

State of Colorado Oil and Gas Conservation Commission

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FOR OGCC USE ONLY

received 04/13/2016 Project 9619 Spill 444585 Doc #: 2212442

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee: [] Spill [] Complaint [] Inspection [] NOAV Tracking No: _____

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

[] Spill or Release [] Plug & Abandon [] Central Facility Closure [X] Site/Facility Closure [] Other (describe): _____

GENERAL INFORMATION

OGCC Operator Number: 47120 Name of Operator: Kerr-McGee Oil and Gas Onshore L.P. Address: P.O. Box 173779 City: Denver State: CO Zip: 80217-3779 Contact Name and Telephone: Name: Phillip Hamlin No: (970) 336-3500 Fax: (970) 336-3656 API/Facility No: 444585 County: Weld Facility Name: HSR-Rademacher 63N67W 30SESW Well Name: Location: NESW Sec 30-T3N-R67W Latitude: 40.193911 Longitude: -104.935524

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Oil Site Conditions: Is location within a sensitive area (according to Rule 901e)? [X] y [] N If yes, attach evaluation. Groundwater < 20 ft. Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Agriculture Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Silty Clay Potential receptors (water wells within 1/4 mi, surface waters, etc.): Surface water approximately 430' NW, wetlands approximately 20' N, water well approximately 2,100' S, livestock approximately 2,650' NW, building approximately 1,000' NW, and excavation groundwater approximately 4' below ground surface (bgs). Description of Impact (if previously provided, refer to that form or document): Impacted Media (check): [X] Soils [] Vegetation [X] Groundwater [] Surface water Extent of Impact: 74' NW-SE x 33' NE-SW x 4' bgs (maximum extent) See attached data How Determined: Collected soil samples for laboratory analysis Collected groundwater samples for laboratory analysis

REMEDIALTION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document): A facility operator discovered a release from an oil bypass line due to a corrosion hole at the HSR-Rademacher 63N67W/30SESW location. An unknown volume of oil was released into the subsurface. The petroleum hydrocarbon impacted soil was excavated. Impacted groundwater was encountered in the excavation. A topographic Site Location Map showing the geographic setting of the release is provided as Figure 1. Describe how source is to be removed: Impacted soil was excavated into the phreatic zone to address potential hydrocarbon impacts that may have been present below the current water table due to past seasonal fluctuations. On January 14, 2016, four sidewall soil samples (N01@3', E01@3', S01@3', and W01@3') were collected from the excavation and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) by United States Environmental Protection Agency (USEPA) Methods 8015C and 8260C, benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260C, pH by USEPA Method 9045D, and specific conductivity (EC) by USEPA Method 9050D. Laboratory analytical results indicated the benzene concentration in sidewall soil sample S01@3' exceeded the COGCC Table 910-1 allowable level for benzene at a concentration of 0.223 milligrams per kilogram (mg/kg). Groundwater was encountered in the excavation at an approximate depth of 4 feet bgs. An excavation groundwater sample (GW01) was collected for BTEX analysis. Laboratory analytical results for the GW01 groundwater sample indicated the benzene concentration exceeded the Colorado Groundwater Quality Standard (CGWQS) for benzene at a concentration of 87.1 micrograms per liter (µg/L). On January 21, 2016, following the removal of additional soil, five additional confirmation soil samples (E02@3', E03@3', S02@3', W02@3', and W03@3') were collected from the excavation sidewalls for laboratory analysis of TPH, BTEX, pH, and EC. Laboratory analytical results indicated that TPH, BTEX, pH, and EC levels were compliant with the COGCC Table 910-1 allowable levels at the extent of the excavation. Approximately 180 cubic yards of impacted soil were excavated and transported to the Front Range Regional Landfill in Erie, Colorado, for disposal. Prior to backfilling, 15 barrels of impacted groundwater were removed from the excavation and transported to a licensed injection facility. Following removal of impacted groundwater, 150 pounds of COGAC™, an activated carbon-based bioremediation product, was applied to the groundwater and clean backfill through a series of lifts to ensure distribution through the phreatic and smear zones. The general site layout, excavation dimensions, and soil and groundwater sample locations are depicted on the Excavation Site Map provided as Figure 2. The excavation soil and groundwater sample analytical results are summarized in Tables 1 and 2, respectively. The laboratory analytical reports are attached.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.: The impacted soil was transported to the Front Range Regional Landfill in Erie, Colorado, for disposal. The impacted groundwater was transported to a licensed injection facility for disposal.



Tracking Number: _____
 Name of Operator: _____
 OGCC Operator No: _____
 Received Date: _____
 Well Name & No: _____
 Facility Name & No.: _____

OGCC Employee: _____

REMEDIATION WORKPLAN (CONT.)

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):
 Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the residual dissolved-phase groundwater impact. The monitoring wells will be surveyed to determine the groundwater flow direction. Groundwater monitoring will be conducted on a quarterly basis and the groundwater samples will be submitted for laboratory analysis of BTEX.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
 The site was restored to its pre-release grade and the facility was reconstructed.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.
 Is further site investigation required? Y N If yes, describe:
 After installing the monitoring wells and establishing points of compliance, groundwater monitoring will be conducted on a quarterly basis.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):
 The impacted soil was transported to the Front Range Regional Landfill in Erie, Colorado, for disposal. The impacted groundwater was transported to a licensed injection facility for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 1/14/2016 Date Site Investigation Completed: Active Remediation Plan Submitted: _____
 Remediation Start Date: 1/15/2016 Anticipated Completion Date: TBD Actual Completion Date: _____

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Phillip Hamlin

Signed: Title: Senior HSE Representative Date: 4/13/2016

OGCC Approved: _____ Title: _____ Date: _____

Submit reports of site investigation and progress of remediation including results of sampling and analysis on an annual basis or more often until remediation project 9619 is closed.