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TRANSWESTERN PIPELINE COMPANY
An ENERGY TRANSFER Company

October 14, 2021

Mr. Ricardo Maestas
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: Approval with Modifications
Report of 2020 Groundwater Remediation Activities
Roswell Compressor Station No. 9
Transwestern Pipeline Company
Roswell, Chaves County, New Mexico
NMOCD Abatement Plan #AP-125 (formerly #GW-052)
EPA ID No. NMD986676955
HWB-TWP-21-001

Dear Mr. Maestas;

Transwestern Pipeline, LLC (Transwestern) submits this *Approval with Modifications Response to Comments* (RTC) regarding the comments received from the New Mexico Environment Department (NMED) in response to the *Approval with Modifications Report of 2020 Groundwater Remediation Activities* for the above referenced Site. To respond specifically to each of the Agency's comments, dated July 15, 2021, the original comment included within the NMED letter is in **bold**, with the Transwestern response included in plain text immediately following the item requiring a response.

Comment 1

The Executive Summary, page vi, states, "[a]s during prior years of operation, the groundwater portion of the system was manually deactivated in January, February, March, November, and December of 2020 due to freezing temperatures. To protect the groundwater treatment system and minimize deactivation periods during future operations, heat tape and pipe insulation have since been installed throughout the process. Additional weather protection will be added as needed to minimize downtime during winter months." Comment 2 of the NMED's *Additional Response to Comments 10/14/2020 Approval with Modification 2019 Groundwater Remediation Activities Former Surface Impoundments,* dated April 9, 2021, states, "[t]he deactivation period is approximately six months and unusually long for southern New Mexico. The Respondent must resolve the issue to minimize the deactivation period before the coldest winter months in late 2021." The mean temperatures during the

months of January, February, March, November, and December in Roswell, New Mexico are reportedly above freezing, and the weather is relatively mild. Therefore, it may not be necessary to deactivate the system for the winter months even without additional weather protection. Evaluate whether the system can be deactivated for shorter periods in response to weather conditions, in order to minimize deactivation periods. Provide a discussion in a response letter.

Comment noted. Furthermore, according to U.S. Climate Data[1] for New Mexico, freezing temperatures appear to occur starting in November thru February. Due to variable weather temperatures, the risk of damage to process equipment (pumps, valves, level sensors, fitting connections, spray field nozzles, etc.) and underground piping (from recovery wells to holding tanks to treatment equipment) increases while operating the system intermittently during the winter months. Also, operating the system while freezing temperature fluctuate will require additional field time for winterizing and de-winterizing the system to protect components from damage. Transwestern will monitor the cold weather periods of daily consistent freezing temperatures and will deactivate the system appropriately to protect system components while minimizing downtime. In addition, Transwestern will install additional cold weather protection as needed to minimize downtime.

Comment 2

In Section 3.3.1, *Perched Aquifer,* pages 7 and 8, the Respondent states, "[s]ince SVE-23 is the only well to contain PSH [in the wells screened across the perched aquifer], it is believed the PSH in SVE-23 may be residual product that may have accumulated in that well. Historical PSH measurements in wells located in the perched aquifer and upper aquifer indicate that the PSH footprint has stabilized or decreased." According to Table 3-2, *Summary of Groundwater Surface Elevations,* page 35 of 70, the PSH column thicknesses in well SVE-23 in the January 2020, January 2021, and April 2021 measurements are recorded as 0.65, 1.08, and 3.00 feet, respectively, and PSH has been detected in well SVE-23 since 2009. The PSH column thickness does not exhibit either decreasing or stabilizing trends; rather it is fluctuating and persistent. The PSH plume is likely present on the perched aquifer. Re-evaluate the conditions regarding the PSH in well SVE-23 and correct the statement, as appropriate, and provide replacement pages.

Based on historical PSH measurements, the PSH trends in SVE-23 appear to fluctuate and persistent since 2009. There was a period between November 2014 through January 2020 (six years) where the PSH thickness (average 0.55 foot) appears to be stable except for one gauging event (November 2018). For the next two gauging events (May 2020 and November 2020), the PSH thickness increased. Since January 2021

[1] https://www.usclimatedata.com/climate/roswell/new-mexico/united-states/usnm0267

through September 2021, PSH thickness has been monitored monthly in SVE-23. The average PSH thickness is 1.58 feet and the minimum and maximum thickness recorded during this 9-monthperiod ranged between 0.65 foot and 3.00 feet, respectively. The paragraph was revised to include this aforementioned information. Replacement pages are attached.

Comment 3

In Section 3.3.1, *Perched Aquifer,* page 8, the Respondent states, "Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 considering the overall corrective action objective for the site. Liquid levels and recovery data collected from SVE-23 during bailing activities will be evaluated to determine if a more aggressive recovery method is warranted." The Respondent submitted the *Extension Request regarding the Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* (Request), dated May 26, 2021and the Request was approved on June 8, 2021. The Request states that the document will be submitted no later than July 1, 2021. Unless the document *(Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations)* is submitted, reviewed and evaluated, NMED will not be able to determine whether the recommendation to stop the PSH measurements and initiate PSH recovery via manual balling is appropriate. Therefore, the recommendation cannot be approved at this time and Comment 4 of the NMED's *Approval with Modifications Report of 2019 Groundwater Remediation Activities,* dated July 2, 2020, still remains valid. Remove the recommendation from the revised Report and provide replacement pages.

Comment noted, the recommendation has been removed per NMED request.

Comment 4

In Section 3.3.2, *Upper Aquifer,* page 8, the Respondent states, "PSH trends decrease since 2018." According to Table 3-2, *Summary of Groundwater Surface Elevations,* page 7 of 70, the measured PSH thicknesses in well MW-16 in the May 2018, May 2020, and April 2021 measurements are recorded as 1.22, 0.31, and 1.66 feet, respectively. PSH appears to be fluctuating or increasing in well MW-16 since 2018. The statement may or may not be accurate for some wells screened in the upper aquifer. Provide more detail to support the assertion and provide replacement pages.

The PSH trend refers to the pattern of decreasing PSH observed throughout the overall plume over several years. Since 2018, trends show a decrease in both the average PSH thickness and the areal extent of the plume. Note that if MW-16 PSH thickness fluctuates,

this does not negate the overall observed trend. Furthermore, the number of wells with measurable PSH has decreased. Replacement pages are attached.

Comment 5

In Section 3.4.1, *Perched Aquifer,* page 8, the Respondent states, "[a]nalytical data also indicates that 1,4-dioxane was not detected in SVE-28 or RW-1; although 1,4-dioxane was detected in SVE-30, it was not above the GCL." According to Table 3-5a, *Summary of Groundwater Analytical Results,* the 1,4-dioxane concentration in the groundwater sample collected from well RW-1 in November 23, 2020 is recorded as <25 µg/L, exceeding the groundwater cleanup level (GCL) of 6.72 µg/L. It is impossible to demonstrate whether 1,4- dioxane is present at concentrations above or below the applicable GCL. All analytes whose limit of quantitation (LOQ) values are higher than the applicable GCLs are considered data quality exceptions and must be identified as such. Revise the Report accordingly and provide replacement pages.

A footnote on Table 3.5a was added to indicate that RW-1 had a recorded limit of quantitation that exceeds the applicable GCL. Section 3.4.1 in the text was updated to indicate that RW-1 had a higher limit of quantitation than the applicable GCL. Replacement pages are attached.

Comment 6

In Section 3.4.2, *Upper Aquifer,* page 9, the Respondent states, "[a]nalytical data indicates that other VOCs were detected in MW-20, MW-22, MW-26, MW-39, MW-41, and MW-42, but only 1,1-DCE was detected at concentrations exceeding GCLs in wells MW-26 and MW-39." According to Table 3-5a, *Summary of Groundwater Analytical Results,* the naphthalene concentrations in the groundwater samples collected from wells MW-20, MW-22, MW-26, MW-39; MW-41, and MW-42 in 2020 are recorded as <2 µg/L, exceeding the groundwater cleanup level (GCL) of 1.43 µg/L. Therefore, it is unknown whether naphthalene is present at concentrations above or below the GCL. All analytes whose LOQ values are higher than the applicable GCLs are considered data quality exceptions and must be identified as such. Revise the Report accordingly and provide replacement pages (see Comment 5 above).

A footnote on Table 3.5a was added to indicate that naphthalene had recorded limit of quantitation that exceeds the applicable GCL. Section 3.4.2 in the text was updated to indicate that naphthalene had a higher limit of quantitation than the applicable GCL. Replacement pages are attached.

Comment 7

In Section 4.1, *Soil Vapor Extraction System Monitoring Results,* page 12, the Respondent states, "[l]aboratory data packages are included in Appendix C." A hard copy of the laboratory analytical reports is not required in the future reports. Provide an electronic copy on CD/DVD only in future reports.

Comment noted.

Comment 8

In Section 4.2, Groundwater Treatment System Monitoring Results, page 12, the Respondent states, "[o]peration records for the irrigation system presented in Table 4-2 indicate that the volume of groundwater recovered, treated, and discharged in 2020 was approximately 97,400 gallons." According to Table 4-2, Summary of Treated Water Irrigation Rates, page 4 of 4, the volume of water treated in 2020 is recorded as 94,800 gallons. Resolve the discrepancy and provide replacement pages.

Section 4.2 has been updated. Replacement pages are attached.

Comment 9

In Section 4.2, *Groundwater Treatment System Monitoring Results,* page 12, the Respondent states, "[a]ccording to Table 4-3, approximately 8.07 pounds (1.27 equivalent gallons) of dissolved-phase hydrocarbons were removed by the groundwater/PSH recovery system in 2020." Table 4-3, *Groundwater Treatment System Mass Removal Calculations for Total BTEX,* does not include the estimated mass of dissolved-phase hydrocarbons removed each year. Include the estimated mass of dissolved-phase hydrocarbons removed each year. In addition, Table 4-6, *Historical Hydrocarbon Removal Summary,* indicates that the mass of dissolved-phase hydrocarbons removed in 2020 is 6.22 pounds rather than 8.07 pounds. Resolve the discrepancy and provide replacement pages.

Table 4-3 has been updates to include the estimated mass of dissolved-phase hydrocarbons removed each year, replacement pages are attached.

Table 4-6 indicates that 8.07 pounds was removed 2020, and so does the text in Section 4.2, it is unclear to Transwestern were the 6.22 pounds come from.

Comment 10

In Section 4.2, *Groundwater Treatment System Monitoring Results,* page 12, the Respondent states, "approximately 940 gallons of PSH accumulated in the surge tank in 2020. PSH separated in the surge tank is removed by a vacuum truck and sent to a permitted off-site disposal facility periodically. Historical PSH recovery volumes are provided in Table 4-6." Table 4-6, *Historical Hydrocarbon Removal Summary,* indicates that the mass of PSH recovered in 2020 is 5,950 pounds; however, the table does not present the PSH recovery volume. Present the PSH recovery volume in the table and provide replacement pages.

Table 4-6 has been updated to include PSH recovery volume. Replacement page is attached.

Comment 11

In Section 4.2, *Groundwater Treatment System Monitoring Results,* page 12, the Respondent states, "[t]he MPE wells are installed on top of the clay layer, and the pumps are currently installed 6 inches from the bottom of the wells. Lowering the pumps in the wells is not possible as the clay layer might be penetrated." It is not clear how lowering the pump would penetrate the clay layer because well end cap would prevent the pump from reaching below the clay layer. Provide a clarification in the response letter.

Section 4.2 was updated to: Lowering the pumps in the wells is not possible as the depth of the wells are terminated at the top of the clay layer. Replacement page is attached.

An illustration of MPE 20 is included for reference detailing the location of the top of the clay layer in relation to the well construction to help visually show how lowering the pump would penetrate the clay layer.

Comment 12

In Section 4.2, *Groundwater Treatment System Monitoring Results,* page 13, the Respondent states, "analytical data for the Post-Treatment sample indicate that BTEX was not detected above laboratory reporting limits." According to Table 4-4, *Summary of Water Treatment System Analyses,* page 65 of 69, the chloride and sulfate concentrations in the Post-Treatment samples consistently exceed the New Mexico Water Quality Control Commission (NMWQCC) standards of 250 and 600 mg/L, respectively. The Respondent must discuss the issue of the chloride and sulfate exceedances with the New Mexico Oil Conservation Division (OCD). Carbon copy (CC) NMED on the OCD notification regarding the issue.

According to historical documents and correspondence between Transwestern and OCD, it has been documented that background concentrations of chloride and sulfate are above the NMWQCC standards (Amended Remediation Workplan, May 2013). According to "Phase III Soil and Groundwater Assessment for Roswell Compressor Station No. 9 Surface Impoundments" (ENRON, October 15, 1997): "Inorganic analyses for major ions indicate that groundwater samples from each well, including upgradient monitor wells MW-6 and MW-10, exceed the NMWQCC groundwater standards for TDS, chloride, and sulfate. Inorganic water quality measurements show similar chemical composition for samples from the uppermost aquifer and water within the Artesia Group. The generally poor inorganic water quality in the vicinity of the site is natural and likely results from gypsum beds within the alluvium and underlying Artesia Group."

The remediation system is operating in accordance with *Stage II Abatement Plan* (AP#125) approved by OCD in email correspondence date March 14, 2016. As requested by NMED, OCD will be contacted to discuss the chloride and sulfate exceedances that appear to be present since 2009.

Comment 13

In Section 4.2, *Groundwater Treatment System Monitoring Results,* page 13, the Respondent states, "[b]etween April and September 2020, the air stripper was monitored at multiple points to detect potential breakthrough of VOCs through the carbon treatment system." According to Table 4-5, *Summary of Air Stripper Vapor Monitoring,* the carbon treatment system has been effectively removing VOCs removed by the air stripper. However, the Report does not provide any discussion regarding the findings (e.g., potential breakthrough of VOCs through the carbon treatment system). Provide a discussion for the findings and provide replacement pages.

Based on field monitoring activities, the carbon treatment system for removing vapor VOCS by the air stripper achieved a 95 percent or greater efficiency for the year. In June 2020, vapor-phase carbon treatment efficiency of zero percentage was observed after the first carbon vessel ("midpoint") location; however, the carbon treatment efficiency was 69 percent after second carbon vessel. Further monitoring was planned to verify treatment efficiencies in August; however, the air stripper was deactivated due to an inoperable float switch. Once repairs were completed, the vapor-phase carbon vessels were monitored in September 2020. Based on field measurements, the carbon treatment efficiency was calculated to be approximately 97 percent in September 2020. Future monitoring will continue to measure breakthrough of the carbon vessels. Replacement pages are attached.

Transwestern appreciates the opportunity to continue to work with NMED and NMOCD to continue to bring this site to closure. If you have any further questions or comments regarding these responses, please do not hesitate to contact me at (210) 870-2725 or JD Haines of EarthCon Consultants, Inc. at (317) 450-6126.

Sincerely,

SBoultinghouse

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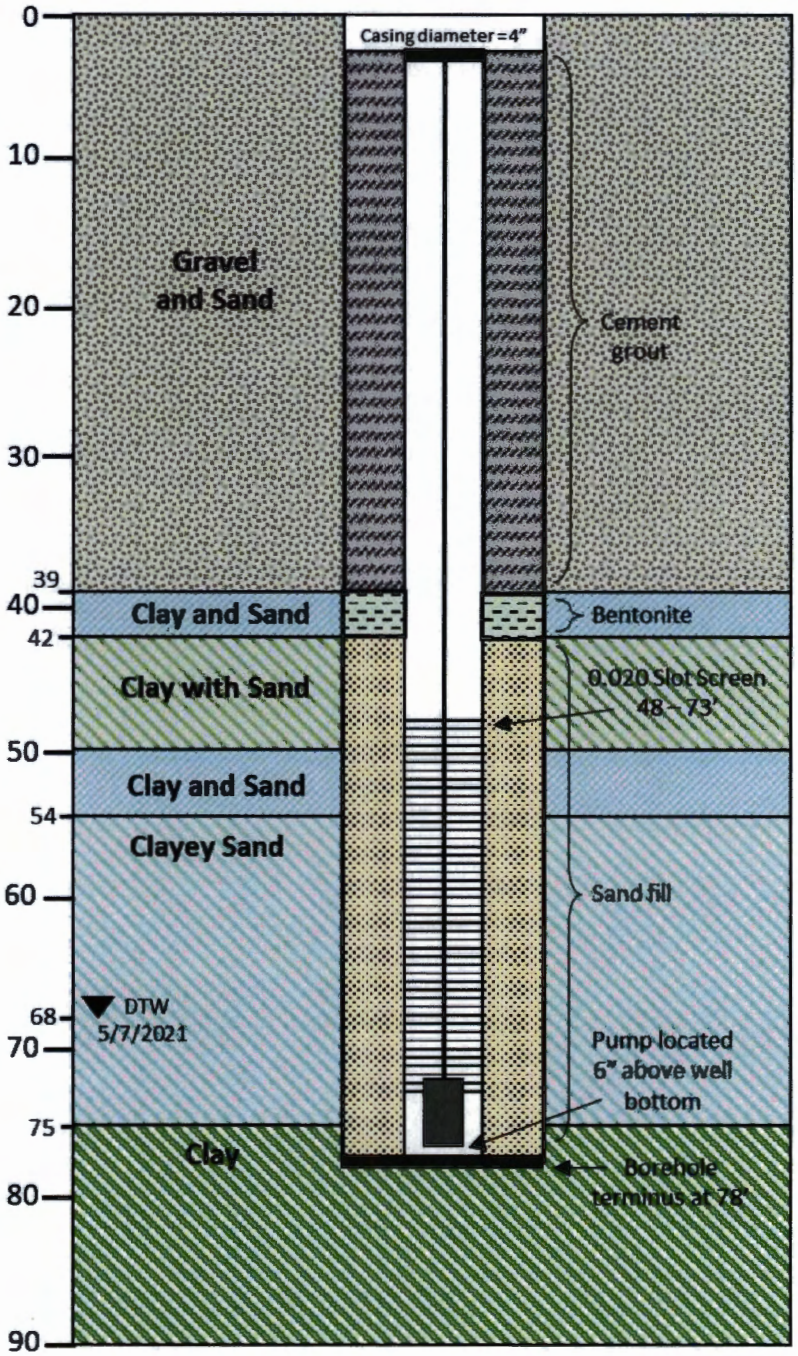
MPE-20 Borehole Illustration



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3.3 PSH Thickness

Groundwater gauging data collected from Site monitoring and recovery wells during the May 2020 sampling event indicates that the average apparent PSH thickness was 0.94 feet, with a maximum of 2.98 feet measured in SVE-23. Groundwater gauging data collected from Site monitoring and recovery wells during the November 2020 sampling event indicates that the average apparent PSH thickness was 0.73 feet, with the maximum thickness of 1.99 feet measured in MPE-38. As of 2021, eleven wells (MPE-10, MPE-16, MPE-17, MPE-27, MPE-38, MW-16, MPE-40, MPE-41, MW-1B, SVE-23, and SVE-25) contain PSH. Correlation graphs have been developed between depth to water and PSH (Response to HWB-TWP-20-002 Comment 3) and are presented in **Appendix E**. Due to recovery efforts, PSH thickness has decreased in certain wells despite fluctuations in the water table. PSH thickness has decreased or has not been measurable for multiple consecutive years in MW-2, MW-12, MPE-20, MPE-21, MPE-23, MPE-24, MPE-28, and MPE-31.

3.3.1 Perched Aquifer

On May 13, 2020 and November 10, 2020, liquid levels were measured in SVE-23 using an optical interface probe to determine the presence and apparent thickness of PSH. According to liquid levels, the apparent thickness of 2.98 feet and 1.17 feet was measured in SVE-23 in May and November 2020, respectively. During 2020, PSH thickness at SVE-23 appeared to be positively correlated with depth to water, but more data is needed for evaluation (Response to HWB-TWP-20-002 Comment 3). Gauging will be conducted every month in 2021, the first four months of which are presented in **Table 3-2**, and an evaluation will be presented in a separate report, as per NMED correspondence dated April 9, 2021. Distribution of PSH apparent thickness is presented in **Figures 3-2a** and **3-2b**. Further PSH monitoring will continue for SVE-23 in 2021. In addition, the SVE-23 will be re-developed using clean water and bailing techniques to remove PSH that may trapped in the well sand pack.

In correspondence dated July 2, 2020 and November 25, 2020, NMED requested Transwestern to provide a work plan to delineate the PSH in SVE-23 which is in the perched aquifer. Based on further review of historical records, Transwestern notes that certain work related to the perched aquifer was first delineated during the 1991 Shallow Subsurface Investigation and in multiple reports prior to the 2013 SFO. ~~Since SVE-23 is the only well to contain PSH, it is believed the~~

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~~PSH in SVE-23 may be residual product that may have accumulated in that well. Historical PSH measurements in wells located in the perched aquifer and upper aquifer indicate that the PSH footprint has stabilized or decreased. Therefore, incurring additional cost to further delineate the PSH in the perched aquifer would not be beneficial to the overall objective of recovering PSH at this time.~~

Based on historical PSH measurements, the PSH trends in SVE-23 appear to fluctuate and persistent since 2009. There was a period between November 2014 through January 2020 (six years) where the PSH thickness (average 0.55 foot) appears to be stable except for one gauging event (November 2018). For the next two gauging events (May 2020 and November 2020), the PSH thickness increased. Since January 2021 through September 2021, PSH thickness has been monitored monthly in SVE-23. The average PSH thickness is 1.58 feet and the minimum and maximum thickness recorded during this 9-monthperiod ranged between 0.65 foot and 3.00 feet, respectively.

~~In correspondence dated July 2, 2020 and November 25, 2020, NMED requested Transwestern to suspend PSH recovery activities in SVE-23 and monitor PSH thickness over time; however, Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 considering the overall corrective action objective for the site. Liquid levels and recovery data collected from SVE-23 during bailing activities will be evaluated to determine if a more aggressive recovery method is warranted. Although, it~~ It should be noted that the current recovery well network for the groundwater extraction and soil vapor extraction is within the footprint of the perched aquifer, specifically in SVE-23.

3.3.2 Upper Aquifer

The areal extent of PSH in the Upper Aquifer, as measured during the May and November 2020 semi-annual sampling events, remains delineated within the Project Area and appears consistent with 2019 data. (**Figures 3-5a** and **3-5b**). Although PSH thickness continues to fluctuate in certain wells, there has been an overall decreasing trend in PSH thickness in the Upper Aquifer since 2018. Furthermore, the number of wells with measurable PSH in the Upper Aquifer has decreased. ~~PSH trends decrease since 2018.~~ Current and historical groundwater gauging data is presented in **Table 3-2**.

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3.4 Groundwater Analytical Results

Groundwater samples were collected and analyzed for BTEX by EPA method 8260 or for VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the SAP. The analytical results for groundwater samples collected during the May, September, and November 2020 sampling events are summarized in **Table 3-5** and the laboratory analytical reports are included in **Appendix B**. Due to PSH detections, a groundwater sample was not collected from MW-16 in May or November 2020.

3.4.1 Perched Aquifer

In the Perched Aquifer, BTEX was detected above reporting limits in wells SVE-28, SVE-30, and RW-1. However, benzene was the only BTEX constituent in these wells that exceeded GCLs (Response to HWB-TWP-19-001 Comment 2). Analytical data also indicates that 1,4-dioxane was not detected in SVE-28 or RW-1 (however, the limit of quantitation was higher than the applicable GCL for RW-1); although 1-4-dioxane was detected in SVE-30, it was not above the GCL.

Analytical data indicates that 1,1-DCA was detected in concentrations exceeding the GCLs in well SVE-30 during the September and November 2020 sampling events (Response to HWB-TWP-20-001 Comment 15). Based on the 2020 analytical data, the areal distribution of BTEX, 1,1-DCA, and 1,1-DCE in the Perched Aquifer remains delineated within the Project Area and is consistent with the 2019 data (**Figures 3-6** through **3-11**).

3.4.2 Upper Aquifer

In the Upper Aquifer, BTEX were not detected above reporting limits in MW-10, MW-11, MW-13, MW-14, MW-17, MW-20, MW-21, MW-22, MW-24D, MW-26, MW-27, MW-29, MW-32, MW-34, MW-35, MW-37, MW-39, MW-40, MW-41, MW-42, and SVE-31. None of the BTEX detects exceeded GCL in the Upper Aquifer. The results also indicate that 1,4-dioxane was not detected in MW-20, MW-22, MW-26, MW-39, MW-41, or MW-42.

Analytical data indicates that other VOCs were detected in MW-20, MW-22, MW-26, MW-39, MW-41, and MW-42, but only 1,1-DCE was detected at concentrations exceeding GCLs in wells MW-26 and MW-39. The limit of quantitation was higher than the applicable GCL for naphthalene, and therefor this data is seen as data quality exceptions. Based on the 2020 analytical data, the areal distribution of BTEX, 1,1-DCA, and 1,1-DCE in the Upper Aquifer remains delineated within the

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Project Area and is consistent with the 2019 data. Furthermore, it appears that benzene and PSH concentration are closely related (**Figures 3-6** through **3-11**).

Analytical results for the duplicates are included in the laboratory data packages in **Appendix B** and indicate that the only target analyte detections were for MW-39, MW-22, and MW-26. For quality assurance purposes, the relative percent difference (RPD) of the reported concentrations between the original samples and their duplicates was calculated for each semi-annual sampling event. The RPDs were at or below 7% for each sampling event, with the calculations included in **Appendix B**.

4.0 REMEDIATION SYSTEM OPERATION, MAINTENANCE, AND MONITORING

During 2020, the SVE portion of the recovery system was operational year-round and included all circuits except for when the SVE system was deactivated for equipment repairs and semi-annual sampling events.

The groundwater/PSH recovery portion of the remediation system operated from April 9, 2020 to October 31, 2020, except for periods of maintenance and during the semi-annual sampling events. Specifically, the groundwater/PSH recovery portion of the remediation system was deactivated in January, February, March, November, and December 2020 due to freezing temperatures. Transwestern reviewed potential cost to winterize the groundwater extraction and treatment equipment components by installing a new heated building, replace the existing outdoor surge tank with an oil/water separator, and replace the spray field with an infiltration gallery (Response to HWB-TWP-20-001 Comment 13). Considering the tasks needed for this upgrade (design, geotechnical study, procurement, installation and permitting), the probable cost for the upgrade could range between $200,000 to $300,000. The benefit for incurring the additional cost to upgrade the system for operating over the extreme winter months would not be considerable since the remaining LNAPL in the subsurface appears to be at residual saturation levels. Furthermore, since the LNAPL and dissolved-phase plume is controlled, it is recommended that the groundwater extraction system operate in a pulsing manner by alternating the operation of select extraction wells over a certain period time. This will allow sufficient time for residual LNAPL to rebound and be recovered more efficiently. If groundwater data suggest that the plume is migrating, the pulsing program would be suspended. The details of the proposed pulsing enhancement will be described in the annual update to the Operation, Maintenance and Monitoring Plan (O&MM Plan), as per March 16, 2021 correspondence with NMED.

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To protect the groundwater treatment system and minimize deactivation periods during future operations, heat tape and pipe insulation have since been installed throughout the process. Additional weather protection will be added as needed to minimize downtime during winter months. However, during extreme freezing temperatures that exist over consecutive days in the winter months, the system will be deactivated. Constant days of severe freezing would increase the risk of failures and major damage to equipment components, piping system, and spray field and possibly lead to uncontrolled discharges or safety hazards. Therefore, deactivation of the system during these occurrences is recommend.

The groundwater/PSH recovery portion of the remediation system was deactivated 48 to 72 hours prior to the 2020 semi-annual sampling events (May 2020 and November 2020).

The remediation system was monitored on a weekly basis to assess for continuous operation of components, maintenance needs, and early detection of potential leaks. System readings, such as flow rates, pressure, and temperature, were collected by the operator on a routine basis to monitor system performance and treatment efficiencies. During this reporting period, maintenance activities of the groundwater recovery system consisted of installing a new meter on the surge tank, replacing filters and rubber washers, decalcifying the air stripper, replacing irrigation sprinkler heads, repairing discharge lines, changing filter bags, cleaning the float switch, installing new sumps, installing new o-rings, fixing hose leaks, changing sock filters, maintenance on the compressor, replacing V-belts on the compressor, repairing the GAC water hose, and repairing the compressor switch. Maintenance activities on the SVE portion of the treatment system during this reporting period included installing new 55-gallon GAC drums on the air stripper, repaired flex hose on the west baker unit, repairing a 4" line, repairing the outlet on the surge tank, repairing an airline on MPE-27, replacing the chart recorder paper periodically, minor maintenance on the compressor, installing a new thermocouple, decalcifying the air stripper, fixing electrical issues, greasing bakers, and repairing a linkage bolt.

Monthly samples were collected from April through October 2020 from the groundwater treatment system at four locations in the treatment process: at the inlet of the air-stripper (Pre-Treatment); at the outlet of the air stripper (Post Air Stripper); at the outlet of the first GAC unit (Between GACs); and at the outlet of the irrigation water holding tank (Post-Treatment). The samples collected from the Pre-Treatment, Post Air Stripper, and Between GACs locations were analyzed for BTEX via method 8021B, and the Post-Treatment sample was analyzed for anions via EPA

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method 300.0, dissolved metals via EPA method 200.7, and VOCs via EPA method 8260B. In addition, vapor readings are collected bimonthly along the process line of the vapor-phase granular carbon connected to the air stripper air exhaust port. Monitoring data is summarized in **Table 4-5** (Response to HWB-TWP-19-002 Comment 3).

Influent air samples from the process pipes prior to entering the east and west Baker Furnaces were collected and analyzed for total VOCs (TVOCs) by EPA Method TO-15 in March 2020, September 2020, and January 2021. In July 2020 only east Baker Furnace samples were collected and analyzed, and in August 2020 only west Baker Furnace samples were collected and analyzed. Total VOCs concentrations are presented in **Table 4-1**.

4.1 Soil Vapor Extraction System Monitoring Results

The average combined air flowrate of the SVE system was approximately 320 cubic feet per minute (cfm) with an applied vacuum between 14 and 82 inches of water. The two thermal oxidizers maintained an average chamber treatment temperature of 1,500°F, which is above the required thermal destruction temperature of 1,400°F.

In 2020, air samples of influent vapor were collected from the Baker Furnaces and were analyzed for TVOCs using EPA method TO-15. Analytical data results summarized in **Table 4-1** indicate that the SVE system recovered approximately 2,918 pounds (or about 461 equivalent gallons) of vapor-phase TVOCs in 2020, compared to the approximately 5,767 pounds (or about 910 gallons) removed in 2019. Historical recovery amounts are provided in **Table 4-6.**

Laboratory data packages are included in **Appendix C**. Historical SVE data was analyzed for TPH in the gasoline range organics (GRO) via EPA method 8015D. These historical tables have been included in **Appendix D**.

4.2 Groundwater Treatment System Monitoring Results

The groundwater extraction flowrate averaged 0.37 gallons per minute (gpm) in 2020. Operation records for the irrigation system presented in **Table 4-2** indicate that the volume of groundwater recovered, treated, and discharged in 2020 was approximately ~~97,400~~94,800 gallons.

According to **Table 4-3**, approximately 8.07 pounds (1.27 equivalent gallons) of dissolved-phase hydrocarbons were removed by the groundwater/PSH recovery system in 2020. The amount of dissolved phase hydrocarbons removed in 2020 appears to have increased compared to 2019,

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during which 2.58 pounds (0.41 equivalent gallons) of dissolved phase hydrocarbons were removed from approximately 24,080 gallons of treated groundwater. A total of approximately 79 pounds of dissolved TVOCs has been removed by the groundwater remediation system since 2009. In addition, approximately 940 gallons of PSH accumulated in the surge tank in 2020. PSH separated in the surge tank is removed by a vacuum truck and sent to a permitted off-site disposal facility periodically. Historical PSH recovery volumes are provided in **Table 4-6.**

Based on NMED Comment 14 (7/2/2020) an evaluation of the MPE wells were conducted in 2020. The MPE wells are installed on top of the clay layer, and the pumps are currently installed 6 inches from the bottom of the wells. Lowering the pumps in the wells is not possible ~~as the clay layer might be penetrated~~as the depth of the well is located at the top of the clay layer. The water level in the Upper Aquifer is near the confining clay layer and fluctuates with the season. Recharge rates decline during the summer months (droughts) as water levels decrease. The groundwater level, clay layer, and the down-well pneumatic pump design limits the water recovery rate in the Upper Aquifer. Therefore, increasing the flowrate in the MPE wells with the current remedial design is not feasible (Response to HWB-TWP-20-001 Comment 14).

To address residual soil contamination within the source area, SVE wells were co-located with the MPE wells. The SVE wells (apart from SVE-3, SVE-23, and SVE-30) were advanced approximately 30-35 ft below ground surface (bgs) within the shallow soil zone consisting of primarily sands and gravels. Due to their shallow depth, the SVE wells are frequently above the water table elevation and may not have detectable water. During 2020, SVE-1A, SVE-2A, SVE-3, SVE-22, SVE-24, SVE-25, SVE-26, SVE-27, and SVE-31, were dry during at least one sampling event.

Monthly water treatment samples were collected between April and October 2020. Samples from the locations identified as Pre-Treatment, Between GACs, and Post Air Stripper were analyzed for BTEX via EPA Method 8021B, and the Post Treatment sample was analyzed for anions via EPA method 300.0, dissolved metals via EPA method 200.7, and VOCs via EPA method 8260B. The analytical data for these samples demonstrates that the treatment system is effectively removing the hydrocarbon constituents present in the recovered groundwater. Furthermore, analytical data for the Post-Treatment sample indicate that BTEX was not detected above laboratory reporting limits. Analytical data for the monthly samples is summarized in **Table 4-4** and laboratory data packages are included in **Appendix C**.

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Between April and September 2020, the air stripper was monitored at multiple points to detect potential breakthrough of VOCs through the carbon treatment system. The PID readings from locations identified as Prior to Carbon, Between Carbon Vessels, and After Carbon Vessels are provided in **Table 4-5** (Response HWB-TWP-19-002 Comment 3). Based on field monitoring activities, the carbon treatment system for removing vapor VOCS by the air stripper achieved a 95 percent or greater efficiency. In June 2020, vapor-phase carbon treatment efficiency of zero percentage was observed after the first carbon vessel ("midpoint") location; however, the carbon treatment efficiency was 69 percent after second carbon vessel. Further monitoring was planned to verify treatment efficiencies in August; however, the air stripper was deactivated due to an inoperable float switch. Once repairs were completed, the vapor-phase carbon vessels were monitored in September 2020. Based on field measurements, the carbon treatment efficiency was calculated to be 97.1 percent in September 2020. Future monitoring will continue to measure breakthrough of the carbon vessels.

5.0 SUMMARY OF FINDINGS AND CONCLUSIONS

Based on the information presented in the previous sections regarding the operation of the remediation system installed at the Project Area, the following findings and conclusions are offered:

- The 2020 Upper Aquifer groundwater gauging data identified a northern component of groundwater flow with a gradient of 0.019 ft/ft and 0.018 ft/ft during the May 2020 and November 2020 sampling events respectively, and a southeastern component of groundwater flow with a gradient of 0.005 ft/ft during the May 2020 sampling event and 0.004 ft/ft during the November 2020 sampling event. These gradients are generally consistent with previous years' observations.
- Historical gauging data for the Site monitoring wells indicates that between 2009 and 2020 groundwater elevation in the Upper Aquifer of the Project Area has decreased by an average of 1.54 feet and groundwater elevation in the deeper San Andres Formation Aquifer has decreased by 4.22 feet.
- Groundwater gauging data collected from the Site monitoring and recovery wells during the May and November 2020 semi-annual groundwater monitoring events indicates that PSH remains delineated within the Project Area. The average side-wide apparent

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3.3 PSH Thickness

Groundwater gauging data collected from Site monitoring and recovery wells during the May 2020 sampling event indicates that the average apparent PSH thickness was 0.94 feet, with a maximum of 2.98 feet measured in SVE-23. Groundwater gauging data collected from Site monitoring and recovery wells during the November 2020 sampling event indicates that the average apparent PSH thickness was 0.73 feet, with the maximum thickness of 1.99 feet measured in MPE-38. As of 2021, eleven wells (MPE-10, MPE-16, MPE-17, MPE-27, MPE-38, MW-16, MPE-40, MPE-41, MW-1B, SVE-23, and SVE-25) contain PSH. Correlation graphs have been developed between depth to water and PSH (Response to HWB-TWP-20-002 Comment 3) and are presented in **Appendix E**. Due to recovery efforts, PSH thickness has decreased in certain wells despite fluctuations in the water table. PSH thickness has decreased or has not been measurable for multiple consecutive years in MW-2, MW-12, MPE-20, MPE-21, MPE-23, MPE-24, MPE-28, and MPE-31.

3.3.1 Perched Aquifer

On May 13, 2020 and November 10, 2020, liquid levels were measured in SVE-23 using an optical interface probe to determine the presence and apparent thickness of PSH. According to liquid levels, the apparent thickness of 2.98 feet and 1.17 feet was measured in SVE-23 in May and November 2020, respectively. During 2020, PSH thickness at SVE-23 appeared to be positively correlated with depth to water, but more data is needed for evaluation (Response to HWB-TWP-20-002 Comment 3). Gauging will be conducted every month in 2021, the first four months of which are presented in **Table 3-2**, and an evaluation will be presented in a separate report, as per NMED correspondence dated April 9, 2021. Distribution of PSH apparent thickness is presented in **Figures 3-2a** and **3-2b**. Further PSH monitoring will continue for SVE-23 in 2021. In addition, the SVE-23 will be re-developed using clean water and bailing techniques to remove PSH that may trapped in the well sand pack.

In correspondence dated July 2, 2020 and November 25, 2020, NMED requested Transwestern to provide a work plan to delineate the PSH in SVE-23 which is in the perched aquifer. Based on further review of historical records, Transwestern notes that certain work related to the perched aquifer was first delineated during the 1991 Shallow Subsurface Investigation and in multiple reports prior to the 2013 SFO.

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Based on historical PSH measurements, the PSH trends in SVE-23 appear to fluctuate and persistent since 2009. There was a period between November 2014 through January 2020 (six years) where the PSH thickness (average 0.55 foot) appears to be stable except for one gauging event (November 2018). For the next two gauging events (May 2020 and November 2020), the PSH thickness increased. Since January 2021 through September 2021, PSH thickness has been monitored monthly in SVE-23. The average PSH thickness is 1.58 feet and the minimum and maximum thickness recorded during this 9-monthperiod ranged between 0.65 foot and 3.00 feet, respectively.

It should be noted that the current recovery well network for the groundwater extraction and soil vapor extraction is within the footprint of the perched aquifer, specifically in SVE-23.

3.3.2 Upper Aquifer

The areal extent of PSH in the Upper Aquifer, as measured during the May and November 2020 semi-annual sampling events, remains delineated within the Project Area and appears consistent with 2019 data. (**Figures 3-5a** and **3-5b**). Although PSH thickness continues to fluctuate in certain wells, there has been an overall decreasing trend in PSH thickness in the Upper Aquifer since 2018. Furthermore, the number of wells with measurable PSH in the Upper Aquifer has decreased. . Current and historical groundwater gauging data is presented in **Table 3-2**.

3.4 Groundwater Analytical Results

Groundwater samples were collected and analyzed for BTEX by EPA method 8260 or for VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the SAP. The analytical results for groundwater samples collected during the May, September, and November 2020 sampling events are summarized in **Table 3-5** and the laboratory analytical reports are included in **Appendix B**. Due to PSH detections, a groundwater sample was not collected from MW-16 in May or November 2020.

3.4.1 Perched Aquifer

In the Perched Aquifer, BTEX was detected above reporting limits in wells SVE-28, SVE-30, and RW-1. However, benzene was the only BTEX constituent in these wells that exceeded GCLs (Response to HWB-TWP-19-001 Comment 2). Analytical data also indicates that 1,4-dioxane was not detected in SVE-28 or RW-1 (however, the limit of quantitation was higher than the applicable GCL for RW-1); although 1-4-dioxane was detected in SVE-30, it was not above the GCL.

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Analytical data indicates that 1,1-DCA was detected in concentrations exceeding the GCLs in well SVE-30 during the September and November 2020 sampling events (Response to HWB-TWP-20-001 Comment 15). Based on the 2020 analytical data, the areal distribution of BTEX, 1,1-DCA, and 1,1-DCE in the Perched Aquifer remains delineated within the Project Area and is consistent with the 2019 data (**Figures 3-6** through **3-11**).

3.4.2 Upper Aquifer

In the Upper Aquifer, BTEX were not detected above reporting limits in MW-10, MW-11, MW-13, MW-14, MW-17, MW-20, MW-21, MW-22, MW-24D, MW-26, MW-27, MW-29, MW-32, MW-34, MW-35, MW-37, MW-39, MW-40, MW-41, MW-42, and SVE-31. None of the BTEX detects exceeded GCL in the Upper Aquifer. The results also indicate that 1,4-dioxane was not detected in MW-20, MW-22, MW-26, MW-39, MW-41, or MW-42.

Analytical data indicates that other VOCs were detected in MW-20, MW-22, MW-26, MW-39, MW-41, and MW-42, but only 1,1-DCE was detected at concentrations exceeding GCLs in wells MW-26 and MW-39. The limit of quantitation was higher than the applicable GCL for naphthalene, and therefor this data is seen as data quality exceptions. Based on the 2020 analytical data, the areal distribution of BTEX, 1,1-DCA, and 1,1-DCE in the Upper Aquifer remains delineated within the Project Area and is consistent with the 2019 data. Furthermore, it appears that benzene and PSH concentration are closely related (**Figures 3-6** through **3-11**).

Analytical results for the duplicates are included in the laboratory data packages in **Appendix B** and indicate that the only target analyte detections were for MW-39, MW-22, and MW-26. For quality assurance purposes, the relative percent difference (RPD) of the reported concentrations between the original samples and their duplicates was calculated for each semi-annual sampling event. The RPDs were at or below 7% for each sampling event, with the calculations included in **Appendix B**.

4.0 REMEDIATION SYSTEM OPERATION, MAINTENANCE, AND MONITORING

During 2020, the SVE portion of the recovery system was operational year-round and included all circuits except for when the SVE system was deactivated for equipment repairs and semi-annual sampling events.

The groundwater/PSH recovery portion of the remediation system operated from April 9, 2020 to October 31, 2020, except for periods of maintenance and during the semi-annual sampling

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In 2020, air samples of influent vapor were collected from the Baker Furnaces and were analyzed for TVOCs using EPA method TO-15. Analytical data results summarized in **Table 4-1** indicate that the SVE system recovered approximately 2,918 pounds (or about 461 equivalent gallons) of vapor-phase TVOCs in 2020, compared to the approximately 5,767 pounds (or about 910 gallons) removed in 2019. Historical recovery amounts are provided in **Table 4-6.**

Laboratory data packages are included in **Appendix C.** Historical SVE data was analyzed for TPH in the gasoline range organics (GRO) via EPA method 8015D. These historical tables have been included in **Appendix D.**

4.2 Groundwater Treatment System Monitoring Results

The groundwater extraction flowrate averaged 0.37 gallons per minute (gpm) in 2020. Operation records for the irrigation system presented in **Table 4-2** indicate that the volume of groundwater recovered, treated, and discharged in 2020 was approximately 94,800 gallons.

According to **Table 4-3**, approximately 8.07 pounds (1.27 equivalent gallons) of dissolved-phase hydrocarbons were removed by the groundwater/PSH recovery system in 2020. The amount of dissolved phase hydrocarbons removed in 2020 appears to have increased compared to 2019, during which 2.58 pounds (0.41 equivalent gallons) of dissolved phase hydrocarbons were removed from approximately 24,080 gallons of treated groundwater. A total of approximately 79 pounds of dissolved TVOCs has been removed by the groundwater remediation system since 2009. In addition, approximately 940 gallons of PSH accumulated in the surge tank in 2020. PSH separated in the surge tank is removed by a vacuum truck and sent to a permitted off-site disposal facility periodically. Historical PSH recovery volumes are provided in **Table 4-6.**

Based on NMED Comment 14 (7/2/2020) an evaluation of the MPE wells were conducted in 2020. The MPE wells are installed on top of the clay layer, and the pumps are currently installed 6 inches from the bottom of the wells. Lowering the pumps in the wells is not possible as the depth of the well is located at the top of the clay layer. The water level in the Upper Aquifer is near the confining clay layer and fluctuates with the season. Recharge rates decline during the summer months (droughts) as water levels decrease. The groundwater level, clay layer, and the down-well pneumatic pump design limits the water recovery rate in the Upper Aquifer. Therefore, increasing the flowrate in the MPE wells with the current remedial design is not feasible (Response to HWB-TWP-20-001 Comment 14).

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To address residual soil contamination within the source area, SVE wells were co-located with the MPE wells. The SVE wells (apart from SVE-3, SVE-23, and SVE-30) were advanced approximately 30-35 ft below ground surface (bgs) within the shallow soil zone consisting of primarily sands and gravels. Due to their shallow depth, the SVE wells are frequently above the water table elevation and may not have detectable water. During 2020, SVE-1A, SVE-2A, SVE-3, SVE-22, SVE-24, SVE-25, SVE-26, SVE-27, and SVE-31, were dry during at least one sampling event.

Monthly water treatment samples were collected between April and October 2020. Samples from the locations identified as Pre-Treatment, Between GACs, and Post Air Stripper were analyzed for BTEX via EPA Method 8021B, and the Post Treatment sample was analyzed for anions via EPA method 300.0, dissolved metals via EPA method 200.7, and VOCs via EPA method 8260B. The analytical data for these samples demonstrates that the treatment system is effectively removing the hydrocarbon constituents present in the recovered groundwater. Furthermore, analytical data for the Post-Treatment sample indicate that BTEX was not detected above laboratory reporting limits. Analytical data for the monthly samples is summarized in **Table 4-4** and laboratory data packages are included in **Appendix C**.

Between April and September 2020, the air stripper was monitored at multiple points to detect potential breakthrough of VOCs through the carbon treatment system. The PID readings from locations identified as Prior to Carbon, Between Carbon Vessels, and After Carbon Vessels are provided in **Table 4-5** (Response HWB-TWP-19-002 Comment 3). Based on field monitoring activities, the carbon treatment system for removing vapor VOCS by the air stripper achieved a 95 percent or greater efficiency. In June 2020, vapor-phase carbon treatment efficiency of zero percentage was observed after the first carbon vessel ("midpoint") location; however, the carbon treatment efficiency was 69 percent after second carbon vessel. Further monitoring was planned to verify treatment efficiencies in August; however, the air stripper was deactivated due to an inoperable float switch. Once repairs were completed, the vapor-phase carbon vessels were monitored in September 2020. Based on field measurements, the carbon treatment efficiency was calculated to be 97.1 percent. Future monitoring will continue to measure breakthrough of the carbon vessels.

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Table 3-5a. Summary of Groundwater Analytical Results - Other Constituents Detected
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Sampling Date	Chloroethane	Isopropyl benzene	n-Propylbenzene	1,2,4-Trichlorobenzene	Napthalene	Cis-1,2-Dichloroethene	Acetone	1,4-Dioxane
NMWQCC Human Health Standard		-	-	-	70	-	70	-	-
USEPA MCL		-	-	-	70	-	70	-	-
Tap Water (2012)		-	679	-	4.12	1.43	73	21800	6.72
Groundwater Cleanup Level (GCL)		-	679	-	70	1.43	70	21800	6.72
MW-20	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/20/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-22	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/20/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-26	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/20/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-39	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/30/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-40	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/30/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-41	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/30/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
MW-42	05/17/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
	11/30/20	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0	<10	<1.0
SVE-28	09/10/20	NA	NA	NA	NA	NA	NA	NA	<1.0
SVE-30	09/10/20	10	6	2	<1.0	6.0	1.0	<50	5.9
	11/23/20	4	4.1	3.1	3.3	<2.0	<1.0	<10	6
RW-1	09/10/20	<2.0	3	<5.0	<5.0	<10	<5.0	<10	<1.0
	11/23/20	<2.0	3.9	3.2	<1.0	4.0	3.6	<10	<25

Notes:

Results only shown for other detected constituents in wells. All other constitutents for wells not shown are below laboratory detection limits.

-- data not available or established

Results reported in micrograms per liter (µg/L)

Prepared by: SWS 10/12/21
Checked by: HRB 10/12/21

NMWQCC - New Mexico Water Quality Control Commission Standard

NMWQCC Human Health Standards - from New Mexico Administrative Code (NMAC) 20.6.2, Part A, Human Health Standards. Used as GCL for target cleanup if lower than the MCL.

USEPA MCL - United States Environmental Protection Agency's Maximum Concentration Limit. Used as GCL for target cleanup if lower than the NMWQCC Human Health Standard.

Tap Water (2012) - From Table A-1 for the 2012 NMED Risk Assessment Guidance for Site Investigation and Remediation. Used as GCL for target cleanup if WQCC standard nor MCL has been established.

Table 4-3. Groundwater Treatment System
Mass Removal Calculations for Total BTEX
Transwestern Compressor Station No. 9 - Roswell, NM

Date	Water Totalizer Meter Reading (gals)	Water Volume (gals)	Elapsed Time (days)	Flow Rate (gals/day)	Total BTEX (ug/L)	Mass Removal Rate (lbs/day)	Mass Removed (lbs)	Mass Removed (equivalent gals)
05/01/09	964,480	NA	NA	NA	NA	NA	NA	NA
05/25/09	1,003,890	39,410	24	1,642	4,339	0.0595	1.4	0.225
06/22/09	1,064,810	60,920	28	2,176	9,810	0.1782	5.0	0.788
07/21/09	1,107,950	43,140	29	1,488	9,910	0.1231	3.6	0.564
08/24/09	1,145,780	37,830	34	1,113	9,400	0.0873	3.0	0.469
09/28/09	1,165,680	19,900	35	569	6,230	0.0296	1.0	0.164
10/29/09	1,180,920	15,240	31	492	10,080	0.0414	1.3	0.203
11/18/09	1,214,350	33,430	20	1,672	6,840	0.0955	1.9	0.302
						2009 Total	**17.185**	**2.715**
06/20/10	1,223,490	NA	NA	NA	NA	NA	NA	NA
06/30/10	1,227,190	3,700	10	370	7,120	0.0220	0.2	0.035
07/31/10	1,248,140	20,950	31	676	5,340	0.0301	0.9	0.148
08/30/10	1,265,630	17,490	30	583	6,350	0.0309	0.9	0.147
11/10/10	1,292,380	26,750	72	372	8,260	0.0256	1.8	0.291
						2010 Total	**3.927**	**0.620**
08/01/11	1,304,610	NA	NA	NA	NA	NA	NA	NA
08/10/11	1,312,240	7,630	9	848	4,400	0.0311	0.3	0.044
10/09/11	1,344,310	32,070	60	535	10,540	0.0470	2.8	0.446
11/03/11	1,357,820	13,510	25	540	10,540	0.0476	1.2	0.188
						2011 Total	**4.292**	**0.678**
04/20/12	1,390,930	NA	NA	NA	NA	NA	NA	NA
04/30/12	1,413,930	23,000	10	2,300	8,800	0.1690	1.7	0.267
06/05/12	1,450,860	36,930	36	1,026	8,920	0.0764	2.8	0.435
06/28/12	1,459,530	8,670	23	377	10,050	0.0316	0.7	0.115
07/25/12	1,479,740	20,210	27	749	10,460	0.0654	1.8	0.279
08/15/12	1,486,280	6,540	21	311	8,970	0.0233	0.5	0.077
09/23/12	1,513,290	27,010	39	693	8,870	0.0513	2.0	0.316
10/25/12	1,524,400	11,110	32	347	10,480	0.0304	1.0	0.154
11/28/12	1,541,110	16,710	34	491	8,530	0.0350	1.2	0.188
						2012 Total	**11.587**	**1.831**
04/30/13	1,553,090	NA	NA	NA	NA	NA	NA	NA
05/16/13	1,576,010	22,920	16	1,433	10,560	0.1263	2.0	0.319
06/17/13	1,614,920	38,910	32	1,216	9,760	0.0991	3.2	0.501
07/17/13	1,641,540	26,620	30	887	11,170	0.0828	2.5	0.392
						2013 Total	**7.675**	**1.213**
07/24/14	1,641,550	NA	NA	NA	NA	NA	NA	NA
07/31/14	1,645,550	4,000	7	571	4,270	0.0204	0.1	0.023
08/25/14	1,667,720	22,170	25	887	4,410	0.0327	0.8	0.129
09/17/14	1,683,180	15,460	23	672	7,280	0.0409	0.9	0.148
10/15/14	1,714,440	31,260	28	1,116	8,500	0.0792	2.2	0.351
						2014 Total	**4.118**	**0.651**
07/01/15	46,250	NA	NA	NA	NA	NA	NA	NA
07/15/15	56,930	10,680	14	763	7,360	0.0469	0.7	0.104
10/27/15	91,500	34,570	104	332	4,600	0.0128	1.3	0.210
11/20/15	104,710	13,210	24	550	8,660	0.0398	1.0	0.151
						2015 Total	**2.940**	**0.464**

Table 4-3. Groundwater Treatment System
Mass Removal Calculations for Total BTEX
Transwestern Compressor Station No. 9 - Roswell, NM

Date	Water Totalizer Meter Reading (gals)	Water Volume (gals)	Elapsed Time (days)	Flow Rate (gals/day)	Total BTEX (ug/L)	Mass Removal Rate (lbs/day)	Mass Removed (lbs)	Mass Removed (equivalent gals)
03/23/16	114,640	NA	NA	NA	NA	NA	NA	NA
05/19/16	127,415	12,775	57	224	4,160	0.0078	0.4	0.070
06/28/16	148,810	21,395	40	535	3,720	0.0166	0.7	0.105
07/07/16	155,900	7,090	9	788	6,360	0.0418	0.4	0.059
08/24/16	190,170	34,270	48	714	6,370	0.0380	1.8	0.288
09/21/16	204,940	14,770	28	528	6,690	0.0295	0.8	0.130
10/24/16	225,540	20,600	33	624	4,040	0.0211	0.7	0.110
11/03/16	234,090	8,550	10	855	7,280	0.0520	0.5	0.082
						2016 Total	**5.348**	**0.845**
07/05/17	242,360	NA	NA	NA	NA	NA	NA	NA
07/11/17	248,050	5,690	6	948	15,194	0.1203	0.7	0.114
08/24/17	272,050	24,000	44	545	9,100	0.0414	1.8	0.288
09/25/17	296,160	24,110	32	753	12,450	0.0783	2.5	0.396
10/23/17	316,010	19,850	28	709	12,100	0.0716	2.0	0.317
11/27/17	331,400	15,390	35	440	12,100	0.0444	1.6	0.246
						2017 Total	**8.613**	**1.361**
06/11/18	332,910	NA	NA	NA	NA	NA	NA	NA
06/25/18	342,410	9,500	14	679	4,620	0.0262	0.4	0.058
07/23/18	350,000	7,590	28	271	7,300	0.0165	0.5	0.073
08/06/18	354,640	4,640	14	331	9,780	0.0271	0.4	0.060
09/24/18	363,300	8,660	49	177	10,850	0.0160	0.8	0.124
10/22/18	374,330	11,030	28	394	12,260	0.0403	1.1	0.178
						2018 Total	**3.122**	**0.493**
01/01/19	374,330	0	71	0	NA	NA	NA	NA
06/30/19	374,790	460	180	3	NA	NA	NA	NA
08/20/19	377,060	980	14	70	NA	NA	NA	NA
09/16/19	383,000	10,017	27	371	12,540	0.0389	1.049	0.166
10/29/19	398,410	15,410	43	358	11,890	0.0355	1.528	0.241
						2019 Total	**2.577**	**0.407**
04/14/20	5,600	4,700	6	783	11,750	0.0769	0.5	0.073
05/31/20	26,600	21,000	47	447	9,870	0.0368	1.7	0.273
06/25/20	36,200	9,600	25	384	8,780	0.0282	0.7	0.111
09/21/20	58,300	22,100	88	251	10,130	0.0212	1.869	0.295
10/26/20	95,700	37,400	35	1,069	10,570	0.0943	3.301	0.522
						2020 Total	**8.067**	**1.274**
						Total	**79**	**12.551**

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
gals - gallons
ug/L - micrograms per liter
lbs - pounds
NA - not applicable, system deactivated during winter months
Total BTEX concentrations are reported from analytical results of monthly influent samples.
1) Specific gravity of VOC is 0.76 based on Fingerprinting Analytical performed by Core Laboratories in October 2012.
2) Between June and August 2019, system was deactivated due to semi-annual sampling delays and malfunctions with the system; therefore water treatment samples were not collected.
3) New water meter installed on 4/9/2020

Prepared by: SWS 2/1/21
Checked by: HRB 2/24/21

Table 4-6. Historical Hydrocarbon Removal Summary
Transwestern Compressor Station No. 9 - Roswell, NM

Year	Extracted Groundwater (gals)	PSH Recovered (gal)	PSH Recovered (lbs)	Dissolved-Phase Mass Removed (lbs)	Vapor-Phase Mass Removal (lbs)
2015	64,140	310	1,962	2.94	2,405
2016	137,650	350	2,216	5.35	2,026
2017	90,550	1,550	9,812	8.60	3,038
2018	41,420	1,330	8,419	3.12	8,356
2019	24,080	1,550	9,812	2.58	5,760
2020	97,400	940	5,950	8.07	2,918

Notes:
gals - gallons
PSH - phase separated hydrocarbons

Prepared by: HRB 10/12/21
Checked by: SWS 10/12/21