



ENERGY TRANSFER PARTNERS

Transwestern Pipeline Company

March 14, 2013

Mr. Glenn von Gonten
Environmental Bureau
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505



RE: Report of 2012 Groundwater Remediation Activities
Roswell Station Remediation Site
Transwestern Pipeline Company, LLC
Chavez County, New Mexico
Case # GW-052

Enclosed for your review is the annual Report of 2012 Groundwater Remediation Activities for the Roswell Station remediation site. This report includes the results of groundwater assessment and remediation work completed at the site during 2012.

A copy of this report is also being provided to the New Mexico Environment Department (NMED), Hazardous Waste Bureau, as required by a Stipulated Final Order signed by NMED on March 11, 2013 and issued to Transwestern Pipeline Company, LLC in a transmittal letter dated March 13, 2013.

If you have any questions or comments regarding this report, please contact me at (713) 408-0437 or George Robinson (Cypress Engineering) at (281) 797-3420.

Sincerely,

Stacy Boultinghouse, PG_(TX4889)
Environmental Specialist
Transwestern Pipeline Company, LLC

xc w/attachment:

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NMED Hazardous Waste Bureau
New Mexico State Land Office
NMOCD Artesia District Office
Transwestern Pipeline Company (Roswell, NM)

Report of 2012 Groundwater Remediation Activities

**Transwestern Pipeline Company, LLC
Roswell Station Remediation Site
6381 North Main Street
Roswell, Chaves County, New Mexico**

CASE # GW-052

Submitted to:

**New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505**

And

**State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505**

March 15, 2013

Prepared For:

Transwestern Pipeline Company, LLC
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Roswell, NM 88201

Prepared by:

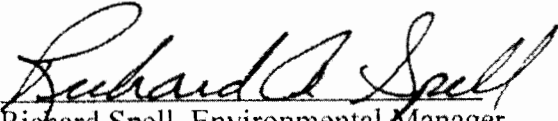
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George C. Robinson, PE_(New Mexico)
Cypress Engineering Services, Inc.

Date: 3-14-2013



Richard Spell, Environmental Manager
Transwestern Pipeline Company, LLC

Date: 3-14-2013

Executive Summary

This document is the Report for 2012 Groundwater Remediation Activities prepared by Cypress Engineering Services, Inc. (Cypress) for the Transwestern Pipeline Compressor Station No. 9 (also known as the Roswell Compressor Station) property located at 6381 North Main Street in Roswell, New Mexico. For the purposes of this annual groundwater report, the term “Facility” will be used to denote the entire compressor station and Project Area will be used to refer to the northeastern corner of the compressor station (approximately 3.5 acres) and the adjacent northern and eastern lands leased from the State of New Mexico Trust (approximately 30 acres).

The purpose of this report is to provide the annual data associated with the two semi-annual sampling events conducted in 2012. In addition, this report will provide a summary of the groundwater sampling and remediation activities anticipated for 2013.

The primary constituent-of-concern (COC) detected in groundwater within the Project Area is benzene. Additional COCs include 1,1,1-TCA, 1,1-dichloroethane (1,1-DCA) and 1,1-dichloroethene (1,1-DCE). Laboratory results for 2012 groundwater samples indicated only benzene and 1,1-DCE were measured at concentrations above the New Mexico Water Quality Control Commission (NMWQCC) standards. The lateral extent of PSH is defined by the occurrence of PSH at the water table in 14 wells and the absence of PSH in all other wells of the “uppermost aquifer”.

Summary of results, findings, or conclusions:

The groundwater flow direction continues to be consistent with previously reported assessments of flow direction. Groundwater under the northern portion of the Project Area flows toward the North, while groundwater beneath the central and southern portion of the Project Area flows toward the South-Southeast. The water table elevation continues to decline. Water table elevation has declined 3 to 4 feet from 2004 to present.

The lateral extent of PSH continues to decrease as it has since 2005. The lateral extent of dissolved-phase benzene in groundwater follows the same trend. In the northern portion of the Project Area, the lateral extent of dissolved-phase chlorinated COCs in groundwater also appears to be decreasing, although the absence of adequate delineation in this area will need to be addressed in 2013. It appears that the groundwater recovery and the Soil Vapor Extraction process has resulted in a decrease in contaminant mass and accelerated natural attenuation.

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1. Introduction

This document is the *Report for 2012 Groundwater Remediation Activities* for the Transwestern Pipeline Compressor Station No. 9 (also known as the Roswell Compressor Station) property located at 6381 North Main Street in Roswell, New Mexico. For the purposes of this annual groundwater report, the term “Facility” will be used to denote the entire compressor station and Project Area will be used to refer to the northeastern corner of the compressor station (approximately 3.5 acres) and the adjacent northern and eastern lands leased from the State of New Mexico Trust (approximately 30 acres).

The last report of groundwater remediation activities covered activities completed through December 2011. This report presents a summary of groundwater monitoring and remediation activities completed during calendar year 2012.

1.1 Background

The facility is an active natural gas compression station located approximately 8 miles north of the city center of Roswell, New Mexico on the east side of U.S. Highway 285. The facility occupies approximately 77 acres in Section 21 and 28 (T9S, R24E), Chaves County. The facility is owned by Transwestern Pipeline Company, LLC (Transwestern). The remainder of Sections 21 and 28 are owned by the New Mexico State Land Trust. Transwestern leases approximately 30 acres to the north and east of the facility for remediation and monitoring purposes.

The facility has been operating since the 1960s and operations include natural gas compression, natural gas transmission pipeline maintenance and offices for support personnel. The facility is currently active. Until approximately 1986, certain transmission pipeline maintenance waste and other wastes were discharged into earthen surface impoundments, referred to as the pits, located in the northeast corner of the facility.

Reportedly, wastes discharged into the pits contained petroleum hydrocarbons, volatile and semi-volatile organic compounds, and metals. Investigations starting in the early 1990s identified the presence of those constituents in the soil and groundwater beneath the pits. Subsequent corrective actions conducted at the Facility, within the Project Area, include removal of waste from the surface impoundments and backfilling with clean soil (conducted in 2001); installation of groundwater monitoring wells (from 1992 to 2003); and installation and continued operation of a soil and groundwater remediation system (installed between 2002 and 2003). Soil vapor and groundwater sampling and analysis have been conducted to delineate groundwater contamination and assess the recovery system performance. Since 2004, these activities have been documented in reports submitted to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (NMOCD).

2. Scope of Groundwater Monitoring Activities

2.1 Semiannual Groundwater Sampling Events

Two semi-annual groundwater sampling events were completed during the reporting period. These events were completed in April 2012 and October 2012. Prior to sampling, the depth to water, and the depth to phase separated hydrocarbon (PSH) where present, was determined for

each monitor well and recovery well. The measured depths and the corresponding water table elevation for each monitor well and recovery well is presented in Tables 1 and 2.

In the course of each sample event, groundwater samples were collected from selected monitor wells at the site in accordance with the site *Sampling and Analysis Plan* (SAP). Generally, as a matter of standard operating procedure, samples are not collected from monitor wells with accumulated PSH in the well casing. However, in the course of the October 2012 sampling event, groundwater samples were collected from three wells that had measured accumulations of PSH; wells MW-12, MPE-16 and MPE-24. These samples were collected in an effort to evaluate the partitioning of BTEX compounds (more specifically, benzene) between remaining PSH and groundwater. PSH was removed from the wells to the extent practical prior to collecting the groundwater samples. Samples from three wells located at the north end of the site were submitted for analysis for volatile organic compounds (VOCs) by EPA Method 8260B. In addition, samples of PSH removed from wells MW-12, MPE-16 and MPE-24 were analyzed for specific gravity and kinematic viscosity; and the sample from well MPE-24 was also analyzed for chemical composition (PIONA analysis; Paraffins, Isoparaffins, Olefins, Naphthenes, and Aromatics). As per the site SAP, the remaining groundwater samples were delivered to a laboratory for analysis for benzene, toluene, ethylbenzene, and xylene (BTEX) by EPA Method 8021B.

A copy of the laboratory reports for the two semiannual groundwater sampling events are included in Appendix D.

3. Regulatory Criteria

The Project Area is subject to applicable cleanup standards as specified by the New Mexico Water Quality Control Commission (NMWQCC) standards. The appropriate cleanup levels for the site are presented on Tables associated with this report.

4. Monitoring Results/Conclusions from Groundwater Sampling Events

4.1 Occurrence and Direction of Groundwater Flow

A water table elevation map based on measurements obtained in October 2012 is included as Figure 2. The information presented in Figure 2 appears to define a complex groundwater system with some areas of low flow and other areas of preferential flow. Furthermore, there is an apparent divide in the groundwater flow direction beneath the site. At the northern end of the affected area, groundwater flow is toward the north; while in the central and southern portions of the site, groundwater flow is toward the south-southeast. The apparent direction of groundwater flow is consistent with water table elevation maps previously developed for this site and is also consistent with the distribution of contaminants in the uppermost aquifer. The measured depths and the corresponding water table elevation for each monitor well and recovery well is presented in Tables 1 and 2. A summary of field measured groundwater quality parameters (pH, temperature, electrical conductivity and dissolved oxygen) obtained in the course of sampling is presented in Table 3. Hydrographs for selected monitoring wells with no accumulated PSH are included in Appendix A. The hydrographs show a history of water table elevation change since depth to water measurements were first recorded at the site in 1996. There is a sharp decline in the water table elevation following startup of the groundwater recovery and treatment system in

April 2004. The hydrographs indicate about a three to four foot decline in the water table during the 8 ½ year period between April 2004 and December 2012. A continued decline in groundwater elevations is anticipated and is beneficial to the remediation effort, as the decline allows additional vapor extraction to occur in soils formerly underneath the water table.

4.2 Lateral Extent of Phase Separated Hydrocarbon

Within the “uppermost aquifer”, the lateral extent of PSH is currently defined by the occurrence of PSH at the water table in 14 wells and the absence of PSH in the remaining wells. The thickness of accumulated PSH in monitor wells and multi-phase extraction (MPE) wells is presented in Tables 1 and 2. The estimated area with PSH present at the water table is approximately 1.5 acres and is shown in Figures 3 and 4, for the April and October 2012 events, respectively. Also indicated in Figures 3 and 4 is the estimated maximum extent of PSH measured at the site in March 2005 (approximately 2.7 acres).

In March 2005, accumulated PSH was measured in 23 wells within the “uppermost aquifer”; in October 2012, this number had been reduced to 14 wells. The current lateral extent of PSH covers an area about 55% the size of the estimated maximum extent indicating that the remediation system is effectively reducing the size of the impacted area. In most wells where accumulated PSH has persisted, the measured thickness of PSH has decreased significantly since active remediation efforts began. This can be seen graphically in the hydrographs presented in Appendix B.

It was suspected that the continued presence of PSH in some MPE wells was more likely associated with the preferential accumulation of PSH in low pressure areas, such as soil vapor extraction wells, and was not likely indicative of PSH present at the water table outside of the immediate vicinity of the well screen. In light of this, a program was initiated in June 2010 to evaluate the re-accumulation rate of PSH in wells. In June 2010, accumulated PSH was removed from eleven wells containing PSH using a bailer. The re-accumulation of PSH was measured in the course of subsequent groundwater sampling events. A summary of the data obtained during this evaluation is provided in Table 2b. Results indicate that the accumulation of PSH was reduced in five of the eleven wells; two of the wells had no measurable re-accumulation of PSH after nearly two years.

A shallow perched zone was identified during the initial site investigation activities. The perched zone is limited in lateral extent and occurs at a depth of about 30-35 feet, which is about 30 feet above the depth of the “uppermost aquifer”. There are 9 SVE wells completed within the perched zone. In October 2012, depth to water measurements indicated that five of the nine shallow SVE wells were dry; the remaining shallow SVE wells contained less than five feet of water column. In addition, one of the shallow SVE wells contained a measurable accumulation of PSH. The estimated lateral extent of PSH in the shallow perched zone is indicated in Figures 5 and 6.

5. Chemical Analytical Data Results: Condition of Affected Groundwater

Constituents of concern initially detected within the Project Area included benzene, 1,1,1-trichloroethane, 1,1-dichloroethane, and 1,1-dichloroethene (1,1-DCE). In October 2012, laboratory results for groundwater samples indicated that only benzene and 1,1-DCE were measured at concentrations above NMWQCC standards (excluding results for samples collected at wells with accumulated PSH). Benzene remains the primary constituent of concern within the

Project Area. An updated summary of laboratory results for organic compounds (BTEX and other VOCs) is presented in Table 4. Analyses for inorganic constituents were discontinued in 2003, however, for reference, a summary of laboratory results for inorganic constituents measured during prior sampling events is presented in Table 5.

Site diagrams indicating the distribution of benzene in groundwater are included as Figures 7 and 8. The present lateral extent of dissolved phase benzene (approximately 2.6 acres) is contained within an area just slightly greater than the lateral extent of PSH. The maximum historic extent of benzene in groundwater is also indicated in Figures 7 and 8 (approximately 5.6 acres). The current lateral extent of benzene covers an area about 46% the size of the estimated maximum extent, further indicating that the remediation system is effectively reducing the size of the impacted area. Similar site diagrams indicating the distribution of Total BTEX in groundwater are included as Figures 9 and 10. The estimated reduction in lateral extent of Total BTEX in groundwater is similar to that for benzene.

Site diagrams indicating the distribution of 11-DCE in groundwater are included as Figures 11 and 12. The small plume of dissolved-phase 11-DCE (approximately 0.4 acres) does not appear to be closely associated with the presence of accumulated PSH.

Startup of the MPE system appears to have accelerated natural attenuation processes and has resulted in a decrease in contaminant concentrations at most sampling locations. It is anticipated that contaminant concentrations in groundwater will continue to decline with continued operation of the MPE system.

6. Remediation System Monitoring

6.1 Remediation Activities Completed through December 2012

The following remediation activities were completed during the reporting period:

- 1) Two routine semiannual groundwater sampling events were completed.
- 2) The SVE system operated continuously from April 20, 2012 through December 31, 2012 except for temporary shut-downs for maintenance.
- 3) Soil vapor samples were collected from each of the five remediation system circuits and from the inlet to each thermal oxidizer on July 3, 2012, October 5, 2012, and October 22, 2012; samples were delivered to a laboratory for analysis for total petroleum hydrocarbons (TPH) by method 8015mod (GRO). The concentrations of TPH found in each circuit correspond well with the distribution of PSH measured in wells. The results from laboratory analyses are presented in Table 8 and Table 8b. As indicated in Table 8b, the SVE system is recovering total non-methane hydrocarbons at a rate of 20,850 pounds per year (or about 3,300 gallons equivalent per year). Note that this recovery rate is an average recovery rate while the SVE system is operating and does not take into account SVE system downtime. An estimate of actual SVE system recovery for 2012 is presented in Item #7 below. A copy of the laboratory reports is included in Appendix D.
- 4) Soil vapor samples were collected from each of the MPE and SVE wells on October 21, 2012 and delivered to a laboratory for analysis for TPH by method 8015mod (GRO). The results from laboratory analyses are presented in Table 9 and in Figures 15 and 16. The area defined by elevated concentrations of TPH in soil vapor corresponds well with the

area defined by PSH measured in wells. A copy of the laboratory report is included in Appendix D.

- 5) The groundwater recovery, treatment, and irrigation system operated from mid-April through November 2012. A summary of measured water recovery and irrigation rates is provided in Table 11. The volume of water recovered, treated, and discharged through the MPE system was 150,240 gallons in 2012. In addition, approximately 956 gallons of PSH accumulated in the MPE system surge tank during 2012. None of the accumulated PSH was removed from the surge tank during 2012.
- 6) Eight water treatment and irrigation system sampling events were completed during the period that the groundwater recovery and irrigation system was in operation. Laboratory results are presented in Table 10. Copies of the laboratory reports are included in Appendix D.
- 7) As previously noted, during 2012, the SVE system was recovering total non-methane hydrocarbons at an average rate of about 20,850 pounds per year (or about 3,300 gallons equivalent per year) while operating. The SVE system operated for 5600 hours during 2012 (average operating time recorded for the two SVE blower units). This is a 64% runtime for the SVE system. The total estimated mass of hydrocarbon removed by the SVE system during 2012, based on the actual runtime and the average removal rate, was 13,344 pounds (or about 2,112 gallons equivalent). The MPE recovery system removed 6,060 pounds of hydrocarbon (956 gallons of PSH). The total estimated mass of hydrocarbon removed during 2012 by both the SVE and MPE recovery systems combined is 19,404 pounds (or about 3,068 gallons equivalent).

7. Summary

The groundwater flow system in the uppermost aquifer is complex with some areas of low flow and other areas of preferential flow. In addition, there is an apparent divide in the groundwater flow direction beneath the site. At the northern end of the affected area, groundwater flow is toward the north; while in the central and southern portions of the site, groundwater flow is toward the south-southeast. The apparent direction of groundwater flow is consistent with water table elevation maps previously developed for this site and is also consistent with the distribution of contaminants in the uppermost aquifer. Hydrographs indicate an approximate three to four foot decline in the water table between April 2004 and December 2012.

Within the uppermost aquifer, the lateral extent of PSH is currently defined by the occurrence of PSH at the water table in 14 wells and the absence of PSH in the remaining wells. This current lateral extent of PSH covers an area about 55% the size of the estimated maximum historical extent.

In October 2012, laboratory results for groundwater samples indicated that only benzene and 1,1-DCE were measured at concentrations above NMWQCC standards. The current lateral extent of benzene covers an area about 46% the size of the estimated maximum extent indicating that the remediation system is effectively reducing the size of the affected area. The detection of dissolved-phase 1,1-DCE in MW-26 does not appear to be associated with the presence of accumulated PSH. Although concentrations of this constituent remain relatively low,

Transwestern intends to install additional well(s) to the north of MW-26 in order to have well(s) that are below the NMWQCC standards downgradient of this location.

7.1 Proposed Modifications

7.1.1 Anticipated Changes to the Groundwater Monitoring and Remediation Well Network

An evaluation of contaminant plume stability was completed in 2012 utilizing the Ricker Plume Stability Analysis method. Findings from this evaluation provided an overall understanding of the stability of the constituent plumes in terms of their area, average concentration, mass indicator, and center of mass. Results indicated that the constituent plumes are stable and/or decreasing.

Upon review of the plume stability evaluation it was noted that the existing monitoring well network will require expansion north (downgradient) of monitoring well MW-26. This will be accomplished with the addition of one or more monitoring wells downgradient of well MW-26. A separate *Amended Investigative Work Plan and Groundwater Monitoring Plan* has been prepared for this activity and will be submitted to NMOCD for review and approval.

The plume stability evaluation also identified several groundwater monitoring and remediation wells that are no longer necessary for continued monitoring and/or remediation activities at the site. Generally, this includes monitoring wells that have been documented to be “clean” for a number of previous sampling events and remediation wells that are outside the affected area. A proposal to plug and abandon wells no longer needed is included in the aforementioned *Amended Investigative Work Plan and Groundwater Monitoring Plan*.

7.1.2 Modifications to the Routine Groundwater Sampling Plan

Sampling locations and frequency as outlined in the project SAP will continue on a semi-annual basis. A summary of the SAP is presented in Table 7.

7.1.3 Modifications to the Remediation System

Although the system continues to be effective, additional measures may be necessary to address PSH that is continuing to add contaminant mass to the groundwater plume. Proposed modifications will be presented in a separate *Amended Remediation Work Plan* which will be submitted to NMOCD for review and approval.

7.2 Reporting

Annual reporting of remediation activities will continue with the next scheduled report submitted to the NMOCD by March 15, 2014.

7.3 Progress Toward Project Completion

The Phase I and Phase II components of the remediation system have been installed and are in operation as described in the *Conceptual Remedial Design and Discharge Plan Modification* document dated September 10, 2002. The SVE component of the system has been in operation since March 2003 and the groundwater recovery system has been in operation since April 2004.

In 2012, the MPE system recovered 13,344 pounds of hydrocarbon by the SVE portion of the system and 6,060 pounds of hydrocarbon by the groundwater recovery system, for a total of

19,404 pounds (or about 3,068 gallons equivalent). Over the life of the system, the areal extent of PSH has decreased to about 55% of the initial extent, while the aerial extent of benzene has decreased to about 46% of the initial extent.

Constituents of concern initially detected within the Project Area included benzene, 111-trichloroethane, 11-dichloroethane, and 11-dichloroethene (11-DCE). In October 2012, laboratory results for groundwater samples indicated that only benzene and 11-DCE were measured at concentrations above NMWQCC standards (excluding results for samples collected at wells with accumulated PSH). Benzene remains the primary constituent of concern within the Project Area.

Based upon these results, operation of the MPE system has been effective in reducing the volume and extent of the PSH at the site and reducing the extent of dissolved COCs in groundwater. In addition to physical recovery of contaminant mass, the remedial system appears to have accelerated natural attenuation processes and has resulted in an additional decrease in contaminant concentrations at many sampling locations. An evaluation of contaminant plume stability indicates that the contaminant plumes are stable and/or decreasing in area, concentration, and mass. The remediation system is anticipated to be optimized such that remediation efforts continue to remain effective and move the project toward closure.