Site Characterization Work Plan

Blanco North Flare Pit

Bloomfield, San Juan County, New Mexico

Prepared for

El Paso CGP Company, LLC
1001 Louisiana Street, Room 956I
Houston, Texas 77002

El Paso
CGP Company, L.L.C.
a Kinder Morgan company

May 2014

CH2MHILL®
3721 Rutledge Road, Suite B-1
Albuquerque, NM 87109

Contents

Acronyms and Abbreviations

AS	Air Sparge
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CLP	Contract Laboratory Program
COC	contaminant of concern
EPCGPC	El Paso CGP Company, LLC
EPNG	El Paso Natural Gas
F	degrees Fahrenheit
ft.	feet
HSP	Health and Safety Plan
LNAPL	light non-aqueous phase liquid
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MW	Monitoring Well
NMOCD	New Mexico Oil Conservation Division
NMOSE	New Mexico Office of the State Engineer
NMWQCC	New Mexico Water Quality Control Commission
PVC	polyvinyl chloride
SOW	Statement of Work
SW	sparge well
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1 Introduction

This Site Characterization Work Plan is prepared to describe activities to identify the nature and extent of environmental impacts at the Blanco North Flare Pit Site ("Blanco North") that resulted from historical operations. The work will incorporate and utilize data gathered during the previously completed document review, meetings with El Paso CGP Company, LLC (EPCGPC), the initial conceptual site model and site visit conducted on August 28, 2013. Investigation of both soil and groundwater is proposed.

1.1 Site Location

The Blanco North site is located in Section 14, Township 29-N, Range II-W, San Juan County, New Mexico, approximately 1.5 miles northeast of the town of Bloomfield, New Mexico on the north side of San Juan County Road 4900. The Blanco North site portion or the Blanco Gas Plant is used for gas gathering activities, with no active gas processing located on this portion of the facility. The facility is primarily owned and operated by Enterprise Products, and Kinder Morgan operates natural gas compression facilities in one area of the facility. Surrounding land use includes ranching, farming, and oil and gas production and transmission. The Blanco North site is shown on Figure 1.

1.2 Summary of Previous Investigations

In 1985, the New Mexico Oil Conservation Division (NMOCD) issued a directive for oil and gas producers to cease discharging production fluids to unlined surface impoundments (pits) located in the groundwater recharge areas of the San Juan Basin and major river drainages to the San Juan, Animas, and La Plata Rivers. Once discharge had ceased, producers were required to investigate and remediate soil and groundwater contamination caused by these pits.

In 1987, the New Mexico Environmental Improvement Division (currently the New Mexico Environment Department) conducted a site inspection at the Blanco North Plant and recommended further investigation to support the submittal of a groundwater discharge plan application. One monitoring well (MW-2) was installed and sampled in 1988. In January 1990, a second monitoring well (MW-19) was installed closer to the North Flare Pit. This well contained an oily sheen on the groundwater and detected levels of benzene, toluene, ethylbenzene, and xylene (BTEX) levels above New Mexico Water Quality Control Commission (NMWQCC) standards (MWH, 2012).

In February 1992, hydrocarbon-contaminated soils were excavated and removed from the North Flare Pit. El Paso Natural Gas (EPNG) subsequently submitted a work plan to the New Mexico Oil Conservation Division (NMOCD) describing activities for a subsurface investigation of the North Flare Pit. The field investigation was conducted in September and October of 1992. Five groundwater monitoring wells were installed (MW-20, MW-23, MW-24, MW-26, and MW-27) to the south of the North Flare Pit. Several additional soil borings were also advanced in the area, however, significant groundwater was not encountered and these additional borings were not completed as monitoring wells. Light non-aqueous phase liquid (LNAPL) (as much as 3.6 feet thick) was encountered in MW-19, MW-26, and MW-27. Also, BTEX concentrations above NMWQCC standards were detected in MW-23 and MW-24. The 1992 investigation suggested two possible sources for hydrocarbon contamination: the North Flare pit and the original Evaporation Pond, which was formerly an unlined pit. LNAPL analysis during this investigation showed a strong correlation with typical pipeline drip, which was known to have been discharged to both the North Flare Pit as well as the former unlined pit (MWH, 2012).

Removal of LNAPL from MW-19 and MW-26 was initiated by EPNG in 1993 and continued through June 1995 together with the periodic groundwater monitoring. By August 1995, LNAPL was not detected in any of the wells. EPNG subsequently submitted a sampling plan to NMOCD in September 1995 that included proposals to remediate BTEX impacts with the addition of nitrate, monitor groundwater quarterly, and then abandon the monitoring wells once it was demonstrated that concentrations remained consistently low. This work plan was not approved by the NMOCD. In October 2001, sludge from the lined evaporation pond was excavated and removed. At that time, the primary liner was pulled back and soil samples were collected from depths of 1 to 4

feet and analyzed for petroleum hydrocarbons using United States Environmental Protection Agency (USEPA) Method 8015 Modified. Petroleum hydrocarbons were not detected in any of the soil samples.

In May 2006, three additional monitoring wells were installed (MW-31, MW-32, and MW-33) in an effort to characterize the site. Within weeks, monitoring well MW-32 was exhibiting a significant LNAPL presence; and a maximum static LNAPL thickness of 12.2 feet was measured in August 2006.

The most recent site-wide groundwater monitoring and LNAPL recovery event was completed in December 2013 (CH2M HILL, 2014). Groundwater was present only in monitoring wells MW-23, MW-32, and MW-33. Wells MW-24, MW-26, MW-27, and MW-31 were dry during the 2013 sampling event, but were not dry during the last sampling event completed by MWH in late 2011 (MWH, 2012), indicating continuing decreases in the local shallow groundwater table. Concentrations of BTEX exceeding the NMWQCC standards were found in monitoring wells MW-23 and MW-32, located in the northern portion of the site. Concentrations of benzene and xylenes at these two wells exceeded the NMWQCC standards of 0.01 milligram per liter (mg/L) and 0.62 mg/L, respectively. Benzene and xylenes were also detected in MW-33, but did not exceed the NMWQCC standards.

1.3 Summary of Previous Removal Actions

In July, 2002, El Paso Field Services provided a work plan proposing installation and operation of a pilot air sparging (AS) system near monitoring wells MW-19 and MW-26 to facilitate groundwater remediation (MWH, 2002). NMOCD provided final approval of the work plan in February 2003. One AS well (SW-1) was installed to the north of monitoring well MW-26 to remediate dissolved-phase hydrocarbon impacts and reduce BTEX concentrations to below NMWQCC standards. The AS system operated on a 12-hour on/off cycle, in order to periodically break up the developed airflow channels in the formation. While running, the AS system injected approximately 5 to 10 standard cubic feet per minute of air at a pressure of 2 pounds per square inch gauge pressure. The system typically ran between 11 and 12 hours per day, with the exceptions of downtime due to electrical supply and maintenance-related issues, and quarterly brief shutdowns during groundwater monitoring events.

At the same time operation of the AS system began (early 2003), approximately 1.4 feet of LNAPL was discovered in MW-26. In April 2003, a skimmer pump was installed in MW-26 and LNAPL removal was initiated. As of July 2003, approximately 3.1 gallons of LNAPL had been removed from MW-26. During the 2011 annual monitoring event, no significant occurrence or accumulation of LNAPL was detected in MW-26 or any other site wells except for monitoring well MW-32, discussed below.

In September 2006, a pneumatic skimmer was installed in MW-32. The skimmer operated for one year, recovering approximately 27 gallons of LNAPL. In response to minimal ongoing LNAPL recovery rates, the skimmer was replaced by passive LNAPL-absorbing socks.

During a biweekly operations and maintenance visit in June 2009, the AS compressor was found to be non-operational. Following 6 years of operation, AS operations were suspended at that time to evaluate the area for hydrocarbon LNAPL rebound. The system has been shut-down since that time.

In August 2011, it was determined that several feet of recovered groundwater and condensate remained in a 210-barrel aboveground storage tank (AST) located near the AS pilot system building. The fluids had been recovered in the 1990's as part of previous remedial activities that were conducted at the time. A vacuum truck was used to remove the fluids and transport them off-site to a commercial waste disposal facility. In the fall of 2013, the 210-barrel AST was toppled during flooding in the arroyo. The AST was subsequently decommissioned and removed from the site. The remaining remediation infrastructure remains at the site, although generally in disrepair and out of service and will be removed as part of the site characterization activities discussed in this plan.

1.4 Current Regulatory Status

EPCGPC is responsible for the Blanco North site. This site is regulated through the New Mexico Oil Conservation Division (NMOCD), generally under the provisions of Ground Water Discharge Permit GW-049. Previous

groundwater monitoring activities were initiated pursuant to a NMOCD letter dated May 3, 2002, regarding remediation activities at the Blanco Plant.

2 Current Site Activities

Current environmental activities are being conducted by EPCGPC. Numerous phases of investigation, monitoring, remediation, and reporting have been conducted over the last 10 to 20 years at this site. Site investigations, groundwater and product monitoring, and remediation activities are being performed under various letters, reports, and work plans from EPCGPC and its predecessors, with approvals from NMOCD. All groundwater analytical results will be compared to NMWQCC groundwater standards.

From 2003 until 2011, environmental infrastructure maintenance and monitoring visits were generally conducted every two weeks; and groundwater monitoring was initially conducted on a quarterly basis and then reduced to annual monitoring (MWH, 2012). The most recent annual groundwater monitoring was completed in December 2013 (CH2M HILL, 2014).

2.1 Current Site Monitoring Infrastructure

Based on a review of available monitoring reports and site visit, there are nine monitoring wells and one AS well at the Blanco North site, which were installed to monitor/remediate the shallow aquifer at the site. Table 2-1 provides a summary of the current status of each of the wells.

Table 2-1. Summary of Existing Monitoring Well Information at the Blanco North Site

Well Identification	Comments
SW-1	Air sparge well. Operated 2003 until 2009. Total depth well – 75.5 ft. bgs
MW-2	Furthest downgradient MW for the Blanco North Site Dry and not sampled since 11/9/2000 No exceedances of NMWQCC standards for BTEX since 1/15/1990 and 8/22/1994, the last time it was sampled before purging dry Detections since installation (Benzene: 6.2 µg/L in 9/29/1993, Ethylbenzene: 0.7 µg/L in 6/18/1991, Total Xylenes: 0.9 µg/L in 6/18/1991 Total depth well – 57.5 ft. bgs
MW-19	Not sampled since well was damaged in 2006 Between 1990 and 2006, exceeded NMWQCC standards each year for benzene; ethylbenzene 2/25/1993 - 6/2/2003; and total xylenes: 2/25/1993 - 6/10/1993 Located downgradient of wells which have reported NMWQCC exceedances Total depth well – 66 ft. bgs
MW-23	Exceeded NMWQCC standards for benzene 9/25/92 - 8/31/11; and xylenes 1992 - 2003 and 2006 - 2011; Periodic detections of ethylbenzene and toluene 1992 – 2011 Increase of benzene concentrations since installation Located downgradient of wells which have reported NMWQCC exceedances Total depth well – 69 ft. bgs
MW-24	Dry and not sampled since 6/2/2003 Exceeded NMWQCC standard for benzene between 9/25/1992 - 5/30/2002; Periodic exceedances for total xylenes 1992 - 1994; toluene and ethylbenzene detections 1992 – 2002 This well is downgradient of wells which have reported NMWQCC exceedances Total depth well – 67 ft. bgs
MW-26	Exceeded NMWQCC standard for benzene between 10/13/1992 - 2/21/2006; Total xylenes exceedances between 10/13/92 - 5/30/02; Periodic detections for BTEX between 6/10/1993 to 8/31/2011 Located downgradient of areas which have reported NMWQCC exceedances Dry in December 2013

	Total depth well – 68 ft. bgs
MW-27	Exceeded NMWQCC standard for benzene and xylenes between 2/26/1993 and 2004 sampling events; Periodic detections for BTEX between 2/26/1993 - 2/22/2011 Downgradient of areas which have reported NMWQCC exceedances Dry in December 2013 Total depth well – 67 ft. bgs
MW-31	Exceeded NMWQCC standard for benzene in February 2008 and May 2009 Well was dry between 8/21/2008 - 8/25/2010 except for 5/11/2009 when BTEX was detected, due to water available for sample collection; Well has not been sampled since 8/25/2010 Periodic detections for BTEX between 5/29/2007 - 5/22/2008 and 5/11/2009 Downgradient of areas which have reported NMWQCC exceedances Dry in December 2013 Total depth well – 71.5 ft. bgs
MW-32	Located within the Former North Flare Pit Exceeded NMWQCC standards between 8/26/2009 - 2/22/2011 for benzene, toluene, and xylenes Furthest upgradient well at Blanco North site Total depth well – 80 ft. bgs
MW-33	Exceeded NMWQCC standard for benzene in 2006; BTEX detections between 6/8/2006 - 8/31/2011 Downgradient/side gradient of areas which have reported NMWQCC exceedances Total depth well – 80.8 ft.

3 Site Physical Setting

The Blanco North site is located on the eastern Colorado Plateau with an average elevation of 5,500 feet above mean sea level and has a semi-arid climate. The site vicinity experiences hot summers and cold winters with low precipitation throughout the year. The average annual snowfall is 12.3 inches and the average annual rainfall is 8.6 inches. The highest average temperatures occur in July (90 degrees Fahrenheit [F]) and the lowest average temperatures occur in January (20 degrees F).

The site is underlain by Quaternary alluvium, which consists of sand, silt, clay, and gravel. At the Blanco North site, the thickness of the alluvium varies from less than 3 feet to more than 75 feet (EPNG, 1989). Beneath the alluvium is the Tertiary Nacimiento Formation, which consists of interbedded coarse-to-medium-grained arkosic sandstone, siltstone, and shale, which were reportedly deposited as channel fill and floodplain deposits (EPNG, 1989).

An initial assessment of site hydrogeology and groundwater resources of the Blanco North site was conducted by EPNG in 1989 (EPNG, 1989). It was reported that orientation of the channel-fill sandstone deposits may control groundwater flow due to higher hydraulic conductivities through those features. The average hydraulic conductivity was estimated to be 2.1 x 10-4 centimeters per second. Depth to groundwater was reported to range from 9 to 50 feet bgs at that time.

In 1992, Burlington Environmental conducted a hydrogeologic investigation specific to the North Flare Pit area (Burlington, 1992). Eight borings were drilled in the area to the south of the North Flare Pit. The borings were advanced through approximately 19 feet of silty/clayey sand, underlain by silty/sandy clay with laminated siltstone and mudstone. In the MW-24, MW-26, and MW-27 borings, a sand layer with gravel and clay was encountered just above the sandstone bedrock, possibly indicating a relict channel feature. Similarly, a thick sandy unit was encountered in the MW-19 boring (K.W. Brown, 1990). Sandstone was encountered at depths ranging from approximately 50 to 70 feet bgs, with the greatest depths occurring beneath the possible relict channel feature. All borings reportedly terminated in gypsum-cemented sandstone that the report characterized as an

apparent aquitard. Groundwater saturation was encountered either within or just above the sandstone, depending on the location.

Based on the available data collected during the 2011 annual monitoring from monitoring wells MW-2, MW-19, and MW-27, groundwater potentiometric surface elevations, at least within the apparent relict channel, were reported to have decreased by approximately 15 feet since the initial environmental investigation in 1988 (MHW, 2012). It was suggested that infiltration from the former North Flare Pit and/or the original unlined evaporation pond functioned as groundwater recharge. However, it was also reported that the groundwater potentiometric surface elevation in monitoring well MW-23 remained stable since 1992. In their report, MWH suggested that water level stability or rise appeared to be a common pattern among monitoring wells (i.e., MW-23 and MW-32) that are located away from the apparent relict channel, in locations where the encountered competent bedrock surface is higher. It was concluded that if a hydraulic connection exists, between groundwater encountered higher in the bedrock with groundwater occurring in the apparent relict channel, it is currently not well understood (MWH, 2012).

The 2013 groundwater monitoring event (CH2M HILL, 2014) indicated that groundwater was present only in monitoring wells MW-23, MW-32, and MW-33. Monitoring well MW-19 was reported damaged in 2006 (MWH, 2012). MW-2 has been dry since at least 2000. Additionally, monitoring wells MW-24, MW-26, MW-27, and MW-31 were dry during the 2013 sampling event, but were not dry during the last sampling event completed by MWH, indicating continuing decreases in the local shallow groundwater table. Although LNAPL has been previously observed in monitoring wells at the site, no measurable LNAPL was found in the wells during the December 2013 monitoring event. Based on the calculated groundwater elevations, the overall groundwater gradient is approximately 0.035 – 0.036 foot per foot, with the overall direction of groundwater flow to the south. The gradient and groundwater flow direction were consistent with that noted in previous reports.

4 Data Gaps and Proposed Site Characterization Activities

Table 4-1 provides a summary of data gaps identified at the Blanco North site and corresponding site characterization activities to address data gaps. These locations have been selected to delineate known areas of contamination. The results of these site characterization activities will guide potential investigation of additional delineation locations and other potential sources, if identified.

Table 4-1. Summary of Data Gaps and Proposed Site Characterization Activities

Identified Data Gap	Proposed Site Characterization Activities
Insufficient soil characterization data in the vadose zone in the vicinity of MW-32.	- Drill and sample six soil borings in the vicinity and peripheral to the former North Flare Pit and MW-32 (see Figure 1) to evaluate the presence of LNAPL in the vadose zone near MW-32 and evaluate what actions are needed, if any, for the site to be appropriate for closure.
Reported groundwater declines have resulted in dry wells from which groundwater potentiometric surface measurements and groundwater samples cannot be collected.	- Abandon MW-2, MW-19, MW-24, MW-26, MW-27, and MW-31 which are reported dry or damaged and replace with new wells that are screened to monitor shallow groundwater and provide information regarding groundwater gradient. Also, the AS well SW-1 will be abandoned because it is no longer in use.
Uncertainty regarding groundwater gradient, flow direction, and hydrocarbon impacts at the Blanco North site.	- Collect and evaluate water level measurements from wells that still have saturated well screens - Install nine new monitoring wells in a much wider area to evaluate groundwater elevation, flow direction, and hydrocarbon impacts (see Figure 1) - Survey new and remaining monitoring wells for elevation and location **Proposed Wells** - Install one upgradient monitoring well at or near the northern property boundary to serve as upgradient data point - Install two monitoring wells downgradient of MW-32 - Install one monitoring well downgradient of the former evaporation ponds, east of MW-31 - Install one monitoring well just north-northeast of MW-19 - Install one monitoring well north-northeast of MW-24 - Install one monitoring well on the southwest side of the arroyo, downgradient of the former flare pit and former evaporation ponds, roughly southwest of MW-26 - Install one monitoring well between MW-33 and MW-2 - Install one replacement monitoring well for MW-2
Uncertainty regarding the currently identified contaminants of concern (COCs).	- Submit soil and groundwater samples for analysis of VOCs using USEPA Method 8260

Identified Data Gap	Proposed Site Characterization Activities
Lack of information regarding the hydraulic connection between the unconsolidated deposits and underlying sandstone bedrock.	- Complete correlation of soil lithology from borings and hydrogeologic evaluation of water levels across the site - Install monitoring well screens at depth intervals to better assess the hydraulic relationship between the unconsolidated materials and sandstone bedrock

5 Site Characterization Field Activities

5.1 Notifications and Site Access

Kinder Morgan and Enterprise Products are the current site operators. Both of these organizations will be informed of the planned drilling program to confirm that there are no concerns with the proposed work locations. Should conflicts with facility operations be identified, attempts will be made to move the proposed drilling location to a technically sound alternate location that is agreeable to all parties.

Prior to the start of field operations, the NMOCD Environmental Bureau will be notified of the planned investigation activities and abandonment of existing monitoring wells. This notice will be provided at least four weeks prior to the start of field operations to allow for NMOCD response.

Prior to the abandonment of any existing monitoring well, a Well Plugging Plan of Operations will be filed with the New Mexico Office of the State Engineer (NMOSE). The NMOSE will review and approve the Plan.

Prior to the installation of any new monitoring wells, well permits will be obtained from the NMOSE. The Plan and well permit processes should be initiated no less than 30 days prior to the anticipated start of field operations.

5.2 Site Preparation

Health and Safety Plan

The existing Health and Safety Plan (HSP) will be updated for the Blanco North site to define the procedures and requirements for the health and safety of CH2M HILL staff and visitors when they are physically on the work site. The site includes the project area and associated oil and gas processing infrastructure, and support facilities thereon, as applicable. The HSP will be developed in conformance with Occupational Safety and Health Administration (OSHA) Code of Federal Regulations (CFR) 1910.120 to describe methods to be used to minimize risk resulting from environmental conditions and incorporate safety requirements into all phases of the work by minimizing hazards. The HSP adopts, by reference and as appropriate, the Standard Operating Procedures in the CH2M HILL Corporate Health and Safety Program and Contractor Safety guidelines.

The HSP developed for the groundwater monitoring activities will be amended to describe the procedures for additional site characterization activities to include hollow-stem auger and air rotary drilling operations, installation of soil borings and collection of soil samples for field screening and laboratory analysis, abandonment of several existing monitoring wells, installation of new monitoring wells, location and elevation surveys of soil borings, monitoring wells, and other site features.

- Site operations will be coordinated with the EPCGPC project manager and local Kinder Morgan and Enterprise Products field operations personnel.
- Copies of up to date Material Safety Data Sheets for all chemicals brought to the Blanco North site will be maintained onsite in a location where employees may easily access them for reference.
- The HSP will include a Vehicular Traffic Control Plan as an appendix. This document will be provided to Kinder Morgan. This document will include the location of all project deliveries, and equipment staging areas.

- CH2M HILL and subcontractor vehicles will contain a first aid kit equipped with bloodborne pathogen protection kits.
- CH2M HILL and subcontractor heavy equipment operators will be trained and qualified in compliance with ISNetworld Safety Program.
- CH2M HILL and subcontractor personnel will be required to don hardhat, safety glasses, fluorescent-color safety vests, hearing protection, steel-toed boots and fire-retardant clothing while working at the Blanco North site.
- Activity Hazard Analysis (AHAs) will be developed by CH2M HILL and subcontractors to review and identify work procedures and identify hazards prior to performing a field operation. The AHA is then reviewed during work to address issues that may have developed after the start of the operation or a change in personnel during the operation. Once the hazards of an operation are known, proper solutions or controls can be developed to eliminate the potential for injury.
- CH2M HILL and subcontractor personnel will be required to review the Kinder Morgan Contractor Environmental /Safety Manual and sign and date the site Safety Policy document.
- CH2M HILL and subcontractor field personnel will complete the CH2M HILL site-specific training before the start of fieldwork. This training will include a discussion of site entry/exit procedures, locations of support facilities, and potential site hazards.

Site Layout

The location coordinates for the soil borings and monitoring well locations will be taken from the site plans using geographic information system tools. The locations will then be accurately located in the field using a handheld global positioning system tool. Once identified, the locations will be staked with wood lath and flagged with fluorescent survey ribbon. Plans for ingress and egress to work location will be addressed in accordance with the Vehicular Traffic Control Plan. A portable toilet will be staged in the vicinity of the work area for use by site workers.

Also, the location of the equipment staging, vehicle parking, and equipment decontamination areas will be established.

Vegetation Clearance

To access some of the proposed soil boring and monitoring well installation locations, vegetation clearance may be required. Vegetation will be cleared to a height between three and six inches above the ground surface using man-portable weed-whackers. Vegetation clearance will be limited to cutting of brush, vines, small trees and tree limbs that would directly impede the movement of the drill rig, service vehicles and site personnel. Cut vegetation will be moved from the work areas so as not to impede field activities.

Utilities Clearance

Subsurface utility clearance will occur at soil boring and monitoring well installation locations. The general areas to be cleared will be clearly marked, and will include a 10-foot radius surrounding each proposed boring/well installation location. Utilities will be located and marked prior to drilling activities. Underground utilities will be marked as appropriate for each utility, (e.g.; electrical, gas, water or communication). Markings will be clearly visible with spray paint and/or pin flags capable of withstanding inclement weather and normal wear.

Once utility clearance has been completed using remote sensing tools, each drilling location will be cleared to a depth of 7 feet bgs using air knifing or water jet techniques. Each borehole will be cleared to the full diameter of the drilling tools (i.e., hollow stem auger outside diameter).

5.3 Well Abandonment and Replacement

Six existing monitoring wells and one existing AS well will require abandonment due to declining groundwater levels or damage, which prevent water level measurements and sampling. The wells will be abandoned in accordance with procedures specified by the NMOCD – Environmental Bureau, and the NMOSE.

The seven wells to be plugged and abandoned include the following:

- SW-1 (Not Used)
- MW-2 (Dry)
- MW-19 (Damaged)
- MW-24 (Dry)
- MW-26 (Dry)
- MW-27 (Dry)
- MW-31 (Dry)

Wells will be abandoned by backfilling the well casing and screen with a cement-bentonite grout slurry consisting of ≥95% Portland cement and ≤5% sodium bentonite. The grout will be emplaced in the PVC screen and casing using a tremie pipe. The entire surface components (i.e., well pad, protective casing, PVC casing) of the wells will be demolished and removed and the upper three feet of the well will be filled with a Portland cement plug. The cement plug will be finished flush with the ground surface.

Due to the non-optimal placement of the existing monitoring wells, the existing wells will not be directly replaced with monitoring wells at the same locations. Rather, eight new wells will be installed throughout the Blanco North site to provide significantly improved hydrogeologic and hydrocarbon distribution information.

5.4 Drill and Sample Soil Borings

Six soil borings will be drilled and sampled in the vicinity of the former North Flare Pit and MW-32 (see Figure 1) to evaluate the presence and potential source of LNAPL in the vadose zone near MW-32 and evaluate what actions are needed, if any, for the site to be appropriate for closure. Six additional soil borings will be completed downgradient of the former North Flare Pit and former Evaporation Ponds. A total of twelve soil borings will be completed.

The soil borings will be completed using hollow-stem auger (HSA) drilling techniques (see Figure1 for soil boring locations) and if needed to penetrate bedrock, air rotary methods. Soil samples will be collected using a procedure that allows for undisturbed soil cores to be continuously obtained for logging, screening, and sampling. The average depth of borings is expected to range from 60 to 80 feet bgs based on previous drilling logs, but may be drilled up to a depth of 100 feet below ground surface, depending on the depth in which saturated conditions are encountered. The drilling method may switch to downhole rotary methods, using the augers as a surface casing if needed, to penetrate into the underlying competent bedrock if contamination is indicated to be present at that depth.

Soil samples for laboratory analysis will be collected every ten feet from the soil boring to the total depth in soil or until bedrock is encountered, whichever is shallower. Sample collection intervals will be modified in the field based on observations including staining, odors, or headspace readings. Collected soil samples will be immediately placed into a laboratory-certified clean glass jars. If required, additional soil or sediment will be collected in a plastic bag for lithologic description and headspace reading. Each sample will be described using Unified Soil Classification System (ASTM International D-1452, D-2487, and D-2488). A photoionization detector will be used to indicate the presence of VOCs in the soil by measuring the VOCs in the headspace of the bag.

Once the sample is collected, the sample container will be capped. The exterior of each sample container will be wiped clean of dirt and moisture using a paper towel. The sample will be properly labeled and logged onto chain-of-custody and field sampling form. A custody seal may be placed on the sample container or the insulated shipping package. The sample will be placed in an insulated container maintained at 4 degrees Celsius and submitted to a laboratory for analysis.

Soil samples will be analyzed via the following:

- BTEX using USEPA SW-846 Method 8260B

Should unknown materials or discolored soils be discovered during soil boring activities, the need to evaluate additional COCs will be discussed with EPCGPC and may warrant the collection of additional soil samples and additional analysis, including waste characterization samples to determine proper disposal procedures for these materials.

Nine of the 12 soil borings are planned to be completed as monitoring wells, following the procedures described in Section 5.5. For the three soil borings that will not be completed as monitoring wells, at the conclusion of drilling and soil sampling, each soil boring will be backfilled using a cement-bentonite grout slurry consisting of ≥95% Portland cement and ≤5% sodium bentonite. The grout will be emplaced in the borehole using a tremie pipe and the augers will be removed from the borehole as the grout is being placed.

Once final soil sample results are received from the analytical laboratory, CH2M HILL will perform data quality assessment, or validation, on 100 percent of the samples analyzed. The analytical data will be reviewed and validated by CH2M HILL chemists, in accordance with the following documents:

- USEPA Test Methods for Evaluating Solid Wastes, SW-846, Revision 6 (2007)
- USEPA Contracts Laboratory Program (CLP) National Functional Guidelines for Evaluating Organic Data Review (June 2008)

Sample results will be subject to a Level IV data review that includes an evaluation of the following QC parameters:

- Data Completeness
- Holding Times and Preservation
- Calibrations
- Blank Analysis Results
- Analytical reporting limits, method detection limits, and limits of detection
- Surrogate Recoveries
- Laboratory Control Sample Results
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Field Duplicates
- Laboratory Spike Results
- Sample Result Verification
- Overall Assessment

A data validation memorandum will be prepared that summarizes the results of the data review. The report will be appended to the Site Characterization Report.

The New Mexico Soil Screening Levels and USEPA Regional Screening Levels (RSLs) for BTEX are shown on Table A-1 of Appendix A for the Blanco North soil sample analytes. Soil sample concentrations will be evaluated against each of the screening criteria.

5.5 Monitoring Well Installation

Soil borings for monitoring well installation will be drilled and sampled in accordance with the procedures described in Section 5.4 minus the backfilling procedures. Monitoring wells will be constructed so that the

screened interval intersects the top of shallow groundwater, as determined from examination of soil boring samples. Each 4-inch diameter PVC well will be equipped with 50 ft. of 0.010-inch mill slot screen. Approximately 15 feet of screen will be installed above the top of shallow groundwater to allow for possible potentiometric surface fluctuations.

The proposed wells to be installed include the following:

- Install one upgradient monitoring well at or near the northern property boundary to serve as upgradient data point
- Install two monitoring wells downgradient of MW-32
- Install one monitoring well downgradient of the former evaporation ponds, east of existing well MW-31
- Install one monitoring well north of existing well MW-19
- Install one monitoring well just southeast of existing well MW-26 and north of existing well MW-24
- Install one monitoring well on the southwest side of the arroyo, downgradient of the former flare pit and former evaporation ponds
- Install one monitoring well between MW-33 and MW-2
- Install one replacement monitoring well for MW-2

Monitoring wells will be identified using a 40-series designation (i.e., MW-40, MW-41, etc.) to avoid confusion with existing wells at both the Blanco North and adjacent sites.

The new monitoring wells will be constructed as follows:

- Schedule 40 PVC 4-inch blank casing – land surface to top of the screen interval,
- Schedule 40 PVC 4-inch 0.010-inch mill slot screen – a total screen length of 50 feet with approximately 15 feet above the top of noted saturated conditions in borings.

Sand pack material properties will be selected to match screen slot size and will be installed in the annular space surrounding the well screen to approximately 1 foot above the top of the screen. The well screen will be swabbed during placement of the sand pack to settle the sand until the sand is 1 foot above the top of the screen. A 1-foot-thick hydrated bentonite chip or pellet seal will be installed above the sand pack, followed by bentonite slurry grout to approximately 1 foot bgs. Above-ground wellheads will be constructed at each location, and will consist of a 5-foot-long (approximately 3 feet of which will remain above ground) 8-inch-diameter steel wellhead protective casing set in a 3-foot by 3-foot by 6-inch-thick concrete pad. Wellhead completions will have a unique well identification number/name inscribed in the concrete pad or permanently affixed to the well. Wells located outside of the plant property boundary will be secured with keyed locks.

Following monitoring well installation, all new wells will be swabbed, bailed, and purged until field measurement of turbidity stabilizes, or until five well casing volumes have been removed, whichever is less. Purge water will be containerized in 55-gallon drums, sampled for characterization to determine the appropriate disposal method, and transported to the on-site designated staging area.

5.6 Decontamination

The drilling rig and support equipment will arrive at the site clean and ready for drilling activities. Decontamination of augers, drilling rods, casings, downhole equipment, etc. will be decontaminated between drilling soil boring/well installation locations and at the completion of all site work to avoid site cross-contamination and off-site transport of contamination. Decontamination will consist of Liquinox/Alconox solution wash/scrub, potable water high pressure wash, hot water rinse (steam cleaning) and water rinse. A decontamination pad area will be constructed to contain all overspray, liquids and solids generated during decontamination procedures. Decontamination fluids will be containerized and transported to the onsite staging

area on a daily basis. Upon completion of drilling activities, the temporary decontamination pad will be removed and properly disposed.

5.7 Site Characterization Groundwater Sampling

Groundwater samples for site characterization will be collected from the new and existing monitoring wells no sooner than 48 hours following the completion of development of the new wells. Groundwater levels will be measured at all Blanco North wells to map and evaluate the current potentiometric surface and assess current groundwater flow direction.

Sampling will be conducted using HydraSleeve™ sampling equipment. The HydraSleeve™ is classified as a no-purge (passive) grab sampling device, meaning that it is used to collect ground-water samples directly from the screened interval of a well without having to purge the well prior to sample collection. The HydraSleeve™ causes no drawdown in the well (until the sample is withdrawn from the water column) and only minimal disturbance of the water column, because it has a very thin cross section and it displaces very little water (<100 ml) during deployment in the well. The HydraSleeve™ collects a sample from within the screen only, and it excludes water from any other part of the water column in the well through the use of a self-sealing check valve at the top of the sampler. It is a single-use (disposable) sampler that is not intended for reuse, so there are no decontamination requirements for the sampler itself. Any purge or excess water generated during sampling will be containerized in 55-gallon drums, sampled for characterization to determine the appropriate disposal method, and transported to the on-site designated staging area.

During sample collection, the following field parameters will be collected from groundwater and surface water:

- Dissolved oxygen
- pH
- Electrical Conductivity (EC)
- Temperature

Samples from new and existing wells at the Blanco North site will be submitted to the analytical laboratory for the following analyses:

- VOCs using USEPA SW-846 Method 8260B.
- Nitrate plus nitrite using USEPA Method 353.2.for samples from the replacement well for MW-2, the new well between MW-2 and MW-33, and MW-33 (three samples total)

Laboratory MS/MSD samples will be collected for the laboratory to assess accuracy, precision, and matrix interference of the groundwater samples. These samples will be collected in the same manner as duplicate samples and are labeled extra volume samples for MS/MSD. Quality control duplicate samples will be collected at a rate of approximately 10% of the total number of samples at the Blanco North Site to assess the total precision of field and laboratory components of the monitoring event. Also, equipment rinsate samples and trip blanks will be collected to assess field operations and sample transport.

Once final results are received from the analytical laboratory, CH2M HILL will perform data quality assessment, or validation, on 100 percent of the samples analyzed. The analytical data will be reviewed and validated by CH2M HILL chemists, in accordance with the following documents:

- USEPA Test Methods for Evaluating Solid Wastes, SW-846, Revision 6 (2007)
- USEPA CLP National Functional Guidelines for Evaluating Organic Data Review (June 2008)

All groundwater sample results will be subject to a Level IV data review discussed in Section 5.4.

The New Mexico Groundwater Standards and USEPA Regional Screening Levels (RSLs) for VOCs and nitrate plus nitrite are shown on Table A-2 and Table A-3 of Appendix A. Groundwater sample concentrations will be evaluated against each of the screening criteria.

5.8 Management of Investigation Derived Wastes

Investigation-derived waste (IDW) generated during the well abandonment including PVC pipe, concrete pads, and protective casings will be moved by drilling subcontractor to a central staging area and placed in rolloff containers for off-site recycling or disposal facility as appropriate.

Unconsolidated soil cuttings generated during drilling activities, including solids from decontamination, will be containerized in rolloff containers for bulk storage and transport to an offsite disposal facility. Samples will be collected from the IDW to characterize the waste and determine the appropriate disposal method.

Water generated during well development, purging and decontamination activities will be containerized in DOT-approved 55-gallon steel drums for off-site disposal. Samples will be collected to characterize the waste water and determine the appropriate disposal method.

Rubbish, personal protective clothing, and other waste materials generated during field activities will be placed in an onsite trash receptacle.

5.9 Surveying

The new and existing well locations at Blanco North will be surveyed for horizontal location and elevation. The surveying will be completed by a New Mexico licensed surveyor. The center of each well casing will be surveyed for horizontal location relative to New Mexico State Plane coordinates and the ground surface top of the PVC well casing will be surveyed relative to elevation in feet above mean sea level to the neared 0.01 feet.

The horizontal location and elevation of soil borings that were not completed as monitoring wells will be determined using a hand-held Differential Global Position System devices.

5.10 Remediation Infrastructure Decommissioning and Disposal

The following environmental remediation infrastructure is currently present at the Blanco North site but no longer in service:

- Electrical wiring which was connected to the former liquid storage above-ground storage tank
- Three steel/metal storage sheds (approximately 5’ x 8’ x 8’) which contained the AS system equipment and one which houses MW-32
- Electrical drop box mounted on the outside of the AS system storage shed
- Two metal housings (approximately 5’ in diameter and 4’ in height) at MW-19 and MW-27. It appears that these were installed to protect the wellheads and remediation equipment from flood water damage
- Two polyethylene storage tanks (each approximately 250 gallons)

The above listed items will be decommissioned, removed, and transported to an offsite recycling or disposal facility, as appropriate.

5.11 Site Characterization Report

Once the field activities have been completed, draft and final versions of a Site Characterization Report will be prepared for the Blanco North site to summarize the results of soil boring, soil sampling, and monitoring well installation and abandonment. The Site Characterization Report will include a presentation of field observations and tabular summary of all soil and groundwater laboratory analytical results. The report will also summarize the results QC sampling performed as part of the field program.

Following incorporation of EPCGPC review comments, CH2M HILL will submit the reports to NMOCD for review and approval or comment. If comments are received, CH2M HILL and EPCGPC will discuss and decide upon the appropriate response. The agreed upon response to NMOCD comments will be submitted to NMOCD.

6 Site Monitoring

6.1 Quarterly Monitoring of Water Levels and Product Levels

Depth to groundwater and depth to LNAPL measurements will be collected on a quarterly basis for the first year to evaluate seasonal fluctuations in fluid elevations and any corresponding impacts to groundwater flow direction.

6.2 Semi-Annual Groundwater Monitoring

Groundwater monitoring activities at the Blanco North site will be conducted twice per year, and will occur in April-June and October-December timeframes. Field operations will be conducted by two field personnel. All site operations will be coordinated with the EPCGPC project manager and local Kinder Morgan and Enterprise Products field operations personnel.

Field operations will be conducted by two field personnel. All site operations will be coordinated with the EPCGPC project manager and local Kinder Morgan and Enterprise Products field operations personnel.

Field operations will commence by collecting water level measurements from all monitoring well locations. Groundwater samples will be collected using HydraSleeve no-purge groundwater samplers discussed in Section 5.6. All water level measurement probes will be decontaminated prior to each measurement. Samples from wells at the Blanco North site will be submitted to the analytical laboratory for:

- VOCs using USEPA SW-846 Method 8260B
- Nitrate plus nitrite using USEPA Method 353.2.for samples from the replacement well for MW-2, the new well between MW-2 and MW-33, and MW-33 (three samples total)

In addition, laboratory MS/MSD samples will be collected for the laboratory to assess accuracy, precision, and matrix interference of the groundwater samples. These samples will be collected in the same manner as duplicate samples and are labeled extra volume samples for MS/MSD. Samples will identified and documented on chain-of-custody documents and prepared for shipment to the analytical laboratory. Quality control duplicate samples will be collected at a rate of approximately 10% of the total number of samples at the Blanco North Site to assess the total precision of field and laboratory components of the monitoring event. Also, equipment rinsate samples and trip blanks will be collected to assess field operations and sample transport.

Once final results are received from the analytical laboratory, CH2M HILL will perform data quality assessment, or validation, on 100 percent of the samples analyzed. The analytical data will be reviewed and validated by CH2M HILL chemists, in accordance with the following documents:

- USEPA Test Methods for Evaluating Solid Wastes, SW-846, Revision 6 (2007)
- USEPA CLP National Functional Guidelines for Evaluating Organic Data Review (June 2008)

Groundwater sample results will be subject to a Level IV data review that includes an evaluation of the following QC parameters:

- Data Completeness
- Holding Times and Preservation
- Calibrations
- Blank Analysis Results
- Analytical reporting limits, method detection limits, and limits of detection
- Surrogate Recoveries
- Laboratory Control Sample Results
- MS/MSD Results
- Field Duplicates
- Laboratory Spike Results

- Sample Result Verification
- Overall Assessment

A data validation memorandum will be prepared that summarizes the results of the data review. The report will be appended to the Annual Report, described below.

Draft and final versions of an Annual Groundwater Monitoring report will be prepared to summarize the results of annual water level measurements and groundwater sampling at new and existing wells at the Blanco North site. The Annual Groundwater Monitoring Report will include a tabular summary of all groundwater laboratory analytical results, results of quality control sampling and data validation technical memorandum. The report will also include a discussion and comparison of water levels and detected COCs in reference to previous monitoring data.

Following incorporation of EPCGPC review comments, CH2M HILL will submit the draft report to NMOCD for review and approval or comment. If comments are received, CH2M HILL and EPCGPC will discuss and decide upon the appropriate response. The agreed upon response to NMOCD comments will be submitted to NMOCD before issuing the final report.

7 References

Brown, K.W., 1990. *Site Investigation of the Blanco Plant, San Juan County, New Mexico.* February.

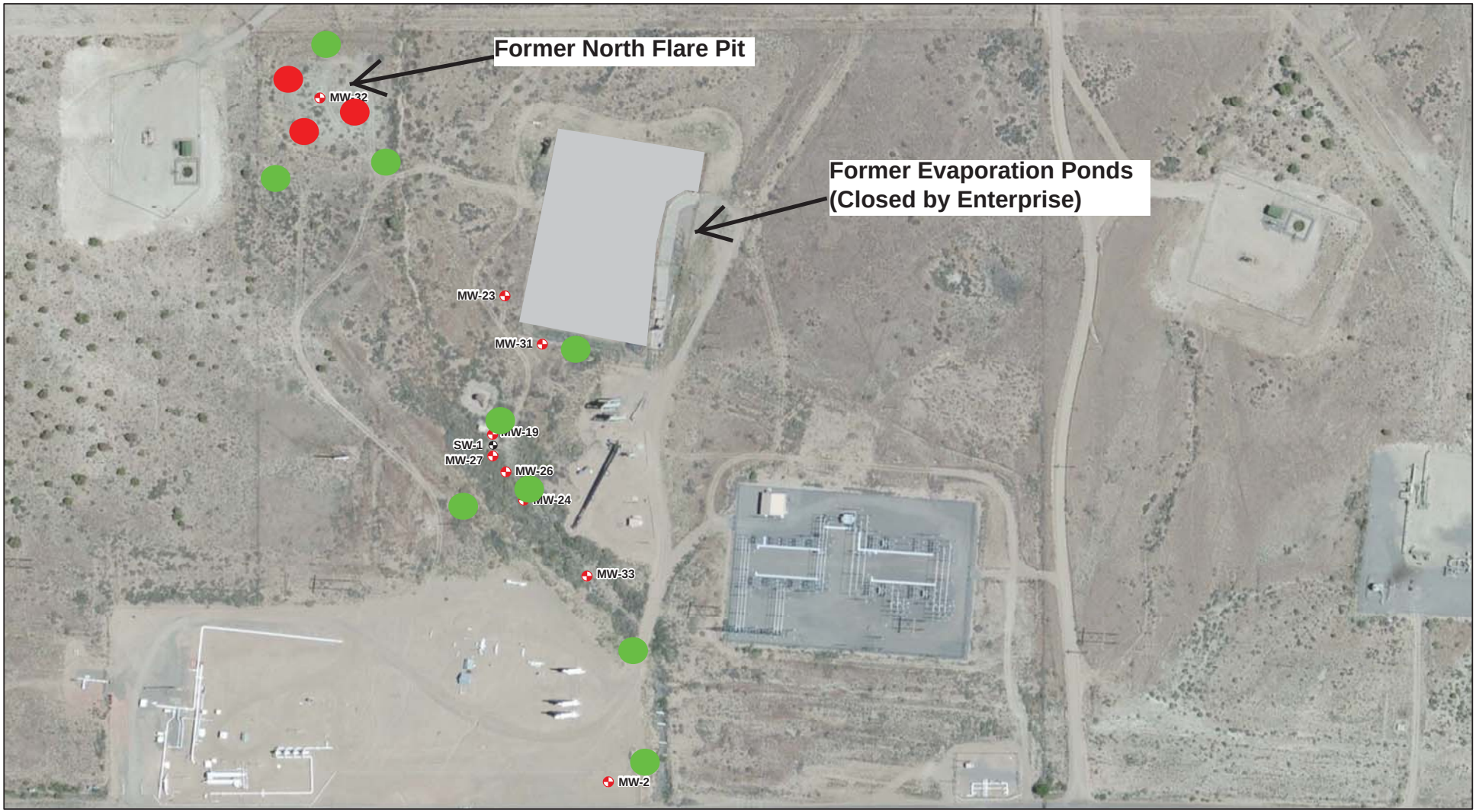
Burlington Environmental, 1992. *Monitoring Well Installation and Testing at the North Flare Pit Area of Blanco Plant*. December.

CH2M HILL, 2014. *2013 Annual Groundwater Monitoring Report, Blanco Plant – North Flare Pit, Bloomfield, New Mexico.* March.

EPNG, 1989. *Groundwater Investigation Report, El Paso Natural Gas Company's Blanco Plant, San Juan County, New Mexico.* January.

Montgomery Watson Harza (MWH), 2012. *2011 Annual Report Blanco North Flare Pit.* March.

Figure



LEGEND

- Monitoring Well
- Sparge Well

N

0 80 160
Feet

- Proposed Monitoring Well
- Proposed Soil Boring

FIGURE 1
Blanco North Flare Pit
Proposed Site Characterization Locations
Bloomfield, New Mexico

Appendix A
Soil and Groundwater Regulatory Screening Levels

TABLE A-1
Soil Sample Screening Criteria – BTEX Compounds
Site Characterization Work Plan, Blanco North Flare Pit, Bloomfield, New Mexico

Analyte	CAS Number	New Mexico Residential Soil Screening[1] Criteria (mg/kg)	New Mexico Industrial/Occupational Soil Screening Criteria[1] (mg/kg)	New Mexico Construction Worker Soil Screening Criteria[1] (mg/kg)	USEPA RSLs for Industrial (mg/kg)[2]
Benzene	71-43-2	15.4	84.7	138	5.4
Ethylbenzene	100-41-4	68.4	378	1,830	27
Toluene	108-88-3	5,270	57,700	13,400	4500
o-Xylene	95-47-6	898	4410	823	300
m-Xylene	108-38-3	774	3780	705	250
p-Xylene	06-42-3	NA	NA	NA	260
Total Xylenes	NA	814	3,980	743	270

Notes:
[1] = New Mexico Soil Screening Levels, 2012
[2] = United States Environmental Protection Agency Regional Screening Levels (RSLs), June 2013
CAS = chemical abstract service
mg/kg = milligrams per kilogram
NA = Not Available

TABLE A-2
Groundwater Sample Screening Criteria – Volatile Organic Compounds
Site Characterization Work Plan, Blanco North Flare Pit, Bloomfield, New Mexico

Analyte	CAS Number	NMWQCC Standard[1] (µg/L)	USEPA Tap Water RSL[2] (µg/L)	USEPA MCL[2] (µg/L)
Benzene	71-43-2	10	2.9	5.0
Ethylbenzene	100-41-4	750	67	700
Toluene	108-88-3	750	86	100
o-Xylene	95-47-6	NA	19	NA
m-xylene	108-38-3	NA	19	NA
p-xylene	06-42-3	NA	19	NA
Total xylenes	NA	620	19	10,000

Notes:
[1] = New Mexico Administrative Code, Title 20 Environmental Protection, Chapter 6 Water Quality, Part 2 Ground and Surface Water Protection
[2] = United States Environmental Protection Agency Regional Screening Levels (RSL), November 2013
CAS = chemical abstract service
MCL = maximum contaminant level
µg/L = micrograms per liter
NA = Not Available
NMWQCC = New Mexico Water Quality Control Commission

TABLE A-3
Groundwater Sample Screening Criteria – Nitrate
Site Characterization Work Plan, Blanco North Flare Pit, Bloomfield, New Mexico

Analyte	CAS Number	NMWQCC Standard[1] (mg/L)	USEPA Tap Water RSL[2] (µg/L)	USEPA MCL[2] (mg/L)
Nitrate-Nitrite as N	14797-55-8	10	NA	10

Notes:
[1] = New Mexico Administrative Code, Title 20 Environmental Protection, Chapter 6 Water Quality, Part 2 Ground and Surface Water Protection
[2] = United States Environmental Protection Agency Regional Screening Levels, November 2013
CAS = chemical abstract service
MCL = maximum contaminant level
µg/L = micrograms per liter
mg/L = milligrams per liter
NA = Not Available
NMWQCC = New Mexico Water Quality Control Commission