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Certified Mail - Return Receipt Requested



January 31, 2022

John Moore  
Environmental Superintendent  
Western Refining, Southwest Inc., Gallup Refinery  
92 Giant Crossing Road  
Gallup, New Mexico 87301

**RE: DISAPPROVAL  
TANK 570 RELEASE AND ADDITIONAL AREAS LASER-INDUCED  
FLUORESCENCE/HYDRAULIC PROFILING INVESTIGATION REPORT  
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY  
MCKINLEY COUNTY, GALLUP, NEW MEXICO  
EPA ID # NMD000333211  
HWB-WRG-21-021**

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has completed its review of the Marathon Petroleum Company dba Western Refining Southwest Inc., Gallup Refinery (Permittee) *Tank 570 Release and Additional Areas Laser-induced Fluorescence/Hydraulic Profiling Investigation Report* (Report), dated October 27, 2021 and received on November 1, 2021. NMED has reviewed the Report, and hereby issues this Disapproval with the following comments.

**Comment 1**

In Section 1.0 (Introduction and Background), page 7 of 20, paragraph 2, the Permittee states, "[t]he investigation scope was conducted in accordance with a series of verbal discussions and agreements between the New Mexico Environment Department (NMED) and the Refinery." Although the investigation scope was discussed verbally, NMED prefers a written form of communication for our record so that they are accessible to the public and will also facilitate with tracking the course of the investigations. Therefore, for future investigations, the Permittee must submit written work plans for review and approval by NMED prior to the investigations being conducted. No revision is required to the Report.

**Comment 2**

In Section 1.0 (Introduction and Background), page 7 of 20, bullet 2, the Permittee states, "[t]he

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results for the Marketing Tank Farm investigations (November 2019 and February 2021) were summarized in the "Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report" (MKTF Report) (MPC 2021) submitted on March 31, 2021 and disapproved in the NMED letter dated June 2, 2021." The Permittee submitted the *[Revised] Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report*, dated September 14, 2021. Subsequently, NMED's *Approval with Modifications* for the revised report was issued on December 2, 2021. As a reminder, the response letter, the replacement pages, table and figure, and an electronic version on a CD/DVD for the revised MKTF Report are due no later than **February 18, 2022**. No revision is necessary.

### **Comment 3**

Section 3.2.1 (Process Area), pages 13 through 14, provides a discussion regarding the results of the Laser-Induced Fluorescence (LIF) investigation in the Process Area. According to Table 1-1 (LIF Boring Destination and Investigation Date), page 3 of 4, the results of the Process Area investigation (e.g., borings PA-LIF-1 through -8) are not included in the Report. Since the Report includes the discussion of the Process Area, Table 1-1 is not accurate. Resolve the discrepancy by correcting Table 1-1 in the revised Report.

### **Comment 4**

In Section 3.2.2 (Active Refinery Western Boundary), page 14 of 20, paragraph 5, the Permittee states, "[i]t is likely that the ponds function as a migration barrier to the [separate phase hydrocarbons (SPH)] impacts within the subsurface." The statement is speculative since the supporting data has not been provided to demonstrate that the ponds function as a migration barrier. Comment 2 of the NMED's December 27, 2021 *Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas* requires the Permittee to "[p]rovide accurate surface elevation survey data for boring OW-69 to confirm that the depth of boring OW-69 was completed to a depth comparable to groundwater levels detected in well GWM-1." Unless the survey data is provided, NMED is unable to evaluate whether boring OW-69 was advanced to a sufficient depth to intercept the saturated zone which would help support the assertion that the ponds function as a migration barrier. In addition, it appears that the LIF/hydraulic profiling (HP) log for boring WB-LIF-113 advanced on the western perimeter of pond AL-2 approximately 100 feet south of well GWM-1 indicates that SPH was absent; however, the LIF/HP boring WB-LIF-113 was only advanced to a depth of 18.92 feet below ground surface (bgs). Since the depths to groundwater (DTW) historically exceed 20 feet bgs in well GWM-1, the depth of boring WB-LIF-113 (18.92 feet bgs) was likely too shallow to intercept the water table where SPH may potentially be present. Remove the statement from the revised Report or provide the supporting data and provide a discussion in the appropriate section(s) in the revised Report.

### **Comment 5**

In Sections 3.2.2 (Active Refinery Western Boundary), page 14 of 20, paragraph 5, and 4.0 (Conclusions and Recommendations), page 19 of 20, bullet 2 under *recommendations*, the Permittee states, "[b]ased on the data presented in this report, sufficient data have been

collected for future engineering evaluation.” If the LIF/HP borings were not advanced to the saturated zone, SPH would be undetected and the data from the investigation would be incomplete for use for future remedial design. Although some LIF/HP borings were advanced to the adequate depth, others were not (e.g., WB-LIF-113). In order to verify whether each boring was advanced to the saturated zone, provide a table that summarizes all of the LIF/HP borings included in Appendix C (LIF/HP Logs) with the following information: (a) final depth of the boring, (b) estimated DTW at the boring location (e.g., based on historical/average DTW data collected from the neighboring wells and/or data obtained from HP, where applicable), and (c) maximum %RE observed from the boring and depth interval. Based on the data listed in the summary table, evaluate and discuss whether each boring was adequately advanced to the saturated zone in the revised Report.

#### **Comment 6**

In Section 3.2.3 (Eastern Boundary), page 15 of 20, paragraph 2, the Permittee states, “[a] gasoline-type waveform was noted in EB-LIF-93 (27 %) northeast of the Marketing Tank Farm area.” Although the statement is true, the highest response (34.5 %RE) was observed at a depth of 1.23 feet bgs and the SPH detected at a depth of 1.23 feet bgs does not appear to be gasoline according to the LIF/HP log for boring EB-LIF-93. Regardless, a gasoline-type waveform (27 %RE) was observed at approximately 13 feet bgs where the water table may be present at the location. The presence of SPH at 13 feet bgs may indicate that the SPH migrated from an upgradient source(s) with groundwater. Concurrently, the presence of SPH at 1.23 feet bgs may indicate that a separate surface release occurred in the vicinity of boring EB-LIF-93. The SPH detections near ground surface and the water table must be addressed separately since the remedial approach addressing the contamination is likely different. In order to identify the type of contamination (e.g., surface vs. aquifer contamination), provide a table that lists all LIF borings included in Appendix C with the following information: (a) an identification of surface contamination, (b) an identification of aquifer contamination, (c) an identification of the vadose zone contamination above the water table, (d) corresponding depth(s) where such contamination is identified, and (e) %RE observed at the field measured depth(s) in the revised Report. This table must be separate from the table referenced in Comment 5.

#### **Comment 7**

In Section 3.2.3 (Eastern Boundary), page 15 of 20, paragraph 4, the Permittee states, “[d]ata suggest that SPH impacts may exist east of EB-LIF-07, EB-LIF-12, and EB-LIF-13 and further delineation may be warranted. Additional assessment of the eastern boundary would be offsite. The Refinery has attempted to contact the adjacent property owner regarding access but has not received any response.” NMED agrees that further delineation is warranted east of EB-LIF-07, EB-LIF-12, and EB-LIF-13. The Permittee must continue to make efforts to contact the adjacent property owner to gain access to the site.

#### **Comment 8**

In Section 3.3 (Hydraulic Profiling Results), page 15 of 20, paragraphs 5 and 6, the Permittee

states, “[t]he HP data were collected from 107 of the borings drilled during the November 2019, February 2021, and May 2021 field events [and t]he dissipation test allows the pressure to equilibrate to hydrostatic pressure for a particular depth, and from that measurement, a potentiometric surface (water table) can be calculated.” Include the estimated depth of the water table at each boring where the HP data were collected in the table required by Comment 5.

**Comment 9**

In Section 3.3 (Hydraulic Profiling Results), page 16 of 20, paragraph 1, the Permittee states, “[t]he hydrostatic pressure gradient increases with depth and permeability decreases with depth, making deeper zones less ideal for dissipation testing.” While a permeability of the soil clearly affects injection pressure exerted from the probe, it is not clear whether or why the depth of the probe would affect the hydrostatic pressure gradient. Provide further explanation in the revised Report.

**Comment 10**

In Section 3.3 (Hydraulic Profiling Results), page 16 of 20, paragraph 2, the Permittee states, “Figures 3-3 through 3-7 present the cross sections with maximum historical SPH thickness.” There appears to be a typographical error that is carried throughout Figures 3-3 through 3-7. The numbers below the horizontal axis are not consistent with the horizontal scale presented in Figures 3-3 through 3-7. Revise the horizontal axis to be consistent with the horizontal scale in the figures and provide replacement figures with the revised Report.

**Comment 11**

In Section 3.3 (Hydraulic Profiling Results), page 16 of 20, paragraph 3, the Permittee states, “[b]edding planes and changes in soil material are possible pathways for SPH migration in the subsurface and are indicated by a slight decrease in P Dwn on the HP logs.” Provide examples of the data in the text to support the Permittee’s assertion in the revised Report.

**Comment 12**

In Section 3.4 (Electrical Conductivity Results), page 16 of 20, paragraph 5, the Permittee states, “[a]ll soil [hydraulic conductivity (K)] data gathered via HP or [electrical conductivity (EC)] tools should be correlated with physical soil samples to ensure that the tools are accurately representing subsurface conditions.” Although geologic soil samples were not collected from most of the boring locations depicted on Figure 3-3 through 3-7 (e.g., WB-LIF-129), specific soil types at the locations were presented on the figures, presumably, based on the readings. General soil types may roughly be estimated from K values; however, it would not be possible to distinguish specific soil types within similar permeabilities unless additional data is available. For example, LIF/HP boring WB-LIF-129 depicted on Figure 3-4 appears to be advanced to “clayey sand, clayey silt, and shale/mudstone” based on the readings. Although the LIF/HP boring log for WB-LIF-129 depicts a steep reduction of K values at depths below 5 feet bgs (e.g., possibly transition from clayey sand to clayey silt), it is unclear how K values on the log can

distinguish clayey silt from shale/mudstone without soil sample classification. Provide an explanation and the supporting data in the revised Report.

**Comment 13**

In Section 3.5 (Soil Sampling Results), page 17 of 20, paragraph 1, the Permittee states, “soil samples were collected to represent a variety of % RE and waveform types” from eight soil boring locations/depths where soil samples were collected for the laboratory analyses. In the revised Report, explain why these soil boring locations/depths were selected in relation to the results of the LIF/HP data.

**Comment 14**

In Section 3.5 (Soil Sampling Results), page 17 of 20, paragraph 3, the Permittee states, “[i]n the Process Area (EB-LIF-34, EB-LIF-108, EB-LIF-109, and PA-LIF-7), TPH-DRO concentrations ranged from 130 milligrams per kilogram (mg/kg) to 2,500 mg/kg. TPH-GRO concentrations ranged from 17 mg/kg to 300 mg/kg. TPH-MRO was non-detect for all Process Area samples. In the Tank Farm (EB-LIF-19, EB-LIF-20, EB-LIF-28, EB-LIF-99), TPH-DRO ranged from non-detect to 3,200 mg/kg. TPH-GRO concentrations ranged from 7.6 mg/kg to 18,000 mg/kg. TPH-MRO was non-detect for all Tank Farm samples.” NMED agrees that the LIF data may be a better indicator of the SPH presence/absence at the location and TPH data may be a better indicator of SPH saturation than the LIF data. However, it is NMED’s opinion that the results obtained from the LIF and TPH data should correlate to one another; otherwise, the LIF screening data would be meaningless. Provide a brief discussion regarding the correlation of the TPH results with % RE and the accuracy of the LIF screening data in the appropriate section(s) of the revised Report.

**Comment 15**

Section 4.0 (Conclusions and Recommendations), page 19 of 20, paragraph 1 lists four significant conclusions obtained from the investigation. However, the data to support the conclusions were not referenced in the discussion. Provide the data (e.g., examples, references) to support the listed conclusions in the revised Report.

**Comment 16**

In Section 4.0 (Conclusions and Recommendations), page 19 of 20, bullet 1 under *recommendations*, the Permittee states, “[f]uture investigations in the Process Area will be addressed in the Process Area Work Plan, requested by NMED in Comment 9 of the Marketing Tank Farm LIF report disapproval letter (NMED 2021).” NMED has received the Permittee’s *Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan*, dated November 30, 2021. This comment serves as an acknowledgement. No response is required.

**Comment 17**

In Appendix B (LIF/HP Methods), page 2 of 2, paragraph 1, the Permittee states, “[t]he estimated K (ft/d) is calculated using the equation:

$$K = \ln(Q/P') * 20.0 + 7.0$$

where: P' = downhole pressure in psi – (0.433 (psi/ft) \* depth below water table (ft)) – atmospheric pressure (psi)

0.433 psi/ft = hydrostatic pressure gradient

Q = flow rate (mL/min).”

Address the following comments about the equation in the revised Report:

- a) While the equation explains how the K is calculated from the HP data, it is not clear how the potentiometric surface (water table) can be calculated from the data. Include a separate equation to calculate the potentiometric surface (water table) and provide an explanation with an example. Furthermore, clarify whether the “depth below water table” is calculated from the potentiometric surface (water table) obtained from the dissipation testing; otherwise, explain how it is estimated.
- b) The Permittee provided the unitless constants, 20 and 7, in the equation but did not define these values. Provide an explanation for the unitless constants (20 and 7) used in the equation. Define all constants when providing equations for future submittals.
- c) Although the Permittee defines “0.433 psi/ft” as the hydrostatic pressure gradient, the Permittee does not reference where the value is from or discuss how it was determined. Discuss and explain why 0.433 psi/ft was used to calculate the equation, if the value is being applied to the vadose zone.
- d) The Permittee did not define P' from the equation. Define P' in the equation and provide value's unit.
- e) P' appears to have a unit with pound per square inch (psi), Q has a unit with milliliter per minute (mL/min) and the output value for K has a unit with feet per day (ft/d). It is unclear how the unit conversion is accomplished from the equation. Provide conversion details to the equation for clarity and include an example calculation with units.

Additionally, the equation to calculate K that is presented in Appendix B was not discussed in the text of the Report. Include an additional section that discusses the equation in the text of the revised Report.

#### **Comment 18**

Appendix D (LIF/HP Elevation Data) provides latitude, longitude, easting, and northing data for each LIF boring; however, the Permittee does not provide ground surface elevation data. The Permittee's September 15, 2021 Response to the NMED's Disapproval Comment 26 states, “[e]levation surface data were collected by Dakota using a GPS during the field event but were

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not included on the LIF/HP logs. The data are included Appendix D of the Sitewide LIF/HP Investigation Report, which will be submitted to NMED on or before October 31, 2021." NMED has not received the elevation surface data. Submit the surface elevation data for each LIF boring in the revised Report.

The Permittee must submit a revised Report that addresses all of the comments contained in this Disapproval. Two hard copies and an electronic version on CD/DVD of the revised Report must be submitted to the NMED. The Permittee must also include a redline-strikeout version in electronic format showing where all revisions to the Report 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. The revised Report must be submitted to NMED no later than **May 6, 2022**.

If you have questions regarding this letter, please contact Michiya Suzuki of my staff at 505-690-6930.

Sincerely,



Dave Cobrain  
Program Manager  
Hazardous Waste Bureau

cc: L. Tsinnajinnie, NMED HWB  
M. Suzuki, NMED HWB  
H. Jones, Trihydro  
L. Barr, EMNRD OCD  
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