

1R - 432

REPORTS

DATE:

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PR-57C

**Remediation Protocol
Devon Energy Corporation
B.C. Dickinson Battery**

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation and closure of the B.C. Dickinson Battery located east of Lovington, New Mexico.

2.0 Scope

This protocol is site specific for the Devon Energy B.C. Dickinson remediation project.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with cognizant personnel within Devon, the NMOCD and the landowner to review and approve this protocol.

3.1.2 Changes to this protocol will be documented and submitted for final review by all parties prior to the initiation of actual field work.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Client personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, and long pants. Each vehicle must be equipped with two way communication capabilities.

4.4 Prior to any excavation, New Mexico One Call will be notified. The One Call notification number will be included within the closure report. If lines are discovered within the area to be excavated they shall be marked with pin flags on either side of the line at maximum five-foot intervals.

4.5 Prior to any field operations, Whole Earth will prepare and submit to Devon Energy a detailed site Health and Safety Plan.

5.0 Preliminary Activities

5.1 All barrels, trash and piping will be scanned for the presence and concentration of naturally occurring radioactive materials (NORM). Any component containing radiation reading exceeding 10 μ rems above background will be segregated for further inspection by a third party certified to work in New Mexico on radioactive materials.

5.2 All clean trash will be collected and sent to a commercial disposal facility. A manifest will be generated and signed by the disposal company. All such manifests shall be collected and included within the final closure report.

5.3 All cement shall be collected and deep buried on-site. The top of the cement shall be a minimum distance of 5' below ground level.

5.4 Monitor wells no. 1 & 2 will be grouted to surface prior to excavation and replaced at the conclusion of the project.

6.0 Remediation

6.1 All berms and assorted piles of contaminated soils will be spread to a maximum depth of 6 inches on the surface of the site. The areas designated on the plat map as "A" and "B" shall be excavated to a minimum depth of 15' below ground surface. The contaminated soils shall be set aside of the excavation but within the existing fence perimeter.

6.2 The side walls and bottom of each excavated area shall be field screened for the presence and concentration of TPH by means of EPA method 418.1 (modified). Excavation of each site shall continue until the TPH concentrations are <1,000 ppm. Prior to backfill, laboratory confirmation samples shall be taken from each side-wall and bottom. The Hobbs office of the NMOCD will be given a minimum of forty-eight hours notification of the intended sampling event.

6.3 Upon approval by the NMOCD, Whole Earth will install a clay liner in the bottom of the excavation having a minimum thickness of 12". All clay layers will be watered and compacted to 100% density.

6.4 A seamless 20 mil polyethylene liner will be installed within the excavation. The liner shall be of sufficient size to cover the bottom and side walls of the hole, and extend to the ground surface.

6.5 The material originally excavated from the pit shall be replaced within the HDPE liner. Care shall be taken to ensure that the soils coming into direct contact with the liner should be finely textured and free of large rocks or sharp edged stones. The soils being replaced within the excavation shall be watered and compacted as required to minimize pore spaces within the cell. Large boulders will be set aside for later disposal or other potentially beneficial use at the conclusion of the project.

6.7 The backfill material shall extend to a minimum depth of five feet below ground level. At this depth, the liner edges will be folded over the backfill material and a second clay cap having a minimum 12" thickness shall be laid atop the backfill materials, watered, compacted and tested to insure mechanical integrity.

6.8 Remediated soils having a maximum chloride concentration of <250 ppm and a maximum TPH concentration of <100 ppm will be placed atop the clay liner. A composite sample of this final backfill material will be submitted to an independent laboratory for analysis of chlorides, TPH and BTEX.

6.9 The land surface shall be re-contoured to match the surrounding topography, seeded with a selection of grasses selected by the landowner.

6.10 A permanent sign shall be erected at each corner of the encapsulation advising "DO NOT EXCAVATE WITHIN THIS AREA". The presence of the encapsulation cell may require a permanent record within the deed.

7.0 Monitoring

The monitor wells will be tested on an annual basis for the presence and concentration of BTEX, and chlorides for a minimum period of five years. If the well shows criteria contaminant concentrations within NMWQCC standards for a minimum of the last three of five years, Devon will request final site closure to include plugging the remaining well.

8.0 Closure Report

8.1 At the conclusion of the project, Whole Earth shall prepare a closure report that contains the following minimum information:

- Photographs of the location prior to remediation
- Photographs of the site at the point of maximum excavation
- Detail photographs of the liner installation
- Photographs of the location at time of final closure
- Lab analysis and related chain of custody for THP, BTEX and chloride testing of each side-wall and excavation bottom
- Lab analysis and related chain of custody for chloride testing of each 3' lift composite
- Procter analysis of the clay
- Clay compaction test report
- Copies of this protocol and all testing procedures
- Shipping manifests for all materials taken to disposal
- Laboratory analysis of water samples obtained from each monitoring well
- Boring logs of any new monitor wells installed at the location

