GW - 028

SWMU/AOC GROUP 2

INVESTIGATION REPORT

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 11, 2011

Darrell Moore
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211-0159

RE: SECOND NOTICE OF DISAPPROVAL
AOC GROUP 2 INVESTIGATION REPORT
NAVAJO REFINING COMPANY, ARTESIA REFINERY
EPA ID No. NMD048918817
HWB-NRC-09-003

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has completed its review of Navajo Refining Company, Artesia Refinery's (the Permittee) Revised *AOC Group 2 Corrective Action Investigation Report* (Report), dated June 2010. NMED hereby issues this second Notice of Disapproval (NOD), and provides the following comments.

Comment 1

The Executive Summary, page vii (Old API Separator), bullet 1, states, "[p]hase-separated hydrocarbon (PSH) was encountered during the drilling of AOC1-SB1 and the planned temporary well was not installed." Temporary wells were installed at AOC2-SB1 and AOC3-SB5 even though "PSH was encountered during development and sample collection." Revise the Report to explain why a temporary well was not installed at AOC1-SB1 but was installed at the other locations.

Comment 2

The Executive Summary, pages xii-xv, states, "[d]ue to the age of the refinery, it is not possible to determine all the specific historic sources that may have contributed to the contamination in this area." NMED understands that all historic releases cannot be determined since the refinery began operations. The Permittee must nevertheless discuss in the revised Report all documented releases for past/current tanks, ancillary equipment, and underground pipes associated with the specific areas of concern (AOCs) in Group 2.

Comment 3

The Executive Summary, page xv (*Hydrocarbon Impacts* – Crude Tank Farm), states, "PSH was encountered during development of monitor well MW-105. The PSH sample from MW-105 was reported to contain 'biodegraded gasoline mixed with some kerosene range organics.' The laboratory report also stated that the sample collected contained elemental sulfur and tetraethyl lead." Revise the Report to address the items listed below.

a. Five PSH samples were collected during the investigation; however, the collection method for the fingerprint analysis samples was not discussed in the work plan or the Report. Provide more information about how the PSH samples were collected and list the constituents analyzed in the fingerprint analyses for all five PSH samples.

b. The Permittee used Critical Soil Screening Levels (CSSLs) and Critical Groundwater Screening Levels (CGWSLs) for elemental lead to evaluate the laboratory results for all AOCs in Group 2. However, because the fingerprint analysis results for AOC 4 indicates tetraethyl lead is present, use the clean up levels for tetraethyl lead to evaluate the laboratory results for AOC 4. Include those values in the revised Report.

c. Tetraethyl lead was detected in only one of the five PSH samples submitted for fingerprint analysis. As stated above, tetraethyl lead were detected in MW-105 but no such contaminant was identified in the AOC2-SB1 PSH sample. Confirm that tetraethyl lead analysis was conducted for all five samples submitted for fingerprint analysis and discuss the results for the other four samples in the text. If tetraethyl lead was not specifically analyzed in the fingerprint analysis, propose tetraethyl lead analysis for samples collected in nearby monitoring wells (MW-64, MW-102, MW-103, and MW-104) in the next update of the Facility-wide Groundwater Monitoring Report.

Comment 4

The Executive Summary, pages xvii-xix (*Inorganic Compound Impacts*) and Section 7.1.2 (Metals), pages 64-67, states, "[b]ecause of the construction of the sand pack in the monitor wells, the samples collected from the monitor wells are more representative of the groundwater conditions than the samples collected from the temporary wells. Therefore, barium is not considered to pose a concern in groundwater at this time." This statement was also made in reference to arsenic, chromium and selenium.

The filter pack of the monitor well can reduce the amount of suspended solids found in groundwater samples but does not reduce the amount of dissolved metals, therefore, arsenic, barium, chromium, or selenium cannot be eliminated as a groundwater quality concern solely because of well construction. Justify, revise, or remove the statement from the revised Report.

Comment 5

Section 1 (Introduction), pages 1-2, describes Group 2 AOC tanks and their contents. However, the current view of Figures 3-6 in the Report include several other tanks in the vicinity of the Group 2 AOCs that are not addressed in these descriptions. In this section of the revised Report, include descriptions of all the Group 2 AOC tanks which are identified in Figures 3-6 and identify their contents (*see* also Comment 39).

Comment 6

Section 3.2 (Investigation Activities Performed), pages 7-11, states, "PSH was encountered during development of and sample collection from [each temporary well]". Development of temporary wells was not conducted. Revise the Report to clarify this statement (e.g., replace development with installation).

Comment 7

Section 3.2.4 (Crude Tank Farm), page 10, states, "[g]roundwater samples were collected from each of the three temporary wells. No PSH was encountered in these temporary wells." However, in Section 3.2.3 (Southwest Tank Farm) there is no indication whether or not PSH was observed when "[g]roundwater samples were collected from MW-103 and MW-104 during the subsequent semiannual groundwater monitoring event." Revise the Report for consistency.

Comment 8

Section 3.2.5 (Soil Vapor Study Area), page 11, summarizes the soil gas study performed at the refinery but does not discuss soil gas samples collected in the vicinity of the Group 2 AOCs. Include discussion about the purpose of the passive soil vapor samples collected in the Group 2 AOCs and explain how the results contribute to the investigation.

Comment 9

Section 3.3.2 (Soil Sample Collection and Analysis), page 14, states, "[s]oil samples were collected continuously with the hand auger." Revise the Report to include more information regarding the hand augered samples (0-2 ft bgs), such as if the samples were discrete, how they were handled (e.g., composited or placed directly into a sample container), and the depth interval where the samples were obtained (e.g., taken directly from the hand auger or from the bottom of the auger boring as a fresh sample).

Comment 10

Section 3.3.2 (Soil Sample Collection and Analysis), page 14, states, "[n]ot all soil samples were submitted for laboratory analysis." Clarify this statement (e.g., indicate which samples were not submitted to the laboratory) in the revised Report.

Comment 11

Section 3.3.3 (Groundwater Sample Collection and Analysis), page 17, states, "[s]amples were collected using low flow/low stress procedures." Revise the Report to include a description of these procedures in this section or in an appendix.

Comment 12

Section 3.6 (Investigation Derived Waste), page 21, states, "[h]azardous waste disposal records are maintained at the refinery." Revise the Report to include an appendix that includes copies of the IDW disposal documentation as indicated in Appendix E.3.n.i (Field Methods) of the Post-Closure Care Permit (Permit).

Comment 13

Section 4.1 (Surface Conditions), page 22, paragraph 4, states, "[p]rocess area wastewater is collected and directed to the wastewater treatment system and does not flow into the stormwater

pond." Provide additional information to describe how the facility prevents run-on during heavy rain events and prevents flow into the stormwater pond.

Comment 14

Section 4.2 (Exploratory Drilling Investigations), page 23, states, "[e]quipment was washed in soap and water then rinsed with distilled water." Revise the Report to identify the type of soap used to wash the equipment (e.g., Alconox).

Comment 15

Section 4.3 (Subsurface Conditions) and Section 4.5 (Groundwater Conditions), pages 23-24, describes groundwater depths and conditions but does not discuss the PSH depths or if the vertical and lateral extent of PSH has been defined around the refinery. Revise the Report accordingly.

Comment 16

Section 4.5 (Groundwater Conditions), page 24, states, "[t]he depth to water from the established measuring point was measured using a battery-powered water level indicator or oil/water interface probe." Revise the Report to define "the established measuring point" and identify if the temporary well measuring points were surveyed relative to surrounding monitoring wells or survey benchmarks.

Comment 17

Sections 5.1 (New Mexico Soil Screening Levels) and 5.2 (New Mexico Groundwater Standards), page 26, state, "TPH DRO and ORO were compared to the screening level values for 'unknown oil' obtained from the NMED guidance document *TPH Screening Guidelines* dated October 2006." Revise the Report to identify which table (Table 2a or 2b) was used for screening level comparisons.

Comment 18

Revise Section 6 (Sampling Results (Site Contamination)), pages 28-58, to include all detections results for duplicate samples. If the duplicate sample detections are greater than the original sample result, the duplicate sample must be compared to the screening levels for all groundwater and soil samples collected (i.e., the highest detection must be compared to the screening levels).

Comment 19

Section 6.1 (Soil Sampling Results), pages 28-41, appropriately reports all clean up levels in the discussion of results for soil samples. In contrast, Section 6.2 (Groundwater Sampling Results) does not report any cleanup levels. Revise the Report to report all appropriate screening levels for the groundwater sample results in Section 6.2.

Comment 20

Sections 6.1.2.1, 6.1.2.3, and 6.1.2.4 provide a limited discussion of detected metal concentrations. Section 6.1.2.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)) does not. Revise Section 6.1 (Soil Sampling Results), pages 28-41 to consistently report all analytical results in all the appropriate Report subsections.

Comment 21

Section 6.1.2.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)), page 32, bullet 5, reports the o-xylene concentration for AOC2-SB1(16-18) as 947 mg/kg. This appears to be a typographical error because the o-xylene concentration for AOC2-SB1(16-18) reported in the laboratory report is 94.7 mg/kg. Correct the typographical error in the revised Report, or otherwise resolve the discrepancy.

Comment 22

Section 6.1.2.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)), page 32, states, "SVOCs were not detected in the sample collected from 24 to 26 ft bgs." However, on page 31, the Permittee states, "[t]he samples from the 0 to 2 ft bgs and 16 to 18 ft bgs intervals were analyzed for SVOCs while the sample from the 24 to 26 ft bgs interval was not." It therefore cannot be concluded that SVOCs were not detected at 24 to 26 ft bgs. Revise the Report to resolve this discrepancy.

Comment 23

Section 6.1.2.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)), page 33, bullet 1, states, "[m]etals were not reported at concentrations that exceeded the CSSLs, with one exception: Arsenic." Mercury exceeded the CSSL at AOC2-SB1(0-2) with a concentration of 0.0637 mg/kg; the CSSL is 0.0293 mg/kg. Selenium exceeded the CSSL at AOC2-SB1(16-18) and AOC2-SB1(24-26) with concentrations of 8.76 and 8.36 mg/kg, respectively. The CSSL for selenium is 0.965 mg/kg. Revise the Report to discuss these results.

Comment 24

Section 6.1.2.3 (Southwest Tank Farm (AOC 4 in Permit, Group 2 AOC3)), page 37, bullet 1, phenanthrene is misspelled. Revise the Report accordingly.

Comment 25

Section 6.3.2 (Soil Vapor Sample Chemical Analytical Results), page 55, states, "[a] geotechnical sample was collected from the soil vapor study area and analyzed for total soil porosity and water filled porosity."

a. Describe how the geotechnical sample was collected (e.g., depth of collection and field equipment used to collect the sample).

b. Identify the laboratory analysis and method number.

c. Verify that the geotechnical sample porosity results for the soil vapor study area are representative of all of the Group 2 AOCs (e.g., all porosities at each Group 2 AOC are within a certain percentage of each other or the geology in the soil vapor study area is similar at all of the Group 2 AOCs).

Comment 26

Revise the Report to verify that passive soil vapor samples were collected in both the soil vapor study area and in the vicinity of the Group 2 AOCs, and include in the discussion in Section 6.3.2 (Soil Vapor Sample Chemical Analytical Results).

Comment 27

Sections 7.1.1.1 (Old API Separator (SWMU 16 in Permit, Group 2 AOC1)) and 7.1.1.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)), pages 58-59, discuss the PSH measurements for MW-48, MW-64, and MW-102. These measurements were obtained in April 2008 and again in September 2008. Discuss possible reasons why the PSH thickness decreased (as much as 1.4 ft) from April 2008 to September 2008. Analyze historic trends in PSH measurements to determine if there is seasonal variation in PSH thickness, an overall decreasing trend, or other reasons the PSH thickness decreased during this monitoring period.

Comment 28

Section 7.1.1.2 (South API Separator (SWMU 19 in Permit, Group 2 AOC2)), page 61, states, "Tank 106 and an associated underground pipeline were found to be leaking in 1999. Repairs to the tank and the pipeline were made at the same time." Revise the Report to include additional details pertaining to the volume (known or estimated) of the release(s), the surface lateral extent of the release, and the amount of product recovered. Indicate if the release occurred before the berms were installed, and how much of the release emanated from the underground pipeline compared to Tank 106.

Comment 29

Section 7.1.2.5 (Lead), page 66, compares the detected Group 2 AOC lead concentrations to the cleanup levels for elemental lead. Fingerprint analysis shows that the sample collected from AOC 4 (MW-105) contained elemental sulfur and tetraethyl lead. Revise the Report to compare the lead data for AOC 4 to the screening levels for tetraethyl lead. In addition, provide a discussion of the sample results for AOC 4 in this section (*see* Comment 3).

Comment 30

Section 7.1.2.6 (Mercury), page 66, states, "[m]ercury was detected in two of the 34 soil samples collected as part of the AOC Group 2 investigation, both within AOC4." According to the laboratory report, sample AOC2-SB1 contained a mercury concentration of 0.0637 mg/kg greater than the CSSL (2.93E-02 mg/kg). Revise this section to discuss this result.

Comment 31

Provide a list of acronyms after the Table of Contents in the revised Report.

Comment 32

In the "Notes" section of all Tables, indicate if sample results are non-detect and provide an abbreviation footnote (e.g., "ND") to indicate the Detection Limit range for each method. Highlight any compound where the detection limit is higher than the screening levels. See Permit Appendix E, Section E.3.1 (Tables).

Comment 33

The following comments pertain to Table 2 (Water Level Measurements):

a. Define "Total Depth" (e.g., bottom of boring or bottom of PVC casing). Explain if it was measured with respect to ground surface or top of casing and note the difference between the top of the casing and the ground surface. Provide this explanation in the text and a reference in the "Notes" section.

b. Define "NM" and "--" in the "Notes" section.

c. Include data measurements (e.g., depth to PSH, depth to water, PSH thickness, and total depth) and corresponding comments (e.g., PSH encountered at approximate depth and when drilling stopped) in "Notes" section for AOC4-SB4.

d. Explain why total depth for Table 2 does not match the total depth measurements in Table 3 (Water Level Measurements – Refinery Wells – First Semiannual Event 2009).

e. Note "b" from Table 2 states, "PSH encountered during development of temporary well." Development of temporary wells did not occur (*see* Comment 6).

f. Explain why the depth to water was not measured for AOC1-SB1, AOC2-SB1, AOC3-SB5, and MW-106 and why the PSH thickness for AOC1-SB1, AOC2-SB1, and AOC3-SB5 was not determined if an oil/water interface probe was used to measure the static water level and depth to PSH. Include this information in the revised Report.

Comment 34

Revise Tables 5 and 6 to include tetraethyl lead screening levels for soil and groundwater (*see* Comment 3).

Comment 35

Revise all tables to be consistent with Table 9 by inserting "NA" into the blank cells to indicate that the constituent was not analyzed.

Comment 36

The following comments pertain to Table 7 (Summary of Soil Sample Analytical Results):

a. Apply the SSLs for tetraethyl lead for comparison to AOC 4 lead analytical results (*see* Comment 3).

b. On page 3, it appears that the result column for AOC2-SB1 is missing mercury. The reported laboratory result for AOC2-SB1 for mercury is 0.0637 mg/kg, greater than the CSSL (2.93E-02 mg/kg). Correct the discrepancy.

c. On page 10, remove the cell highlight where the sample result is non-detect in the result column for AOC3-SB5.

d. On page 10, it appears that the result for benzene in the AOC 3 DUP 1 sample is incorrect (0.892 mg/kg). The laboratory result for AOC 3 DUP 1 is 0.592 mg/kg. Correct the discrepancy.

e. On page 13, it appears that the total xylenes result for MW-104 (8-10) is incorrect. The actual sum of total xylenes for MW-104 is 1.86 mg/kg. Correct the discrepancy.

f. On page 16, it appears that the gasoline range organics (GRO) result for AOC4-SB2 (0-2) was incorrectly reported as 7.91 mg/kg. The laboratory result reports the GRO is 16.4 mg/kg. Correct the discrepancy.

g. On pages 25 through 27, the RL column for AOC4 MW-106 DUP-2 sample has several RLs that exceed the CSSLs for several constituents which should be highlighted. Correct this discrepancy.

h. There are several blank cells in the "Result" column that are accompanied by a value in the "RL" column in Table 7. There is no explanation in the footnotes, but laboratory results show these constituents as being "non-detect." Take care to define all symbols, qualifiers, and abbreviations in the tables in the revised Report and future documents.

Comment 37

The following comments pertain to Table 9 (Summary of Groundwater Sample Analytical Results):

a. Apply the cleanup levels for tetraethyl lead for comparison to AOC 4 lead analytical results (*see* Comment 3).

b. On page 3, 9, and 12, provide the water laboratory analytical data for metals for AOC3-SB-4, AOC4-MW-106, and AOC4-MW-107. NMED did not find any of these results for metals on the CDs provided.

c. On page 4, it appears that the total xylenes result for MW-103 (3/16/2009) is incorrect. The actual sum of total xylenes result for MW-103 (3/16/2009) is 409 mg/kg. Correct the discrepancy.

d. On page 6, it appears there is data missing for hexachloro-1,3-butadiene for MW-103 (3/16/2009) and MW-104 (3/16/2009). Verify that hexachloro-1,3-butadiene was part of the analytical suite for these two samples.

e. On page 6, it appears that the MW-103 (9/26/2008) reported results for nitrobenzene (280 ug/L) and total PAHs (420 ug/L) are incorrect. The laboratory results for MW-103 (9/26/2008) for nitrobenzene and total PAHs are 250 ug/L and 390 ug/L, respectively. Correct this discrepancy.

f. On page 6, AOC3 MW-104 (3/16/2009) column "RL" states the reporting limit for sodium is 10 mg/L, which is incorrect. The laboratory data reports the reporting limit for sodium as 0.2 mg/L. Correct this discrepancy.

Comment 38

The following comments pertain to the Figures:

a. Include all tank numbers for the tanks depicted on Figures 2-6 and 9-16 within the scaled view of each figure. Provide color codes to define the tank contents (*see* below Items b.2 and b.3)

b. Global changes to Figures 3-6 and 9-16:

    1. Include all underground utilities (e.g., underground pipelines, electrical lines, and water lines) in accordance with Permit Appendix E.2.1, Item 2. Modify the current view or provide additional figures if the utilities cannot be depicted on the figure.

    2. Assign colored lines or shading to depict the tank contents and provide a description in the legend. Provide a table with this information and indicate if the tank is active or inactive and if there have been any documented releases.

c. Report the unit of measurement for the soil vapor results as "ug/m^3" on Figures 9, 10, 15, and 16.

d. It appears that the total xylenes soil sample result for MW-104 in Figure 11 is incorrect. The laboratory result is 1.86 mg/kg. Correct this discrepancy.

e. It appears that the GRO soil sample result for AOC4-SB2 in Figure 12 is incorrect. The laboratory result is 16.4 mg/kg. Correct this discrepancy.

f. In Figure 12, verify the selenium concentration in the soil sample AOC4-SB3 exceeds the screening level (9.56E-01 mg/kg).

g. Soil sample results for the duplicate samples for AOC3-SB2 and MW-106 must be reported on Figures 11 and 12 because higher detections for the constituents were reported for both samples (*see* also Comment 18).

h. Revise Figures 13 and 14 to report the same data sets reported in the tables on the Figures. For example, four of the six tables on Figure 13 include results for "chloride, fluoride, and sulfate" and five of the six tables on Figure 14 include results for "arsenic, barium, chromium, lead, and selenium." Revise the tables on the figures to consistently report the same constituents.

i. In Figure 13, bis(2-ethylhexyl)phthalate groundwater results are only reported for MW-103 and MW-104. Include the results for this constituent in all of the data tables reported on this figure.

j. In Figure 13, it appears that the reported total xylenes groundwater result for AOC3-SB4 is incorrect. The laboratory result is 5,180 ug/L. Correct this discrepancy.

k. In Figure 14, it appears that the reported barium groundwater result for MW-107 is incorrect. The laboratory result is 0.41 mg/L. Correct this discrepancy.

l. Revise Figure 15 to include AOC3-SG11 soil gas results.

m. Revise Figure 16 to include AOC4-SG7 soil gas results.

Comment 39

The following comments pertain to Appendix A (Soil Boring and Monitor Well Completion Logs):

a. Define "Total Depth" (e.g., total drilled depth of the boring and, if a well was installed, the total depth to the bottom of the well) and provide this information as a comment in the "Description" section of the logs.

b. List total depth on each well and boring log.

c. Identify all static water levels and PSH depths on all well and boring logs with symbols (e.g., "▼" as static water level and "▽" as PSH depth).

d. Include temporary well casing elevations relative to the ground surface.

e. Verify that all measurements reported in Table 2 (Water Level Measurements) are consistent with those in the well and boring logs. For example, the total depth of AOC4-SB2 listed on the well log is 23.0 ft but in Table 2 it is listed as 12.42 ft. Provide an explanation for this discrepancy, or correct either the log or the table.

f. Clarify the noted description in the AOC4-SB4 Well Log which states, "10" Sch. 40 PVC surface casing was set to -8.0'."

Comment 40

Appendix B (Survey Data), Note 3, states, "[m]easuring point for all wells is top of casing on the north side." Indicate if a measuring point elevation was measured for any of the temporary well casings relative to the ground surface.

Comment 41

The following comments pertain to Appendix C:

a. Appendix C includes several groundwater results (MW-66, MW-99, MW-45, MW-98, MW-90, MW-92, MW-93, MW-29, MW-18, MW-18, MW-55, TEL-4, TEL-2, and TEL-1) which are not discussed in the Report. If the results are not relevant, provide a statement that they are not relevant to the investigation. Otherwise, include a discussion of the results and how the data relate to the investigation.

b. Include a reference in the IDW section of the revised Report that the IDW disposal data (DRUM AOC MW-103A, DRUM AOC 2 MW-103B, DRUM AOC2 MW-103C, DRUM AOC2 MW-104A, DRUM AOC2 MW-104B, and DRUM AOC MW-104C) are presented in Appendix C.

Comment 42

Section 8 (Recommendations), pages 70-72, states "[o]peration of recovery trench[es RW-6 and RW-15], is on-going and will continue." Provide a discussion of the installation of additional recovery wells in the revised Report.

Comment 43

Section 8 (Recommendations), pages 70-72, recommend advancing additional soil borings near AOC3-SB5 and MW-105. Explain why additional soil borings are not recommended for other portions of Group 2.

Comment 44

The Permittee failed to address Comment 8 in NMED's Approval with Direction (Direction) for *AOC Group 2 Revised Corrective Action Investigation Work Plan* (Revised Work Plan) dated February 21, 2008, concerning the mercury spill cleanup. In a separate letter, provide an explanation for the Permittee's failure to execute NMED's direction and provide the status of the mercury spill cleanup. This letter must be submitted to NMED no later than June 6, 2011.

Address all comments contained in this NOD in a revised Report. The revised Report must be accompanied with a response letter that details where all revisions have been made, cross-referencing NMED's numbered comments. In addition, an electronic version of the revised Report must be submitted identifying where all changes were made to the Report in red-line strikeout format. The revised Report and letter addressing Comment 44 must be submitted to NMED no later than June 6, 2011.

If you have any questions regarding this letter, please contact Leona Tsinnajinnie of my staff at (505) 476-6057.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain, NMED HWB
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