NEW MEXICO
ENVIRONMENT DEPARTMENT

ENTERED

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 2, 2021

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

RE: DISAPPROVAL
MARKETING TANK FARM LASER-INDUCED FLUORESCENCE/HYDRAULIC PROFILING INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-21-007

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has reviewed the *Marketing Tank Farm Laser-induced Fluorescence/Hydraulic Profiling Investigation Report* (Report), dated March 31, 2021, submitted on behalf of Marathon Petroleum Company dba Western Refining Southwest Inc., Gallup Refinery (the Permittee). NMED hereby issues this Disapproval with the following comments.

Comment 1

The cover letter states, "[t]he LIF/HP lithologic boring logs will be submitted to the New Mexico Environment Department under separate cover letter by April 30, 2021." Appendix C, *LIF/HP logs,* that presents the LIF/HP lithologic boring logs is included in the Report. Clarify whether the referenced logs are already included in the Report or if there are additional logs. If not, the

referenced logs have not been received by NMED as of May 27, 2021. In this case, submit the referenced document to NMED upon receipt of this letter.

Comment 2

In the Executive Summary, page 3, and Section 4.0, *Conclusion,* page 16, the Permittee states, "[t]he gasoline occurrence splits into two lobes at the west side of the parking lot (Figure 3-2)." The gasoline lobes are designated as northern and southern lobes and the diesel lobes are designated as the east and west lobes. Figure 3-2, *Approximate Locations of SPH Occurrence Marketing Tank Farm/Loading Rack*, does not identify the boundary of each lobe. Provide a figure that identifies the boundaries in the revised Report.

Comment 3

In the Executive Summary, page 3, and Section 4.0, *Conclusion,* page 16, the Permittee states, "[t]he leading edge of the north gasoline occurrence appears to be in the area of the borrow pit hydrocarbon seep (between MKTF-LIF-73 and MKTF-LIF-74)." Gasoline is detected at multiple borings (e.g., MKTF-LIF-60) located north of borings MKTF-LIF-73 and MKTF-LIF-74 according to Figure 3-2. Provide explanation to support the assertion or revise the statement for accuracy in the revised Report.

Comment 4

In the Executive Summary, page 3, and Section 4.0, *Conclusion*, page 16, the Permittee states, "SPH is in the near surface (less than 6 feet below ground surface) east of the borrow pit hydrocarbon seep near MKTF-LIF-74." According to the MKTF-LIF-74 log included in Appendix C, an elevated % RE signal is observed at a depth of approximately three feet below ground surface (bgs) and diminished at a depth of approximately six feet bgs. The depth of the water table at boring MKTF-LIF-74 is presumably below six feet bgs based on the gauging data collected from adjacent MKTF wells. Since the location of boring MKTF-LIF-74 is approximately 800 feet west of the source location, groundwater would be the only transport mechanism for SPH detected at the location. Therefore, it is not clear how SPH has migrated approximately 800 feet downgradient from the source location and been detected at a depth where groundwater is absent. Provide explanation in the revised Report.

Comment 5

In the Executive Summary, page 3, and Section 4.0, *Conclusion,* page 16, the Permittee states, "southern [gasoline] lobe is migrating to the southwest towards the 90-day pad but has not reached the water seep located just to the east of the pad (west of MKTF-LIF-90)." According to Figure 3-2, no boring was advanced west of MKTF-LIF-90; therefore, the leading edge of the gasoline plume is not delineated. Well MKTF-42 is suitable as a sentinel well for the detection of SPH migrating west of MKTF-LIF-90. However, the water seep location must also be visually monitored on a monthly basis for potential breakthrough. Propose to monitor the seep and report the monitoring results in the future quarterly hydrocarbon seep interim measures status reports.

Comment 6
In the Executive Summary, page 3, and Section 4.0, *Conclusion*, page 16, the Permittee states, "[a] north diesel occurrence emanating from the Marketing Tank Farm appears to be moving through a paleochannel to the north towards the hydrocarbon seep located near monitoring well MKTF-01." Note that the location of the referenced paleochannel may coincide with that of the sewer line to the Sanitary Lagoon. Therefore, the diesel migration may follow the sewer line. The Permittee's *Sanitary Lagoon Investigation Phase II Work Plan*, dated March 31, 2021, proposes to install trenches along the sewer line. The investigation may help identify the diesel migration path toward the hydrocarbon seep area. Incorporate the findings from this LIF/HP investigation in the Sanitary Lagoon investigation report, as appropriate.

Comment 7
In the Executive Summary, page 3, and Section 4.0, *Conclusion*, page 16, the Permittee states, "[t]he west [diesel] lobe of the occurrence appears to be comingling in the south with the MKTF gasoline occurrence and in the north with the naphtha occurrence, migrating beneath the road from the east." The statement is not clear because the references to the statement are not provided (see also Comment 2). Revise the statement for clarity.

Comment 8
In the Executive Summary, page 3, and Section 4.0, *Conclusion*, page 16, the Permittee states, "[t]he east lobe of the occurrence is migrating to the west towards the crude tanks from the process area and is nearing the Marketing Tank Farm complex (MKTF-LIF-66). The waveforms from this occurrence are similar to the waveforms observed in PA-LIF-4." According to Appendix C, the % RE signals of boring MKTF-LIF-66 (max % RE = 708.9% at 8.57 feet bgs) are much greater than those of boring PA-LIF-4 at any depth (max % RE = 196.1% at 10.48 feet bgs). If diesel were migrating from the process area to the crude tanks and marketing tank farm, the % RE responses of boring PA-LIF-4 would likely be greater since it is located closer to the source area (Process Area); however, the data indicates otherwise. Provide explanation for why diesel may be originating from the process area rather than other potential source areas such as SWMU 6 – Tank Farm in the revised Report.

Comment 9
In the Executive Summary, page 4, the Permittee states, "[the recommendations include] [i]nvestigating the Process Area diesel occurrence to evaluate the eastern extent prior to recommending any remediation activities." NMED concurs that the Process Area needs further investigation. Submit a work plan proposing to investigate the Process Area no later than **November 30, 2021**.

Comment 10
In Section 3.0, *Investigation Results*, page 11, the Permittee states, "[t]he air knife excavations were backfilled with dry cuttings prior to installing the LIF/HP boreholes. Therefore, the LIF/HP interval of 0-5 ft was not representative of undisturbed subsurface conditions." According to

the MKTF-LIF-74 log included in Appendix C, an elevated % RE signal is observed at a depth of approximately three feet below ground surface (bgs) and diminished at a depth of approximately six feet bgs. Provide a clarification whether the interval of boring MKTF-LIF-74 represents backfill material. If it represents backfill material, the data collected from MKTF-LIF-74 is not representative. If it does not represent backfill material, provide a table that indicates which borings used the air knife excavation/backfill procedures in the revised Report.

Comment 11

Section 3.1, *Laser-Induced Fluorescence Results*, pages 11 through 13, discusses the LIF results for borings designated as MKTF-LIF and PA-LIF. Figure 3-2 also presents borings designated as EB-LIF that were advanced in the vicinity of Tank 572. Elevated % RE signals were observed from these borings according to Appendix C. However, the Report does not discuss the results collected from the borings designated as EB-LIF. Revise the Report to include the discussion for the data collected from the borings designated as EB-LIF.

Comment 12

In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "[a] classic gasoline waveform appears in MKTF-LIF-37 below approximately 6 ft bgs." According to the MKTF-LIF-37 log included in Appendix C, elevated % RE signals are observed at the depth intervals of approximately 5 - 17 feet bgs and 22 - 29.5 feet bgs. Although elevated % RE signals were detected at a termination depth of 29.5 feet, boring MKTF-LIF-37 was not advanced to a deeper interval. Therefore, the vertical extent of the SPH distribution at boring MKTF-LIF-37 was not determined. The boring should have been advanced to the depth where % RE signals diminish. Include this provision in future LIF investigations. No response required.

Comment 13

In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "[i]n MKTF-LIF-42, the SPH is following lower permeability zones at 11.0 to 11.5 ft bgs, 15.5 to 16.0 ft bgs, and at the alluvium/Chinle Group interface at 20.0 ft bgs. The predominant SPH pathway appears to be from 15.5 to 18.5 ft bgs where % RE responses of up to 367 % were recorded." The statement does not appear to be accurate. Elevated % RE signals are observed at depths of approximately 11.5 to 28 feet bgs according to the MKTF-LIF-42 log included in Appendix C. Note that the % RE signal exceeding 350% appears at a depth of approximately 27.5 feet bgs rather than 15.5 to 18.5 ft bgs. Correct the statement in the revised Report.

Comment 14

In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "[m]oving west to MKTF-LIF-42 and MKTF-LIF-43, the MKTF gasoline occurrence appears to bifurcate along western and southwestern paths (Figure 3-2)." It is not clear what data suggests that the MKTF gasoline occurrence bifurcates west of boring MKTF-LIF-42 and MKTF-LIF-43. Provide additional data and discussion to support the assertion in the revised Report.

Comment 15
In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "MKTF-LIF-61 marks the northern edge of the north gasoline occurrence with a peak response at 23.73 ft bgs, similar to the depths at MKTF-LIF-62 and MKTF-LIF-54 to the south." The statement is contradictory to the previous statement in the Executive Summary and in Section 4.0 stating, "[t]he leading edge of the north gasoline occurrence appears to be in the area of the borrow pit hydrocarbon seep (between MKTF-LIF-73 and MKTF-LIF-74)" (see also Comment 3). Resolve the discrepancy in the revised Report.

Comment 16
In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "[t]he south gasoline occurrence forms a path between MKTF-LIF-43 and MKTF-LIF-90 (Figure 3-2). This portion occurs as a very thin interval where potential product was identified in the LIF pushes. The maximum response signal is 56.4% RE at 19.91 ft bgs and is centered on a less permeable zone between 18.5 and 20.0 ft bgs." According to the MKTF-LIF-43 and MKTF-LIF-90 logs included in Appendix C, neither log appears to represent the described observation in the statement. The maximum response signals are recorded as 287.0% at 14.61 feet bgs in boring MKTF-LIF-43 and 83.2% at 16.68 feet bgs in boring MKTF-LIF-43. Correct the statement in the revised Report.

Comment 17
In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "MKTF-LIF-77 has a strong response of 321% RE at 18.03 ft bgs with the SPH filling a less permeable zone between 17.0 and 19.0 ft bgs. This permeable zone appears to resemble the permeable zone in MKTF-LIF-67." The former and latter sentences appear to be contradictory regarding the description of permeable zone. According to the MKTF-LIF-77 log included in Appendix C, the conductivity readings at a depth of approximately 17 and 19 feet bgs range 40 to 70 mS/m, which is notably lower than those at other depth intervals. Therefore, the soils at a depth of approximately 17 and 19 feet bgs would rather be relatively more permeable. Correct the statement in the revised Report.

Comment 18
In Section 3.1, *Laser-Induced Fluorescence Results*, page 12, the Permittee states, "[b]oring locations in the MKTF, north, and south gasoline occurrences with greater than 100% RE include MKTF-LIF-46 (409%), MKTF-LIF-45 (329%), MKTF-LIF-44 (315%), MKTF-LIF-37 (339%), MKTF-LIF-42 (367%), MKTF-LIF-43 (287%), MKTF-LIF-77 (321%), MKTF-LIF-62 (361%), MKTF-LIF-61 (105%), MKTF-LIF-72 (305%), and MKTF-LIF-74 (538%). The LIF response at these locations indicate the presence of gasoline and diesel product within the soil and formation pore space." According to Figure 3-2, boring locations MKTF-LIF-46, MKTF-LIF-45, and MKTF-LIF-44 indicate the presence of both gasoline and diesel while boring locations MKTF-LIF-37, MKTF-LIF-42, MKTF-LIF-43, MKTF-LIF-77, MKTF-LIF-62, MKTF-LIF-61, MKTF-LIF-72, and MKTF-LIF-74 indicate the presence of only gasoline. Revise the statement for accuracy in the revised Report.

Furthermore, other MKTF borings with greater than 100% RE are present according to Appendix C. For example, boring MKTF-LIF-36, located north of boring location MKTF-LIF-37, indicates the presence of both gasoline and diesel with the % RE signals exceeding 100%. Boring MKTF-LIF-36 is not included in the discussion. Revise the statement or explain the criteria for selecting the boring locations discussed in the statement.

Comment 19

In Section 3.1, *Laser-Induced Fluorescence Results*, page 13, the Permittee states, "[a]s observed in MKTF-LIF-36, the waveform indicates the presence of gasoline (blue and green waveforms) mixed with a small amount of diesel (orange and red peaks that are higher than what would be expected in a gasoline)." The statement indicates that gasoline is dominant rather than diesel at boring location MKTF-LIF-36. According to the MKTF-LIF-36 log included in Appendix C, diesel rather appears to be dominant with orange peaks. Correct the statement or explain the interpretation in the revised Report.

Comment 20

In Section 3.1, *Laser-Induced Fluorescence Results*, page 13, the Permittee states, "[t]he north diesel occurrence appears to have headed further to the northwest and is evident in MKTF-LIF-56 where it appears to have mixed with the naphtha occurrence moving in from the east." According to Figure 3-2, only diesel was detected at boring location MKTF-LIF-56. Resolve the discrepancy in the revised Report.

In addition, the western extent of diesel contamination detected boring MKTF-LIF-56 was not delineated. Explain why the western extent of diesel was not investigated or propose to submit a work plan to investigate the extent in the revised Report.

Furthermore, the Permittee explained that blue and green peaks represent gasoline and orange and red peaks represent diesel. However, it is not clear how naphtha peaks are differentiated from gasoline and diesel peaks. Naphtha may range from a gas condensate to a kerosene-like product. First, define the naphtha (e.g., composition); then, explain how the naphtha peaks are differentiated from gasoline and diesel peaks in the revised Report.

Comment 21

In Section 3.1, *Laser-Induced Fluorescence Results*, page 13, the Permittee states, "[t]he north diesel occurrence is present in MKTF-LIF-87 and may also be present in MKTF-LIF-86 (the orange coloration at 9 to 10 ft bgs)." According to Figure 3-2, both diesel and naphtha were detected at borings MKTF-LIF-86 and MKTF-LIF-87. Correct the statement in the revised Report.

In addition, the northern extent of diesel and naphtha was not delineated. Explain why the northern extent of diesel and naphtha was not investigated or propose to submit a work plan to investigate the extent in the revised Report.

Comment 22
In Section 3.1, *Laser-Induced Fluorescence Results*, page 13, the Permittee states, "[t]he SPH in MKTF-LIF-85 is an unidentified petroleum product that may possibly be from the sour naphtha release on March 26, 2017. The waveform in the LIF response is representative of naphtha, and the boring is located within the naphtha release area." According to Figure 3-2, naphtha was detected at boring MKTF-LIF-85. It appears that there is sufficient evidence to state that the SPH detected in MKTF-LIF-85 is naphtha; however, the Permittee labels it as an unidentified petroleum product. Revise the statement for clarity.

Comment 23
In Section 3.1, *Laser-Induced Fluorescence Results*, page 13, the Permittee states, "[a]s further evidence of a diesel fuel composition, recently found SPH in MKTF-39 (between MKTF-LIF-66 and PA-LIF-04) has an initial boiling point of 333°F, which is within the range (310-691°F) in Section 9 of the MPC #2 Ultra Low Sulfur Diesel Safety Data Sheet. This diesel waveform is also found in MKTF-LIF-84, which is northwest of MKTF-LIF-66." According to Figure 3-2, only naphtha was detected at boring MKTF-LIF-84 and the detection of diesel is not indicated. Resolve the discrepancy in the revised Report.

In addition, boring MKTF-LIF-66, where diesel was detected, was advanced adjacent to well MKTF-16, where elevated benzene concentrations in groundwater samples have persisted in recent years. Diesel detected in boring MKTF-LIF-66 is unlikely the source of benzene detected in well MKTF-16. The LIF instrument is not capable of detecting dissolved phase constituents and the source of benzene in well MKTF-16 remains unknown. Discuss the potential source of benzene in well MKTF-16 and propose to investigate the source of benzene in well MKTF-16 in the revised Report.

Comment 24
In Section 3.2, *Hydraulic Profiling Results*, page 13, the Permittee states, "[t]his low K prevented the dissipation test from being conducted during the first mobilization in November 2019 due to the extremely long dissipation time (hours). Dissipation tests were conducted at four locations during the second mobilization in February 2021. These locations were PA-LIF-02, PA-LIF-06, MKTF-LIF-83, and MKTF-LIF-84." Clarify if the purpose of the dissipation tests is to determine depth of the water table.

In addition, it is not clear why the dissipation tests were conducted in February 2021 but not in November 2019 and why the tests were conducted at only four locations in February 2021. It is useful to compare depths of the water table relative to the depths where SPH is distributed. If existing hydraulic profiling data allow calculation of the water table depth, revise the LIF/HP logs in Appendix C to include the estimated depths of the water table.

Comment 25

In Section 3.2, *Hydraulic Profiling Results*, page 14, the Permittee states, "[l]ow K values (high P Dwn) on the HP logs roughly correlate with the alluvium/Chinle Group contact as shown on the Figure 3-4 cross section." In Figure 3-4, *Cross Sections with Maximum Separate Phase Hydrocarbons,* the only borings advanced to the alluvium/Chinle interface are historical borings LR-1 and LR-2, which are not relevant to the hydraulic profiling investigation. Provide explanation for clarity or revise the statement for accuracy in the revised Report.

Comment 26

In Section 3.2, *Hydraulic Profiling Results*, pages 13 and 14, the Permittee states, "Figure 3-3 presents the cross-section location map; Figure 3-4 presents the cross-sections with maximum historical SPH thickness." Figure 3-4 depicts the surface elevations of borings MKTF-LIF-42, MKTF-LIF-73, MKT-LIF-74, MKTF-LIF-81, and MKTF-LIF-89; however, the LIF/HP logs included in Appendix C indicate that the elevations are unavailable. If the elevation data are available, include the data in the LIF/HP logs; otherwise, explain how the surface elevations were determined in the revised Report.

Comment 27

In Section 3.2, *Hydraulic Profiling Results*, page 14, the Permittee states, "[f]ractures and/or bedding planes are possible pathways for SPH migration below the alluvium/Chinle Group contact and are indicated by a slight decrease in P Dwn on the HP logs." According to Figure 3-4, no LIF/HP borings or groundwater monitoring wells were advanced to the depth of the alluvium/Chinle interface. It is not clear which data suggests such observations. Provide an explanation for clarity.

Comment 28

In Section 3.2, *Hydraulic Profiling Results*, page 14, the Permittee states, "[e]xamples of P Dwn indicating a fracture and/or bedding planes can be seen recurring in MKTF-LIF-45 at 25 ft bgs (Appendix C). This example represents micro or thin fractures that likely contribute to most of the permeability, resulting in a bulk average permeability similar to a clayey silt rather than intact bedrock." Boring MKTF-LIF-45 was advanced along the A – A' cross section according to Figure 3-3, *Cross-section Location Map*; however, it is not included in Figure 3-4 that presents the cross sections. Revise Figure 3-4 to include boring MKTF-LIF-45.

Comment 29

In Section 3.3, *Electrical Conductivity Results*, page 14, the Permittee states, "[e]xamples of conductivity indicating a fracture and/or bedding planes can be seen in MKTF-LIF-77 at 18.0 ft bgs and 19.73 ft bgs on MKTF-LIF-79A (Appendix C)." The lower electrical conductivity readings observed in the LIF/HP logs represent a presence of coarser sediments; however, they do not

necessarily represent a presence of fractures. Revise the statement for accuracy or provide explanation to support the assertion in the revised Report.

Comment 30

In Section 3.4, *Soil Sampling Results*, page 15, the Permittee states, "[t]he samples [that were analyzed for TPH] were labeled as MKTF-LIF-44 (6 to 7 ft, 8 to 10 ft, and 18 to 19 ft), MKTF-LIF-53 (7 to 8 ft and 8 to 9 ft), MKTF-LIF-74 (2 to 3 ft, 4 to 5 ft, and 5 to 6 ft), MKTF-LIF-85 (7 to 9 ft), and PA-LIF-07 (11 to 13 ft and 13 to 14 ft)." According to Appendix C, higher % RE signals are recorded from other boring locations (e.g., 708.9% RE at 8.57 feet bgs in MKTF-LIF-66). Provide an explanation for why these five sampling locations were selected in the revised Report.

In addition, one soil sample was collected from a depth of 7 - 9 feet bgs from boring MKTF-LIF-85. According to the MKTF-LIF-85 log included in Appendix C, the % RE signals are recorded as less than 100% at the selected sampling interval. The higher % RE signals are recorded at a depth of approximately 11 feet bgs (608.7%) in the boring. Explain why the soil sample was collected from the selected interval of 7 – 9 feet bgs in the revised Report.

Comment 31

In Section 3.4, *Soil Sampling Results*, page 15, the Permittee states, "TPH-DRO ranged from non-detect to 840 milligrams per kilogram (mg/kg) and TPH-GRO ranged from 82 mg/kg to 2,300 mg/kg," and "TPH-DRO and TPH-GRO concentrations maybe lower than might be expected based on the reference emitter (%RE)." The TPH-DRO concentration in the soil sample collected from boring MKTF-LIF-44 at a depth of 18 – 19 feet bgs is recorded as 840 mg/kg, which is the highest TPH-DRO concentration detected; however, the % RE signals at the same sampling interval are recorded as less than 50%. The TPH-DRO concentration in the soil sample collected from boring PA-LIF-07 at a depth of 11 – 13 feet bgs is recorded as 130 mg/kg, which is relatively low; however, the % RE signals at the same sampling interval are recorded as more than 200%. Similarly, the TPH-GRO concentration in the soil sample collected from boring MKTF-LIF-74 at a depth of 4 – 5 feet bgs is recorded as 2,300 mg/kg, which is the highest TPH-GRO concentration detected; however, the % RE signals at the same sampling interval remain less than 300%. The TPH-GRO concentration in the soil sample collected from the same boring (MKTF-LIF-74) at a depth of 2 – 3 feet bgs is recorded as 1,500 mg/kg; however, the % RE signals at the same sampling interval exceed 500%. The TPH concentrations do not correlate with respective % RE signals. % RE signals qualitatively identify the presence or absence of SPH. Provide addition explanation to support the assertion or revise the statement for accuracy.

Comment 32

In Section 3.4, *Soil Sampling Results*, page 15, the Permittee states, "[g]rain-size analysis indicate that the majority of the materials are gravels and sands." Table 3-2, *LIF Investigation – Grain Size Analysis*, indicates that the composition of each soil sample is variable. It is not

accurate to generalize the soil samples as gravels and sands. For example, the majority of materials were silt and clay in the sample collected from location MKTF-LIF-85 at 7 – 9 feet bgs. Revise the Report accordingly.

Comment 33

In Section 3.4, *Soil Sampling Results*, item 1, page 15, the Permittee states, "[t]he higher TPH concentrations, at locations MKTF-LIF-44 (18 to 19 ft) and MKTF-LIF-74 (4 to 5 ft) are around 2,500-3,000 mg/kg total TPH (i.e., the sum of GRO and DRO). This is consistent with SPH saturations in the range of 3% to 5% (Hawthorne and Kirkman 2012) and likely near the residual saturation limit." Table 3-1 indicates that the sums of GRO and DRO for the samples collected from locations MKTF-LIF-44 (18 to 19 ft) and MKTF-LIF-74 (4 to 5 ft) are calculated as 2,340 and 2,480 mg/kg, respectively, that are less than the described range of 2,500-3,000 mg/kg. Revise the statement for accuracy.

According the *TPH in Soil to NAPL Saturation Fraction Conversion Matrix* in the reference (Hawthorne and Kirkman 2012), when TPH value is 5,000 mg/kg, SPH saturation level ranges 2% to 6%, regardless of any differences in the input variables (e.g., soil porosity and SPH density). Note that the saturation range (2% to 6%) is not the residual saturation limit, where non-aqueous phase liquid (NAPL) becomes mobile. The TPH ranging 2,500-3,000 mg/kg may possibly equate the range of 3% to 5% saturation level as stated; however, the range is not near its saturation limit, regardless of the soil and NAPL types. Correct the statement in the revised Report.

In addition, it is not clear how SPH saturation was calculated. Explain how SPH saturation was calculated in the revised Report. Provide explanation for all assumptions used in the calculation.

Furthermore, Table 3-2, *LIF Investigation – Grain Size Analysis,* indicates that the composition of the soils at locations MKTF-LIF-44 (18 to 19 ft) and MKTF-LIF-74 (4 to 5 ft) is different. Explain how porosity and soil density of each soil were determined in the revised Report. According to the reference (Hawthorne and Kirkman 2012), SPH saturation is a function of grain/soil density, porosity and density of the SPH. Among these variables, the porosity value appears to influence the result of the calculation the most. Since some soils at the site consist of fine sediments (e.g., silt and clay), the values of effective and total porosity would be widely different. Clarify whether the porosity used to calculate SPH saturation is an effective or total porosity in the revised Report.

Comment 34

In Section 3.4, *Soil Sampling Results*, item 1, page 15, the Permittee states, "[a]lthough the highest soil TPH concentrations [in locations MKTF-LIF-44 (18 to 19 ft) and MKTF-LIF-74 (4 to 5 ft)] are consistent with SPH at or near residual saturation at those locations, the LIF data

suggest that SPH at higher saturations exist in portions of the subsurface from which soil samples were not collected." A total of three soil samples including the one with the highest % RE intervals were collected from both borings MKTF-LIF-44 and MKTF-LIF-74. It is not clear what data suggest that SPH at higher saturations may exist in portions of the subsurface from which soil samples were not collected. Provide an explanation in the revised Report.

Comment 35

In Section 3.4, *Soil Sampling Results*, item 2, page 15, the Permittee states, "[d]iscrete soil sampling intervals commonly miss small intervals of very high SPH saturation in the subsurface and/or average those small intervals across larger intervals with lower saturation overall." Provide a discussion of the sampling technique used to collect a discrete soil sample from each sampling interval in the revised Report.

Comment 36

In Section 3.4, *Soil Sampling Results*, page 15, the Permittee states, "LIF data are a better indicator of the presence/absence and/or location of SPH than the TPH data, while the TPH data are a better indicator of SPH saturation than the LIF data. Therefore, the two datasets aren't really measuring the same thing." NMED concurs with the statement. However, the Permittee attempted to provide discussion regarding the correlation between soil TPH concentrations and % RE signals in the Report. The discussion is unnecessary. Remove the discussion from the revised Report, as appropriate.

Comment 37

In Section 4.0, *Conclusion*, page 16, the Permittee states, "Based on the information collected during this investigation, the recommendations include:

- Installing a row of five sumps in the borrow pit to cut off the western migration of the north gasoline occurrence.
- Installing a recovery well between MKTF-LIF-77 and MKTF-LIF-90 to intercept migration of the south gasoline occurrence."

NMED concurs with the recommendations. Comment 5 of the NMED's *Approval with Modifications Hydrocarbon Seep Interim Measures 2020 Fourth Quarter Status Report,* dated March 30, 2021, states, "[s]ubmit an interim measure work plan to eliminate the source of the gasoline plume no later than **July 30, 2021**." The interim measure work plan required by Comment 5 of the NMED's March 30, 2021 Approval with Modifications is no longer necessary because of the recommendations provided in the Report. However, when the remediation system is implemented, its effectiveness must be evaluated and reported to the NMED. Submit an interim measures report that summarizes the monitoring data collected and effectiveness of the remediation system no later than **December 31, 2021**.

Comment 38

Table 3-1, *LIF Investigation – Soil Sample Results,* does not include soil screening levels for an evaluation of the risk associated with the constituents in the samples. Revise the table to include all applicable soil screening levels. In addition, it is not necessary to tabulate a reporting limit for every sampling result. Rather, the constituent concentrations recorded as "ND (not detected)" must only indicate their reporting limits (e.g., < 50 mg/kg for MRO at 6 – 7 feet bgs collected from MKTF-LIF-44). Revise the table accordingly.

Comment 39

Figures 3-3 and 3-4 include historical borings designated as "LR". Provide a copy of the boring logs in the revised Report. In addition, Figure 3-4 includes the cross section of 12 MKTF wells. A copy of these boring logs must also be provided in the revised Report.

The Permittee must submit a revised Report that addresses all comments contained in the letter. Two hard copies and an electronic version 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 **September 14, 2021**. In addition, a work plan proposing to investigate the Process Area required by Comment 9 above must be submitted no later than **November 30, 2021** and an interim measures report that summarizes the effectiveness of the remediation system required by Comment 37 above must be submitted no later than **December 31, 2021**.

If you have questions regarding this letter, please contact Michiya Suzuki of my staff at 505-476-6046.

Sincerely,

Dave Cobrain
Program Manager
Hazardous Waste Bureau

cc: M. Suzuki, NMED HWB
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File: Reading File and WRG 2021 File