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Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

January 26, 2021

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

**RE: DISAPPROVAL  
NATURAL ATTENUATION ASSESSMENT AND PROPOSED WORKPLAN FOR THE  
HYDROCARBON SEEP AREA  
FRENCH DRAIN SOIL SAMPLING INVESTIGATION WORK PLAN  
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY  
EPA ID # NMD000333211  
HWB-WRG-20-023**

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has reviewed the *Natural Attenuation Assessment and Proposed Workplan for the Hydrocarbon Seep Area* (Report), dated December 15, 2020, 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 Report does not present data that support the evidence of natural attenuation potential.

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For example, although the Evaluation of Current MNA Conditions Section, pages 5 and 6, provides a list of the site conditions that are favorable for anaerobic biodegradation of chlorinated compounds, the supporting data that demonstrate such conditions are not provided. All relevant groundwater monitoring wells where chlorinated compounds were previously detected must individually be evaluated to support the evidence. In order to evaluate such evidence, all pertinent parameters for natural attenuation (e.g., ORP, dissolved oxygen (DO), electron acceptors and donors, released chlorinated compounds and their daughter products, pH, and temperature) must be tabulated and compared, and the potential for biodegradation to occur in each well must be evaluated and discussed.

In addition, although the potential of MTBE degradation was also required to be evaluated in accordance with the NMED's February 1, 2018 letter, the evaluation was not included in the Report. Include the evaluation in the revised Report.

#### **Comment 2**

In the Hydrogeology Section, *Subsurface Conditions*, page 3, the Permittee states, "[i]n the Hydrocarbon Seep Area, three-dimensional geological modeling using available boring log information strongly suggests that the swale in the area of the hydrocarbon seep area is underlain by a corresponding swale in the shallow alluvium that likely influences shallow groundwater flow in this area. This is shown in Figure 3." Figure 3, *3D Modeling of Local Geology in the Hydrocarbon Seep Area*, includes a magnified image of the subsurface conditions in the hydrocarbon seep area; however, the depths where the subsurface features are located are not indicated. Include this information in the revised Report. In addition, the location of the swale is not clear from the figure. The swale is presumably a stringer of relatively coarse sediments; however, such channel does not appear to be present in the magnified image. Indicate the location of the swale and provide a description of the location in the revised Report.

#### **Comment 3**

In the Natural Attenuation Section, page 4, the Permittee states, "[a] generalized diagram of typical hydrocarbon groundwater plume redox conditions is shown Figure 4," and "[i]n general, the sequence of electron acceptor use is as follows:  
 $O_2 > NO_3^- > Mn(III) \text{ or } Mn(IV) > Fe(III) > SO_4^{2-}$ "

Figure 4, *Reducing Regimes in a Typical Hydrocarbon Groundwater Plume*, indicates that the least aerobic regime is methanogenic. However, the electron acceptors under methanogenic conditions are not included in the statement above. Include the information for consistency in the revised Report.

**Comment 4**

In the Evaluation of Current MNA Conditions Section, page 4, the Permittee states, "Table 2 presents oxidation reduction potential (ORP) field data from quarterly sampling from quarters 1, 3 and 4 in 2016 (Western 2017)." Although Table 1, *MNA Analytical Data*, presents the most recent data, Table 2, *2016 ORP Field Data*, presents the data collected in 2016. It is not clear why the 2016 ORP data is presented rather than the most recent data. Provide an explanation or revise the Report to include the most recent data.

**Comment 5**

In the Evaluation of Current MNA Conditions Section, page 5, the Permittee states, "[e]vidence for conditions favorable for anaerobic biodegradation of chlorinated compounds includes [d]etection of vinyl chloride, which is typically a byproduct of TCE degradation." The accumulation of vinyl chloride is likely occurring based on the site's groundwater conditions. Indicate wells where vinyl chloride concentrations are detected in the revised Report and provide figures (concentrations versus time plots) that present trends for vinyl chloride concentrations at the wells in the revised Report.

**Comment 6**

In the Evaluation of Current MNA Conditions Section, page 5, the Permittee states, "[e]vidence for conditions favorable for anaerobic biodegradation of chlorinated compounds includes [d]epleted sulfate in wells with elevated benzene (e.g. MKTF-10, MKTF-16, MKTF-17), indicating reducing conditions and sulfate reduction to sulfite [sic] as part of anaerobic biodegradation." The concentrations of chlorinated compounds are consistent in these wells according to Table 1. Although the Permittee states that favorable conditions for anaerobic biodegradation of chlorinated compounds exist, the chlorinated compounds do not appear to be degrading in the wells. Resolve the discrepancy or provide clarification in the revised Report.

In addition, an analysis for the end product of sulfate reduction (sulfide) is not being conducted under the current groundwater monitoring work plan. The increase in sulfide levels may provide direct evidence of sulfate reduction. Propose to conduct sulfide analysis for pertinent wells in the next groundwater monitoring work plan update.

**Comment 7**

In the Evaluation of Current MNA Conditions Section, page 6, the Permittee states, "[t]o date, insufficient monitoring well analytical data is available to perform a statistical analysis of concentration trends. As more data become available, contaminant trend plots can be developed and statistical analysis can be performed." A total of fifty MKTF wells has been installed in the vicinity of the hydrocarbon seep area since 2014. There appear to be a sufficient number of wells. Relevant analytical data have been collected since 2014 for most wells. There appears to be sufficient data. Provide information regarding the insufficient data that are

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necessary to conduct such statistical analysis or include the analysis using available historical data in the revised Report.

#### **Comment 8**

In the Proposed Workplan for Natural Attenuation Evaluation for Future Annual Reports Section, page 6, the Permittee states, "MPC proposes that a natural attenuation evaluation section be completed on an annual basis using the existing quarterly sampling analyte list as shown in Table 3 as lines of evidence," and "[t]ables will be added to future annual reports with these analytes, and a new section will be added to present these key data and to summarize natural attenuation progress, including trends in contaminant concentrations and key MNA indicators." It is not appropriate to include the natural attenuation evaluation section in an annual groundwater monitoring report. Rather, a separate letter report that focuses on the evaluation of natural attenuation in the hydrocarbon seep area must be prepared and submitted. Submit the separate natural attenuation evaluation letter report that includes the data collected in year 2021 no later than **March 31, 2022**.

#### **Comment 9**

The Proposed Workplan for Natural Attenuation Evaluation for Future Annual Reports Section, page 6, states, "MPC proposes that a natural attenuation evaluation section be completed on an annual basis using the existing quarterly sampling analyte list as shown in Table 3 as lines of evidence. These lines of evidence will include:

- Benzene, MTBE, 1,1-DCA, 1,2-DCA, TCE, and vinyl chloride analytical results
- Inorganic analyses including dissolved/total analyses for iron and manganese, nitrate/nitrite, pH and sulfate to determine their availability as terminal electron receptors and the redox state. A table of the results will be prepared.
- Field measurements conducted during quarterly sampling and well purging (pH, ORP and dissolved oxygen)
- As more data become available, and trends become evident, a Mann-Kendall statistical analysis will be performed to quantify contaminant concentration trends."

Resolve the issues listed below and/or provide clarification in the revised Report:

- a) Table 3, *Existing Groundwater Quarterly Sampling Analyses and MNA Applicability*, lists BTEX, 1,1-DCA, 1,2-DCA, TCE, and vinyl chloride data to be monitored while the statement proposes benzene, MTBE, 1,1-DCA, 1,2-DCA, TCE, and vinyl chloride data to be monitored. These monitoring parameters must be consistent. Include BTEX in the revised Report.

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- b) All released chlorinated compounds and their daughter products (e.g., PCE, cis-DCE) that were historically detected in the pertinent wells must be included as natural attenuation monitoring parameters in the revised Report.
- c) The degradation products of MTBE (e.g., tert-butyl alcohol) must be monitored to demonstrate MTBE natural attenuation in pertinent wells. Propose to conduct the analyses of the degradation products of MTBE in the next groundwater monitoring work plan update.
- d) The daughter products of vinyl chloride (e.g., ethene) must be monitored to evaluate vinyl chloride natural attenuation in pertinent wells. Propose to conduct the analyses of the daughter products of vinyl chloride in the next groundwater monitoring work plan update.

**Comment 10**

Table 1, *MNA Analytical Data*, does not provide important natural attenuation evaluation parameters such as DO concentrations. Include all important parameters necessary to evaluate natural attenuation potential. Table 1 must list the wells with data relevant to the natural attenuation of chlorinated compounds; remove wells where chlorinated compounds were not Fr

In addition, prepare a separate table that lists parameters necessary to evaluate natural attenuation of MTBE in the revised Report. The table must list the wells with data relevant to the natural attenuation of MTBE.

Furthermore, each table must provide a score for each well to weigh the potential for natural attenuation of chlorinated compounds and MTBE based on the data listed in the table. The revised Report must include a section to discuss how the scoring system is developed. Such scoring system may be referenced from a technical guidance such as EPA's *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*, 1998. It should be noted that natural attenuation is not a remedial option for the sites where SPH or high concentrations of contaminants are present. This evaluation must focus on the fate of chlorinated compounds and MTBE.

The Permittee must submit a revised Report that addresses all comments contained in this 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 **August 2, 2021**.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Dave Cobrain". The signature is fluid and cursive, with the first name "Dave" and last name "Cobrain" clearly distinguishable.

Dave Cobrain  
Program Manager  
Hazardous Waste Bureau

cc: M. Suzuki, NMED HWB  
C. Chavez, OCD  
L. King, EPA Region 6 (6LCRRC)

File: Reading File and WRG 2021 File