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Western Refining

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December 21, 2017

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Via Certified Mail No. 7015 3010 0002 0440 9455
Return Receipt Requested

Mr. John E. Kieling, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, New Mexico 87505-6313

Re: RESPONSE TO APPROVAL WITH MODIFICATIONS
RIVER TERRACE VOLUNTARY CORRECTIVE MEASURES BIOVENTING SYSTEM ANNUAL REPORT (JANUARY - DECEMBER 2014), MARCH 2015, AND
RIVER TERRACE VOLUNTARY CORRECTIVE MEASURES BIOVENTING SYSTEM ANNUAL REPORT (JANUARY - DECEMBER 2015), MARCH 2016, AND
RIVER TERRACE VOLUNTARY CORRECTIVE MEASURES BIOVENTING /AIR SPARGING SYSTEM ANNUAL REPORT (JANUARY - DECEMBER 2016), MARCH 2017
WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD TERMINAL
EPA ID# NMD089416416
HWB-WRB-15-002
HWB-WRB-16-001
HWB-WRB-17-001

Dear Mr. Kieling:

This letter provides the Western Refining Southwest, Inc. (Western) response to comments in NMED's Approval with Modifications letter dated August 18, 2017.

NMED Comment 1:

The following comments address editorial issues. No revisions to the Reports are necessary; however, ensure all issues are addressed in future reports.

a. The abbreviation "NPP" was found in the Depth to Product column in the tables. The designation was not defined in the footnotes or list of acronyms. Define all acronyms in future reports.

b. In Figure 3, River Terrace Annual Report Bloomfield Terminal River Terrace Well Location Map (all Reports), well DW-1 is indicated as an inactive well while well DW-2 is indicated as an active well. The description in the Reports indicates the opposite. Correct Figure 3 in future reports.

c. In the Executive Summary (2015 Report), Western states,"[t]he Dewatering System consists of two dewatering wells (DW-2 and DW-3), and a collection gallery, each is equipped with a dedicated submersible pump." However, in Section 1.l, Site Location and Description, Western states, "[t]he active dewatering system consists of two dewatering wells (DW-1 and DW-3) and a collection gallery, each equipped with variable-speed submersible pumps." Provide the correct well references in future reports.

d. In Section 3.1.2 (2016 Report), Groundwater Field Parameters, Western states, "[a] summary of the groundwater field parameters collected during the sampling event are included in Table 2." These parameters were included in Table 1. Ensure future reports provide correct references to tables.

Western Response:

The noted issues will be addressed in future reports.

NMED Comment 2:

The contaminant concentrations in the groundwater samples collected from the GAC-Inlet are more elevated compared to those in samples collected from wells DW-1 and DW-3 according to the Groundwater Monitoring Summary Tables and GAC Filter Monitoring Tables. For example, during the week of the April 28, 2015 sampling event, the benzene concentrations in the groundwater samples from wells DW-1and DW-3 were reported as non-detect and 0.082 mg/L, respectively. During the same period (the April 1 and May 6, 2015 sampling events), the benzene concentrations in samples collected from the GAC-Inlet were reported at higher concentrations of 0.130 and 0.140 mg/L, respectively. Since the GAC-Inlet receives groundwater from DW-1, DW-3 and the collection gallery, the elevated concentrations appear to originate from the collection gallery. In an updated Facility-Wide Groundwater Monitoring Plan, propose to collect groundwater samples from the collection gallery, and present and discuss the analytical results for BTEX, MTBE, TPH-GRO, and ORO, and total lead concentrations in the next annual report.

Western Response:

The 2018 Facility-Wide Groundwater Monitoring Plan will incorporate the requested analyses of groundwater samples collected at the collection gallery.

NMED Comment 3:

According to a NMED letter dated April 18, 2007, the sampling requirement for wells DW-2 and MW-48 was removed from the monitoring plan; however, more than 10 years have passed since the update and the subsurface conditions may have changed due to the on-going remedial activities. In addition, the hydrocarbon concentration in well TP-5 has been increasing since 2012 according to the Groundwater Monitoring Summary Tables. TP-5 is located within 20 feet from DW-2. Propose to collect groundwater samples from wells DW-2 and MW-48 for analysis for BTEX, MTBE, TPH-GRO and DRO, and total lead in an updated Facility-Wide Groundwater Monitoring Plan. Present and discuss the results in the next annual report.

Western Response:

The 2018 Facility-Wide Groundwater Monitoring Plan will incorporate the requested analyses of groundwater samples collected at the collection gallery.

NMED Comment 4:

In the Executive Summary (all Reports), Western states that a "[t]otal of 219,715, 401,618 and 401,137 gallons of impacted groundwater were removed and treated in 2014, 2015 and 2016, respectively." The volume of recovered groundwater was almost doubled since 2014 to 2015. Provide an explanation for the increased volume in the response letter. In addition, the volume fraction of recovered groundwater appears to be different among the two wells and the collection gallery. For example, if DW-3 and the collection gallery yield much more water compared to the DW-1's production rate, the submersible pump may be removed from DW-1 and placed in other extraction wells (e.g., DW-2) to achieve a higher recovery rate. Install a well flow totalizer in each dewatering well to optimize effectiveness of the system. It should be noted that the contaminant concentrations in samples collected from well DW-1 have been consistently low while the concentrations in samples collected from TP-5, located adjacent to DW-2, have been increasing in recent years. Evaluate the benefit of extracting groundwater from well DW-2 or other wells rather than DW-1 and provide recommendations in the next annual report.

Western Response:

The groundwater recovery increase observed in 2015 and into 2016, is believed to be associated with the pump maintenance activities conducted in March, 2015; and the recovery from several years of drought conditions in the region that resulted in a Navajo Dam (San Juan River) high-flow discharge event in 2016.

Western proposes to re-evaluate the entire River Terrace System in early 2018, as noted in the response to Comments 5 and 7.

NMED Comment 5:

In Section 4.2 (2014 Report), Recommendations, Western states, "[W]estern has removed the impacted soil from the River Terrace System and believes the groundwater is our main focus for remediation." NMED concurs with Western's statement. The biovent (BV) wells address impacted soil in the vadose zone; however, they provide little effect for impacted groundwater; thus, the existing system must be modified to target groundwater cleanup. Discuss the modification or replacement of the BV wells to focus the treatment to the saturated zone. Propose to submit a work plan to modify or replace the existing BV wells, and provide a plan to evaluate the effectiveness of the modification in the work plan.

Western Response:

The BV wells have always addressed both groundwater and soil impacts. The wells were originally designed with two stingers in the wells, one shorter and one longer to accommodate fluctuations in water levels. The longer stinger actually acts as a sparging system depending on water levels in the individual wells. Also, Western has continually evaluated and updated the system with NMED concurrence to

improve the performance, including the installation of the groundwater collection gallery and air sparge lines A and B.

The original bioventing remediation system clearly has been effective in addressing both soil impacts and groundwater concentrations. Since the 2006 system start-up, the majority of groundwater concentrations have been reduced to near or below regulatory clean-up levels. A work plan to modify or replace the existing wells is not warranted at this time.
In early 2018, Western proposes to re-evaluate the entire River Terrace System and meet with NMED to discuss a path-forward to closure.

NMED Comment 6:

In Section 4.1.2 (2014 and 2015 Reports), Soil Vapor Monitoring, Western states, "[s]oil gas field measurements indicate that the aeration system has been successful in maintaining sufficient oxygen within the subsurface to help sustain bioremedial activity." Although the measured oxygen levels (17.6 - 20.9%) in the monitoring wells support Western's statement, the pressure reading indicates "zero" in each monitoring well, possibly implying no influence from the BV wells. When the air is distributed in the vadose zone from the BV wells, an increased pressure reading is expected among wells located within the radius of influence. Provide an explanation regarding the zero-pressure reading in the response letter. Ensure that the pressure gauge is appropriate for the range of the measurement and can display readings with sufficient resolution across the range.

Western Response:

Beyond possible variations in injection flow rates and pressures, the field measurements of pressure readings at the land surface may be affected by a number of factors, including shallow and variable depth to the potentiometric surface, variable lithology and permeability, changes in barometric pressure/surface temperature, etc. These factors are too numerous to indicate one variable (e.g. pressure) as the culprit. In the 2015 report, some of the wells have shown elevated pressure readings, but the readings have varied over time, including zero readings. Historical pressure readings reflecting similar trends have been reported since system start-up. It is important to note that the pressure readings were recorded by experienced professionals using the appropriate equipment.

Although some of the wells registered zero-pressure readings, the oxygen levels have remained sufficient to support bioremediation and an injection pressure adjustment has not been necessary. Another consideration is that raising the injection pressure (and flow) may be detrimental to bioremedial activity. A slow flow of air is preferred to achieve an effective and efficient bioremediation effort[1].

NMED Comment 7:

In Section 1.1 (2016 Report), Site Location and Description, Western states, "[i]nstallation of the air sparging component of the biovent system was completed in late 2012, and consists of two air sparging lines (Air Sparging Line A and Air Sparging Line B). Each air sparging line consists of air sparging tubes that extend down into the groundwater (Western Refining, 2013). Air from the biovent main air blower is pushed into each sparging tube, causing a bubbling effect in the groundwater while also

[1] Testa, S.M. and Winegardner, D.L., 2000, *Restoration of Contaminated Aquifers Petroleum Hydrocarbons and Organic Compounds*, 2nd ed. CRC Press LLC, p. 309

oxygenating the surrounding subsurface." While sparging the contaminated groundwater, VOCs will be partitioned into the air. Although previous soil vapor monitoring data indicates that the effect of BV wells is not a concern for vapor-phase VOCs, the stripped VOCs (especially when air sparging performs effectively) may cause an increase in soil vapor concentrations. In an updated Facility-Wide Groundwater Monitoring Plan, propose to collect soil gas samples in the vicinity of the two air sparge lines. Propose to collect pressure readings and soil gas samples from wells DW-3 and MW-48 and the collection gallery for BTEX and TPH GRO analyses. Provide and discuss the analytical data in the next annual report. In addition, evaluate the need for a soil vapor extraction system to address vapor-phase VOCs in the vicinity of the air sparging system.

Western Response:

The BV wells have always addressed both groundwater and soil impacts. As noted above in response to Comment 5, the existing BV wells combine air sparging with air injection into the vadose zone and soil gas monitoring data has indicated the system is effectively removing the VOCs from the vadose zone including any VOCs partitioned from air sparging. Bioremediation of the VOCs, which may be stripped from groundwater along the two air sparging lines (i.e., A and B), is anticipated to be similarly effective along the air sparge lines as demonstrated in the nearby BV wells.

In early 2018, Western proposes to re-evaluate the entire River Terrace System and meet with NMED to discuss a path-forward to closure.

NMED Comment 8:

In Section 3.3.2 (2016 Report), Aeration System Monitoring, Western states, "[t]he effectiveness of the air system was monitored using a portable pressure gauge at various points along the air injection piping system. Pressure measurements were collected at BV-1, B[V]-3, BV-4, BV-5, BV-6, Air Sparging Line A, Air Sparging Line B, and at the discharge of the main air blower. The readings are used to ensure a uniform distribution of air throughout the system." In future reports, tabulate the readings in a manner similar that presented in 2014 and 2015 Reports. Provide a revised table tabulating the 2016 pressure readings with the 2017 Annual Report,

Western Response:

The readings will be summarized in tables in future reports, as was completed in prior years.

NMED Comment 9:

In Section 4.2 (2016 Report), Recommendations, Western states, [i]n 2016 lead concentrations over the regulatory limit were present in TP-8 and TP-9 and were not present in 2015. The results also show the same detection in MW-49 which is located on the river side of the slurry wall. Western believes these lead detections could be due to the quality of the river water during the sampling run." The lead detections may indicate that water migrates through the bentonite slurry and sheet pile barrier wall. Consequently, hydrocarbons in groundwater may be leaching through the wall to the San Juan River. In addition, since the groundwater flows along the slurry wall, the elevated lead concentrations may be present in the groundwater around the vicinity of the slurry wall. Collect groundwater samples from wells OW 11+15, OW 16+60 and OW6+70 and analyze the samples for total lead. Discuss the results in the next annual report.

Western Response:

The reference to the quality of the river water during the sampling run was to the visible turbidity in the surface water. Upon further review, the analytical results of the river water samples collected since 2013 have been non-detect (<0.005 mg/l) for dissolved lead. NMED mentions the possibility of hydrocarbons leaching through the wall to the San Juan River; however, the hydraulic gradient is maintained such that any potential for flow would be from the river side of the barriers toward the remediation area. Also, the difference in water levels measured on opposite sides of the sheet pile and slurry wall clearly show the lack of groundwater flow through these hydraulic barriers.

NMED then appears to discuss the slurry wall that is present on top of the bluff, which is totally unrelated to the River Terrace Remediation System. Prior chemical analyses of groundwater samples collected at the observations wells along the slurry wall at the top of the bluff have not indicated problems with lead being present in the groundwater at concentrations above regulatory standards. Further, on-going chemical analyses of groundwater samples collected across most of the refinery do not show there to be sources of lead contaminated groundwater that could possibly threaten the lower river terrace area. Also, there is no evidence to show flow of groundwater off the bluff towards the river terrace. Monitoring of seeps at the top of the bluff shows very little potential for groundwater flow down the bluff to the river terrace area and there is little groundwater present in the collection wells present on the down-gradient side of the slurry wall that runs along the top of the bluff. In fact, well OW6+70 did not have sufficient water in 2016 even allow for sample collection.

The more likely scenario is that a small volume of sediment was entrained in the groundwater samples that were collected with bailers and then preserved without filtration for totals analyses. A water sample collected at MW-49 would be expected show the presence of organic contaminants before showing elevated metals if the contaminants were being transported via groundwater flow to that location from the back side of the slurry/sheet pile wall. However, there are no detections of either BTEX or TPH in the groundwater samples collected from MW-49.

Western proposes to discuss this request further with NMED prior to making changes to the 2018 Facility-Wide Groundwater Monitoring Plan, as we do not believe there is any source of lead contamination in the area of the river terrace and the low concentrations of lead reported in the groundwater samples are likely the results of collecting the groundwater samples with bailers.

NMED Comment 10:

In Appendix C, Western includes Hall Environmental Analysis Laboratory's *Quality Assurance Plant Revision* 10.1. Approval of the Reports does not constitute approval of the Quality Assurance Plan. No response is necessary.

Western Response:

The Laboratory QA Plan will not be included in future report submittals. It is of course always available if NMED were to desire a copy.

Extension Requests:

Facility-Wide Groundwater Monitoring Plan

Western requests an extension to submit the Facility-Wide Groundwater Monitoring Plan to the regular due date of June 30th. The reason for the extension is that the plan covers more than the River Terrace area and incorporates New Mexico Oil Conservation Division (OCD) requirements. The 2017 OCD Discharge Permit renewal includes additional sampling requirements. Meanwhile, Western will conduct the additional groundwater sampling discussed in Comments 2 and 3.

Work Plan to Modify or Replace Existing BV Wells:

Western requests an extension to submit a work plan to modify or replace existing BV wells until 30 days after NMED and Western meet to discuss a path-forward to closure.

If you have any questions regarding this response to comments, please contact me at 915-534-1483.

Sincerely,

Western Refining Southwest, Inc.

By: ALLEN S. HAINS, P.E.
Manager Remediation Projects

cc: D. Cobrain, NMED HWB
K. Van Horn, NMED HWB
L. Tsinnajinnie, NMED HWB
M. Suzuki, NMED HWB
C. Chavez, EMNRD OCD
K. Robinson, Western Refining Southwest, Inc., Bloomfield Terminal