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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

June 20, 2016

Mr. Ed Riege
Remediation Manager
Western Refining Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

**RE: DISAPPROVAL
ANNUAL GROUNDWATER MONITORING REPORT:
GALLUP REFINERY – 2014
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-15-004**

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the *Annual Groundwater Monitoring Report: Gallup Refinery – 2014* (Report), dated August 2015 submitted on behalf of Western Refining Southwest, Inc. Gallup Refinery (the Permittee). NMED hereby issues this Disapproval. The Permittee must address the following comments provided by both NMED and the New Mexico Energy Minerals and Natural Resources Department Oil Conservation Division (OCD):

Comment 1

The Permittee included a red-line strikeout version with the Report. A red-line strikeout version is only required to be submitted with a *revised* document and the 2014 Report is a new document. Generally, when NMED disapproves a document, it must be re-submitted as a revised document with a red-line strikeout version that illustrates where all changes to text, tables and figures were made to aid in review of the revised document. No revision to this Report is required; however, when the revised Report is submitted the Permittee must submit a red-line strikeout of the revisions along with the revised Report.

Comment 2

The Permittee has been including analysis of uranium in groundwater samples per an NMED comment in the December 12, 2012 *Approval with Modifications for the 2010 Facility-Wide Groundwater Monitoring Report*. While some crude oil may contain uranium, the refinery is likely not a source of uranium in groundwater. The Permittee may discontinue the analysis of uranium in groundwater samples. The Permittee must propose this change in the updated Facility-Wide Groundwater Monitoring Work Plan. No revision to the Report is necessary.

Comment 3

NMED has not been able to locate the boring logs or well construction diagrams for wells STP-1NW and STP-1SW. Provide the boring logs and well completion reports for STP-1NW and STP-1SW in the revised Report. Also, revise the Report to explain why these wells were installed and how the locations were selected. Because the water sample analytical results for the wells indicate elevated chloride and nitrate concentrations, the Permittee must discuss all issues associated with the operation of STP-1 and discuss other potential sources for the elevated concentrations in the revised Report.

Comment 4

There are multiple issues regarding recovery well RW-1. The Permittee must address the following comments in the revised Report:

- a. The Permittee states in Section 6.3.3 (RECOVERY WELLS: RW-1, RW-2, RW-5, RW-6) and similarly stated on page 6 of the Executive Summary that, “[h]ydrocarbon recovery from RW-1 has shown a steady decrease from 2005 through 2014. In 2014, total hydrocarbon recovery is estimated at 2.25 gallons in 83 gallons of water purged compared to the 2005 estimate of 431 gallons of hydrocarbons in 1,210 gallons of water.” While this statement is true, it omits the fact that a sustained and significant increase in measured product thickness was recorded starting in 2013. See the table below (based on table from APPENDIX A SEPARATE PHASE HYDROCARBON RECOVERY LOGS):

Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness Level (ft)
10/28/2012	29.28	30.18	0.9
3/26/2013	29.11	32.6	3.49
6/17/2013	29.37	33.1	3.73
9/16/2013	28.75	33.09	4.34
11/12/2013	28.73	33.11	4.38
3/7/2014	28.15	31.65	3.5
6/9/2014	28.31	33.06	4.75
9/18/2014	28.05	Unknown	--
11/13/2014	28.11	33.04	4.93

- b. Since the first quarter of 2013 there has been an increase in the amount of separate phase hydrocarbons (SPH) measured at RW-1. The Permittee must 1) discuss the potential source of the increase in SPH thickness in RW-1, 2) address the apparent continued movement of the SPH plume, and 3) provide NMED and OCD with data relating to any inspections/evidence (e.g., leaking tanks) indicating that the tank farm may be the source of the increase in SPH levels in RW-1. Additionally, the Permittee has an approved Work Plan for investigation at OW-14 that may address some of the issues related to the tank farm area.
- c. The amount of SPH recovered versus the measured SPH thickness at RW-1 do not correlate, because there appears to be more product in RW-1 than what is recovered. Revise the Report to discuss this discrepancy.
- d. There are three quarters of data reported for 2014 rather than the four required by the Facility-wide Groundwater Monitoring Work Plan. Ensure that field technicians are aware of all monitoring and sampling requirements. Deviations from the approved Work Plan must be discussed in the Report; revise the Report to discuss all deviations, including the omitted monitoring and sampling events.
- e. The table included in Appendix A includes notes for RW-1; however, the statement "Annual Sampling Only" in the table does not describe why data was collected more frequently. A second note in the table states "[a]nnual Samples collected - no purging done at this time. Technician did not record DTW measurement." This note does not adequately explain why SPH was not measured. Revise the Report to discuss the increase in SPH in RW-1 and explain why measurements were not recorded for the third quarter of 2014.
- f. The Permittee must collect a sample of the product from RW-1 and submit it for fuel fingerprint analysis at an off-site laboratory to help determine the potential source of the free product in the well. See also Comment 18.

Comment 5

Appendix A (Separate Phase Hydrocarbon Logs) does not contain hydrocarbon recovery data for the MKTF wells. Provide a table reporting the hydrocarbon measurements and recovery data for the MKTF wells in the revised Report.

Comment 6

In Section 6.4.2 (OBSERVATION WELLS: OW-1 AND OW-10) the Permittee states, "low concentrations of [methyl tert-butyl ether] MTBE below the standard of 0.143 mg/L were detected in each 2014 quarter in OW-10 (Table 8.13)." Based on this data, NMED believes that OW-10 may indicate the leading edge of contaminant plume migration. The data reported in

Table 8.13 demonstrates that there was a spike in MTBE from 3/22/2012 through 9/4/2013. The nearest downgradient well is OW-1; currently, OW-1 is checked for water and if water is present it is sampled and analyzed for major cations and anions, volatile organic compounds (VOC), diesel range organics (DRO) extended/ gasoline range organics (GRO), and New Mexico Water Quality Commission (WQCC) metals. Given the levels of MTBE in well OW-10, the Permittee must analyze OW-1 for MTBE, ethylene dichloride (EDC) and 1,2-dibromoethane (EDB) beginning with the next round of quarterly sampling. Analysis of EDB must be conducted using EPA Method 8011. Update the Facility-wide Groundwater Monitoring Work Plan as necessary.

Comment 7

The new MKTF wells were reviewed as part of the *Hydrocarbon Seep Interim Measure Report*, dated July 2015. Continue to monitor and report on the MKTF wells in the Facility-wide Groundwater Monitoring Report. When the Permittee installs new monitoring wells, the appropriate way to report on the installation is through an investigation report rather than include the well installation information in the Facility-Wide Groundwater Monitoring Report. No revision necessary.

Comment 8

Table 1 in the Facility-wide Groundwater Monitoring Work Plan requires that the inlet to evaporation pond EP-2 be sampled annually; however, the sampling is inconsistent. The Report indicates that samples were collected three times in 2014: Quarter 1 on 3/5/2014; Quarter 3 on 9/10/2014; and Quarter 4 on 3/5/2014. Revise the date for the fourth quarter sampling to reflect the actual sampling date in the revised Report. The analytical laboratory reports for STP-1 to EP-2 in Appendix K are dated 3/5/2014 (this report does not indicate analysis for benzene), 9/10/2014 (this report indicates the sample was analyzed for benzene), and 11/12/2014 (this report does not indicate the sample was analyzed for benzene). Additionally, Table 8.18 only presents data from an annual sampling event for 2014; all sampling events and results must be reported in the data tables. Discuss any deviations in the revised Report and discuss the reasons why the sampling and analyses for the inlet to EP-2 are inconsistent. Also, since benzene and diesel range organics (DRO) have been detected since 2013, the Permittee must modify the sampling schedule for the EP-2 inlet to quarterly sampling starting with the next quarterly sampling event. Modify the Facility Wide Groundwater Monitoring Work Plan Table 1 to change sampling frequency from annual to quarterly sampling at STP-1 to EP-2.

Comment 9

In Section 1.2 (BACKGROUND INFORMATION) pages 13-14, the Permittee describes the process wastewater system and the stormwater collection system separately. Since the systems are connected, the Permittee must indicate this more clearly in the discussion. Please revise the descriptions of the process wastewater and stormwater collection system in the revised Report.

Comment 10

In Section 6.2.2, page 31, the Permittee states, “[w]hen applicable, standing water is removed from the vault of the three sub-surface wells prior to opening and sampling each well. The standing water is placed into a container for proper disposal.” This is a recurring issue that must be addressed. The Permittee must ensure that surface water is prevented from entering the wells and maintain the well vault seals so that no water enters the vault. Permit Section IV.K.5 requires that “[a] weep hole shall be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing around the well riser.” Revise the Report to discuss the construction of the surface completions for the New American Petroleum Institute Separator (NAPIS) wells and discuss whether or not the vaults are sealed to prevent entry of water. If the well completion was not installed correctly, the Permittee must correct this problem and provide documentation to NMED and OCD.

Comment 11

The analytical results for the MKTF wells demonstrate that there is trichloroethylene (TCE), vinyl chloride, and EDC present in the groundwater. Since EDC is a lead scavenger, the Permittee must add analysis for EDB in all monitoring wells where EDC has been detected; this change must be incorporated into the updated Facility-Wide Groundwater Monitoring Work Plan. The Permittee must use an analytical method capable of detecting EDB at concentrations less than 0.004 micrograms per liter (i.e., EPA Method 8011). No revision to the Report is required.

Comment 12

In Section 7.1 (GROUP) the Permittee recommends discontinuing semi-volatile organic compounds (SVOCs) at the BW-wells. In the July 24, 2015 *Approval with Modifications Facility-wide Groundwater Monitoring Work Plan* letter NMED approved discontinuation of SVOC analysis, but required the addition of gasoline range organics (GRO) and DRO-extended analysis. No revision to the Report is necessary.

Comment 13

In Section 7.3 (GROUP C – GROUNDWATER MONITORING) the Permittee states, “[d]own gradient from OW-14 is OW-29, and OW-30 and the analytical data from both of these wells indicates that MTBE is present in the groundwater at concentration levels exceeding the NMED Tap Water standard of 0.143 mg/L since March of 2010 in OW-29 and December 2007 in OW-30. Analytical data for these four wells indicate a steady increase of MTBE concentration levels indicating that the MTBE plume is slowly migrating in a north, north-west direction down-gradient from RW-1 and RW-2. The stratigraphic units in which these wells exist are in what is known as the Chinle/Alluvium Interface. RECOMMENDATIONS: Continue with current sample schedule. MTBE plume is present between OW-13, OW-14, OW-29 and OW-30 and analytical data indicates a very slight increase in concentration levels over time. It was suspected

that the migration of the MTBE plume may be in a northeast direction. As a result OW-50 and OW-52 were installed down gradient from these wells. After three years of sampling no contaminants have been detected in the groundwater collected quarterly from these wells. It is possible that the MTBE plume may be migrating in a north-northwest direction from OW-29 following the natural formation of the Chinle-Alluvium interface. Analytical data indicates that MTBE concentrations have been slowly increasing from year to year in OW-29 as well as OW-30." NMED notes that the Permittee submitted a work plan to install additional monitoring wells north-northwest of OW-29 and OW-30 in order to delineate contaminant migration and demonstrate that the plume is not migrating off-site. No revision to the Report is required.

Comment 14

In Section 7.3 (GROUP C – GROUNDWATER MONITORING), page 54, the Permittee states that, "[t]wo 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 in a north, north-east direction. To date, no detectable concentration levels of [benzene, toluene, ethylbenzene, xylenes] BTEX or MTBE constituents have been detected in OW-50 and OW-52. Based on the analytical data from these two new wells the migration of MTBE may be in a north-northwest direction from OW-29. RECOMMENDATION: Discontinue [semi-volatile organic compounds] SVOCs. Continue with the current monitoring schedule." NMED notes that the July 24, 2015 Approval letter for the Work Plan allowed the Permittee to discontinue SVOC analysis, but required the addition of GRO and DRO-extended. No revision required.

Comment 15

In Section 7.4 (GROUP D – GROUNDWATER MONITORING), page 55, the Permittee recommends that the sampling requirements for OW-10 include, "[c]hange the quarterly analytical sampling test methods to: [volatile organic compounds] VOCs, major cations/anions, arsenic, and uranium." NMED notes that as required by the July 24, 2015 Approval letter for the Work Plan the Permittee must continue sampling for MTBE, GRO, DRO-extended, uranium and arsenic as well as VOCs and major cations and anions. The OW-series of groundwater monitoring wells are used for detection and compliance monitoring and it is necessary to continue to monitor for these constituents and any changes in groundwater conditions over time. As per Comment 2, uranium analysis may be discontinued. No revision to the Report is required.

Comment 16

Table 8.3.1 (SMW-2, SMW-4 General Chemistry and DRO/GRO Analytical Result Summary) includes analytical results from well SMW-2 that are above the WQCC limits for chloride and sulfate. Low concentrations of MTBE and GRO are also found in the groundwater samples from this well (results are presented in Table 8.3 and 8.3.1). SMW-2 is downgradient from both the OCD Temporary Landfarm and the Evaporation Ponds both of which are potential sources for chloride and sulfate in the groundwater. Submit a work plan no later than **October 17, 2016** to

propose investigation to discover the source of contamination in SMW-2. No revision to the Report is required.

Comment 17

A monitoring well must be installed between MKTF-44 and the BW-1 series of nested wells to monitor contamination that may flow in a westerly direction. At this time there are no wells downgradient of the southern evaporation ponds. The Permittee must submit a work plan no later than **October 17, 2016** to install an additional monitoring well between MKTF-44 and the BW-1 wells. No revision to the Report is required.

Comment 18

Additional investigation must be conducted regarding recovery well RW-1. Figure 13 (Product Thickness Map (SPH for 11/14) depicts the product thickness in the MKTF wells and the RW wells. RW-1 exhibits an SPH thickness of 4.89 feet; however, the extent of the contamination has not been delineated. Figure 10 (Alluvium/Chinle Gp Interface Water Elevation Map) depicts groundwater flow to the north; an additional groundwater monitoring well north of RW-1 is needed to confirm the groundwater flow direction. The OW-14 Source Area Work Plan field work may address some of the issues regarding RW-1. If the planned field investigation does not address the issues at RW-1, the Permittee must submit an additional work plan proposing to investigate and delineate the SPH in groundwater in this area at a date determined after NMED and OCD review the OW-14 investigation report. See also Comment 4.

Comment 19

The field notes for OW-1 sampling on 6/3/14 in Appendix C notes that "Pump does not seem to be in the screened interval Purged 25 gallons, well had to be turned off several times to recharge to reach 25 gallons." The Permittee must inform their field personnel that groundwater may not be present in OW-1 or if it is present, the recharge rate may be lower than other wells encountered during monitoring. In addition, where the recharge rate for groundwater monitoring wells is low, the Permittee must adjust the purging techniques accordingly (see Permit Section IV.J.2.h.i (Well Purging)). No revision to the Report is necessary.

Comment 20

The field notes in Appendix C for the MKTF wells demonstrate several potential issues with the field sampling. The Permittee must address the following comments in the revised Report:

- a. Some of the field logs for MKTF wells 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 31, 30, 32, 33, and 34 during the 6/2014 sampling event read "gauge only." The log for MKTF-27 reads "Sampled but supposed to gauge only." The Permittee is required to gauge and sample all of the wells each quarter; discuss why the required sampling was not conducted.

- b. Several wells (e.g., MKTF-22, 23, 26, and 34) are noted as not having locks in the field notes. Permit Section IV.K.5 states, “[a] locking protective casing shall be installed around the well casing (riser) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line and extend several inches above the well riser stickup ... A cap shall be placed on the well riser to prevent tampering or the entry of foreign materials, and a lock shall be installed on the protective casing to provide security.” The Permittee must install locks on all wells that currently do not have locks to secure the well. Provide documentation that this activity is complete no later than **July 20, 2016**.
- c. MKTF 33 is noted as having “no outer casing or concrete pad + bollards”. Permit section IV.K.5 requires that “[i]n above ground completions, a three foot wide, four inch thick concrete surface pad shall be installed around the well at the same time the protective casing is installed. The surface pad shall be sloped so that drainage will flow away from the protective casing and off the pad. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.” The Permit section also states, “[i]f the wells are located in an area that receives traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five foot length should be installed. The bumper guards should be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes should be filled with concrete to provide additional strength. The pipes should be painted a bright color to reduce the possibility of vehicular damage.” The Permittee must either properly abandon MKTF-33 or install the proper outer casing and concrete pad. The Permittee must submit correspondence related to either the abandonment or installation of the concrete pad no later than **July 20, 2016**.
- d. Many MKTF wells were noted to run dry after several gallons of purging. The field note for MKTF-16 reads “does not recharge very fast”. A note for MKTF-10 reads “Well was bailing dry at 4 gallons so I grabbed a sample”. The note for MKTF-18 reads, “Did not collect full bottle set due to well going dry.” The note for MKTF-02 reads “well going dry after about 15 gallons; note recovery wells were being pumped within 50’ during purge”. Discuss the following issues regarding the MKTF wells:
 - a. the saturated interval and the well screen interval for the wells in a table;
 - b. if the wells are screened in a groundwater interval or within a saturated interval related to the hydrocarbon seep;
 - c. whether low-flow sampling methods are effective at these wells or if low-flow sampling was used (see Permit Section IV.J.2.h.i Well Purging);

- d. whether or not samples collected from wells that are running dry are representative of the groundwater;
- e. why wells that are purged dry are not allowed to recharge sufficiently to collect a sample bottle set; and
- f. how often the recovery wells are used and how often that may coincide with groundwater sampling.

Comment 21

Appendix J (Temporary Land Farm Analytical Results) was not included in the hard copy of the Report. In the revised Report include Appendix J or refer to the fact that Appendix J is included on the disc.

The Permittee must address all comments in this Disapproval and submit a revised Report. Two bound hard copies and an electronic version must be submitted to NMED. Please also include a red-line strikeout version in electronic format showing where all revisions have been made. The revised Report must be accompanied with a response letter that details where all revisions have been made, cross-referencing NMED's numbered comments. Ensure that OCD is also provided a copy of the revised Report. The revised Report must be submitted to NMED no later than **November 30, 2016**.

The Permittee must also update the updated version the Facility-wide Groundwater Monitoring Work Plan to be submitted in accordance with Permit Section IV.C.2 (Facility-Wide Groundwater Monitoring Plan) and also begin sampling during the next quarter of sampling (post second quarter sampling that occurred in June) to address Comments 2, 6, 8, and 11.

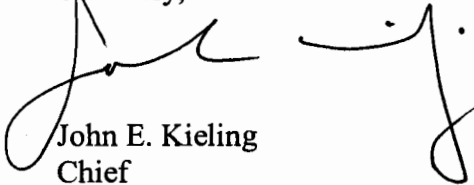
The Permittee must submit work plans to address groundwater contamination in accordance with Comment 16, 17 and 18. The Work Plans must be submitted no later than **November 1, 2016**.

The Permittee must provide proof that wells without locks now have locks and that well MKTF-33 surface completion is completed no later than **July 20, 2016**.

Ed Riege
Gallup Refinery
June 20, 2016
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If you have questions regarding this Disapproval, please contact Kristen Van Horn of my staff at 505-476-6046.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain NMED HWB
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