

**General Release Notification, Response and Remediation Plan  
(for Release Sites under NMOCD Jurisdiction)**

**Enterprise Products Operating LLC  
(Operator for Enterprise Field Services, LLC and  
Mid-America Pipeline Company LLC)**

**And**

**Enterprise Crude Pipeline LLC  
(Operator for Enterprise Crude Pipeline LLC and Enterprise Crude Oil LLC)**



**Prepared for:**

**Enterprise Products Operating LLC  
and  
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**Revised March 9, 2015**

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## 1.0 INTRODUCTION

The General Release Notification, Response and Remediation Plan, referred to hereinafter as the “General Plan”, describes how Enterprise Products Operating LLC (EPOLLC), operator for assets owned by Enterprise Field Services, LLC (EFS) and Mid-America Pipeline Company LLC (MAPL), and Enterprise Crude Pipeline LLC (ECPLLC), operator for assets owned by ECPLLC and Enterprise Crude Oil LLC (ECOLLC), all collectively termed “Enterprise” in this document, will typically respond to release sites under New Mexico Oil Conservation Division (NMOCD) jurisdiction.

EPOLLC (operator for assets owned by both EFS and MAPL) owns numerous oil and natural gas assets. These assets include gathering and transmission pipelines, natural gas compressor stations, gas treating plants, and natural gas processing plants. MAPL owns a natural gas liquids (NGL) pipeline that runs from northwest NM (Farmington, NM) to southeast NM (near Hobbs, NM). The MAPL pipeline is equipped with NGL pump stations to move the liquid to downstream users.

ECPLLC (operator for assets owned by ECPLLC and ECOLLC) owns crude oil assets in NM including pipelines, pumping stations, and storage facilities.

This General Plan was developed in accordance with applicable requirements of New Mexico Administrative Code (NMAC) 19.15.29.8 (Release Notification), 19.15.29.9 (Reporting Requirements), 19.15.29.11 (Corrective Action), 19.15.30 (Remediation), and the NMOCD guidance document entitled: *Guidelines for Remediation of Leaks, Spills & Releases, August 13, 1993*. This General Plan is intended to satisfy the initial Remediation Plan requirement identified in 19.15.29.11 NMAC, and its provisions, as applicable, will be followed at all Enterprise New Mexico assets.

The procedures described in this General Plan have been developed to streamline regulatory reporting requirements by allowing “pre-approved” or “generic” response actions, site investigations, and certain remedial actions without specific NMOCD approvals prior to implementation. This General Plan is intended to cover all response, delineation, and remediation activities occurring between the time of release discovery and the delineation of soil and/or “ground water<sup>1</sup>” (referred to herein as “groundwater”) impact. Remediation methods described in this General Plan assume released constituents and resulting affected environmental media are RCRA-exempt and nonhazardous. NMOCD approval will be obtained for substantial deviations from the provisions of this General Plan.

In the event that site remediation is achieved under the provisions of this General Plan, Enterprise will submit a Corrective Action Report requesting site closure for NMOCD review and approval. Conversely, if impact remains above regulatory guidance standards, Enterprise will submit a site-specific Remediation Plan (requiring NMOCD approval prior to implementation), as required by 19.15.29.11 NMAC, prior to implementing additional remediation activities.

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<sup>1</sup> “Ground water” as defined in 20.6.2.7 (Z) NMAC “means interstitial water which occurs in saturated earth material and which is capable of entering a well in sufficient amounts to be utilized as a water supply;”

## 2.0 RESPONSIBLE PARTY DESIGNATION

The designated Responsible Party for this General Plan is:

Enterprise Products Operating LLC or Enterprise Crude Pipeline LLC  
Environmental Department  
P.O. Box 4324  
Houston, TX 77210-4324

*Emergency Contact Phone Number: 1-888-883-6308*

## 3.0 RELEASE NOTIFICATION PROCEDURES

Enterprise will follow NMOCD release notification requirements, specified in 19.15.29.8 NMAC, for unauthorized releases. Release notifications may also be provided, as applicable, to the United States Department of Transportation (U.S. DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), National Response Center (NRC), Bureau of Land Management (BLM), New Mexico Environment Department (NMED), Local Emergency Planning Commissions (LEPC), Navajo Nation Environmental Protection Agency (NNEPA), Jicarilla Apache Environmental Protection Office (JAEPO), Jicarilla Apache Oil and Gas Administration (JAOGA), and other affected Federal, State, Tribal or local governmental entities.

NMOCD release categories, and associated notification requirements that will be followed by Enterprise, are described below:

### 3.1 Major Releases:

Major releases as defined in 19.15.29.7(A) NMAC include:

1. An unauthorized release volume, excluding gases, greater than 25 barrels (bbls);
2. An unauthorized release volume that: results in a fire; will reach a watercourse; may endanger public health; or results in substantial property or environmental damage;
3. An unauthorized release of gases greater than 500 thousand cubic feet (MCF);
4. A release of a volume that with reasonable probability may be detrimental to water or exceed the water quality standards in Subsections A, B, or C of 19.15.30.9 NMAC.

Major release reporting requirements:

Enterprise will report major releases in accordance with the Reporting Requirements of 19.15.29.9 NMAC, meeting the notification content requirements of 19.15.29.10(A) and (B) NMAC, which state in part:

1. Immediate (within 24 hours) verbal notification will be provided to the NMOCD District Office for the area where the release occurs, in accordance with the provisions of 19.15.29.10(A) and (B) NMAC. In addition, immediate verbal notice will be provided to the NMOCD Environmental Bureau Chief for a release of a volume that may, with

reasonable probability, be detrimental to water in accordance with the provisions of 19.15.29.10(A) and (B) NMAC. These verbal notifications will include information required on Form C-141.

2. Timely written notification shall be provided within 15 days of release discovery to the NMOCD District Office for the area where the release occurs by completing and filing a Form C-141 in accordance with provisions of 19.15.29.10(B) NMAC. This written notification will also be provided within 15 days to the NMOCD Environmental Bureau Chief if the release could, with reasonable probability, be detrimental to water or exceed the standards in Subsections A and B or C of 19.15.30 NMAC.

### **3.2 Minor Releases:**

Minor releases as defined in 19.15.29.7(B) NMAC include:

1. An unauthorized release of a volume greater than five barrels, but not more than 25 barrels; or greater than 50 MCF, but less than 500 MCF.

Minor release reporting requirements:

Enterprise will report minor releases in accordance with the Reporting Requirements of 19.15.29.9 NMAC, meeting the notification content requirements of 19.15.29.10(B) NMAC, which state in part:

1. Timely written notification shall be provided within 15 days to the NMOCD District Office for the area where the release occurs by completing and filing a Form C-141 in accordance with provisions of 19.15.29.10(B) NMAC.

### **3.3 Releases of Less than Five Barrels/50 MCF**

For unauthorized releases of a volume less than five barrels or less than 50 MCF, Enterprise will perform "housekeeping" to remove released liquids and potentially associated affected soils. Examples of housekeeping activities may include:

- sorbent material application
- vacuum truck removal of liquids (notably in lined-containment releases)
- hand tool or mechanical removal of affected soils
- microbial application for surface spray areas (where allowed)
- surface reclamation, including reseeding as necessary

Environmental wastes derived from housekeeping activities will ultimately be recycled (e.g. reclaimable liquids) or relinquished to an NMOCD approved landfarm, land fill, or other approved disposal facility.

#### 4.0 SITE RANKING AND RESPONSE OBJECTIVES

For the purpose of this document, the terms “initial release response action(s)” or “initial response action(s)” pertain to any remedial or investigative activity that occurs concurrently with pipeline repair or other release responses. During initial response actions, Enterprise will make every effort to contain or control released materials to prevent additional migration of the release; and, to the extent possible, remove released liquids and impacted soils for recycling or proper offsite disposal. Initial response actions may include:

- source isolation/repair
- berming
- deploying sorbent booms/pads or other sorbent material
- removal of free liquids utilizing a vacuum truck
- removal of impacted soils utilizing hand tools and/or mechanical digging equipment during repair/response activities

Environmental wastes derived from initial response activities will ultimately be recycled (e.g. reclaimable liquids) or relinquished to an NMOCD approved landfarm, land fill, or other approved facility for treatment or disposal.

Access to the release area will be controlled as necessary to reduce the potential for public, livestock, and wildlife exposure.

In order to establish relative site risks and associated remediation requirements, Enterprise will follow the NMOCD guidance document titled: *Guidelines for Remediation of Leaks, Spills and Releases*, dated August 13, 1993. Consistent with these guidelines, general site characteristics, including the depth to groundwater, and the distance to water wells or surface water sources, will be utilized to determine the appropriate “ranking” of individual release sites, and the associated remedial action requirements.

The site ranking criteria and associated scoring values, based on the 1993 guidance, are summarized in the following Table:

Ranking Criteria			Score
Depth to Groundwater	<50 feet	20	
	50 to 99 feet	10	
	>100 feet	0	
Wellhead Protection Area <1,000 feet from a water source, or; <200 feet from private domestic water source.	Yes	20	
	No	0	
Distance to Surface Water Body	<200 feet	20	
	200 to 1,000 feet	10	
	>1,000 feet	0	
Total Ranking Score:			

## 5.0 REMEDIAL ACTION LEVELS FOR SOILS

Site-specific total ranking scores will be utilized to develop Remedial Action Levels (RALs) for soils in accordance with the NMOCD guidance document entitled: *Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993*, as summarized below:

Constituent <sup>(1)(2)</sup>	Total Ranking Score <b>&gt;19</b>	Total Ranking Score <b>10 to 19</b>	Total Ranking Score <b>0 to 9</b>
<b>Benzene</b>	10	10	10
<b>Total BTEX<sup>(3)</sup></b>	50	50	50
<b>TPH<sup>(3)</sup></b>	100	1,000	5,000

- 1) All constituent concentrations are expressed in milligrams per kilogram (mg/kg)
- 2) This constituent list is appropriate for RCRA-exempt natural gas liquids (condensate) and crude oil release sites only. Analysis for additional constituents may be necessary to ensure proper characterization of other release types.
- 3) BTEX – benzene, toluene, ethylbenzene, total xylenes. TPH – total petroleum hydrocarbons.

At a minimum, Enterprise will collect soil samples for BTEX and TPH analyses at each confirmed release site. Additional analytes (such as chloride) will be evaluated on a case-by-case basis. Analytical methods are referenced in Appendix A.

## 6.0 REMEDIAL ACTION LEVELS FOR GROUNDWATER

Groundwater protection (abatement) standards discussed in 19.15.30.9 (B) NMAC, which refer to applicable New Mexico Water Quality Control Commission (WQCC) standards, are designed to protect groundwater with an existing total dissolved solids (TDS) concentration of 10,000 mg/l or less. These abatement standards, which are listed as Human Health Standards in 20.6.2.3103 (A) NMAC, are baseline standards and include the following constituents and their associated maximum allowable concentrations:

Constituent <sup>(1)</sup>	Groundwater Standards <sup>(2)</sup>
Benzene	0.01
Toluene	0.75
Ethylbenzene	0.75
Xylenes	0.62
Chloride	250.0
Sulfate	600.0
TDS	1,000.0
NAPL <sup>(3)</sup>	not measurable <sup>(3)</sup>

This constituent list is appropriate for RCRA-exempt natural gas liquids (condensate) and crude oil release sites only. Analysis for additional constituents (as noted in Table 1, Appendix A) may be necessary to ensure proper characterization of other release types.

- 1) All concentrations are expressed in milligrams per liter (mg/l)
- 2) These concentrations represent Human Health Standards for potential use as a source of drinking water and may not be applicable in all cases. Site specific background concentrations may need to be determined to properly evaluate cleanup goals for chloride, sulfate, or TDS.
- 3) If present, measureable non-aqueous phase liquid (NAPL) will be removed.

In cases where groundwater assessment is necessary, Enterprise will collect groundwater samples for BTEX analysis. Additional analytes (such as chloride) will be evaluated on a case-by-case basis. Analytical methods are referenced in Appendix A.

## 7.0 REMEDIAL ACTION FOR SOIL

This section discusses general remedial action methods for affected soils during initial response actions as well as investigation and remediation activities. Details regarding notification requirements, remedial action standards and reporting are provided in other sections of this General Plan.

During initial release response actions to an unauthorized release, Enterprise will recover released liquids for recycling or disposal, and remove affected soils (to the extent practical) to either RALs (as described in Section 5.0 above) or background conditions, or other applicable regulatory standards (in the case of non-hydrocarbon analytes), whichever is higher. For example, TPH in soils will be delineated to below 100 mg/kg for release sites with groundwater depths less than 50 feet. Remedial action methods to achieve these objectives are described within this Section, and will be considered self-implementing under this General Plan to expedite remedial actions.

In most cases, some remedial actions will be performed prior to, or concurrently with, soil and/or groundwater delineation activities. For example: During pipeline repair activities, impacted soil will be removed by excavation, and, if observed, NAPL in excavation water or pooled at the ground surface would be removed by vacuum truck. As another example: NAPL removal activities may be initiated at monitoring wells prior to complete groundwater plume delineation.

Some release sites may require soil and/or groundwater investigations to be conducted to fully delineate remaining impact to soil and/or groundwater. These investigations will be conducted under the provisions of this General Plan, in accordance with the Site Investigation Methods provided in Section 9.0.

## **7.1 Treatment Methods**

### **7.1.1 Soil Excavation**

The recovery of released liquids, and the excavation of affected soils (prior to recycling or proper offsite disposal), is the initial response objective for Enterprise release sites. Excavation of saturated or highly contaminated soils will continue to the maximum practicable vertical and horizontal extent. Excavation will be directed based on field observations, photo-ionization detection (PID) instrument readings, and if appropriate, field analysis for chlorides, to provide an initial verification that affected soils have been removed. Grab or composite confirmation samples, appropriate to the release type, will be obtained for analytical testing to confirm remediation objectives prior to backfilling completed excavations.

### **7.1.2 Vadose Zone Soils Treatment**

Treatment of unsaturated vadose zone soils, which cannot be removed by direct excavation, is normally performed in conjunction with treatment of affected groundwater and would be covered under a site-specific Remediation Plan. However, there may be cases in which the treatment of these soils may be beneficial prior to the completion of soil and/or groundwater delineation.

Typical insitu treatment methods may include, but are not limited to, soil vapor extraction (SVE), mobile dual-phase extraction (MDPE), or other accepted treatment technologies to reduce volatile hydrocarbon concentrations present in the vadose zone. These technologies typically induce a vacuum at extraction wells located near the highest concentrations of affected soils to remove and treat hydrocarbon vapors. MDPE units can recover both vapors and liquids.

Enterprise will remediate affected vadose zone soils in accordance with provisions of 19.15.30.9(A) NMAC to ensure affected vadose zone soils are not capable of contaminating either groundwater or surface water in excess of applicable regulatory standards.

## **7.2 Soil Sampling Program**

Soil samples may be collected at any stage of the release response process (i.e. during initial response actions as well as investigation and remediation activities) to evaluate potential soil impacts. Soil sampling will be performed to evaluate attainment of regulatory standards during response actions; including, verification of affected soil removal at release sites. Field observations and instrumentation readings may also be utilized prior to final confirmation sampling.

Reusable sampling equipment will be cleaned using an Alconox<sup>®</sup> (or comparable) wash and potable water rinse prior to the beginning of the project, and before collecting each soil sample. Soil samples will be placed in laboratory prepared glassware, placed on ice in a cooler, and transmitted to an accredited laboratory for analyses in accordance with standard chain-of-custody procedures. Additional Standard Operating Procedures (SOPs) are referenced in Appendix A.

### **7.2.1 Excavation Confirmation Sampling**

Following removal of affected soils at a major or minor release, Enterprise will verify attainment of remediation objectives (around the impacted area) in accordance with these guidelines:

- Confirmation soil samples will be obtained at locations of potentially remaining affected soils, based on field observations or instrumentation readings. This will ensure conservative attainment of remediation objectives.
- Enterprise will collect confirmation soil samples in accordance with accepted industry practice, and in coordination with local NMOCD guidance, when provided.
- Sampling frequency will be based on site conditions, but at least one grab sample or composite sample will be obtained from each excavation sidewall and floor.
- The potentially-affected portion of larger excavations will be sampled on an approximate frequency of one composite or grab sample representing every 25 linear feet of a typical excavation on each sidewall and the floor (from the areas of most likely impact, based on PID readings). For deep excavations, additional samples will be collected, as necessary, to adequately evaluate potential impact.
- Photographic logs and detailed field notes of excavation dimensions and confirmation sampling locations will be maintained.

## 8.0 REMEDIAL ACTION FOR GROUNDWATER

If subsurface water, as defined in 20.6.2.7 (UU) NMAC, is encountered in a pipeline repair or remediation excavation and grab samples of this water contain target analytes in excess of regulatory limits, or if phase-separated hydrocarbons are present on the water, Enterprise will proceed with groundwater delineation activities under this General Plan. Following installation and sampling of properly constructed temporary or permanent monitoring wells, and receipt of final laboratory results confirming groundwater impact, appropriate regulatory agencies will be notified as defined in 19.15.29.10 A and/or B NMAC.

Prior to completing the delineation activities, it may be beneficial to initiate NAPL and/or affected groundwater removal, especially if an open excavation contains impacted water or if a surface water or potential drinking water source is threatened. Initial groundwater remedial actions may include:

- NAPL recovery (utilizing bailers, absorbents, or skimmers)
- NAPL recovery with an automated system (if sufficient recovery is available)
- *In situ* treatment, including SVE or MDPE extraction (if necessary to reduce potential for groundwater impacts by recovery of affected vadose zone soil vapors, or NAPL)
- Barrier wall construction (if necessary to prevent further migration of affected groundwater)

## 9.0 SITE INVESTIGATION METHODS

If necessary to fully characterize the extent of a release site, Enterprise recommends proceeding with initial site soil and groundwater investigations under provisions of this General Plan as soon as practicable after a release occurs. These investigations will enable more effective response actions by determining the extent and distribution of soil impacts. Initial groundwater investigations may also be conducted to determine if groundwater has been affected, and if additional delineation investigations or remedial actions are required. Enterprise will advance/install a sufficient number of soil borings and/or monitoring wells to fully delineate the affected area. Affected soils will be delineated to either background conditions, or the applicable RALs as identified in Section 5.0. Affected groundwater will be delineated to either background conditions, or concentrations specified under the WQCC groundwater protection standards listed in 20.6.2 .3103 NMAC, as summarized in Section 6.0. These investigations will follow standard investigation protocols, provided in Appendix A, and may utilize temporary or permanent monitoring well installations if groundwater conditions are investigated.

If, after groundwater delineation is complete, additional remedial actions are necessary to meet WQCC groundwater protection standards specified in 20.6.2.3103 NMAC, Enterprise will propose site-specific remedial actions in a site-specific Remediation Plan for NMOCD approval.

## 9.1 Reporting

Reports and associated submittals will cumulatively contain sufficient information to allow review by the NMOCD including, as appropriate:

- relevant site history, including a summary of initial response actions and previous reporting
- initial C-141 Report
- analyte list appropriate to the release
- review of surface water and water wells (1/2 mile radius, including 1/4 mile radius walking search for unregistered water wells)
- land use and ownership
- site map: location map (USGS topo) showing the release area
- soil boring and monitor well locations
- soil boring logs and site geologic cross-sections (if appropriate)
- monitor well construction details
- landowner approvals (if required)
- State Engineers Office approvals (if required)
- groundwater depth, if encountered
- tabulated analytical results and corresponding regulatory action levels
- site maps showing distribution of analytes exceeding RALs or Groundwater Standards in affected environmental media
- laboratory results and Chain-of-Custody documents

## 10.0 ENVIRONMENTAL WASTE MANAGEMENT

Enterprise will properly manage and dispose of contaminated soils, sorbents, equipment decontamination rinsate, or other environmental wastes generated during response actions, site investigations, and routine groundwater monitoring events. Environmental wastes generated will be properly disposed of at an NMOCD-approved facility. Recovered product that can be recycled will be recovered for recycling or reuse. Recovered product not deemed suitable for recycling will be disposed of with the remainder of the environmental waste collected during the response efforts as dictated by local, State, or Federal requirements.

## 11.0 SURFACE RESTORATION AND SITE CLOSURE

Following completion of response actions, Enterprise will restore affected surface features by backfilling completed excavations with clean/approved backfill and contouring excavation and treatment areas to the approximate former grade (following removal of containment berms if applicable). Any use of treated soils as backfill will only be performed after specific agency and landowner approvals (if necessary). Final surface grades will be sloped to allow proper drainage, re-vegetated with a land owner/manager-approved seed blend, or covered with gravel or other land owner/manager-approved material. Site restoration procedures will also be

conducted in accordance with specific surface owner requirements, including Tribal, New Mexico State Land Office or BLM requirements.

Final site closure actions, including proper plugging and abandonment of site monitor wells will be performed in accordance with 19.27.4 NMAC, or OSE approved deviations, following NMOCD approval.

## **12.0 REPORTING AND RECORDKEEPING**

In addition to the release notification procedures described in Section 3.0, Enterprise will provide site-specific Remediation Plans for release sites with affected soil or groundwater, as appropriate, requiring additional investigations, as noted in Section 9.0. Reports will be submitted under an Enterprise cover letter, and signed. Submitted reports will be for individual sites only (or related sites in immediate proximity), and will reference the appropriate OCD remediation permit (RP) number, if assigned.

Monitor wells installed at remediation sites will normally be sampled on a semi-annual basis, including sites where groundwater delineation is ongoing. Enterprise may perform more frequent, or quarterly monitoring, during initial site characterizations, or if other conditions warrant more frequent monitoring. Routine groundwater monitoring reports will be submitted to the NMOCD annually.

Following approval of final site closure by the NMOCD, final site restoration, including proper plugging and abandonment of site monitor wells, will be performed and reported to the NMOCD. Enterprise may elect to plug and abandon monitor wells at sites pending NMOCD closure approval “at risk” following Enterprise notification to the NMOCD.

## Appendix A

### Standard Operating Procedures

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## **FIELD EXPLORATION**

### ***Advancement of Soil Borings***

Soil borings are advanced using a truck or track-mounted direct push drilling rig, hollow stem auger rig, sonic rig, air rotary rig, or hand auger (or other industry approved methods). Soil core samples for field screening will be collected continuously, as practicable, utilizing a core barrel, spit spoon or equivalent sampler.

### ***Equipment Calibration and Decontamination***

The PID is calibrated with “zero air” and 100 parts-per-million isobutylene calibration gas. Calibration of the PID is checked each day prior to use in the field.

Sampling and drilling equipment is decontaminated prior to commencement of the project and between the advancement of each soil boring. Additionally, select sampling tools/devices are decontaminated utilizing phosphate free Alconox<sup>®</sup> (or comparable) detergent wash and de-ionized water rinse prior to and after use.

If portable or other existing containment is not available, plastic sheeting is placed in the decontamination area where the decontamination procedures are conducted. Wash and rinse water generated during the decontamination process is captured and then transferred into a secured, labeled 55-gallon drum.

### ***Field Screening of Soil Borings***

During the advancement of soil borings, soil core samples for field screening are collected continuously, as practicable, and examined to document lithology, color, moisture content and visual or olfactory evidence of impact. In addition, headspace analysis is conducted by placing a composite soil sample collected from each one-foot interval (as recovery allows) into a sealable plastic bag. The plastic bag is sealed and then placed in a warm area to promote volatilization. The air above the sample, the headspace, is then evaluated using a PID capable of detecting volatile organic compounds (VOCs).

Headspace results should be considered a qualitative field measurement and should not be interpreted as a quantitative analysis.

### ***Installation of Monitoring Wells/Temporary Sampling Wells***

Subsequent to advancement, select soil borings may be converted to permanent groundwater monitoring wells. Permanent monitoring wells are typically completed using the following methodology:

- Installation of approximately 10.0 to 15.0 feet of 2-inch or 4-inch diameter, 0.010-inch machine slotted PVC well screen assembly with a threaded bottom cap with approximately 5 feet of screen above the apparent static water level (Note: Monitoring well screen lengths and associated boring depths may vary due to site specific geologic conditions and water table elevations.);
- Installation of 2-inch or 4-inch diameter, threaded, flush joint PVC riser pipe to the surface;
- Addition of a graded annular sand pack from the bottom of the boring to

- approximately 2 feet above the top of the well screen;
- Addition of approximately 2.5 feet of bentonite seal;
- Addition of a properly constructed annular seal to ground surface; and,
- Installation of a concrete pad with a flush-mount or above-grade monitoring well cover and locking well cap.

Subsequent to advancement, select soil borings may be converted to temporary groundwater sampling wells. The temporary sampling wells are completed using the following methodology:

- Installation of approximately 10.0 to 15.0 feet of 1-inch (or greater) diameter, 0.010-inch machine slotted PVC well screen assembly with a threaded bottom cap with approximately 5 feet of screen above the apparent static water level (Monitoring well screen lengths and associated boring depths may vary due to site specific geologic conditions and water table elevations.); and
- Installation of 1-inch (or greater) diameter, threaded, flush joint PVC riser pipe to the surface;
- Addition of a graded annular sand pack from the bottom of the boring to approximately 2 feet above the top of the well screen.

Monitoring well installation and plugging and abandonment will adhere to the New Mexico Office of the State Engineer (OSE) regulations (19.27.4 NMAC) or OSE approved deviations.

#### ***Monitoring Well/Temporary Sampling Well Development***

The purpose of monitor well development is to: remove fine grained sediments (fines) from the vicinity of the well screen (This allows the water to flow freely from the formation into the well, and also reduces the turbidity of the water during sampling.); remove/reduce “caking” that may have affected sidewall permeability during drilling activities; and, remove water in the immediate vicinity of the well bore to remove any liquids that were in potential contact with down-hole equipment during drilling activities (decontaminated equipment might inadvertently exhibit Alconox<sup>®</sup> or other residues that could affect groundwater chemistry).

Subsequent to completion, each permanent monitoring well or temporary sampling well is developed by surging and removing groundwater utilizing a dedicated disposable bailer or surge block/pump combination until fluids are generally free of fine-grained sediment. Surging involves raising and lowering a surge block or bailer inside the well. The resulting motion forces water into/out of the formation and loosens sediment, pulled from the formation into the well, facilitating removal of the fines and potential sidewall “caking”.

#### ***Monitoring Well/Temporary Sampling Well Plugging and Abandonment***

Monitoring well installation and plugging and abandonment will adhere to the New Mexico Office of the State Engineer (OSE) regulations (19.27.4 NMAC) or OSE approved deviations.

#### ***Environmental Wastes***

Environmental wastes generated during site investigation activities will be placed in DOT approved shipping containers (typically 55-gallon drums), properly labeled and stored onsite or at a nearby Enterprise facility pending characterization. Disposal requirements will be determined following receipt of laboratory analyses of the waste(s). Environmental wastes

derived from initial response, investigative, and remedial activities will ultimately be recycled (e.g. reclaimable liquids) or relinquished to an NMOCD approved landfarm, land fill, or other approved facility for treatment or disposal.

### **Soil & Groundwater Sampling Procedures**

During the completion of soil boring advancement, soil samples are typically collected for laboratory analysis. The soil samples are selected based on the likelihood of adverse impact using the following parameters:

- PID reading
- visual or olfactory evidence of impact
- capillary fringe
- bottom of boring
- change in lithology

The selected samples will be placed into labeled, laboratory-supplied sampling containers. The sample media is packed tightly into the container to minimize headspace and prevent the possible volatilization of potential contaminants from the sample media.

Groundwater samples are collected utilizing low-flow/micro purge equipment or disposable polyethylene bailers.

#### **Bailer Sampling**

Between three (3) and five (5) casing volumes of water will be purged from the monitoring well prior to sampling. Groundwater parameters will be monitored during the bailer/pump purging process to evaluate pH and conductivity stabilization.

#### **Low Flow Sampling**

Prior to sample collection, each monitoring well is micro-purged utilizing low-flow sampling techniques. Low-flow refers to the velocity with which groundwater enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharge at the surface which can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrogeological situation. The objective is to pump in a manner that minimizes stress (drawdown) to the system to the extent practical taking into account established site sampling objectives. Flow rates on the order of 0.1 to 0.5 liters per minute (L/min) are maintained during the sampling activities. The water level is checked periodically to monitor drawdown in the well as a guide to flow rate adjustment.

The utilization of low-flow minimal drawdown techniques enables the isolation of the screened interval groundwater from the overlying stagnant casing water. The pump intake is placed within the screened interval such that the groundwater is recovered directly from the formation with little mixing of casing water or disturbance to the sampling zone. A groundwater sample is collected from each monitoring well once produced groundwater is consistent in color, clarity, pH, dissolved oxygen (DO), oxidation/reduction potential (ORP), temperature and conductivity. Measurements are taken every three to five minutes. Stabilization is achieved after key parameters (especially pH and conductivity) have stabilized for three successive readings. Stabilized purge indicator parameter trends generally follow either an exponential or asymptotic change to stable values during purging.

Groundwater samples are collected in select containers based on the laboratory analysis to be performed. Groundwater samples collected for BTEX analysis are placed in 40-mL (milliliter) septum vials with screw caps with a Teflon<sup>®</sup> lined silicone disk in the cap to prevent contamination of the sample by the cap. The 40 mL vials are preserved with HCl (or HgCl<sub>2</sub> to minimize effervescence while preserving the volatile constituents in solution). Samples collected for chloride, sulfate, and TDS analyses are collected in 500 mL HDPE unpreserved containers. The samples are carefully poured down the inside of the vial or bottle to minimize turbulence. Headspace in the bottle is eliminated upon sealing with the cap. The samples are then packed in ice for transport to the laboratory for analysis.

### ***Sample Handling Procedures***

Subsequent to sample collection, each sample container is placed on ice in a cooler which is secured with a custody seal. Soil and groundwater samples remain packed in ice, in a cooler, from the time of sample collection until the time they are accepted by the laboratory via appropriate chain of custody transfer. Samples will be stored at or below four degrees Celsius until the time of analysis.

### ***LABORATORY ANALYTICAL PROGRAM***

The soil and groundwater samples collected are analyzed for specific parameters based on the objective of the investigation. The parameters and associated information listed in the following table includes common drinking water parameters as well as parameters that might be required for a delineation/remediation of certain types of releases. Many of these parameters are not indicative of a RCRA exempt oil & gas release and are unlikely to be utilized under this General Plan.

<b>Table 1 LABORATORY ANALYSES</b>				
<b>Parameter/Analyte</b>	<b>Analytical Method</b>	<b>Media</b>	<b>Sample Containers</b>	<b>Preservation</b>
Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Mineral Oil Range Organics (MRO)	SW-846 #8015	Soil	4-oz. Glass Jar	4°C
Benzene, Toluene, Ethylbenzene & Xylenes (BTEX)	SW-846 #8021	Soil	4-oz. Glass Jar	4°C
	SW-846 #8021	Water	40 mL VOA Vials	4°C/HCl or HgCl <sub>2</sub>
Chloride	300.1	Soil	4-oz. Glass Jar	4°C
	300.1	Water	500 mL Plastic	4°C
Volatile Organic Compounds (VOCs)	SW-846 #8260	Soil	4-oz. Glass Jar	4°C
	SW-846 #8260	Water	40 mL VOA Vials	4°C/HCl or HgCl <sub>2</sub>
Polycyclic Aromatic Hydrocarbons (PAHs)	SW-846 #8310 or #8270	Soil	4-oz. Glass Jar	4°C
	SW-846 #8310 or #8270	Water	1-Liter Amber	4°C
Semi-Volatile Organics (SVOCs)	SW-846 #8270	Soil	4-oz. Glass Jar	4°C
	SW-846 #8270	Water	1-Liter Amber	4°C
RCRA Metals	SW-846# 6010/7470	Soil	4-oz. Glass Jar	4°C
	SW-846# 6010/7470	Water	500 mL Plastic	4°C / HNO <sub>3</sub>
Carbon Dioxide	SM 4500	Water	1-Liter Amber	4°C
Ferrous Iron	SM 3500	Water	1-Liter Amber	4°C
Nitrate	9056	Water	1-Liter Amber	4°C
Sulfate	9056	Water	1-Liter Amber	4°C
Alkalinity	2320B	Water	1-Liter Amber	4°C
pH	SM 4500	Water	500 mL Plastic	4°C
Specific Conductivity	SM 2510B or field instrument	Water	500 mL Plastic	4°C
TDS	SM 2540C	Water	500 mL Plastic	4°C

**Laboratory QA/QC**

Data are reviewed and validated and the results of the review/validation are discussed in the final report.