDC) and 2.1E-03 mg/L for 1,1-Dichloroethene.

6.2.7 OW-11, OW-12

These wells are sampled on an annual basis. Ground water samples are analyzed for the following analytes for OW-11: Major cations/anions, 8260B plus MTBE, 8270 plus phenol, and WQCC Metals. OW-12: 8260B plus MTBE. Wells were sampled on the following date:

- OW-11: 8/22/12
- OW-12: 8/22/12

BTEX plus MTBE concentrations levels indicated non-detect for all four quarters for both wells. Chloride and bromide were detected at concentration levels below the applicable standards in OW-11. OW-12 had detectable concentration levels of fluoride, chloride, bromide and sulfate below the applicable standards. Total metals analysis indicated detectable levels of the following metals and cations in OW-11: Barium iron, manganese and selenium which are at concentration levels below the applicable standards. In OW-12, barium, iron, manganese and uranium were detected. Dissolved metals also had detectable concentration levels below the applicable standards of the following metals and cations in OW-11: arsenic, barium, calcium, magnesium, manganese, potassium, selenium, sodium and zinc. In OW-12 the following dissolved metals were detected: arsenic, barium, calcium, iron, manganese, sodium, uranium and zinc.

6.2.8 OW-50, OW-52

OW-50 and 52 are sampled on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. Ground water samples are analyzed for the following analytes: 8260B plus MTBE, 8270 plus phenol, 8015B, General Chemistry and WQCC Metals. Method 8270C analysis was sampled on 12/5/12 as this method was missed during the scheduled quarterly sampling which was completed in November 2012. Wells were sampled on the following dates:

- OW-50: 3/22/12, 6/13/12, 8/23/12, 11/27/12
- Resampled: 12/5/12
- OW-52; 3/22/12, 6/13/12, 8/23/12, 11/27/12
- Resampled: 12/5/12

2012 analytical data indicate non-detectable concentration levels of BTEX and MTBE from 2009 to 2012. Fluoride, chloride, bromide, and sulfates were detected in both OW-50 and 52 at concentration levels below the applicable standards. The following metals were detected in both wells at concentration levels below the applicable standard: barium, copper, iron, manganese, uranium and zinc. Dissolved metals also indicated the following metals found in OW-50 and 52 at concentration levels below the applicable standards: barium, calcium, iron, manganese potassium, sodium, uranium and zinc.

Trace level of bis (2-ethylhexyl) phthalate (0.011 mg/L) and benzoic acid (0.02 mg/L) were detected in OW-50 during the first quarter 2010 sampling. Subsequent sampling results indicate non-detectable concentration levels for the remainder of 2010, 2011 and 2012.

6.2.9 PW-2, PW-3, PW-4

These process/production wells are on a 3 year sampling schedule beginning in 2008 for PW-2 and PW-3 and a start year of 2007 for PW-4. PW-3 sampling schedule was changed to annual sampling in 2009 due to the detection of 2-Methylnaphthalene (0.032 mg/L) during the annual sampling for 2007 which was conducted on 1/1/08. Pursuant to NMED's Comment 12 of the May 16, 2011 NOD (May 2011 NOD) for the Annual Ground Water Monitoring Report 2009, annual sampling is required for PW-3 until otherwise directed by NMED. Ground water samples are analyzed for the following analytes: 8260B plus MTBE, 8270 plus phenols, WQCC Metals, cyanide and nitrates. Only PW-3 was scheduled for sampling in 2012.

- PW-3: 8/24/12

BTEX and MTBE analytical results indicate non-detectable concentration levels in 2012 for PW-3. The following metals were detected at concentration levels below the applicable standards during the 2012 annual sampling event: Barium, iron, cyanide and zinc, calcium, potassium, selenium and sodium. No organic compounds were detected in PW-3 for 2012.

6.3 EVAPORATION PONDS, INFLUENTS, EFFLUENTS, BOILER WATER TO EP-2 AND LEAK DETECTION UNITS – CONSTITUENT LEVELS.

6.3.1 EVAPORATION PONDS 1 THROUGH 12B

In 2011, the approved FWGWMP (August 25, 2010) added ponds 9a, 11, 12A and 12B to the monitoring schedule as well as sampling frequency was changed to semi-annual. Prior to the approved 2010 FWGWMP, the ponds were sampled on an annual basis. Evaporation pond water samples are analyzed for the following analytes: General Chemistry, 8260B plus MTBE, WQCC metals, 8270 plus phenol, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), E-Coli Bacteria. The ponds were sampled on the following dates:

- EP-1 thru EP-12B: 5/29/12, 5/30/12, 11/6/12, 11/7/12

Laboratory analysis of BTEX plus MTBE indicates non-detectable concentration levels for 2012 for evaporation ponds EP-1 through EP-12B. Fluoride, chloride and sulfates were detected in all of the ponds at concentration levels above the WQCC standards. Bromide was also detected in ponds 1 through 12B. In EP1 - 5 and 11- 12B, BOD and COD analyses indicate concentration levels above the WQCC general requirement standards. EP-6 thru EP-9 had detectable concentration levels of COD for 2012 and BOD concentration levels were detected below the applicable standards. Total metals analyses indicate that arsenic was detected in ponds EP-1 through EP-12B at concentration levels above the applicable standard. Mercury only detected in EP-1 at concentration levels above the applicable standard, however trace levels were also detected in EP-2, EP-3 and EP-12B. Iron and manganese were detected in ponds 1 through 12B also at concentrations levels above the applicable standards. Trace levels of barium, chromium, copper, selenium, and zinc were also detected at concentration levels below the applicable standards. Dissolved metals analyses also indicated the following had detectable concentration levels above the applicable standards in ponds 1 through 12B: Arsenic and manganese. The metal iron was also detected in ponds 1 through 3 at concentration levels above the applicable standards. Selenium was detected in ponds 7, 8 and 9 at concentration levels above the applicable standards. Barium, calcium, chromium, potassium, selenium, sodium, uranium and zinc were also detected at concentrations below the applicable standards.

In EP-4, carbon disulfide was detected at a concentration level of 0.78 mg/L and EP-5 at 1.3 mg/L in the second half of 2012 which is above the applicable standard. The following organic constituents were detected at concentration levels below the applicable standards for 2012: Acetone, carbon disulfide, in EP-1 and EP-3; acetone, 2-Butanone in EP-2; acetone in EP-4. Semi-volatile organic constituents detected at concentration levels above the applicable standard are as follows: EP-1 through EP-6, aniline and phenol; EP-11, EP-12A, phenol and in EP-12B aniline and phenol. Trace levels of 2,4-Dimethylphenol, 2-Methylphenol, 3+4-Methylphenol were detected in EP-1 through EP-5. In EP-11 and EP-12A, 2-Methylphenol and 3+4-Methylphenol were detected at concentration levels below the applicable standards. EP-12B had detection levels of 2,4-Dimethylphenol, 2-Methylphenol and 3+4-Methylphenol below the applicable standards.

6.3.2 INFLUENTS: INFL TO AL-1; INFL TO AL-2; INFL TO EP-1

Beginning the third quarter of 2012, Influent to AL-1 was no longer in operation due to the start up of the new WWTP. All waste water is now routed to the WWTP via Tank 35 and the NAPIS. The only waste water going into aeration lagoon 1 is from the pilot lift station. Samples are no longer collected from the location known as Infl to AL-1.

These outfalls are sampled on a quarterly basis. Boiler Water to Evaporation Pond 2 (EP-2) is sampled on a semi-annual basis. Outfalls are analyzed for the following analytes. Influent to AL-1 and AL-2: 8260B plus MTBE, BOD, COD, Chloride, 8015B, pH and Phenol. Influent to EP-1: Major cations/anions, pH, BOD, COD, 8260B plus MTBE, 8270 plus phenol, 8015B, and WQCC Metals. Method 8270 analysis was missed during the November sampling event and on 12/5/12 samples were collected. Influents were sampled on the following dates:

- Infl to AL-1: 3/21/12, 6/14/12
- Infl to AL-2: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12
- Infl to EP-1: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12

In the first half of 2012, Influent to AL-1 BTEX analyses indicated concentration levels above the applicable standards for benzene, toluene, ethyl benzene and total xylene. MTBE analysis continued to indicate non-detectable levels from 2010 through 2012.

Infl to AL-2 had non-detectable BTEX and MTBE concentration levels for 2012. Chloride concentration levels were above the applicable standards for Influent to AL-1 and AL-2. Ph was also outside of the range specified by WQCC in Infl to AL-1, with pH levels ranging from 9.13 in the first quarter to 8.73 in the second quarter. DRO was also detected at a concentration level above the NMED Table 6 (unknown oil) TPH screening guidelines for Potable Ground Water (GW-1) (Jun 2012) for the first and second quarter. BOD and COD concentration levels were above the applicable standards for the first and second quarters of 2012.

The following VOCs were detected in Infl to AL-1 at concentration levels above the applicable standards: 1,2,4-Trimethylbenzene, naphthalene, 1-Methylnaphthalene, and 2-Methyl-naphthalene, aniline, 2,4-Dimethylphenol, 2-Methylphenol and phenol. The following organic compounds were also detected at concentration levels below the applicable standards: 1,3,5-Trimethylbenzene, acetone, 2-Butanone, n-Propylbenzene, benzyl alcohol, 3+4-Methylhenol, phenanthrene and carbazole.

In Infl to AL-2, no VOCs were detected for 2012 that had concentration levels above the applicable standards. In the first quarter the following SVOCs were detected at concentration levels above the applicable standards: Aniline, 2-Methylphenol, phenol and bis (2-ethylhexyl) phthalate which was detected for the first time at a concentration level of 0.072 mg/L in the third quarter of 2012. Trace levels of the following SVOCs were also detected: Acetone, 2-Butanone, 2,4-Dimethylphenol and 3+4-Methylphenol at concentration levels below the applicable standards.

Infl to EP-1, BTEX and MTBE analyses were all at non-detectable levels for 2012. Fluoride, chloride and sulfate were detected at concentration levels above the applicable standards for 2012. DRO concentration levels were also above the applicable standards for all four quarters ranging from 12 mg/L in the first quarter to 9.2 mg/L in the fourth quarter. BOD and COD concentration levels were above the applicable standards for 2012. Total metals detected in Infl to EP-1 at concentration levels above the applicable standards are as follows: Arsenic, iron, manganese and mercury. Barium, chromium, copper, lead, manganese, selenium, uranium and zinc all had detectable concentration levels which were below the applicable standards for 2012.

Dissolved metals analyses detected concentration levels of arsenic, iron and manganese. Barium, calcium, copper, magnesium, potassium, selenium, sodium, uranium and zinc were also detected at concentration levels below the applicable standards.

No VOCs were detected in Infl to EP-1 at concentration levels above the applicable standards; however acetone and 2-butanone were detected at concentration levels below the applicable standards for 2012. SVOCs detected include, aniline, 2-Methylphenol and phenol all at concentration levels above the applicable standard. 2,4-Dimethylphenol and 3+4-Methylphenol were also detected at concentration levels below the applicable standard for 2012.

6.3.3 EFFLUENTS: AL-2 TO EP-1; PILOT EFFLUENT, NAPIS EFFLUENT

Beginning the third quarter of 2012, NAPIS effluent was rerouted to the new WWTP via Tank 35, and the NAPIS. All waste water is now routed to the WWTP via Tank 35 and the NAPIS and the only waste water going into aeration lagoon 1 is from the pilot lift station. Samples are no longer collected from location NAPIS Effluent.

The effluents are sampled on a quarterly basis. Pilot Effluent is sampled for the following analytes: 8260B plus MTBE, 8015B, BOD, COD and WQCC Metals. NAPIS Effluent is sampled for the following analytes: General chemistry, 8260B plus MTBE, 8270 plus phenol, 8015B and WQCC Metals. AL-2 to EP-1 is sampled for the following analytes: Major cations/anions, 8260B plus MTBE, 8270 plus Phenol, 8015B and WQCC Metals. The effluents were sampled on the following dates:

- AL-2 to EP-1: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Resampled: 12/5/12
- Pilot Effluent: 3/20/12, 6/12/12, 8/21/12, 12/5/12
- NAPIS Effluent: 3/21/12, 6/12/12

AL-2 to EP-1, samples caught on 12/5/12 were for SVOCs only as this particular suite was missed during the fourth quarter sampling event. In Al-2 to EP-1, BTEX and MTBE concentration levels were all undetectable for 2012. Fluoride, chloride and sulfates were detected at concentration levels above the applicable standards as follows: Fluoride ranged from first quarter 57 mg/L to fourth quarter 4.5 mg/L; chloride ranged from first quarter 2200 mg/L to 380

mg/L in the fourth quarter; sulfate concentration levels ranged from 780 mg/L in the first quarter to a high of 1200 mg/L in the second quarter. Bromide was also detected in the first and second quarter at 5.0 mg/L and 1.6 mg/L. DRO was also detected in all four quarters at concentration levels above the applicable standard as follows: First quarter 15 mg/L, second quarter 9.0 mg/L, third quarter 2.8 mg/L and fourth quarter 7.8 mg/L.

Total metals analysis detected the following metals at concentration levels above the applicable standards: arsenic, iron, manganese and mercury. Trace levels of barium, chromium, copper, selenium, uranium and zinc were also detected at concentration levels below the applicable standards throughout the year. Dissolved metals analysis detected the following metals at concentration levels above the applicable standard: Arsenic, iron, and manganese. Trace levels of barium, calcium, chromium, lead, magnesium, potassium, selenium, sodium, uranium and zinc were also detected at concentration levels below the applicable standards in 2012.

In 2008 through 2011, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, naphthalene, 1-Methylnaphthalene and 2-Methylnaphthalene have been detected in the samples collected at concentration levels above the applicable standards. In 2012, concentration levels for the above listed organics have been at non-detectable levels. Trace levels of acetone, 2-Butanone and carbon disulfide have also been detected at concentration levels below the applicable standards. Three semi-volatile organic compounds were detected in the first and fourth quarter and are listed as follows: Aniline at 0.38 mg/L = first quarter; 2-Methylphenol at 1.4 mg/L = first quarter, and phenol at 5.4 mg/L in the first quarter and 0.074 mg/L in the fourth quarter. All concentrations detected are above the applicable standards. Trace levels of 3+4-Methylphenol was also detected only in the first quarter at 2.1 mg/L.

Pilot Effluent had no detectable concentration levels for BTEX and MTBE for 2012. DRO was detected in the first quarter at 4.7 mg/L, second quarter at 7.6 mg/L, third quarter at 3.5 mg/L which are all at concentration levels above the applicable standard. GRO analysis indicated non-detect for 2012and Motor Oil Range Organics (MRO) was detected in the second quarter at 5.1 mg/L. BOD and COD concentration levels were all above the applicable standards for 2012. Total metals analysis detected the following metals: Arsenic first quarter = 6.1E-03 mg/L, second quarter = 2.7E-03 mg/L, third quarter 3.5E-03 mg/L and fourth quarter = 2.7E-03 mg/L. Iron was also detected in the first quarter at 1.1 mg/L which is above the applicable standard and only trace levels detected for the remainder of the year. Trace levels of barium, chromium, copper, lead, selenium and zinc were also detected at concentration levels below the applicable

standards. Dissolved metals detected at concentration levels above the applicable standards are as follows: Arsenic, first quarter = 3.7E-03 mg/L, second quarter = <0.005 mg/L, third quarter = 1.2E-03 mg/L and fourth quarter = 1.1E-03 mg/L. The following dissolved metals were also detected at concentration levels below the applicable standards: barium, chromium, copper, iron, manganese, selenium, uranium and zinc. No VOCs were detected at concentration levels above the applicable standard; however acetone, carbon disulfide, chloroform, and 4-Isopropyl were detected at concentration levels below the applicable standards.

In the NAPIS Effluent, BTEX was detected at concentration levels above the applicable standards for 2012. The following are the results: Benzene first quarter = 11 mg/L, second quarter = 8.9 mg/L; toluene, first quarter = 20 mg/L and second quarter = 14 mg/L; ethyl benzene first quarter = 1.3 mg/L and second quarter = 1.4 mg/L; total xylene first quarter = 7.8 mg/L and second quarter 8.4 mg/L. MTBE did not have detectable concentration levels for 2012.

Fluoride, chloride, and sulfate were detected at concentration levels above the applicable standards for 2012. Bromide and nitrate were also detected during the first and second quarters. DRO was detected in the first quarter at 23 mg/L and 98 mg/L in the second quarter which are at concentration levels above the applicable standards. GRO also had detectable levels in the first and second quarter.

Total metals detected above the applicable standard are as follows: Arsenic = 0.013 mg/L in the first quarter and 7.3E-03 mg/L in the second quarter; Iron = 3.3 mg/L in the first quarter and 11 mg/L in the second quarter; Mercury = 1.7E-03 mg/L in the first quarter and 4.6E-03 mg/L in the second quarter. Trace levels of barium, chromium, copper, lead, manganese, selenium and zinc were also detected in 2012. Dissolved metals which were above the applicable standards are as follows: Arsenic = 6.3E-03 mg/L in the first quarter and <0.005 mg/L in the second quarter; Iron = 0.5 mg/L in the first quarter and 3.3 mg/L in the second quarter; Selenium = 0.051 mg/L in the first quarter and 0.015 mg/L in the second quarter. Trace levels of barium, calcium, chromium, magnesium, manganese, potassium, sodium, and zinc were also detected for 2012.

VOCs detected with concentration levels above the applicable standards are as follows: 1,2,4-Trimethyl benzene first quarter 0.9 mg/L and second quarter 1.6 mg/L; 1,3,5-Trimethyl benzene first quarter 0.27 mg/L and 0.56 mg/L in the second quarter; naphthalene first quarter 0.32 mg/L and second quarter 0.39 mg/L; 2-Methylnaphthalene second quarter 0.48 mg/L and acetone in the first quarter 14 mg/L and 7.2 mg/L in the second quarter. Isopropylbenzene and n-

Propylbenzene were also detected in the first and second quarter. SVOCs detected with concentration levels above the applicable standards are as follows: Aniline first quarter 0.63 mg/L and second quarter 0.6 mg/L; 2,4-Dimethylphenol first quarter 0.33 mg/L and second quarter 0.53 mg/L; 2-Methylnaphthalene first quarter 0.11 mg/L and second quarter 1.3 mg/L, 2-Methylphenol first quarter 2.2 mg/L and second quarter 2.0 mg/L; 2-Methylphenol first quarter = 2.2 mg/L and second quarter = 2.0 mg/L; naphthalene first quarter 0.17 mg/L and second quarter 0.53 mg/L; phenol first quarter 8.6 mg/L and second quarter 7.8 mg/L; 1-Methylnaphthalene first quarter 0.073 mg/L and second quarter 0.84 mg/L. Carbazole, 3+4-Methylphenol and phenanthrene were also detected.

6.3.4 LEAK DETECTION UNITS (LDU): EAST LDU, WEST LDU, OIL SUMP LDU

The LDU or otherwise known as the NAPIS secondary containment units identified as East LDU, West LDU and Oil Sump LDU, are a new addition to the approved 2010 FWGWMP (August 25, 2010). These units are sampled and inspected on a quarterly basis. Third quarter sampling was combined with the annual sampling event per approval from NMED and OCD. LDUs are sampled for the following analytes: 8021B plus MTBE, 8015B and WQCC Metals. The units were sampled on the following dates:

- East LDU: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- West LDU: 3/20/12, 6/12/12, 8/21/12, 11/28/12
- Oil Sump LDU: 3/20/12, 6/12/12, 8/21/12, 11/28/12

In the East LDU, BTEX was detected at concentration levels above the WQCC standards as follows: Benzene = first quarter 1.4 mg/L, second quarter 1.3 mg/L, third quarter 1.2 mg/L and fourth quarter 1.1 mg/L; Toluene = first quarter 3.1 mg/L, second quarter 1.1 mg/L, and fourth quarter 0.89 mg/L; ethyl benzene = first quarter 0.56 mg/L, second and third quarter 0.46 mg/L and fourth quarter 0.51 mg/L; total xylene = first quarter 8.0 mg/L, second quarter 6.3 mg/L, third quarter 5.7 mg/L and fourth quarter 6.7 mg/L. There was no detectable concentration level of MTBE for 2012.. DRO has been detected in this unit since March 2010 (16000 mg/L) through fourth quarter 2012 (19 mg/L).

Total metals detected in the East LDU are as follows: Arsenic, cadmium, chromium, iron, and manganese which were all at concentration levels above the applicable standards. Barium, selenium and zinc were also detected at concentration levels below the applicable standard. Dissolved metals detected in the East LDU are as follows: Arsenic, chromium and manganese which were all at concentration levels above the applicable standards. Barium, iron, selenium and zinc were also detected at concentration levels below the applicable standard. VOCs detected are as follows that were above the applicable standards: 1,2,4-Trimethylbenzene (0.84 mg/L) and 1,3,5-Trimethylbenzene (0.28 mg/L).

West LDU, BTEX was detected at concentration levels above the WQCC standards as follows: Benzene = first quarter 1.6 mg/L, second quarter 1.4 mg/L, third quarter 1.8 mg/L and fourth quarter 2.0 mg/L; Toluene = first quarter 6.0 mg/L, second quarter 3.5 mg/L, third quarter 3.2 mg/L, fourth quarter 1.9 mg/L; ethyl benzene = first quarter 0.69 mg/L, second quarter 0.41 mg/L, third quarter 0.66 mg/L and fourth quarter 0.57 mg/L; total xylene = first quarter 7.6 mg/L, second quarter 5.7 mg/L, third quarter 3.1 mg/L and fourth quarter 5.1 mg/L. There was no detectable concentration level of MTBE for 2012. DRO has been detected in this unit since March 2010 (16 mg/L) through fourth quarter 2012 (5.7 mg/L).

Total metals detected in the West LDU are as follows: Arsenic, chromium, iron, and manganese which were all at concentration levels above the applicable standards. Barium, selenium and zinc were also detected at concentration levels below the applicable standard. Dissolved metals detected in the West LDU are as follows: Arsenic, chromium and manganese which were all at concentration levels above the applicable standards. Barium, iron, selenium and zinc were also detected at concentration levels below the applicable standard. VOCs detected are as follows that were above the applicable standards: 1,2,4-Trimethylbenzene (0.55 mg/L) and 1,3,5-Trimethylbenzne (0.24 mg/L).

Oil Sump LDU, BTEX was detected at concentration levels above the WQCC standards as follows: Benzene = first quarter 2.0 mg/L, second quarter 2.1 mg/L, third quarter 1.8 mg/L and fourth quarter 2.7 mg/L; Toluene = first quarter 8.1 mg/L, second quarter 6.2 mg/L, third quarter 6.0 mg/L, fourth quarter 6.6 mg/L; ethyl benzene = first quarter 0.89 mg/L, second and third quarter 0.59 mg/L, and fourth quarter 0.57 mg/L; total xylene = first quarter 6.9 mg/L, second quarter 5.1 mg/L, third quarter 5.5 mg/L and fourth quarter 5.4 mg/L. There was no detectable concentration level of MTBE for 2012. DRO has been detected in this unit since March 2010 (35 mg/L), through fourth quarter 2012 (13 mg/L).

Total metals detected in the Oil Sump LDU are as follows: Arsenic, chromium, iron, manganese and mercury which were all at concentration levels above the applicable standards. Barium, copper, lead, selenium and zinc were also detected at concentration levels below the applicable standard. Dissolved metals detected in the Oil Sump LDU are as follows: Arsenic, chromium and manganese which were all at concentration levels above the applicable standards. Barium, iron, selenium and zinc were also detected at concentration levels below the applicable standard. VOCs detected are as follows that were above the applicable standards: 1,2,4-Trimethylbenzene (0.85 mg/L) and 1,3,5-Trimethylbenzene (0.27 mg/L).

6.3.5 BOILER WATER TO EVAPORATION POND 2 (BW TO EP-2)

BW to EP-2 is sampled on a semi-annual basis and sampled for the following analytes: Major cations and anions. BW to EP-2 was sampled on the following dates:

- BW to EP-2: 5-29-12, 11-6-12

BW is defined as reverse osmosis water coming from the units (Boiler). BW to EP-2 had detectable concentration levels of fluoride in the first and second semi-annual sampling event (0.82 mg/L and 1.4 mg/L). Sulfates were also detected in 2012 at concentration levels above the applicable standards (1700 mg/L and 1900 mg/L). Chloride, and bromide were also detected at concentration levels below the applicable standards for 2012. Calcium, potassium and sodium also had detectable concentration levels for 2012.

6.3.6 EVAPORATION POND 2 INLET (EP-2 INLET)

EP-2 Inlet designation was changed in the second half of 2012 due to the startup of the new WWTP and use of the new pond STP-1. STP-1 effluent now flows into the northeast corner of EP-2. 2012 sample taken for EP-2 Inlet is from STP-1 inlet flow. EP-2 Inlet is sampled on an annual basis and sampled for the following analytes: 8260B plus MTBE, 8015B, BOD, COD and TDS. EP-2 Inlet was sampled on the following date:

- EP-2 Inlet: 8/21/12

BTEX and MTBE concentration levels were all undetectable. DRO and GRO were also found to have non-detectable concentration levels and TDS was detected at 3720 mg/L, which is down from the previous year of 6730 mg/L. BOD and COD concentration levels were <2.0 for BOD and <10.0 for COD which is also down from the previous year of 410 mg/L (BOD) and 1520 mg/L (COD). No VOCs were detected in 2012.

6.4 OCD GROUNDWATER DISCHARGE PERMIT GW-032

On February 15, 2012, Ground Water Discharge Permit GW-032 was rescinded by OCD. We are however required to continue to abate pollution of ground water pursuant to 19.15.30 NMAC (Remediation) under case number AP-111.

The new waste water treatment plant (WWTP) was put into service in late April 2012. With this came revisions to influent and effluent sample locations at the aeration lagoons, evaporation pond 2 and at the NAPIS. In the second half of 2012, sample location NAPIS Effluent (NAPIS EFF) and Influent to AL-1 (Infl to AL-1) were re-routed to the new WWTP and sampling at both of these location was discontinued. The only effluent going into aeration lagoon 1 is from the pilot lift station.

Sampling requirements for the new WWTP is per NMED Notice of Approval with Modifications for Western Refining's Process Design Report for Waste Water Treatment Plant Work Plan (Alternate Design) dated April 30, 2010 (Work Plan), Comment 17, System Startup Requirements.

In July of 2012 a new well was installed on the northwest corner of where the benzene stripper pad was located. This well was installed as a result of a site investigation at the aeration basin for SWMU 1 and SWMU-14 (Old API Separator) conducted by RPS. The site investigation included numerous soil and ground water sampling at the aeration basin to determine and evaluate the presence, nature, and extent of releases at this site. The site investigation was conducted by RPS and the well was developed by Enviro-Drill, Inc. The new well is identified as OAPIS-1. Well logs and analytical data are presented in Appendix F. On April 2, 2013, OAPIS-1 was surveyed by a professional surveyor for vertical and horizontal positions, ground level elevation, well casing rim elevation, corresponding measuring point description and current coordinate system. Survey is to be 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. A copy of the survey is included in Appendix F. OAPIS-1 has been added to the quarterly sampling schedule to begin in 2013.

A change to the sampling schedule for OW-50 and OW-52 was requested by Western to reduce the quarterly sampling to an annual event. Since its development in 2009, no BTEX or MTBE constituents have been detected in either of these wells. Metals detection has also been minimal with only trace levels detected. Only in November 2010 and March 2011, arsenic was detected at 3.1E-03 mg/L and 0.003 mg/L, and in November 2012, iron was detected at 1.3 mg/L which are all at levels above the current applicable standards. Annual sampling is to begin in 2013.

SECTION 7
CONCLUSIONS AND RECOMMENDATIONS

This section is an overview of the analytical water quality data collected to identify potential impacts to the ground water and determine if further monitoring is required.

7.1 EAST SIDE GROUND WATER

Ground water monitoring activities on the East side have shown that MTBE is present in all four well locations (OW-13, OW-14, OW-29, and OW-30) which are located on the northeast corner of the active refinery perimeter. In March of 2010 dedicated pumps were installed in all four wells to prevent possible cross contamination from sampling equipment and or field activities. Of the three wells OW-14 is the only well where three constituents (benzene, ethyl benzene and MTBE) have been consistently detected in the ground water samples collected since 2006. Benzene concentration levels have increased from 3.4E-03 mg/L in 2006 to fourth quarter 2012 of 2.7 mg/L. Ethyl benzene has also seen an increase beginning in 2006 at 2.5E-03 mg/L to fourth quarter 2012 of 0.056 mg/L. MTBE has also been on the incline from 2006 first reported at 0.016 mg/L to 2012 fourth quarter results of 1.4 mg/L. OW-14 is located down-gradient from two recovery wells RW-1 and RW-2. In this group of wells OW-29, which is located down-gradient (directly north) of OW-14, MTBE has been on a steady incline since its first detection in 2007 at 4.3E-03 mg/L to fourth quarter 2012 concentration levels of 0.47 mg/L. OW-30 which is also down-gradient from RW-1 and RW-2 and northeast of OW-14 has also shown a steady increase from its first detection in 2007 at 0.29 mg/L to fourth quarter 2012 results of 2.2 mg/L. No BTEX constituents have been detected in OW-13, OW-29 and OW-30. Only OW-13 in this group has detectable levels of MTBE at concentration levels below the NMED Tap Water standard of 0.125 mg/L. 2007 results indicate 1.3E-03 mg/L was detected and fourth quarter 2012 analytical results were detected at 0.011 mg/L indicating that the MTBE plume is slowly migrating in a north-west direction down-gradient from OW-14. The stratigraphic units in which these wells exist are in what is known as the Chinle/Alluvium Interface.

Also in the east section are wells OW-11 and OW-12, at a total depth of 65.79 feet and 128.85 feet. Both of these wells are located in the stratigraphic unit known as the Sonsela Sandstone. OW-12 is located south-west of OW-13 and OW-11 is located up-gradient, directly south of OW-12. Analytical data for OW-11 and OW-12 indicate no detectable BTEX or MTBE constituents from 2006 to 2012.

Two new wells (OW-50 and OW-52) were installed in October 2009 down gradient of OW-13, OW-14 and OW-29 to monitor possible migration of MTBE from these wells in a north-easterly direction. To date no detectable concentration levels of BTEX or MTBE constituents have been detected in these wells based on laboratory analysis.

Up-gradient of the OW wells, directly north of OW-14, are four shallow recovery wells (RW-1, RW-2, RW-5 and RW-6) from which SPH has been recovered and continues to be recovered. These wells are inspected on a quarterly basis and were added to the annual sampling schedule beginning in 2011. No product has been recovered from RW-2, as this well has shown no detectable product level and bailing is not required. RW-1 has had the most product recovery to date estimated to be 464.56 gallons from start year of 2005 through 2012. Starting in 2010 product recovery began to decline in this well. In 2012 it is estimated that less than 1 gallon of product was recovered from this well with the purging of 137 gallons of water total. RW-5 has also shown a decline in product recovery starting with year 2010 through 2012. Although there is no detectable product level, this well continues to be bailed as the water bailed has a slight odor and there is a visible sheen on the purged water. Total water bailed from this well for 2012 was 50 gallons with no measureable product thickness level. RW-6 has also showed a steady decline in product recovery beginning in 2009. In 2012 quarterly inspections revealed no measureable product level. This well does have a slight odor when plug is removed and the purged water continues to have a visible sheen when purged. Total water purged from this well for 2012 was 67 gallons with no measureable product level. RW-5 and RW-6 will continue to be bailed on a quarterly basis.

7.2 WEST SIDE MONITORING

The West side consists of ground water monitoring wells at the aeration basin and alongside a series of large evaporation ponds. At the aeration basin, there are four monitoring wells located around the NAPIS which were installed in 2007 and 2008 to address potential leaks of

hydrocarbons from the NAPIS. NAPIS-1 which is located on the east side (up-gradient) of the NAPIS has had no detectable concentration levels of BTEX or MTBE constituents from 2008 to 2012 and also no detectable concentration levels of any organic constituents. Immediately down gradient of the NAPIS on the west side, NAPIS-2, benzene, ethyl benzene and MTBE have been detected every year from 2008 through 2012 at concentration levels above the WQCC standards. The only organic constituent detected in this well are the following: 1-Methylnaphthalene in the third quarter 2009, second quarter 2010 and in 2011; naphthalene and 1,1-Dichloroethane and most recently in 2012 phenols were detected in the first and second quarter.

Also located at the NAPIS are three leak detection units which are inspected and if fluids are detected, samples are collected on a quarterly basis. All three leak detection units continue to have a fluid level. Analytical data results indicate detectable concentration levels of BTEX constituents for all three units beginning in 2008 to 2012. DRO continues to be detected in all three wells as well as the detection of several metals such as arsenic, chromium and manganese which are in all three units at concentration levels above the applicable standards. 1,2,4-Trimethylbenzene and 1,3,5-Trimethylbenzene have also been detected in all three units at concentration levels above the applicable standard. Quarterly analyses of fluid collected from these units and the continued presence of fluid indicate the potential that the fluid may be coming from the NAPIS.

At the aeration basin are three wells (GWM-1, GWM-2, GWM-3) which were installed in 2004 and 2005 to monitor aerations lagoons 1 and 2 and pond 1 for potential leaks. Analyses of ground water samples collected from GWM-1 have indicated detectable concentration levels for benzene, ethyl benzene and MTBE constituents since 2006 and would indicate the potential for historical releases from the aeration lagoons. GWM-2 and GWM-3 which is located on the northwest corner of EP-1 were installed in 2005 and no water was detected in each well. Water has been detected in GWM-2 in 2008 and continuously from 2010 through 2012 and in GWM-3 from 2010 through 2012. Analyses of ground water samples collected from both wells indicate no detectable concentration levels of BTEX constituents and MTBE has been detected at concentration levels below the NM Tap Water RSL standard.

The boundary wells (BW-1A, BW-1B, BW-1C, BW-2A, BW-2B, BW-2C, BW-3A, BW-3B, BW-3C) are located in the northwest section of the refinery along the west side of EP-7, EP-8, EP-11 and north of EP-12B. BW-1A, 1B and BW-3A did not have any water level during the annual inspection conducted in 2012. Analytical data from ground water sample analyses

indicate no detectable levels of BTEX or MTBE constituents in any of these wells from 2006 to 2012. In July 2009, the organic constituent bis (2-ethylhexyl) phthalate was detected in BW-3B; however subsequent analyses indicate no detectable levels. The same constituent was detected in BW-3C in 2011 and in 2012 analytical data results were non-detect. The detection of this organic constituent may have been from field handling and/or laboratory contamination. All of the boundary wells with water levels did indicate elevated fluoride levels from 2006 through 2012 and minimal detection of metals.

The MW (MW-1, MW-2, MW-4, and MW-5) series of wells are located around the RCRA LTU and are developed in the Sonsela stratigraphic unit. MW-4 is located directly north of EP-3. No detectable concentration levels of BTEX and MTBE constituents were found from the ground water samples collected at these locations. Arsenic is the only metal that has been detected in all four wells throughout 2007 to 2010. In 2008, bis (2-ethylhexyl) phthalate was detected in the ground water sampled collected from this well at a concentration level of 6.79E-03 mg/L. Subsequent ground water sampling has indicated no detectable levels of this particular constituent. The detection of this particular constituent is suspect and ground water sample may have been contaminated by sampler or at the laboratory.. These wells are also monitored under the RCRA Post Closure Permit on a 10-year cycle. The first cycle was completed in 2009.

The SMW (SMW-2, SMW-4) wells are also located around the RCRA land treatment unit and are developed in the Chinle/Alluvium Interface stratigraphic unit. These wells are also monitored under the RCRA Post Closure Permit on a 10-year cycle. The first cycle was completed in 2009. No detectable concentration levels of BTEX and MTBE constituents were found from the ground water samples collected at these locations from 2006 through 2012. MTBE was detected in SMW-2 in years 2008, 2010, 2011 and 2012 at concentration levels below the applicable standard. SMW-2 had elevated chloride and sulfate levels and SMW-4 had slightly elevated fluoride levels. Arsenic, chromium, and uranium were detected at concentration levels above the applicable standards in both wells.

7.3 ADDITIONAL MONITORING

On February 15, 2012, NMED OCD division rescinded the current OCD Ground Water Discharge Permit GW-032 and replaced with abatement #AP-111. Due to existing ground water contamination, OCD is requiring Western to continue to abate pollution of ground water pursuant

to 19.15.30 NMAC (REMEDIATION). Western will continue to monitor the following some of which were requirements for the OCD Ground Water Discharge Permit GW-032.

- Continue to monitor the aeration lagoons, ponds and outfalls between the lagoons and ponds on a quarterly and semi-annual basis.
- Summary of all EPA/NMED/RCRA Activity
- Summary of all Leaks, Spills and Releases
- Perimeter Inspections
- Temporary Land Farm Monitoring
- Monthly Flow Rate to NAPIS
- Follow most current sample schedule for start up of new WWTP requirements.

7.4 RECOMMENDATIONS

- Continue with the sampling requirements of the most current approved Facility Wide Ground Water Monitoring Work Plan.
- Submit the 2012 Annual Ground Water Monitoring Report on or before September 1, 2012.
- Submit recommendations to change or modify sampling requirements as needed.

SECTION 8

Data Tables

SECTION 8

DATA TABLES

8.1 EFFLUENTS (AL-2 to EP-1, Pilot Effluent, NAPIS Effluent)
BTEX Analytical Result Summary

			Parameters				
			Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103			**0.01**	**0.75**	**0.75**	**0.62**	**NE**
40 CFR 141.62 MCL (APR 2013)			**0.005**	**1.0**	**0.7**	**10**	**NE**
EPA RSL for Tap Water (NOV 2012)			**3.9E-03**	**0.86**	**0.013**	**0.19**	**0.125[1]**
SAMPLE ID	**DATE SAMPLED**	**METHOD**					
AL-2 to EP-1	11/28/2012	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	8/21/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	6/12/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	3/20/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	12/14/2011	8260B	<0.005	<0.005	<0.005	8.7E-03	<0.005
	9/28/2011	8260B	**6.1E-03**	0.013	<0.005	<0.0075	<0.005
	6/15/2011	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	3/8/2011	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	11/3/2010	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	9/13/2010	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	6/8/2010	8260B	<0.01	<0.01	<0.01	<0.0015	<0.01
	3/9/2010	8260B	<0.005	0.011	<0.005	0.013	<0.005
	11/10/2009	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	8/19/2009	8260B	<0.005	4.4E-03	**1.4E-03**	0.011	<0.005
	5/26/2009	8260B	<0.005	<0.005	<0.005	7.3E-03	<0.005
	3/31/2009	8260B	<0.005	<0.005	<0.005	0.03	<0.005
	12/2/2008	8260B	**0.012**	0.085	**0.028**	0.021	<0.005
	9/9/2008	8260B	<0.02	<0.02	<0.02	<0.03	<0.02
	6/17/2008	8260B	<0.005	<0.005	<0.005	<0.005	<0.005
	3/10/2008	8260B	**0.19**	0.46	**0.099**	**0.68**	<0.01
Pilot Effluent	12/5/2012	8260B	<0.001	<0.001	<0.001	<0.0015	<0.0015
	8/21/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	6/12/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	3/20/2012	8260B	<0.01	<0.01	<0.01	<0.015	<0.01
	12/14/2011	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	9/28/2011	8260B	<0.005	8.4E-03	<0.005	<0.0075	<0.005
	6/16/2011	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	3/9/2011	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	11/3/2010	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	9/16/2010	8260B	<0.001	<0.001	<0.001	<0.003	<0.0015
	6/28/2010	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	3/10/2010	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	11/10/2009	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	8/19/2009	8260B	<0.005	3.8E-03	<0.005	<0.0075	<0.005
	5/27/2009	8260B	<0.005	4.5E-03	<0.005	<0.0075	<0.005
	3/31/2009	8260B	<0.005	6.8E-03	<0.005	<0.0075	<0.005
	12/2/2008	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	9/9/2008	8260B	<0.005	<0.005	<0.005	<0.0075	<0.005
	6/17/2008	8260B	<0.001	6.2E-03	<0.001	<0.0015	<0.001
	3/11/2008	8260B	<0.001	1.5E-03	<0.001	<0.0015	<0.00

8.1 EFFLUENTS (AL-2 to EP-1, Pilot Effluent, NAPIS Effluent)
BTEX Analytical Result Summary

			Parameters				
			Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103			0.01	0.75	0.75	0.62	NE
40 CFR 141.62 MCL (APR 2013)			0.005	1.0	0.7	10	NE
EPA RSL for Tap Water (NOV 2012)			3.9E-03	0.86	0.013	0.19	0.125[1]
SAMPLE ID	DATE SAMPLED	METHOD					
NAPIS Effluent[2]	6/12/2012	8260B	**8.9**	**14**	**1.4**	**8.4**	<0.1
	3/21/2012	8260B	**11**	**20**	**1.3**	**7.8**	<0.1
	12/14/2011	8260B	**19**	**20**	**1.4**	**8.9**	<0.1
	9/28/2011	8260B	**17**	**31**	**2.1**	**0.3**	<0.1
	6/15/2011	8260B	**8.9**	**21**	**2.0**	**12**	<0.1
	3/8/2011	8260B	**8.1**	**13**	**0.89**	**5.2**	<0.1
	11/3/2010	8260B	**4.2**	**12**	**1.5**	**8.4**	<0.1
	9/13/2010	8260B	**12**	**30**	**2.8**	**17**	<0.1
	6/8/2010	8260B	**1.5**	**6.0**	**0.67**	**3.8**	<0.05
	3/9/2010	8260B	**13**	**26**	**2.7**	**14**	<0.05
	11/10/2009	8260B	**5.9**	**16**	**1.6**	**9.4**	<0.05
	8/19/2009	8260B	**2.6**	**7.1**	**0.71**	**4.2**	<0.05
	5/26/2009	8260B	**4.1**	**14**	**1.6**	**10**	<0.05
	3/31/2009	8260B	**2.6**	**7.4**	**0.54**	**3.5**	<0.05
	12/2/2008	8260B	**1.4**	**3.3**	**0.36**	**1.9**	<0.05
	9/9/2008	8260B	**0.36**	0.39	**0.028**	**0.2**	<0.05
	6/17/2008	8260B	**0.84**	**1.5**	**0.14**	**0.89**	<0.1
	3/10/2008	8260B	**0.47**	0.73	**0.15**	**0.97**	<0.05

NOTES
NE = Not established
NA = Not analyzed
NL = Not listed on laboratory analysis
Bold and highlighted values represent values above the applicable standards

STANDARDS
WQCC 20 NMAC 6.2.3103 - Standards for Ground Water of 10,000 mg/l TDS Concentration or Less.
a) Human Health Standards; b) Other standards for Domestic Water
40 CFR 141.62 Detection Limits for Inorganic Contaminants
EPA Regional Screening Level (RSL) Summary Table
1) NMED Tap Water (JUN 2012)

NOTES
2. *No samples collected from NAPIS Effluent beginning the third quarter 2012. Effluent is now going into the new Waste Water Treatment Plant (WWTP).*