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State of New Mexico  **ENTERED**  
ENVIRONMENT DEPARTMENT

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**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

August 22, 2017

Mr. William Bailey  
Environmental Supervisor  
Western Refining, Southwest Inc., Gallup Refinery  
92 Giant Crossing Road  
Gallup, New Mexico 87301

**RE: APPROVAL WITH MODIFICATIONS  
REVISED LETTER REPORT EVAPORATION POND 7 DIKE BREACH AND  
SUMMARY REPORT EVAPORATION POND REPAIRS  
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY  
EPA ID # NMD000333211  
HWB-WRG-15-006**

Dear Mr. Bailey:

The New Mexico Environment Department (NMED) is in receipt of Western Refining Southwest, Inc. Gallup Refinery's (the Permittee) submittal *Revised Summary Report Evaporation Pond Repairs* (Report) dated February 2017. NMED has reviewed the revised Report and the Permittee's response to NMED comments dated August 22, 2016 and issues this Approval with the following comments. Many of the comments must be addressed in a report for the additional data collection and analysis for slope stability.

**Comment 1**

The Permittee's response to NMED Comment 1 appears to validate that there is moisture within the evaporation pond berms and did not address NMED's concern regarding the moisture and stability of the berms. NMED understands that generally, there will be some moisture within the berm due to the phreatic line; however, the Permittee did not sufficiently explain the presence of the moisture and how it potentially affects the stability of the berms. For instance, in the "Response to Comment 1C" on page 2, the Permittee states, "[t]he sandy layer encountered and

described on the October 2015 boring logs SB-8N and SB-8S, is at a depth of 11.5 to 12 feet below the current crest elevation and is at the transition from berm fill material to native soil.” Discuss whether the berms are keyed into the underlying soil to achieve a good seal between the ground and the bottom of the berm to prevent lateral seepage of wastewater through the base of the berm. The only difference between the phreatic line and damaging seepage is the ability to pipe soil – inspections must include observations of voids and small tunnels. Discuss whether undisturbed samples have any observations of voids. Discuss whether the phreatic line is at a distance greater than capillary rise from the wastewater below the sloping face. The diagrams provided in Appendix E (Piezometer Log Forms) are for Ponds 6, 7, and 8 and do not include vertical scales, provide figures with scales in the report for additional data analysis. The Permittee must discuss the moisture present within the berms, the phreatic line, the volume of water held in the evaporation ponds and the water level compared to the top of the berms and the measured phreatic line over time, groundwater levels compared to the level of the berms and the bottom of the evaporation ponds, the sandy zones within the berms, and the potential for piping within the berms based on observed soils. Provide these responses in the Report for the additional data analysis.

#### **Comment 2**

The Permittee’s response to NMED’s Comment 4 discusses new permanent piezometers and states, “Western will provide the updated numerical slope stability evaluation in an addendum to the revised report.” Rather than submitting an addendum, submit a new report that discusses the phreatic line, the slope stability calculations, and the installation of the new piezometers. This information can be included in the report regarding additional data collection and analysis for slope stability.

#### **Comment 3**

The Permittee’s response to NMED Comment 5 responds to the stress analysis of the berm slopes and a requirement to submit a work plan to collect additional soil samples for geotechnical analysis. The Permittee proposes to install piezometers in the downstream slopes of the berms and to collect soil data to update the numerical slope stability analysis. A report must be submitted to NMED detailing the field activities and the results of the geotechnical analysis and the updated slope stability. In the future, when NMED requires a work plan for additional work, rather than propose work as part of the comment response, the Permittee must submit a separate work plan for NMED review.

#### **Comment 4**

In the Permittee’s Response to Comment 6, the Permittee states, “[t]he reference provided for a pseudo-seismic analysis is confusing. The reference provided [i.e., 40 CFR §257.74(3)(e)(iv)] appears to be for structural integrity criteria for new CCR surface impoundments and any lateral expansion of a CCR surface impoundment.” The Permittee goes on that the CCR does not apply to the facility and that the berms are not new, so pseudo-seismic analysis is not required. The Permittee also states, “[i]n addition, Western does not agree that the liquefaction potential for the berm material needs to be evaluated. Based on observations of the earth berms, there is insufficient flow or seepage at the toe of the downstream slope to require analysis for seepage

forces and liquefaction potential.” A seismic analysis, which includes a liquefaction potential analysis, may be warranted based on the following:

- 1) If the dikes are classified as a significant or a high hazard potential dam(s) the stability analyses required are outlined in NMAC 19.25.12.
- 2) “EM 1110-2-1902, Slope Stability”, United States Army Corps of Engineers (USACE) 2003, lists “ER 1110-2-1806, Earthquake Design and Evaluation for Civil Works Projects”, USACE 2016 (latest edition), as a guide for seismic loading conditions.

Based on these guidance documents, NMED recommends a seismic analysis, which includes a liquefaction potential analysis, be performed for the ponds. The reference to 40 CFR §257.74(3)(e)(iv) is from the new CCR guidance and was not a proper reference for this scenario.

#### **Comment 5**

The Permittee’s response to Comment 7 states, “[t]he Pond 9 north rebuild section is modeling the cross-section from December 2002 slope stability work with no new additional soil or groundwater data. However, work in 2016 added fill material to the Pond 9 north berm. The numerical slope stability of the Pond 9 north berm will be evaluated using the updated topography and soil strength parameters.” The updated stability analysis of the Pond 9 north berm must also consider new groundwater elevations from the proposed piezometer in the Pond 9 north berm.

#### **Comment 6**

The Permittee’s response to Comment 8, which the Permittee broke into parts, so 8A response, did not resolve NMED’s comment regarding the soil properties used for the stress properties analysis. The Permittee stated that average values were used to determine the total stress properties of the native material and berm fill. Based on the information provided in Table 1, the average cohesion for the native soil should be equal to 756 psf, not 1152 psf. Based on the soil test results, the strength difference between the soil types used in the model is great enough that the model must represent field conditions as accurately as possible. NMED recommends careful delineation of soil types in the updated slope stability analysis.

#### **Comment 7**

The Permittee’s response to Comment 8B states, “[t]hough the boring logs from the 2002 engineering report do not contain elevations, the historic topography was discussed in Sections 2 and 3 and shown in cross-sections on Figure 6b of the Report. The geotechnical data for the December 2002 work was provided in Appendix C of the Report. In addition, geotechnical data from the 2013 and 2015 improvement work was provided in Appendix B of the Report. As shown on Table 1 of the Report, the soil properties do not vary greatly for the berm fill throughout the various earth berm sample locations.” The report tables must be updated to include the additional data obtained for the revised stability analysis, including the proposed effective stress soil strength parameters to be used for the proposed updated slope stability analysis, as described in Western Comment Response No. 5. Provide updated tables to NMED.

**Comment 8**

The Permittee's response to Comment 9 states, "[a] rapid drawdown analysis is not warranted since Western does not expect a rapid drawdown at the evaporation ponds." If this is the case, then the Permittee must ensure that the drawdown rate of the ponds is never more than 1 ft/day.

**Comment 9**

The Permittee's response to Comment 10 states, "[s]urcharge loading on the berms is not expected other than occasional light vehicle traffic. Should berm loading beyond light vehicle traffic be required, the loadings will be analyzed as appropriate." The Permittee must ensure that the only loading allowed on the berms is light vehicle traffic. Any loading more than light vehicle traffic may cause damage and create a hazard.

**Comment 10**

The Permittee's response to NMED Comment 12 (1) discusses the use of temporary piezometers to estimate the groundwater surface and states that permanent piezometers will be installed. Use data from the new piezometers to develop an estimate of the groundwater surface in the future slope stability analysis. Also, include details regarding the permanent piezometers in the report regarding additional data collection and slope stability.

**Comment 11**

The Permittee's response to NMED Comment 12 (2) states, "[i]n the updated 2015 slope stability analysis, entry/exit ranges were chosen that cover the entire length of the berm. This forced deeper slip surfaces in order to identify the critical potential failure surface." Pond 6 West and Pond 9 North rebuild analyses have a critical surface entry point that is located at the limit of analysis. Extend the entry range to cover the entire length of the berm. Provide the updated analysis in the additional data report.

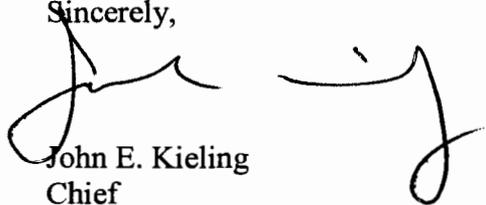
NMED's comments must be addressed in the report for additional soil samples for geotechnical analysis and slope stability calculations. The report must be submitted on or before **December 29, 2017**.

The Permittee must provide revised tables, per Comment 7, on or before **September 29, 2017**.

Mr. Bailey  
August 22, 2017  
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If you have questions regarding this correspondence, please contact Kristen Van Horn of my staff at 505-476-6046.

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Kieling". The signature is fluid and cursive, with a large initial "J" and a long horizontal stroke.

John E. Kieling  
Chief  
Hazardous Waste Bureau

cc: K. Van Horn, NMED HWB  
A. Hains, WRG  
C. Chavez, EMNRD OCD  
S. Holcomb, NMED SWQB  
L. King, EPA

File: Reading File and WRG 2017 File  
WRG-15-006