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April 11, 2016

Mr. Gary Snellgrove
Division Director
Environmental Division
Office of Conservation-9th Floor
617 N. 3rd Street
Baton Rouge, Louisiana 70802

Re: Sweet Lake vs. Oleum Operating, L.C., et al
East Bell City Oil and Gas Field
Section 34, Township 10 South, Range 6 West
Calcasieu Parish, Louisiana
LDNR OC Legacy Project No.: 014-006-001

Dear Mr. Gary Snellgrove:

On behalf of The Sweet Lake Land & Oil Company, L.L.C. (Sweet Lake), Approach Environmental, LLC (Approach) is submitting supplemental information to our March 9, 2016, Proposed Remediation Plan. The following provides an explanation regarding the placement of each supplement into our March 9, 2016 Proposed Remediation Plan.

The Title Page, Table of Contents, and text should be replaced. The following replacements are regarding the tables in the Appendices:

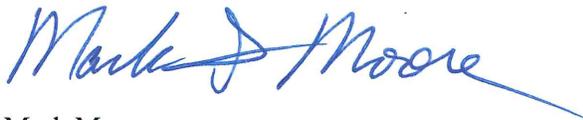
- **Replace** Appendix A Table A-1 page 43, "Groundwater Analytical Data- HET Investigation"
- **Replace** Appendix A Table A-4, "Approach RECAP Tables"
- **Replace** Appendix E Table E-4, "Approach RECAP Tables"
- **Replace** Appendix L, "Background Concentration Information"
- **Insert** Appendix A Table A-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (Area 1)"
- **Insert** Appendix B Table B-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, WELL SITE S.N. 67773/66878 (C-5) (Area 2)"
- **Insert** Appendix C Table C-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, WELL SITE S.N. 64709 (C-3) (Area 3)"
- **Insert** Appendix D Table D-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, WELL SITE S.N. 63282 (C-2) (Area 4)"
- **Insert** Appendix E Table E-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, WELL SITE S.N. 68920 (C-7) (Area 5)"
- **Insert** Appendix F Table F-3, "29-B Salt Parameter Exceedances" "Soil Exceedances of LDNR Section 313 29B Standards, WELL SITE S.N. 216967 (C-9) (Area 6)"
- **Insert** Appendix V, "Norm Meter Survey Map"
- **Insert** Appendix W, "Groundwater Remediation Plan Addendum"
- **Insert** Appendix X, "Soil Areas and Volumes Calculations"

The following are the maps that were revised and should be replaced:

- **Replace** Figure A-2-C
- **Replace** Figure A-2-G
- **Replace** Figure A-3-G
- **Replace** Figure A-19-A
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- **Replace** Figure B-8-D
- **Replace** Figure B-12-A
- **Replace** Figure B-12-B
- **Replace** Figure B-12-E

Should you have any questions or comments regarding this supplemental information, please do not hesitate to contact me via telephone at (318) 222-2424, my cell phone at (318) 401-0085, or via email at marksm@approachenv.com. Approach appreciates the Office of Conservation's review and comments.

Sincerely,



Mark Moore
Louisiana Professional Geoscientist (P.G. #490)
Approach Environmental, LLC



Encl./

Cc: Mr. Guy Wall; Wall Bullington & Cook



**APPROACH ENVIRONMENTAL'S
REVISED PROPOSED REMEDIATION PLAN
FULL COMPLIANCE WITH
LOUISIANA ADMINISTRATIVE CODE (LAC) 43: XIX CHAPTER 6
AND LAC 43: XIX CHAPTER 3
(ALL PROVISIONS OF STATEWIDE ORDER 29-B)**

**THE SWEET LAKE LAND & OIL COMPANY, L.L.C. VS.
OLEUM OPERATING COMPANY, LC, ETAL
EAST BELL CITY OIL AND GAS FIELD
SECTION 34, TOWNSHIP 10 SOUTH, RANGE 6 WEST
CALCASIEU PARISH, LOUISIANA
LDNR OC LEGACY PROJECT NO. 014-006-001**

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APRIL 11, 2016


Mark S. Moore, Professional Geoscientist #490



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Appendix W	Groundwater Remediation Plan Addendum
Appendix X	Soil Areas and Volumes Calculations

1. INTRODUCTION

Approach Environmental, L.L.C (Approach) submits this plan to remediate environmental damage at oil and gas well sites on Sweet Lake’s property in Section 34, Township 10 South, Range 6 West in Calcasieu Parish, Louisiana. This submittal complies with LAC 43.XIX.611.F because it includes a plan that complies with Statewide Order 29-B, Louisiana Administrative Code (LAC) 43: XIX Chapter 3, without exception. Neither BP nor Sweet Lake has requested an exception under LAC 43.XIX.319. Sweet Lake objects to the grant of an exception. But in an abundance of caution, in the event an exception is granted, this submittal also contains plan variations based upon one (1) or more exceptions to Statewide Order 29-B.

A reasonable effort has been made to obtain a complete list of parties (as defined in 603). A commissioner’s conference was held on April 4, 2016.

1.1 Litigation Summary

In 2010, Sweet Lake sued BP and others in the 14th Judicial District Court for the Parish of Calcasieu (Docket No. 2010-00172, Division A). The jury found that BP was responsible for environmental damage on all areas of the property; the jury was not asked to determine a feasible plan. On September 11, 2015, the court entered a judgment holding BP responsible for the environmental damage and ordering it to submit, within 60 days, a plan to the Louisiana Office of Conservation (“OC”) in accordance with Louisiana Revised Statutes section 30:29. On November 6, 2015, the court amended its judgment to give BP 90 days to submit its plan and to give Sweet Lake 90 days to submit its plan or comments after receipt of BP’s plan. On December 10, 2015, BP submitted, to the OC, a “Proposed Remediation Plan.”

1.2 Property Location, Description, and Use.

The property in question is about 199 acres located about 27 miles north of the Louisiana coastline and a mile and a half north of Bell City, Louisiana, at the southwest corner of the intersection of Lognion Road and Sidney Derouen Road. Vicinity Map, Figure (“Fig.”) 1. Small roads provide access to many portions of the subject property and are typically surfaced with dirt, grass, or rock. Study Area Map, Fig. 2; Topographic Map, Fig. 3. The property is within the following geographic coordinate boundaries:

- North: 30.141635
- South: 30.131287
- East: -92.962588
- West: -92.973795

Study Area Map, Fig. 2.

Elevations range from 7.5'-10.5' above sea level (amsl) according to the topographic survey performed across the site by a professional land surveyor. Topographic Map, Fig. 3. The landscape is characterized by agricultural fields, small shrub brush and various grasses.



Subject and Adjacent Property
View to the Southwest from the SWD Tank Battery (Area 1)

BP's Ecological Checklist characterizes the area in question as upland (HET's Remediation Plan, 12/10/2015). BP's wetland consultant, Blue Frog Environmental, characterized 145.86 acres as wetlands, 18.09 acres as built up (man-made), 32.07 acres as non-wetlands.



Pit Remnant in Wetland Area at C-7 Well Site (Area 5)

There are no public water supplies available. The nearest surface water bodies are (a) a large irrigation canal trending generally north-south across the property and (b) a smaller irrigation canal trending generally east-west. The larger canal generally divides the subject property into two (2) distinct areas: the west side and the east side. Topographic Map, Fig. 3. Canal bottom elevations in the east-west canal ranged from 3.24' amsl near the access road to the SWD Tank Battery site to 4.37' amsl west of the same access road near the SWD Tank Battery site. Farther to the east, near the C-5 wells 66878/67773, the east-west canal bottom elevations ranged from 5.43' amsl to 5.71' amsl. Based on the survey data, the water depths in the east-west canal were 1.06'-1.58'. The bottom of the north-south canal near the C-5 site (66878/67773) ranges from 4.55' amsl to 8.78' amsl. Based on the survey data of the surface water samples and the canal bottoms, the water depths in the north-south canal ranged from 0.18'-1.72'. Survey, App. R.

There are 4' to 7' of clay between the bottom of the canals and the top of the shallow aquifer. Cross Sections, App. A & B.

The property has not been affected by hurricane storm surges in recorded history. The National Oceanic and Atmospheric Administration's (NOAA) National Hurricane Center website was studied to determine whether the areas at/near the Subject Property were impacted by storm surges from past major hurricanes dating back to 1900. The most severe hurricanes to impact Calcasieu Parish were Hurricanes Audrey (1957) and Rita (2005); neither had a storm surge that impacted this property according to NOAA's data and a 2013 USGS publication (McGee, etal, 2006).



SWD Tank Battery Site (Area 1) Toward the North

The subject property is used for residential purposes (one residence on Lognon Road), agriculture, including crop and livestock production, recreational hunting, Eco-tours, and oil and gas operations. The portion historically used for oil and gas wells and facilities has not been used for agricultural purposes for several years due to oil and gas E&P activities and associated contamination.



Produced Brine Scarring – At/Near 64709 Well Site (Area 3)

Adjacent and nearby properties are used for residential purposes, agriculture, including crops, tree-farming (Loblolly Pine), and livestock, recreational hunting, and oil and gas exploration and production.

Sweet Lake recently created a recreational lake (hunting, fishing), known as Miller Lake, on a parcel of their property about ten miles southwest of the subject property. An agricultural and/or domestic water well(s) will likely be installed at the subject property.

2. GEOLOGY, HYDROGEOLOGY, AND AQUIFER CHARACTERISTICS

2.1 Surficial Geology

The surficial geology at the property consists of the Pleistocene aged Beaumont Alloformation, which is composed of coastal plain deposits of late to middle Pleistocene streams (App. I, 2003 Louisiana Geological Survey Map). The Pleistocene was dominated by several periods of glaciation which caused multiple regressions and transgressions in sea level. As glaciers formed, the sea level dropped, and streams and rivers flowing into the Gulf of Mexico cut incised valleys thereby confining their sediment

loads to their channels and depositing the vast majority of sediments further out on the continental shelf. As glaciers melted, however, sea level rose and the river and stream channels were flooded and backfilled with sediments. There was also an abundance of new sediments being carried downstream by glacial melt waters. According to “The Geology and Ground-Water Resources of Calcasieu Parish, Louisiana” by A.H. Harder, these sediments were deposited in great quantities in the coastal areas in the forms of channel, levee, and flood plain deposits (Harder, 1960, pages 9-10). These processes deposited clays, silts, sands and gravels throughout the area.

The primary source of deposition in the western Calcasieu Parish area during the Pleistocene was the Paleo Red River and its tributaries (2003 Louisiana Geological Survey Map). The surface soils are composed primarily of Mowata-Vidrine soil complexes with a less significant percentage of Crowley-Vidrine soil complexes in the northeast corner of the property near the 64709 well site (Area 3)(Appendix M, United States Department of Agriculture (USDA) Web Soil Survey, p.8-10, 15-16). The USDA describes the Mowata soils as fine, low permeability, typically poorly drained, and smectitic, i.e., they expand when subjected to large quantities of water. The Mowata soils are also classified as strongly to slightly acidic from the ground surface to approximately 51 inches below ground surface (bgs), below which they become more neutral and eventually alkaline. The Vidrine soils are also classified as smectitic but drain moderately well to somewhat poorly. Like Mowata, the Vidrine soil is strongly to slightly acidic in the leached upper horizons and become neutral to alkaline with depth. The less abundant Crowley soils near the 64709 well site are also smectitic, somewhat poorly drained with low permeability, and moderately acidic near the surface becoming neutral to alkaline at about 33 inches bgs. These soils were characterized at the subject property via the soil borings that were drilled and sampled. Soil Boring Logs, App. J.

Approach’s environmental geologist supervised the drilling of 90 soil borings (3 of which were converted to monitoring wells (MWs) and 39 of which were converted to temporary MWs), 64 surface samples, and 7 surface water sample locations. The soil borings were drilled, plugged and abandoned (P&A’d) by a Louisiana licensed driller. The same environmental geologist, under the supervision and guidance of Mark S. Moore, a Certified Professional Geologist (Louisiana Board of Professional Geoscientists #490), created written logs of each boring as it was drilled. Soil Boring Logs, App. J. The locations of the borings were professionally surveyed and are depicted on the surveyor’s certified maps. PLS Maps, App. R. The soil borings locations are presented in each Site Appendix (A-F) as Fig. A-1, B-1, C-1, etc.

The soils were relatively consistent over the areas of investigation:

- From the surface to 6.5'-8' below ground surface (bgs) (+/-2'): dry to moist, silty clays with root fragments were predominant with occasional silty, sandy layers (referred to in this report as the overlying clay zone);
- A 0.2'-3.5' thick layer of moist silty, clayey sand was sometimes noted underlying the dry silty clays. This layer, when present, was typically moist (referred to in this report as the intermediate silt zone) and was not consistent across the subject site.
- When this silty clayey sand zone was present, it was typically underlain by a 2.3'-5.2' thick dry, silty clay (referred to in this report as the intermediate clay).
- Underlying the clay zone is a confined water bearing zone consisting of oyster shells intermingled in silty clay and silty sands, with a thickness from 0.4' to 3.7'. This shallow aquifer is underlain by markedly dry, silty clays (referred to in this report as the "underlying dry clay").

The Soil Boring Logs are in App. J. The Cross-Sections for each respective site illustrate the soil lithology across the property. Site App. A, B, & E.

2.2 Regional Hydrogeology

The property is situated within the Gulf Coast Plain Physiographic Province and is directly underlain by the Chicot aquifer system surficial confining unit - clays and thin zones of coarser material that confine the sand and gravel deposits of the productive Chicot aquifer below ("Thickness of the Chicot Aquifer System Surficial Confining Unit and Location of Shallow Sands, Southwestern Louisiana" by Sargent, 2004, page 2). The Chicot aquifer is the most used source of fresh groundwater in Louisiana, accounting for nearly 41% of all groundwater withdrawals ("Water Use in Louisiana, 2010", revised 2012, Sargent, 2011, page 117, 134). The aquifer is comprised of three (3) distinct sand units within the Lake Charles area - the 200 foot sand, 500 foot sand, and 700 foot sand, each named for the approximate depth bgs at which it is encountered - with the majority of the population obtaining drinking water from the 500 foot sand ("Hydrogeologic Framework of the Shallow Sand in Calcasieu Parish, Louisiana", Lovelace, 1999, page 1-2). The coarser grained sediment zones within the Chicot surficial confining unit are collectively referred to as the shallow sand and these sands are used for domestic water supplies in many areas of Calcasieu Parish ("Distribution of Saltwater in the Chicot Aquifer System of Southwestern Louisiana, Lovelace, 1999, page 9).

There are approximately 178 wells within a ten (10) mile radius of the Subject Property that are drawing water from the shallow sand (less than 150 feet deep) of the Chicot aquifer confining unit. Feb. 2016 Louisiana Department of Natural Resources (LDNR) Online Water Well Database (App. N). Of those

wells, 160 are listed as domestic wells and another 4 are described as public supply wells. Twenty-nine (29) of those wells are screened at depths of less than 100 feet bgs. There are seven active wells used within ten miles of the site that are screened at less than 40' bgs. They are used for domestic water supply, irrigation, or other purposes. Active wells screened at less than 40' bgs were installed as early as 1910 and 1937. Other wells screened at this interval were installed as recently as 1998. Registered Water Wells, App. N. In 1960, there were several domestic supply wells 14'-28' deep in Calcasieu Parish. Harder, "The Geology and Ground-Water Resources of Calcasieu Parish," p. 78 (US Dept. Int. GPO 1960).

The shallow sands in the Upper Confining Unit of the Chicot Aquifer provide a conduit for vertical lateral movement of contaminants within the Chicot aquifer confining unit. "Distribution of Saltwater in the Chicot Aquifer System of Southwestern Louisiana", Lovelace, 1999, pages 7, 9-10. Therefore, there is potential for constituents of concern from impacted groundwater at the Subject Property to impact domestic and/or public supply wells in the area.

2.3 Site Hydrogeology

Approach drilled 90 soil borings on the property, most with depths of (8) feet to twenty (20) feet bgs and the deepest to about ninety (90) feet bgs. Two (2) primary saturated zones underlie the surface: (1) a shell bed at ten (10) to fourteen (14) feet bgs; and (2) a clayey/silty sand zone at seventy five (75) feet bgs. A shallower silt zone at about eight (8) feet bgs (previously referred to as the Intermediate Silt Zone) appears frequently but is not uniform across the site. Silty clays are consistently found above and below the intermediate silt zone and above and below the shallow aquifer across the site. Approach screened permanent and temporary monitoring wells in the shallow aquifer across the site and one (1) monitoring well in the sand zone at seventy five (75) feet bgs. Soil Boring & Monitor Well Locations, Site Maps (App. A-F) and Soil Boring Logs and Monitoring Well Construction Diagrams – App. J.

The water in wells screened in the shallow aquifer rose to within a foot of the surface indicating confined groundwater conditions. Approach used a pumping test and slug tests to determine that the average horizontal hydraulic conductivity within this aquifer is 2.6×10^{-2} cm/sec. Groundwater Restoration Plan, App. P (Aquifer Test Report, App. A to Groundwater Restoration Plan). Sweet Lake has a cattle pond that is likely recharged by this same aquifer on other property in Calcasieu Parish.

Approach drilled a geotechnical boring from which cores were sent to the laboratory for sieve analyses and hydraulic conductivity determinations. The clay zones above and below the shallow aquifer had vertical and horizontal hydraulic conductivities of 10^{-8} cm/sec. Geotechnical Report, App. K. Laboratory derived hydraulic conductivities could not be accurately determined in the shallow aquifer due to the unconsolidated nature of the zone. Geotechnical Testing data, App. K.

Currently, there are no groundwater wells screened in the shallow aquifer on the subject property, but Sweet Lake may use this groundwater in the future.

2.4 Aquifer Characteristics

Approach and Terra Solve conducted a 24-hour, constant drawdown aquifer pumping test on PW15 to determine the shallow aquifer's hydraulic conductivity, transmissivity, storativity, well yield, and drawdown. Groundwater Restoration Plan, App. P (Aquifer Test Report, App. A to Groundwater Restoration Plan). The well was screened from eleven (11) feet to sixteen (16) feet bgs, covering the shallow aquifer encountered from 11.5 feet to 12.5 feet bgs. During the 24 hour pumping test, the well yielded 4,061 gallons and the aquifer exhibited an average hydraulic conductivity of 2.16×10^{-2} cm/sec. Groundwater Restoration Plan, App. P (Aquifer Test Report, App. A to Groundwater Restoration Plan). The pump did not stop and the well did not pump dry.

Surface water bodies did not influence the pumping test. The surface water bodies closest to the pumping test well were the east-west canal, 516 feet away, and the north-south canal, 1,025 feet away. Six feet (6') of clay separated the canal bottom from the top of the shallow aquifer. PLS Survey, App. R (deepest part of either canal was 3.24' amsl; top of the screened interval was -2.58' amsl). The calculated seepage rate from the east-west canal into the aquifer is 2 gallons of water per day (based on the canal being 600' long). Jan. 27, 2016 Seepage Calculations, App. H. Geotechnical data collected from a boring less than five feet (5') from PW15 showed horizontal and vertical hydraulic conductivity of 10^{-8} cm/sec. in the confining clay above the shallow aquifer (Appendix K). Drawdown data obtained from monitor wells during the pumping test established that the pumping wells' radius of influence was 230 feet. Therefore, the pumping test yield was not influenced by surface water bodies.

The recharge source for the shallow aquifer is not fully known at this point in the investigation. While most aquifers are recharged by surface water bodies and slow recharge through the soil, information gained from the site-specific soil borings, laboratory tests of soil hydraulic conductivity (10^{-8} cm/sec), and infiltration and seepage calculations indicate that little seepage or infiltration from the surface or the canals to the shallow aquifer is occurring or has occurred. Literature states that the sands of the Chicot aquifer and the sediments of the upper confining unit generally dip to the south. It also states that the Chicot sands and some shallower sands are primarily recharged from up-dip recharge zones in parishes to the north where these sands outcrop at the surface (Lovelace, 7-12). Further, according to the Chicot Aquifer Summary 2008, published by the LDEQ (page 4), recharge to the Chicot occurs primarily through the direct infiltration of rainfall in the interstream, upland outcrop-subcrop areas. Recharge also occurs by water movement from the Atchafalaya alluvium, downward infiltration through the clays south of the

primary recharge outcrop area, upward movement from the underlying Evangeline aquifer, and inflow from the Vermilion and Calcasieu rivers.

The shallow aquifer zone is hydraulically isolated from outside sources of water, including the canals, as illustrated in the Cross Sections in Site Appendices A, B, and E.



Pumping Test near SWD Tank Battery Site (Area 1)

The above photograph of the pumping test shows that the ground was not inundated with water during the test. The few water puddles present at the site could not and did not influence the pumping test by increasing the yield.

Rising head slug tests were also conducted on PW15, MW1, and MW2. The results indicated an average hydraulic conductivity of 1.94×10^{-3} cm/sec. Groundwater Restoration Plan, App. P (Aquifer Test Report, App. A to Groundwater Restoration Plan).

3. REGULATORY LIMITS ON CONTAMINANTS

The evaluation and remediation of oilfield sites is regulated by the Louisiana Department of Natural Resources (LDNR) according to Louisiana Administrative Code (LAC) Title 43, Part XIX, Subpart 1, Statewide Order No. 29-B, Chapter 3-Pollution Control—Onsite Storage, Treatment and Disposal of Exploration and Production Waste (E&P Waste) Generated from the Drilling and Production of Oil and Gas

Wells (Oilfield Pit Regulations) (referred to in this report as 29-B); Chapter 4-Pollution Control (Class II Injection/Disposal Well Regulations); Chapter 5-Off-Site Storage, Treatment and/or Disposal of Exploration and Production Waste Generated from Drilling and Production of Oil and Gas Wells; and Chapter 6-Procedures for Hearings and the Submission and Approval of Plans for the Remediation of E and P Sites in Accordance with LSA-R.S. 30:29. These regulations, in particular sections 311 and 313, establish the maximum levels of contaminants that may be left at an E&P site. Levels in excess of those maximums are considered to be contamination and constitute environmental damage if caused by oil and gas E&P activities.

4. INVESTIGATION RESULTS AND EVALUATION

Approach compared analytical data to regulatory limits or background to determine the existence and extent of contamination in the soil and groundwater. The analytical summary tables and isoconcentration maps include Approach's analytical data and HET's analytical data. When applicable, the analytical summary tables indicate the regulatory standard for each parameter. For sample locations with multiple sample results available for the selected interval or location, the higher of the sample results was used to contour the isoconcentration maps.



Produced Brine Scarring At/Near SWD Tank Battery Site (Area 1)

4.1 Soil Remediation Standards

The LAC 43.XIX.313 standards for wetlands not normally inundated were used to evaluate the analytical results and to prepare a fully compliant 29-B Plan in accordance with LAC 43.XIX.611. For hydrocarbons in the soil for which there is no 29-B standard, *e.g.*, benzene, TPH-GRO, TPH-DRO, TPH-ORO, Methylene Chlorides, *etc.*, background concentrations are used as the specific and relevant standard. In some cases, these contaminants will be addressed by remediating substances regulated by 29-B.

4.2 Areas of Soil Contamination

For soil contamination, the six (6) areas of concern are depicted on the Areas of Concern Map-Fig. 2-A. The soil analytical data from both HET and Approach are compiled, tabulated, and mapped for interpretation and illustration in the Tables and Maps of each Site Appendix (App. A-F). Approach grouped the soil analytical data by the area of concern, location of sample, depth of sample, and parameter analyzed. In the isoconcentration maps, lines of equal value were not interpolated beyond control points.



Flare and Pit at 68920 Well Site (Area 5)

Please refer to the soil isoconcentration maps and cross sections in each respective Site Appendix (App. A-F and App A, B and E, respectively) for illustration of contaminant distribution across each of the sites in relation to the underlying soils and depths below ground surface.

Methylene Chloride was detected at all the site at Areas 1, 2, 3, and 5, at several intervals and locations, but is not adequately delineated. Although Methylene Chloride is often considered as a laboratory contaminant, it was not detected in the laboratory blanks and therefore should not be considered as a laboratory contaminant at these locations.

4.2.1 SWD Tank Battery Area (34829, 970411, 970412) (HET Area 1)

4.2.1.1 29-B Exceedances Other than Salt

In this area, Approach collected fifty surface soil samples and three surface water samples, drilled 43 soil borings, converted three of the soil borings to permanent monitor wells, and converted 24 soil borings to temporary monitor wells (TMWs). The following tables show the exceedances of 29-B soil standards (other than salt parameters) and background where there is no 29-B standards:

Soil Exceedances of LDNR 29B Standards					
Sampler	Sample ID	Date Sampled	Oil and Grease, Soxhlet/ Gravimetric (%)	Arsenic (mg /Kg)	Selenium (mg/Kg)
LDNR 313			1	10	10
APPROACH ENVIRONMENTAL INVESTIGATION					
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)					
AE	SB1 10-12'	11/3/2009		10.2	
AE	SB1A 2-4'	4/2/2013	2.67		
AE	SB12 4-6'	11/13/2012	2.57		
HET	SB12 6-8'	11/13/2012	1.37		
AE	SB12 8-10'	11/13/2012	2.35		
HET	SB12 8-10'	11/13/2012	2.22		
AE	SB22 24-26'	1/7/2013			27.7
AE	SB22 26-28'	1/7/2013			24.2
AE	SB22A 30-32'	3/25/2013		31.2	
MAXIMUM			2.67	31.2	27.7
HET INVESTIGATION					
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)					
AE	A1-MW7 (0-2)	5/21/2013	4.44		
HET	A1-MW12 (6-8)	5/23/2013	1.18		
HET	A1-MW13 (1-3)	5/23/2013	1.3		
AE	A1-SB10 (4-6)	5/24/2013	2.32		
AE	A1-SB11 (1-3)	5/29/2013	1.05		
HET	A1-SB11 (4-6)	5/29/2013	1.07		
HET	A1-SB12 (6-8)	5/29/2013	1.36		
MAXIMUM			4.44	Not Applicable	Not Applicable

Soil Exceedances of Background Standards							
Sampler	Sample ID	Date Sampled	TPH-GRO (mg/Kg)	TPH-DRO (mg/Kg)	TPH-ORO (mg/Kg)	Benzene (mg/Kg)	Methylene Chloride (mg/Kg)
BACKGROUND			Non Detect				
APPROACH ENVIRONMENTAL INVESTIGATION							
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)							
AE	NORTH	2/10/2009	91	5800			
AE	SOUTH	2/10/2009	7.8	12			
AE	SB1 4-6'	11/3/2009		470	130		
AE	SB1 10-12'	11/3/2009		17	5.2		
AE	SB1A 2-4'	4/2/2013				0.00175	
AE	SB2 2-4'	11/3/2009		4.1	6.2		
AE	SB3 8-10'	11/4/2009				0.17	
AE	SB8 0-2'	11/12/2012					0.08
AE	SB8 2-4'	11/12/2012					0.16
AE	SB10 0-4'	11/13/2012				0.15	
HET	SB10 0-4'	11/13/2012				0.146	
AE	SB10 4-6'	11/13/2012				0.11	
HET	SB10 4-6'	11/13/2012				0.047	
AE	SB12 4-6'	11/13/2012				0.12	
HET	SB12 4-6'	11/13/2012		47	59	0.045	
AE	SB12 6-8'	11/13/2012				0.26	
HET	SB12 6-8'	11/13/2012		1790	2150	0.326	
AE	SB12 8-10'	11/13/2012				1.6	
HET	SB12 8-10'	11/13/2012		465	448	1.34	
HET	SB12 14-16'	11/13/2012				0.00148	
AE	SB13 0-4'	1/8/2013					0.074
AE	SB13 4-6'	1/8/2013					0.078
AE	SB13 8-10'	1/8/2013					0.06
AE	SB13 10-12'	1/8/2013					0.086
AE	SB15 4-6'	1/10/2013					0.02
AE	SB15 8-10'	1/10/2013					0.045
HET	SB15 12-14'	1/10/2013				0.00145	
AE	SB16 4-6'	1/10/2013					0.026
AE	SB16 8-10'	1/10/2013					0.044
AE	SB16 12-14'	1/10/2013					0.022
HET	SB16 12-14'	1/10/2013				0.00161	
AE	SB19A 0-2'	3/26/2013				0.014	

HET	SB20 4-6'	11/16/2012		190			
AE	SB22 24-26'	1/7/2013				0.92	
AE	SB22 26-28'	1/7/2013				0.58	
AE	SB22A 28-30'	3/25/2013				0.87	
HET	SB22A 28-30'	3/25/2013				0.527	
AE	SB22A 30-32'	3/25/2013				1.8	
HET	SB22A 30-32'	3/25/2013				1.01	
HET	SB22A 50-54'	4/8/2013				0.00109	
AE	SB23 6-8'	1/8/2013					0.12
AE	SB23 10-12'	1/8/2013					0.065
AE	SB30 2-4'	1/29/2013					0.023
AE	SB31 12-14'	1/31/2013					0.056
MAXIMUM			91	5800	2150	1.8	0.16
HET INVESTIGATION							
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)							
HET	A1-MW2 (0-2)	5/21/2013		486	991		
HET	A1-MW12 (4-6)	5/23/2013		334	367		
HET	A1-MW12 (6-8)	5/23/2013		5430	6370		
HET	A1-MW12 (8-10)	5/23/2013		5330	6660		
HET	A1-MW12 (10-12)	5/23/2013		215	188		
HET	A1-MW13 (1-3)	5/23/2013		7540	8410		
HET	A1-MW13 (4-6)	5/23/2013		2040	2280		
HET	A1-MW13 (6-8)	5/23/2013		34.2	43.1		
HET	A1-SB2 (1-3)	5/17/2013		1770	1530		
AE	A1-SB2 (1-3)	5/17/2013		2300	580		
HET	A1-SB2 (4-6)	5/17/2013		2570	2140		
AE	A1-SB2 (4-6)	5/17/2013		290	65		
HET	A1-SB4 (6-8)	5/20/2013		64.6	<8.40		
HET	A1-SB8 (6-8)	5/23/2013		6.12	7.07		
HET	A1-SB8 (8-10)	5/23/2013		<4.00	5.4		
HET	A1-SB8 (10-12)	5/23/2013		<4.00	5.98		
HET	A1-SB9 (1-3)	5/24/2013		1150	1260		
HET	A1-SB9 (6-8)	5/24/2013		8.76	11.6		
HET	A1-SB9 (8-10)	5/24/2013		<3.97	<4.17		
HET	A1-SB10 (1-3)	5/24/2013		1070	1110		
HET	A1-SB10 (4-6)	5/24/2013		3930	3970		
HET	A1-SB10 (6-8)	5/24/2013		78.8	81.9		
HET	A1-SB11 (1-3)	5/29/2013		1380	1670		
HET	A1-SB11 (4-6)	5/29/2013		2860	2270		
HET	A1-SB11 (6-8)	5/29/2013		22.3	5.77		
HET	A1-SB12 (4-6)	5/29/2013		1660	1630		
HET	A1-SB12 (6-8)	5/29/2013		2190	3090		
HET	A1-SB12 (8-10)	5/29/2013		216	408		
MAXIMUM			Not Applicable	7540	8410	Not Applicable	Not Applicable

4.2.1.2 Exceedances of 29-B Salt Parameters

The number of samples which exceeded 29-B regulations for salt parameters were 125 for EC (average exceedance value=15.3), 179 for ESP (average exceedance value=48.09), 232 for SAR (average exceedance value=27.2), 22 for pH. One (1) background exceedance of Benzo(a)pyrene was detected in NORTH (AE) at 0.34 mg/kg. A table showing the exceedances of 29-B soil standards for salt parameters is too large to include in the text of this report, but may be seen in Appendix A.

4.2.1.3 Additional Delineation

Although numerous soil samples were collected, additional delineation will be necessary as shown below:

- ESP toward the north at the 20'-30' interval
- SAR towards the north and west in the 4-8' interval
- Oil & Grease toward the south and southwest at the 0'-2' interval
- Oil & Grease towards northeast, south, and southwest at the 4-6' interval
- Oil & Grease toward the southwest at the 6'-8' interval
- O&G toward the south and southwest at the 8-10' interval
- Benzene toward the east-northeast at the 6'-8' interval
- Benzene toward the southwest at the 8'-10' interval
- Benzene in all directions at the 30'-32' interval
- Selenium towards the north and west at the 24-26' interval
- Selenium towards the north and west at the 26-28' interval

4.2.2 66878 and 67773 (C-5 & 5-D) (HET Area 2)

4.2.2.1 29-B Exceedances Other than Salt

At this site, Approach collected 2 surface soil samples, drilled 14 SBs, converted 7 SBs to TMWs, and collected 4 surface water samples. The following tables show the exceedances of 29-B soil standards (other than salt parameters) and background where there is no 29-B standards:

Soil Exceedances of LDNR 29B Standards				
Sampler	Sample ID	Date Sampled	Oil and Grease, Soxhlet/ Gravimetric (%)	True Total Barium (mg/Kg)
LDNR 313			1	20,000 (wetland)
APPROACH ENVIRONMENTAL INVESTIGATION				
WELL SITE SN 67773/66878 (C-5) (AREA 2)				
AE	SB1 8-10'	11/15/2012	2.04	
AE	SB1 10-12'	11/15/2012	1.35	
AE	SB1 12-14'	11/15/2012	1.11	
AE	SB3 0-2'	11/16/2012	1.11	
AE	SB3 2-4'	11/16/2012	1.63	
AE	SB3 4-6'	11/16/2012	6.32	
AE	SB6 0-2'	11/16/2012	6.89	27600
HET	SB6 0-2'	11/16/2012	2.05	25900
AE	SB6 2-4'	11/16/2012	3.03	70500
HET	SB6 2-4'	11/16/2012	1.60	156000
AE	SB6 4-6'	11/16/2012	2.92	
MAXIMUM			6.89	156000

Soil Exceedances of Background Standards							
Sampler	Sample ID	Date Sampled	TPH-GRO (mg/Kg)	TPH-DRO (mg/Kg)	TPH-ORO (mg/Kg)	Benzene (mg/Kg)	Methylene Chloride (mg/Kg)
BACKGROUND			Non Detect				
APPROACH ENVIRONMENTAL INVESTIGATION							
WELL SITE SN 67773/66878 (C-5) (AREA 2)							
HET	SB1 0-2'	11/15/2012				3.02	
AE	SB1 2-4'	11/15/2012				50	
HET	SB1 2-4'	11/15/2012		62.6	127	115	
HET	SB1 4-6'	11/15/2012				62.5	
AE	SB1 6-8'	11/15/2012				30	
HET	SB1 6-8'	11/15/2012		12.5	37.2	25.8	
AE	SB1 8-10'	11/15/2012				21	
HET	SB1 8-10'	11/15/2012		57.7	164	14.8	
AE	SB1 10-12'	11/15/2012				2.1	
HET	SB1 10-12'	11/15/2012				2.13	
AE	SB1 12-14'	11/15/2012				0.019	
HET	SB3 0-2'	11/16/2012		118	217		
HET	SB3 2-4'	11/16/2012		915	943		
HET	SB3 4-6'	11/16/2012					0.009
HET	SB6 0-2'	11/16/2012		8930			

AE	SB6 2-4'	11/16/2012				0.53	
HET	SB6 2-4'	11/16/2012		91000		0.011	
HET	SB6 8-10'	11/16/2012					0.034
AE	SB7 0-4'	1/17/2013					0.032
AE	SB7 6-8'	1/17/2013					0.068
AE	SB7 8-10'	1/17/2013					0.054
AE	SB7 10-12'	1/17/2013					0.046
AE	SB8 2-4'	1/17/2013					0.05
AE	SB8 6-8'	1/17/2013					0.048
AE	SB8 8-10'	1/17/2013					0.056
AE	SB8 10-12'	1/17/2013					0.045
AE	SB9 2-4'	1/17/2013					0.074
AE	SB9 8-10'	1/17/2013					0.064
AE	SB10 2-4'	1/17/2013					0.052
AE	SB10 4-6'	1/17/2013					0.054
AE	SB10 8-10'	1/17/2013					0.085
AE	SB11 0-4'	1/18/2013					0.034
AE	SB11 6-8'	1/18/2013					0.07
AE	SB11 8-10'	1/18/2013					0.087
AE	SB11 10-12'	1/18/2013					0.1
AE	SB12 2-4'	1/18/2013					0.076
AE	SB12 8-10'	1/18/2013					0.1
HET	SB12 12-14'	1/18/2013				0.00255	
MAXIMUM			Not Applicable	91000	943	115	0.1
HET INVESTIGATION							
WELL SITE SN 67773/66878 (C-5) (AREA 2)							
Approach	A2-MW7 (1-3)	6/4/2013	NA	7	4.2		
HET	A2-MW7 (4-6)	6/4/2013	125			5.59	
HET	A2-MW7 (6-8)	6/4/2013	818	4.28	21.4	14.3	
Approach	A2-MW7 (6-8)	6/4/2013		6.8	5.7		
HET	A2-MW7 (8-10)	6/4/2013	83.1		4.48	3.26	
Approach	A2-MW7 (8-10)	6/4/2013	190			12	
HET	A2-MW7(10-12)	6/4/2013				3.52	
MAXIMUM			818	7	21.4	14.3	Not Applicable

Additional background exceedances include multiple Toluene, Ethylbenzene, Xylenes background exceedances. One (1) background exceedances of 2-Butanone in SB6 4-6' (AE) at 1.8 mg/kg was reported. One (1) background exceedance of Acetone in SB11 0-4' (AE) at 0.092 mg/kg and one (1) background exceedance of 1,2-Dichloroethane was reported at a concentration of 5.3 mg/kg in SB1 2-4' (AE).

4.2.2.2 Exceedances of 29-B Salt Parameters

The number of samples which exceeded 29-B regulations for salt parameters were 7 for EC (average exceedance value=22.9), 20 for ESP (average exceedance value=36), 45 for SAR (average exceedance=22.5), 22 for pH. A table showing the exceedances of 29-B soil standards for salt parameters is too large to include in the text of this report, but may be seen in Appendix B.

4.2.2.3 Additional Delineation

Although many soil borings were drilled at the site, additional delineation is necessary primarily toward the east, as further delineation was delayed due to the northeast-southwest canal. The following additional delineation is needed:

- ESP towards the east in the 0'-2' interval
- ESP towards the east in the 2'-4' interval
- ESP towards the east in the 4-8' interval
- ESP towards the east in the 8'-14' interval
- SAR towards the east in the 0'-2' interval
- SAR towards the east in the 2'-4' interval
- SAR towards the south, east, and west in the 8'-14' interval
- Oil & Grease towards the east and west in the 0'-2' and 4'-6' intervals
- Oil & Grease towards the northwest and southeast in the 2-4' interval
- Oil & Grease towards the south and east in the 8'-10' interval
- Oil & Grease towards the east and west in the 10-12' interval
- Oil & Grease towards the west and east in the 12-14' interval
- TTBa towards the north, east and west in the 0'-2' interval
- TTBa towards the north, east, and west in the 2'-4' interval
- 1,2 Dichloroethane towards the east in the 2'-4' interval
- Benzene towards the southeast in the 2-4' interval
- Benzene towards the east in the 4-6' interval
- Benzene towards the southeast in the 6-8' interval
- Benzene towards the east in the 8'-10' interval
- Benzene to south and southeast in the 10-12' interval

4.2.3 64709 (C-3) (HET Area 3)

4.2.3.1 29-B Exceedances Other than Salt

At the 64709 site, Approach drilled 12 SBs (1 surface sample collected in the same location as an SB) and converted 4 of the SBs to TMWs. The following tables show the exceedances of 29-B soil standards (other than salt parameters) and background where there is no 29-B standards:

Soil Exceedances of Background Standards						
Sampler	Sample ID	Date Sampled	TPH-GRO (mg/Kg)	TPH-DRO (mg/Kg)	TPH-ORO (mg/Kg)	Methylene Chloride (mg/Kg)
BACKGROUND			Non Detect	Non Detect	Non Detect	Non Detect
APPROACH ENVIRONMENTAL INVESTIGATION						
WELL SITE S.N. 64709 (C-3) (AREA 3)						
AE	64709 SS1	3/22/2010		26	45	
AE	64709 SB2 5'	3/22/2010		34	26	
HET	SB3 0-2'	11/15/2012				0.024
HET	SB3 2-4'	11/15/2012		1500	4730	
HET	SB3 4-6'	11/15/2012		3130	2170	
AE	SB9 4-6'	1/11/2013				0.011
Maximum			Not Applicable	3130	4730	0.024
HET INVESTIGATION						
WELL SITE S.N. 64709 (C-3) (AREA 3)						
HET	A3-SB4 (0-2)	6/4/2013		1890	1790	
AE	A3-SB4 (0-2)	6/4/2013	15			
AE	A3-SB4 (1-2)	6/4/2013		9.1		
AE	A3-SB4 (2-3)	6/4/2013		6.8		
AE	A3-SB5 (3-5)	6/5/2013		41		
AE	A3-SB5 (3-5)	6/5/2013		26		
Maximum			15	1890	1790	Not Applicable

The 29-B standard for Arsenic was exceeded at 13.7 mg/kg at A3-SB5 (15-17) in a sample taken by HET. If converted to wet weight, the 29-B limit for Arsenic would not be exceeded.

4.2.3.2 Exceedances of 29-B Salt Parameters

The number of exceedances of 29-B salt parameters regulations were 6 for EC (average exceedance value=16.8), 8 for ESP (average exceedance=52.8), 15 for SAR (average exceedance=23), 70 for pH. A table showing the exceedances of 29-B soil standards for salt parameters is too large to include in the text of this report, but may be seen in Appendix C.

4.2.3.3 Additional Delineation

Additional delineation is necessary for the following parameters and intervals:

- EC towards the northwest at the 0'-2' interval.
- EC towards the southwest and south in the 2'-4' interval
- ESP towards the south and west at the 2'-4' interval.
- ESP towards the north at the 4'-8' interval
- ESP towards the north, east, and south in the 8-14' interval
- SAR towards the west at the 2'-4' interval.
- SAR towards the north and west in the 0-2' interval
- SAR towards the north, south, and west at the 4'-8' interval.

4.2.4 63282 (C-2) (HET Area 4)

4.2.4.1 Exceedances of 29-B Salt Parameters

At well site 63282, Approach drilled 4 SBs and collected 1 surface sample. The following summarizes each of the 29-B salt-related parameters:

The number of exceedances of 29-B salt parameters regulations were 5 for EC (average exceedance value=11.24), 2 for ESP (average exceedance value=37.95), 11 for SAR (average exceedance value=22.3), 11 for pH. A table showing the exceedances of 29-B soil standards for salt parameters may be seen in Appendix D.

4.2.4.2 Additional Delineation

Additional delineation at this site is necessary for the following parameters and intervals:

- EC towards the west at the 0'-2' interval
- ESP towards the west at the 0'-2' interval
- SAR towards the west at the 0'-2' interval
- SAR towards the east and west at the 2'-4' interval
- SAR towards the north, south, east, and west at the 4'-6' interval

4.2.5 68920 (C-7) (HET Area 5)

4.2.5.1 29-B Exceedances Other than Salt

At well site 68920, Approach collected 6 surface soil samples, drilled 8 SBs, and converted 3 SBs to TMWs. The following tables show the exceedances of 29-B soil standards (other than salt parameters) and background where there is no 29-B standards:

Soil Exceedances of 29B Standards				
Sampler	Sample ID	Date Sampled	Oil and Grease, Soxhlet/ Gravimetric (%)	Arsenic (mg/Kg)
LDNR 313			1	10
APPROACH ENVIRONMENTAL INVESTIGATION				
WELL SITE S.N. 68920 (AREA 5)				
AE	SS60	8/13/2009	3.68	
AE	SS61	8/13/2009	3.22	
AE	SB4 0-1'	1/15/2013		43.5
Maximum			3.68	43.5

Soil Exceedances of Background Standards						
Sampler	Sample ID	Date Sampled	TPH-DRO (mg/Kg)	TPH-ORO (mg/Kg)	Benzene (mg/Kg)	Methylene Chloride (mg/Kg)
BACKGROUND			Non Detect	Non Detect	Non Detect	Non Detect
APPROACH ENVIRONMENTAL INVESTIGATION						
WELL SITE S.N. 68920 (AREA 5)						
HET	SB1 0-2'	11/14/2012	398	339		
HET	SB1 2-4'	11/14/2012	6.87	7.33		
AE	SB2 0-4'	11/14/2012			0.24	
HET	SB2 0-4'	11/14/2012	351	240	0.408	
AE	SB2 4-6'	11/14/2012			0.12	
HET	SB2 4-6'	11/14/2012	204	144	0.057	
HET	SB3 0-2'	11/14/2012	4.03	7.09		
HET	SB3 2-4'	11/14/2012	<4.00	<4.20		
AE	SB7 4-6'	1/16/2013				0.057
AE	SB7 8-10'	1/16/2013				0.014
MAXIMUM			398	339	0.408	0.057
HET INVESTIGATION						
WELL SITE S.N. 68920 (AREA 5)						
HET	A5-SB1 (0-2)	6/7/2013	1620	1640		
AE	A5-SB1 (0-2)	6/7/2013	200	69		
MAXIMUM			1620	1640	Not Applicable	Not Applicable

4.2.5.2 Exceedances of 29-B Salt Parameters

The number of exceedances of 29-B salt parameters regulations were 2 for EC (average exceedance value=15.95), 3 for ESP (average exceedance=35.93), 7 for SAR (average exceedance=21.76, 9 for soil pH. A table showing the exceedances of 29-B soil standards for salt parameters may be seen in Appendix E.

4.2.5.3 Additional Delineation

Additional delineation is required for the following parameters and intervals:

- Oil and Grease towards the north and south at the 0'-2' interval
- Benzene towards the west at the 4'-6' interval

4.2.6 216967 (C-9) (HET Area 6)

4.2.6.1 29-B Exceedances Other than Salt

At well site 216967, Approach collected 5 surface samples, drilled 9 SBs, and converted 1 SB to a TMW. The only 29B soil exceedance (not including salt parameters) was True Total Barium at 22,800 mg/Kg at SS11 sampled by Approach.

4.2.6.2 Exceedances of 29-B Salt Parameters

The number of exceedances of 29-B salt parameters were 2 for EC (average exceedance value=8.85), 5 for ESP (average exceedance value=33.1), 3 for SAR (average exceedance=20.8), 7 for pH. A table showing the exceedances of 29-B soil standards for salt parameters may be seen in Appendix F.

4.2.6.3 Additional Delineation

Additional delineation is necessary for the following parameters and intervals:

- ESP towards the north and east in the 0-2' interval
- ESP towards the southwest at the 2'-4' interval
- SAR towards the north and east at 0'-2' interval'
- TTBa towards the north, south, east, and west at the 0'-2' interval

4.3 Groundwater Contamination

LAC 43:XIX.303.C provides "Contamination of a groundwater aquifer or a USDW with E&P Waste is strictly prohibited." Therefore, background concentrations were calculated and used to evaluate the analytical results of the investigation and to prepare a plan that restores the property to 29-B standards.

Approach selected background sample locations away from the contaminated areas, calculated background limits by the arithmetic mean (average), and those averages were rounded for ease of use. See App. L for Background Calculations.

4.4 Areas of Groundwater Contamination

Groundwater contamination was detected in five (5) distinct areas. Approach and HET collected enough data to approximate the area of contamination but further delineation should be done before remediation.

The groundwater analytical data from each area from Approach and HET have been compiled, tabulated for interpretation in Table 1 and Table 2 of each Site Appendix (App. A-C, E & F) and mapped

for illustration in each respective Site Appendix (Apps. A-C, E & F). At Well site 63282, groundwater samples were not collected because no soil contamination was identified at depths indicative of groundwater contamination. Please refer to the Groundwater Concentration Maps in each respective Site Appendix (Apps. A-C, E & F).

4.4.1 SWD Tank Battery area (34829, 970411, and 970412)(HET Area 1)

In this area, Approach converted three of the soil borings to permanent monitor wells and twenty four (24) soil borings to temporary monitor wells (TMWs). The following shows the exceedances of the background concentrations:

Groundwater Exceedances of Background Standards									
Sampler	Sample ID	Sample Date	TDS (mg/L)	Chloride (mg/L)	Arsenic (mg/L)	Barium (mg/L)	TPH-GRO (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)
BACKGROUND			750	250	<0.01	0.2	Non Detect	Non Detect	Non Detect
APPROACH ENVIRONMENTAL INVESTIGATION									
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)									
AE	TMW BG1	1/29/2013	3450	1450		0.324			
HET	BG1	1/29/2013	2690	1430		0.25		0.219	
AE	MW1	11/13/2009		27200		7.4	0.15	2.2	0.34
AE	MW1	6/12/2010	22300						
AE	MW1	3/26/2013	27700	15800	0.0114	8.86		2	
HET	TMW1	3/26/2013	22400	15300		8.13		5.23	
AE	MW2	11/13/2009		11100		3.74		0.7	0.17
AE	MW2A (DUPLICATE)	11/13/2009		11100		3.6		0.54	0.14
AE	MW2	6/12/2010	20800						
AE	MW2	3/26/2013	23600	13200	0.0261	4.56		0.44	
HET	TMW2	3/26/2013	20800	13100	0.019	5.21		2.76	
AE	TMW8	1/10/2013	12100	7050	0.014	1.66		0.37	
HET	TMW8	1/10/2013	12600	5110	0.018	1.5		0.575	
AE	TMW13	1/16/2013	10300	4330		1.26		0.43	
HET	TMW13	1/16/2013	7880	4020		1.39		1.29	
AE	TMW15	1/16/2013	10800	8870		4.27		1.4	
HET	TMW15	1/16/2013	14700	7410		4.37		6.31	
AE	TMW16	1/16/2013	8040	6000		2.06		0.65	
HET	TMW16	1/16/2013	10600	5830		2.12		1.81	
HET	TMW17	1/17/2013	8450	7810		0.88		0.68	
AE	TMW17	1/17/2013	15500	5770		1.02			
AE	SB21	1/8/2013	12200	6190		0.648			
HET	SB21	1/8/2013	10100	5900		0.51		0.224	
HET	MW22	1/10/2013	10800	4560		1.58		0.656	
AE	TMW22	1/10/2013	11200	6330		1.58		0.35	
AE	MW22A	4/9/2013	1740						
HET	MW22A	4/9/2013	1560						
AE	TMW23	1/16/2013	1180	536					
HET	TMW23	1/16/2013	1370	504		0.2		0.187	
AE	TMW24	1/10/2013	1540	3510		0.211			
HET	TMW24	1/10/2013	1520	571		0.22		0.183	
AE	TMW25	1/31/2013	12600	6410		0.942		0.18	
HET	TMW25	1/31/2013	12400	7260		0.83		0.212	

AE	TMW26	1/30/2013	9160	4680		0.328			
HET	TMW26	1/30/2013	9230	5250		0.29		0.2	
AE	TMW27	1/30/2013	7840	4100		1.19		0.44	
HET	TMW27	1/30/2013	7670	4800		0.98		1.03	
AE	TMW28	1/30/2013	10000	5250	0.0127	1.37		0.32	
HET	TMW28	1/30/2013	10200	5700	0.016	1.12		0.672	
AE	TMW29	1/30/2013	5030	2570		0.982		0.3	
HET	TMW29	1/30/2013	4870	2810		0.82		0.573	
AE	TMW30	1/30/2013	30600	1980	0.0138	8.93		1.4	
HET	TMW30	1/30/2013	31900	20900	0.018	8.2		3.78	
AE	TMW31	2/1/2013	2220	1020	0.0173	0.24		0.28	
HET	TMW31	2/1/2013	2190	978	0.017	0.2		0.572	
AE	SB36	4/2/2013	5590	2990		0.316			
HET	TMW36	4/2/2013	5240	2520		0.37			
AE	SB37	4/2/2013	5050	2130					
HET	TMW37	4/2/2013	4160	2070		0.23			
AE	SB38	4/2/2013	937	308					
HET	TMW38	4/2/2013	914	279					
AE	SB39	4/2/2013	1880	1380		0.206			
HET	TMW39	4/2/2013	1750	839		0.22			
AE	SB40	4/1/2013	873	306					
HET	TMW40	4/1/2013	802	262					
AE	SB41	4/2/2013	1060	403		0.65			
AE	SB42	4/2/2013	1230	540		0.208			
HET	TMW41	4/2/2013	1080	354		0.57			
HET	TMW42	4/2/2013	1230	503					
MAXIMUM			31900	27200	0.0261	8.93	0.15	6.31	0.34
HET INVESTIGATION									
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)									
HET	A1-MW1 (8'-18')	6/10/2013	2190	935		0.24			
AE	A1-MW1 (8'-18')	6/10/2013	1910	827		0.181			
HET	A1-MW2 (8'-18')	5/30/2013	2440	1350		0.26			
AE	A1-MW2 (8'-18')	5/30/2013	2400	1060		0.253			
HET	A1-MW3 (6'-16')	5/29/2013	994	313					
AE	A1-MW3 (6'-16')	5/29/2013	820	290					
HET	A1-MW4 (6'-16')	5/29/2013	2140	921		0.2			
AE	A1-MW4 (6'-16')	5/29/2013	2500	838		0.211			
HET	A1-MW5 (6'-16')	5/29/2013	4660	2350					
AE	A1-MW5 (6'-16')	5/29/2013	5070	2190					
HET	A1-MW6 (8'-18')	5/30/2013	21600	9960	0.01				
AE	A1-MW6 (8'-18')	5/30/2013	18100	8910		1.91			
HET	A1-MW7 (8'-18')	5/29/2013	34700	20400	0.027	8.53			
HET	A1-MW7 Duplicate (8'-18')	5/29/2013	32700	20000	0.03	8.39			
AE	A1-MW7 (8'-18')	5/29/2013	36400	18100		8.87		1.2	0.71
HET	A1-MW8 (10'-20')	6/10/2013	8560	4930	0.012	1.05			
AE	A1-MW8 (10'-20')	6/10/2013	9400	4610		0.888			
HET	A1-MW9 (6'-16')	5/31/2013	11100	6590					
AE	A1-MW9 (6'-16')	5/31/2013	12400	6040		1.18			

HET	A1-MW10 (8'-18')	6/10/2013	4450	2050		0.41			
AE	A1-MW10 (8'-18')	6/10/2013	4910	2460		0.36			
HET	A1-MW11 (8'-18')	6/10/2013	5540	2720		0.91			
AE	A1-MW11 (8'-18')	6/10/2013	6050	2730		0.704			
HET	A1-MW12 (9'-19')	5/30/2013	26800	16800	0.013/	8.14			
AE	A1-MW12 (9'-19')	5/30/2013	28300	15100		9.01	0.56		
HET	A1-MW13 (9'-19')	5/30/2013	20500	14600	0.026	9.81			
AE	A1-MW13 (9'-19')	5/30/2013	26100	12900	0.0187	10.9		1.40	0.94
MAXIMUM			36400	20400	0.03	10.9	0.56	1.4	0.94

Additional background exceedances include Toluene, Ethylbenzene, and Xylenes exceedances. Also, one (1) background exceedance of Lead was detected in SB41 at 0.0211 mg/L and two (2) background exceedances of Benzene were reported from laboratory analysis and indicate concentrations of 0.097 and 0.096 mg/L at MW12 per HET and Approach sampling data.

Further delineation of the horizontal extent of the dissolved contamination at this site is necessary for the following parameters and directions:

- Chlorides towards the east, south, and west
- TDS towards the east, south, and west
- TPH DRO towards the south and west
- Arsenic towards the west and east
- Barium towards the west and east

4.4.2 66878 and 67773 (C-5 & 5-D) (HET Area 2)

At this site, Approach converted seven soil borings to TMWs. The following table shows exceedances of the background concentrations:

Groundwater Exceedances of Background Standards								
Sampler	Sample ID	Sample Date	TDS (mg/L)	Chloride (mg/L)	Barium (mg/L)	TPH-GRO (mg/L)	TPH-DRO (mg/L)	Benzene (mg/L)
BACKGROUND			750	250	0.2	Non Detect	Non Detect	Non Detect
APPROACH ENVIRONMENTAL INVESTIGATION								
WELL SITE SN 67773/66878 (C-5) (AREA 2)								
AE	SW4	3/26/2013				0.16		
AE	TMW1	1/31/2013	7280	3890	3.39	87	1	35
HET	TMW1	1/31/2013	7100	4280	3.34/2.91	132	2.81	40.5
AE	TMW7	1/31/2013	957					
HET	TMW7	1/31/2013	804				0.684	
AE	TMW8	1/31/2013	4060	2130	0.497			
HET	TMW8	1/31/2013	3820	2160	0.46		0.181	
AE	TMW9	2/1/2013	9510	5330	0.378			
HET	TMW9	2/1/2013	9740	5230	0.34		0.357	
AE	TMW10	2/1/2013	13100	7910	0.696		0.24	
HET	TMW10	2/1/2013	14200	8080	0.62		0.532	
AE	TMW11	1/31/2013	1910	500			0.25	
HET	TMW11	1/31/2013	1820	501				
AE	TMW12	2/1/2013	4800	2480	0.279			
HET	TMW12	2/1/2013	4560	2610	0.24		0.151	
MAXIMUM			9740	8080	3.39	132	2.81	40.5
HET INVESTIGATION								
WELL SITE SN 67773/66878 (C-5) (AREA 2)								
HET	A2-MW2 (6'-16')	6/11/2013	4090	2120	0.21			
AE	A2-MW2 (6'-16')	6/11/2013	4610	1960	0.175			
HET	A2-MW3 (8'-18')	6/12/2013	7390	3740				
AE	A2-MW3 (8'-18')	6/12/2013	7430	3510	0.165			
HET	A2-MW4 (6'-16')	6/11/2013	1370	571	0.3			
AE	A2-MW4 (6'-16')	6/11/2013	1230	564	0.279			
HET	A2-MW5 (6'-16')	6/11/2013	11800	6370	1.01			
AE	A2-MW5 (6'-16')	6/11/2013	11400	6820	1.03		0.22	
HET	A2-MW6 (6'-16')	6/11/2013	6010	3140				
AE	A2-MW6 (6'-16')	6/11/2013	6800	3340				
HET	A2-MW7 (6'-16')	6/12/2013	6750	4420	6.31			36.9
AE	A2-MW7 (6'-16')	6/12/2013	7610	4080	5.73	100	1.2	29
MAXIMUM			11800	6820	6.31	100	1.2	36.9

Additional background exceedances include multiple Toluene, Ethylbenzene, Xylenes exceedances. One (1) exceedance of 2-Methylnaphthalene in A2-MW7 (6'-16') (HET) at a concentration of 0.00481 ppm

was reported. One (1) exceedance of Naphthalene was reported at a concentration of 0.0781 ppm in the A2-MW7 (6'-16') (HET) groundwater sample.

Additional delineation is required for the following parameters:

- Chlorides and TDS towards the east, south, and west
- Benzene, TPH-GRO, and Barium towards the east
- TPH-DRO towards the west, north, and east
- Barium towards the west and east

4.4.3 64709 (C-3) (HET Area 3)

At the 64709 site, Approach converted four of the soil borings to TMWs. The following table shows exceedances of background concentrations:

Groundwater Exceedances of Background Standards							
Sampler	Sample ID	Sample Date	TDS (mg/L)	Chloride (mg/L)	Barium (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)
BACKGROUND			250	750	0.2	ND	ND
APPROACH ENVIRONMENTAL INVESTIGATION							
WELL SITE S.N. 64709 (C-3) (AREA 3)							
AE	TMW9	1/18/2013	5790	2850	5.13	0.55	
HET	TMW9	1/18/2013	4350	2820	4.57	1.03	
AE	TMW10	1/18/2013	4070	2050	5.24	0.78	
HET	TMW10	1/18/2013	3290	2000	4.33		
AE	TMW11	1/18/2013	6950	3330	3.83	0.43	
HET	TMW11	1/18/2013	5210	3540	4.18	0.855	
AE	TMW12	1/18/2013	10000	5160	11.8	0.81	
HET	TMW12	1/18/2013	7880	4900	9.99		
Maximum			10000	5160	11.8	1.03	Not Applicable
HET INVESTIGATION							
WELL SITE S.N. 64709 (C-3) (AREA 3)							
HET	A3-MW1 (6'-16')	6/13/2013	8360	4430	6.16		
AE	A3-MW1 (6'-16')	6/13/2013	8070	3510	4.31	0.65	0.33
HET	A3-MW2 (6'-16')	6/12/2013	1690	607	0.73		
AE	A3-MW2 (6'-16')	6/12/2013	1700	562	0.731		
HET	A3-MW3 (6'-16')	6/12/2013	1210	500	0.31		
AE	A3-MW3 (6'-16')	6/12/2013	1380	427	0.312		
HET	A3-MW4 (6'-16')	6/13/2013	2920	253	0.25		
AE	A3-MW4 (6'-16')	6/13/2013	892		0.233		
HET	A3-MW5 (6'-16')	6/13/2013	3720	1840	0.89		
AE	A3-MW5 (6'-16')	6/13/2013	4380	1730	0.884		
Maximum			8360	4430	6.16	0.65	0.33

Two (2) background exceedances for Lead were detected; one (1) at TMW9 (AE) and one (1) at A3-MW4 (AE).

Additional delineation is required for the following parameters:

- Chlorides towards the east, south, and west
- TDS in all 4 directions
- Barium in all directions
- Lead towards the north, east, and west

4.4.4 68920 (C-7) (HET Area 5)

At well site 68920, Approach converted three soil borings to TMWs. The following table shows exceedances of the background concentrations:

Groundwater Exceedances of Background Standards								
Sampler	Sample ID	Sample Date	TDS (mg/L)	Chloride (mg/L)	Arsenic (mg/L)	Barium (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)
BACKGROUND			250	750		0.2	ND	ND
APPROACH ENVIRONMENTAL INVESTIGATION								
WELL SITE S.N. 68920 (AREA 5)								
AE	TMW6	1/29/2013	1390	373		0.611		
HET	TMW6	1/29/2013	1200	401		0.51	0.296	
AE	TMW7	1/29/2013	5510	2110		0.810	0.43	
HET	TMW7	1/29/2013	4390	2310		0.69	1.96	
AE	TMW8	1/29/2013	1180	315	0.116	0.937		
HET	TMW8	1/29/2013	933	343	0.13	0.8	0.645	
MAXIMUM			5510	2310	0.13	0.937	0.43	
HET INVESTIGATION								
WELL SITE S.N. 68920 (AREA 5)								
HET	A5-MW1 (6'-16')	6/13/2013	1610	618		0.4		
AE	A5-MW1 (6'-16')	6/13/2013	5480	536		0.364		
HET	A5-MW2 (6'-16')	6/13/2013	4710	2350		0.87		
AE	A5-MW2 (6'-16')	6/13/2013	1630	1850		0.826	0.45	0.19
HET	A5-MW3 (6'-16')	6/14/2013	1470	740		0.79		
AE	A5-MW3 (6'-16')	6/13/2013	4500	686		0.721		
MAXIMUM			5480	2350	Not Applicable	0.826	0.45	0.19

Additional delineation is required for the following parameters:

- Chlorides towards the west and south
- TDS towards the north, south, and west
- TPH-DRO towards the north, south, east, and southwest
- Arsenic towards the west, south, and east

4.4.5 216967 (C-9) (HET Area 6)

At this site, Approach converted one (1) soil boring to a TMW. The following table shows exceedances of background concentrations:

Groundwater Exceedances of Background Standards								
Sampler	Sample ID	Sample Date	TDS (mg/L)	Chloride (mg/L)	Arsenic (mg/L)	Barium (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)
BACKGROUND			250	750		0.2	ND	ND
APPROACH ENVIRONMENTAL INVESTIGATION								
WELL SITE S.N. 68920 (AREA 5)								
AE	TMW6	1/29/2013	1390	373		0.611		
HET	TMW6	1/29/2013	1200	401		0.51	0.296	
AE	TMW7	1/29/2013	5510	2110		0.810	0.43	
HET	TMW7	1/29/2013	4390	2310		0.69	1.96	
AE	TMW8	1/29/2013	1180	315	0.116	0.937		
HET	TMW8	1/29/2013	933	343	0.13	0.8	0.645	
MAXIMUM			5510	2310	0.13	0.937	0.43	
HET INVESTIGATION								
WELL SITE S.N. 68920 (AREA 5)								
HET	A5-MW1 (6'-16')	6/13/2013	1610	618		0.4		
AE	A5-MW1 (6'-16')	6/13/2013	5480	536		0.364		
HET	A5-MW2 (6'-16')	6/13/2013	4710	2350		0.87		
AE	A5-MW2 (6'-16')	6/13/2013	1630	1850		0.826	0.45	0.19
HET	A5-MW3 (6'-16')	6/14/2013	1470	740		0.79		
AE	A5-MW3 (6'-16')	6/13/2013	4500	686		0.721		
MAXIMUM			5480	2350	Not Applicable	0.826	0.45	0.19

Additional delineation is necessary for the following parameters:

- Chlorides and TDS towards the west and the south.
- TDS towards the north
- TPH-D towards the southeast
- Barium towards the west, south, and east

5. INVESTIGATION CONCLUSIONS

Oil and gas exploration and production activities contaminated the soil and groundwater on the subject property. The areas of highest contamination are at and below previously existing pit areas or facilities and contaminants from these areas have migrated down, out and away from the contaminant sources. The contamination has been occurring for decades given the extent of the contaminant migration out and down from the sources.

5.1 Contamination Quantities and Areas

The approximate soil volumes and groundwater areas are described for each of the sites in the following sections. The volumes are based on cubic yards in place.

SWD Tank Battery area (34829, 970411, and 970412 (HET Area 1) (soil and groundwater contamination)

- 526,831 c.y.
- 34.68 acres of groundwater contamination (groundwater contamination has commingled between this site and the Wells 66878 and 67773)

Well Site 66878/67773 (C-5 & 5-D) (HET Area 2) (soil and groundwater contamination)

- 21,872 c.y.
- 1.64 acres of groundwater contamination (groundwater contamination has commingled between this site and the SWD Tank Battery site)

Well Site 64709 (C-3) (HET Area 3) (soil and groundwater contamination)

- 2,463 c.y.
- 1.38 acres of groundwater contamination

Well Site 63282 (C-2) (HET Area 4) (soil contamination)

- 1,953 c.y.
- No groundwater contamination documented

Well Site 68920 (C-7) (HET Area 5) (soil and groundwater contamination)

- 2,125 c.y.
- 0.37 acres of groundwater contamination

Well Site 216967 (C-9) (HET Area 6) (soil and groundwater contamination)

- 637 c.y.
- 0.87 acres of groundwater contamination

These areas are out of compliance with the Office of Conservation rules and regulations and must be remediated to regulatory standards. Without remediation, this contamination will continue to migrate deeper and farther out in the future.

6. SELECTION OF REMEDIATION PLAN

Approach reviewed remediation options to restore each site to compliance with Statewide Order 29-B. Further, the many additional constituents previously discussed herein that are not specifically listed in LDNR's 29-B were considered during evaluation of remediation options.

Additionally, Approach considered remediation alternatives that would leave contamination in excess of 29-B on the property. These alternatives will be referred to as the “29-B Exception Plan”.

6.1 29-B Plan: Review of Potential Remediation Alternatives

In selecting a plan that would restore the property to compliance with 29-B, Approach evaluated various remedial options based upon current and future use of the property, nature and extent of contamination, costs, and time. The following is a summary of that evaluation and Approach’s recommendations:

Chemical Injection

- Does not effectively remediate all contaminants;
- Would have required numerous injection holes;
- Even distribution of chemical into the subsurface was not likely
- Therefore, chemical injection is not recommended as part of the recommended remediation plan

Solidification

- Since the bottom of the solidified material must be buried at least 5’ bgs above the seasonal high water table and the top of the solidified material must be buried at least 5’ bgs, solidification could not be implemented at the subject site
- Therefore, solidification is not recommended as part of the recommended remediation plan

Soil Washing

- Soil washing is not as effective for heavy metals and PAH’s. Therefore, project completion is more difficult to predict with this option
- Generate additional waste water for disposal
- Therefore, soil washing is not recommended as part of the recommended remediation plan

Soil Mixing

- Not effective for remediation of all contaminants at the subject site
- Less effective as the contaminant depth increases
- If soils are imported from off-site, soil mixing increases the volume of the soil on-site, which will create topographic changes that may affect the future use of the property
- Therefore, soil mixing is not recommended as part of the recommended remediation plan

On-Site Land-Treatment and Chemical Amendment Application

- On-Site Land-Treatment would be effective for remediation of saltwater contaminated soils at the surface or in the shallow sediments. The effectiveness is dependent upon the depth or thickness of the land-treatment material, the availability of fresh water, etc.

- Disadvantages:
 - Failure to collect leachate results in the displaced Na⁺ remaining in the water table and “wicking” back up and re-contaminating previously remediated soil. This may have occurred when BP attempted to remediate the big pit at the SWD
 - Not effective for remediation of Methylene Chloride, which was detected at the subject site.
 - Typically requires a lot of time and mechanical working/mixing.
 - Not as effective in clayey soils
- Therefore, Land-Treatment is not recommended

Burial and Trenching

- Since the bottom of the buried/trenched mixture must be buried at least 5’ bgs above the seasonal high water table and the top of the buried/trenched mixture must be buried at least 5’ bgs, burial/trenching could not be implemented at the subject site
- Therefore, burial/trenching is not recommended as part of the recommended remediation plan

Monitored Natural Attenuation (MNA)

- Not effective for remediation of all contaminants
- Requires many years to address certain organic contaminants
- Does not protect the shallow aquifer, the Chicot aquifer , the surface water, adjacent property uses
- Limits the future use of the property
- Therefore, MNA will not be recommended as part of the recommended remediation plan

Large-scale excavation/transportation/off-site disposal

- The most effective for ensuring that all contaminants are removed and properly disposed.
- Removes all contaminants and prevents the potential for future leaching of contaminants
- Project can be completed in a time-effective manner, eliminating continued exposure of the ecosystem to the contaminants
- HET agrees that this is the appropriate plan to remediate the property to compliance with Statewide Order 29-B. 2013 Brent Pooler Dep., pages 64-66.
- Will reduce the groundwater remediation time
- Disadvantages:
 - Disturbing the soil continuum. But the soil continuum has already been disturbed and is out of balance because of the contamination on the surface and the subsurface.

- Landfill/disposal facility space availability. Approach has identified the availability of commercial disposal facility space availability (use of 2-3 facilities)
- Finding backfill material. But Approach has arranged for backfill material
- Large-Scale Excavation/Transportation/Off-Site Disposal is recommended for remediation of the soils at the subject site.

After the large-scale excavation phase of the project has been completed, groundwater remediation will still be necessary because the groundwater contaminant plume is larger than the large-scale soil excavation area. This is shown by comparison of the soil and groundwater contaminant extent maps at each site in the respective Site Appendices (App. A-F).

6.2 29-B Compliant Remediation Plan

Due to the limits established by 29-B, the extreme levels of contamination in the soil and groundwater, the fact that the majority of the sites and surrounding land are wetlands, and considering the potential intended uses of the properties, the majority of the remedial technologies were not sufficiently effective to ensure compliance with the 29-B regulation. Therefore, large-scale excavation assisted by de-watering for excavation into, through and below the first saturated zone is the most effective method to accomplish full 29-B compliance. Subsequent groundwater monitoring would be conducted to evaluate whether groundwater remediation is necessary after the large-scale remediation.

Terra-Solve's Groundwater Remediation plan, prepared by Perry Evans, a licensed Professional Engineer, is included in Appendix P.

6.3 Exception Based Remediation Plan

Neither BP nor Sweet Lake has requested an exception to Statewide Order 29-B. In some instances, LDNR has granted requests for exceptions to its regulations if there is good cause and if the exception will not negatively affect the environment, public health, and welfare. Should LDNR decide to follow that route even though no party has requested it, then the following should be considered:

6.3.1 Soil Remediation with Exception to 29-B

Soil should be remediated to all depths to meet 29-B standards for Metals and Oil & Grease. Salt contaminated soil could be remediated to below root depth using 29-B standards for salt parameters (EC, ESP and SAR), as long as a capillary barrier is placed below the treatment depth and root depth. Future use of the property should be considered when evaluating depth of remediation and root zone depths. For salt below root depth and contaminants for which no appropriate level is specified in 29-B, soil could be remediated in accordance with RECAP.

Approach did not apply a dilution factor (DF) or a dilution attenuation factor (DAF) to the Soil Protective of Groundwater MO-1 (Table 2) standards because the point of exposure will be the point on the property where the well is located or a cattle pond is dug. Therefore, the point of exposure will not be the property boundary. Moreover, the soil contamination is leaching vertically into the groundwater, not horizontally through the soil to the property boundary.

6.3.2 Groundwater Remediation Pursuant to RECAP

Groundwater could be remediated pursuant to RECAP. RECAP standards should be derived from the highest management option that does not result in a property use limitation. Background concentrations could be used as the standard for Chloride (250 mg/L) and for TDS (750 mg/L) since they are non-traditional parameters that lack toxicity data (RECAP Appendix D). These standards are not multiplied by a DF or DAF since RECAP Appendix H (page H-43, H-52 and H-57) states the GW RS, when based on background concentrations, is not multiplied by a DF or DAF.

6.3.3 RECAP in General

Relevant RECAP Appendix C Forms are provided in Table 1-C of each respective Site Appendix (App. A-F). Where a sample quantitation limit (SQL, aka, detection limit) was not low enough to evaluate, the parameter is noted "N-Conf" in the RECAP tables (Site App. A-F) to indicate confirmation sampling should be conducted after remediation to demonstrate the RECAP standard has been met at the sampling location.

The location of each COC maximum concentration is noted on the RECAP forms with either AE or HET after the sample identification (ID). This designation indicates the party that analyzed the sample, but does not indicate which investigation the sample came from. In general, an A# prior to a sample ID is from the HET investigation and MW, TMW, or SB prior to a sample ID is from the Approach investigation.

6.3.4 Application of Foregoing Principles to Determine RECAP Exceedances

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

SOIL

The RECAP Screening Option (SO) analysis shows that Arsenic, Barium, Benzene, TPH-GRO, TPH-DRO, TPH-ORO, C12-C16 Aliphatics, C12-C16 Aromatics, C16-C35 Aliphatics, C21-C35 Aromatics, Methylene Chloride, Selenium and Benzo(a)pyrene exceed the RECAP Screening Standards (SS). The RECAP Management Option-1 (MO-1) evaluation indicates Barium, Benzene, TPH-GRO, TPH-DRO, TPH-ORO, Methylene Chloride and Benzo (a) pyrene, and Selenium exceed the Limiting RECAP Standard (LRS). It should be noted the NORTH sample that exhibited the highest TPH-GRO concentration is located at latitude 30.136732 and longitude -92.972469.

HET's fractionation results were not used since the results are inconsistent and, therefore, unreliable. A1-MW13 1-3' exhibited the highest TPH-DRO concentration of 7480 mg/kg and the highest TPH-ORO concentration of 8410 mg/kg. However, the fractionation results for A1-MW13 1-3' were significantly lower than the maximum fractions detected at SB12 6-8' (which had a TPH-DRO concentration of 1790 mg/kg and TPH-ORO of 2150 mg/kg) and A1-SB2 1-3' (which had a TPH-DRO concentration of 1770 mg/kg and TPH-ORO of 1530 mg/kg). Also, for two (2) of the fractions, a low enough SQL was not achieved. Therefore, these fractions cannot be reliably screened and were not used to evaluate TPH-DRO and TPH-ORO. The sample that HET analyzed for PAHs was not collected from the highest TPH-DRO sample.

HET's SPLP results were not used as part of this evaluation because the samples used for SPLP analysis were from depths below the groundwater aquifer addressed in this Plan (SB22A 28-30' and 30-32' bgs). HET's analytical data indicates that a higher benzene concentration was detected at SB 12 from 8-10' bgs but no SPLP analysis was performed on it. Neither party analyzed soil samples for Benzene during HET's investigation.

GROUNDWATER

The RECAP SO evaluation shows that Arsenic, Chlorides, TDS, Barium, Benzene, Lead, TPH-GRO, TPH-DRO, TPH-ORO, C10-C12 Aliphatics and C12-C16 Aliphatics exceed the SS. The RECAP MO-1 evaluation indicates the same except TPH-ORO meets the MO-1 LRS.

Regarding fractionation, RP's fractionation results were not used since the results were inconsistent and unreliable as described in the aforementioned soil discussion. TMW15 (HET) exhibited the highest TPH-DRO concentration of 6.31 mg/L and A1-MW13 (AE) exhibited the highest TPH-ORO concentration of 0.94 mg/L. All fractionation results for these two (2) samples were non-detect (<0.15 mg/L). However, the fractionation results for TMW36 (HET) and TMW42 (HET) had exceedances of the RECAP SS and each sample reported a TPH-DRO concentration of non-detect (<0.1 and <0.128 mg/L respectively).

67773/66878 (C-5, 5-D) (HET Area 2)

SOIL

The RECAP SO evaluation shows that Barium, Benzene, Toluene, Ethylbenzene, Xylenes, 1,2-Dichloroethane, TPH-GRO, TPH-DRO, TPH-ORO, C8-C10 Aliphatics, C10-C12 Aliphatics, C10-C12 Aromatics, C12-C16 Aliphatics, C12-C16 Aromatics, Lead and Methylene Chloride exceed the SS. The highest TPH-GRO and TPH-DRO were fractionated and the fractionation data was used to evaluate TPH-GRO and TPH-DRO. The highest ORO was fractionated, but since neither the corresponding TPH-ORO SQL

nor the fractionation SQLs were low enough to evaluate, TPH-ORO was carried forward to MO-1. SPLP data was not used to evaluate Benzene, Toluene, Ethylbenzene, Xylenes since the highest Benzene, Toluene, Ethylbenzene, and Xylenes concentrations were not subjected to SPLP testing. The RECAP MO-1 evaluation shows Barium, Benzene, Toluene, Ethylbenzene, Xylenes, 1,2-Dichloroethane, C10-C12 Aliphatics, C10-C12 Aromatics, C12-C16 Aliphatics and C12-C16 Aromatics, Lead and Methylene Chloride exceed the LRS.

GROUNDWATER

The RECAP SO evaluation indicates Barium, Chlorides, TDS, Benzene, Toluene, Ethylbenzene, TPH-GRO, TPH-DRO, C6-C8 Aliphatics, C8-C10 Aromatics, C10-C12 Aromatics, C12-C16 Aromatics, 2-Methylnaphthalene and Naphthalene exceed the SS. The RECAP MO-1 evaluation indicates the same except 2-Methylnaphthalene meets the MO-1 LRS

HET's fractionation results were not used since the results were inconsistent and unreliable. TMW1 (HET) exhibited the highest TPH-GRO concentration of 132 mg/L and highest TPH-DRO concentration of 2.81 mg/L but did not consistently exhibit the highest fractionation results.

64709 (C-3)(HET Area 3)

SOIL

The RECAP SO evaluation indicates Arsenic (dry weight), Barium, TPH-DRO, TPH-ORO, C12-C16 Aliphatics, C16-C35 Aliphatics, C21-C35 Aromatics and Methylene Chloride exceed the SS. Since the highest TPH-DRO and TPH-ORO were not fractionated, TPH-DRO and TPH-ORO were carried forward to the MO-1 evaluation and fractionation data was not. Since the samples analyzed for MTBE and 1,2-dichloroethane do not have a low enough SQL, confirmation sampling of these parameters should be conducted subsequent to remediation activities at these locations. The RECAP MO-1 evaluation indicates Arsenic and Barium do not exceed the LRS, but TPH-DRO, TPH-ORO and Methylene Chloride do exceed the LRS.

GROUNDWATER

The RECAP SS and MO-1 evaluation indicates Barium, Lead, Chlorides and TDS exceed the RECAP LRS. TPH-DRO and TPH-ORO exceed the RECAP SS, but were eliminated based on fractionation data.

63282 (C-2) (HET Area 4)

SOIL

The RECAP SO evaluation indicates TPH-DRO, and TPH-ORO are below RECAP SS and Barium is below the MO-1 LRS. Benzene, Toluene, Ethylbenzene, Xylenes, TPH-GRO and PAHs were not analyzed.

GROUNDWATER

Based on soil analytical results, groundwater was not sampled or analyzed.

68920 (C-7) (HET Area 5)

SOIL

The RECAP SO evaluation shows that Arsenic, Barium, Benzene, TPH-DRO, TPH-ORO, C12-C16 Aliphatics, C16-C35 Aliphatics, C21-C35 Aromatics and Methylene Chloride exceed the RECAP SS. The sample from A5-SB1 (0-2') exhibited the highest TPH-DRO concentration of 1620 mg/kg and the highest TPH-ORO concentration of 1640 mg/kg and were fractionated. However, the fractionation results for A5-SB1 0-2' were significantly lower than SB1 0-2', which had a TPH-DRO concentration of 398 mg/kg and TPH-ORO of 339 mg/kg. Also, for several of the SB1 0-2' fractions, a low enough SQL was not achieved. Therefore, these fractions cannot be reliably screened and were not used to evaluate TPH-DRO and TPH-ORO. The RECAP MO-1 evaluation indicates Barium is below the MO-1 LRS but Arsenic, Benzene, TPH-DRO and TPH-ORO exceed the MO-1 LRS. Neither TPH-GRO nor TPH-GRO fractions were analyzed. Confirmation sampling for Methylene Chloride should be conducted.

GROUNDWATER

The RECAP SS and MO-1 evaluation indicates Arsenic, Chlorides and TDS exceed the RECAP LRS. TPH-DRO and TPH-ORO exceed the RECAP SS, but were eliminated based on fractionation data.

216967 (C-9) (HET Area 6)

SOIL

Benzene, Toluene, Ethylbenzene, Xylenes, TPH-GRO, TPH-DRO and TPH-ORO were not analyzed. The RECAP evaluation indicates Barium exceeds the RECAP SS, but does not exceed the MO-1 LRS.

GROUNDWATER

The RECAP SS and MO-1 evaluation shows that Chlorides and TDS exceed the LRS. TPH-DRO exceeds the RECAP SS, but was eliminated based on fractionation data.

7. PROPOSED 29-B REMEDIATION

7.1 Soil - Excavation

Excavation, transportation, and off-site disposal of the contaminated soils to the vertical and horizontal extent of each contaminant parameter is the most effective remediation option to accomplish full compliance with 29-B. De-Watering will be necessary at the SWD Tank Battery site in order to excavate into and below the shallow aquifer. The de-watering, however, will enhance groundwater remediation at the site. Environmental personnel will be on-site to perform confirmation sampling of the soils during excavation to ensure full compliance with 29-B. Back-filling the excavations with similar soils will be performed after confirmation sampling has confirmed compliance with 29-B.

In some areas of concern, the soil contamination has a greater areal extent at depth than it has at shallower depths, such as the surface. Clean soils encountered while excavating shallower soils will be segregated and used as clean fill upon completion of the excavation.

7.2 Groundwater – Pump and Treat

Groundwater remediation will be performed on the shallow aquifer. The proposed remediation will, when necessary, begin with de-watering activities and soil excavation, and then, after the excavation and clean fill, proceed to pump and treat the remaining groundwater plume. The engineered groundwater remediation plan for all areas is in Appendix P.

7.3 Naturally Occurring Radioactive Materials

A NORM survey was performed by Approach and identified 2 areas that exhibited twice the background NORM levels. These areas are depicted in Appendix V. BP's NORM expert also performed a NORM survey and identified several additional areas of NORM contamination. Approach generally agrees with BP's NORM expert's proposed remediation costs, contingent upon confirmation samples documenting compliance with applicable LDEQ NORM regulations and levels.

7.4 Permitting

Corps of Engineers (COE) permitting will be required under the Nationwide 38 permit. The COE indicated the activities will be viewed as "Temporary Impacts" and mitigation will not be required.

The water from the de-watering will be processed and disposed via an on-site SWD well. However, if the recovered water's salinity is reduced to a level not conducive for injection, then the water will be processed on-site by reverse-osmosis (RO) (costs of the RO equipment are included in the remediation cost estimate) and reinjected into the shallow aquifer according to an injection permit, or discharged in accordance with a discharge permit.

Saltwater Disposal (SWD) Well Permitting will be required prior to installing and receiving recovered groundwater.

7.5 Site Specific 29-B Remediation Plans for Each Site/Area

The following outlines the remediation requirements at each site:

SWD Tank Battery area (34829, 970411, and 970412) (HET Area 1)

Soil Remediation

There are 526,831 c.y. of soil contaminated with excess EC, SAR, ESP, and pH, Oil & Grease, Arsenic, Selenium, Benzene, Methylene Chloride, TPH-GRO, TPH-DRO, TPH-ORO, and Benzo(a)pyrene. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix A. The maximum anticipated depth of excavation is 40'

in one (1) small area. Confirmation samples for all parameters/intervals will be performed prior to backfilling.

The soil contamination is present into, through and below the shallow aquifer over a relatively large area at this site. Therefore, the area of proposed excavation will be divided into four smaller areas for de-watering prior to the proposed excavations into and below the shallow aquifer.

Three (3) de-watering wells on each side of the proposed excavation will be required. Since the water recovered from the de-watering wells will be contaminated, the water will be disposed into a proposed, private SWD well, reinjected into the shallow aquifer according to an injection permit, or discharged in accordance with a discharge permit. Soil excavation and off-site disposal activities in the soils above the shallow aquifer will be performed concurrently with the de-watering. After de-watering has been sufficiently achieved, the additional excavation into, through and below the shallow aquifer will be performed to the extent necessary for full compliance with 29-B.

After excavation activities have been completed and full compliance with 29-B has been accomplished, backfilling will be conducted to the base of the aquifer. At that point, a filter-fabric will be placed over the backfilled clay to prevent settlement of the replacement shallow aquifer material into the backfilled clay. The shallow aquifer material will be replaced with clean pea gravel according to the thickness of the removed shallow aquifer material. Overlying the replacement shallow aquifer material, filter fabric will also be placed to prevent infiltration of fine grained materials from the replacement backfill material above the shallow aquifer. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater Remediation

Over 34 acres of groundwater are contaminated with excess Chlorides, TDS, Barium, Arsenic, Benzene, Toluene, Ethylbenzene, Xylenes, TPH-GRO, TPH-DRO, TPH-ORO, and Lead. The groundwater contamination from this site has commingled with that from Wells 66878 and 67773. The groundwater should be pumped and treated in accordance with the engineered plan in Appendix P

Groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

66878 and 67773 (C-5 & 5-D) (HET Area 2)

Soil Remediation

There are 21,872 c.y. of soil contaminated with excess EC, SAR, ESP, pH, Oil & Grease, TTBa, Benzene, Ethylbenzene, Toluene, Xylenes, 1,2-Dichloroethane, Methylene Chloride, Acetone, 2-Butanone, TPH-GRO, TPH-DRO, and TPH-ORO. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix B. The soil contamination is present to a depth of 14'. Confirmation samples for all parameters/intervals will be performed prior to backfilling.

Although groundwater will likely be encountered during the deeper excavation activities, dewatering will not be necessary since the deeper excavation area is relatively small and vacuum trucks can be used for water removal as needed.

After excavation activities have been completed and full compliance with 29-B has been accomplished, backfilling will be conducted to the base of the aquifer. At that point, a filter-fabric will be placed over the backfilled clay to prevent settlement of the replacement shallow aquifer material into the backfilled clay. The shallow aquifer material will be replaced with clean pea gravel according to the thickness of the removed shallow aquifer material. Overlying the replacement shallow aquifer material, filter fabric will also be placed to prevent infiltration of fine grained materials from the replacement backfill material above the shallow aquifer. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater Remediation

There are 1.64 acres of groundwater in the shallow aquifer contaminated with excess Chlorides, TDS, Barium, Benzene, Toluene, Ethylbenzene, Xylenes, TPH-GRO, TPH-DRO, 2-Methylnaphthalene, and Naphthalene. This contamination has commingled with contamination from the SWD Tank Battery site. At a minimum, groundwater remediation should be performed as described in the engineered plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

64709 (C-3) (HET Area 3)

Soil Remediation

There are 2,463 c.y. of soil contaminated with excess EC, SAR, ESP, pH, Methylene Chloride, Acetone, TPH-GRO, TPH-DRO, and TPH-ORO. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix C. The soil contamination is present to a depth of 14'. Confirmation samples for all parameters/intervals will be performed prior to backfilling.

Although groundwater will likely be encountered during the deeper excavation activities, dewatering will not be necessary since the deeper excavation area is relatively small and vacuum trucks can be used for water removal as needed.

After excavation activities have been completed and full compliance with 29-B has been accomplished, backfilling will be conducted to the base of the aquifer. At that point, a filter-fabric will be placed over the backfilled clay to prevent settlement of the replacement shallow aquifer material into the backfilled clay. The shallow aquifer material will be replaced with clean pea gravel according to the thickness of the removed shallow aquifer material. Overlying the replacement shallow aquifer material, filter fabric will also be placed to prevent infiltration of fine grained materials from the replacement backfill material above the shallow aquifer. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater Remediation

There are 1.38 acres groundwater contaminants at this site are Chlorides, TDS, Barium, TPH-DRO, TPH-ORO, and Lead. Groundwater remediation should be performed as described in the engineered groundwater remediation plan enclosed in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

63282 (C-2) (HET Area 4)

Soil Remediation

There are 1,953 c.y. of soil contaminated with excess EC, SAR, ESP, and pH. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix D. The soil contamination is present to a depth of 4'-6'.

Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater contamination was not determined.

68920 (C-7) (HET Area 5)

Soil Remediation

There are 2,125 c.y. of soil contaminated with excess EC, SAR, ESP, pH, Oil & Grease, Arsenic, Benzene, Methylene Chloride, TPH-DRO, and TPH-ORO. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix E. The soil contamination is present to a depth of 4'-6'. Confirmation samples for all parameters/intervals will be performed prior to backfilling.

After excavation activities have been completed and full compliance with 29-B has been accomplished, backfilling will be conducted to the maximum depth of excavation. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater Remediation

There are 0.37 acres of groundwater contaminated with Chlorides, TDS, Arsenic, Barium, TPH-DRO, and TPH-ORO. Groundwater remediation should be performed as described in the engineered groundwater remediation plan enclosed in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

216967 (C-9) (HET Area 6)

There are 637 c.y. of soil contaminated with excess EC, SAR, ESP, pH, and TTBa. The areas and depths of contaminated soil excavation are shown by the outer limit of the contaminants on each soil contaminant extent map in Appendix F. The soil contamination is present to a depth of 4'-6'. Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

Groundwater Remediation

There are 0.87 acres of groundwater contaminated with excess Chlorides, TDS, Barium, and TPH-DRO. At a minimum, groundwater remediation should be performed as described in the engineered plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

7.6 Estimated Time Frame

- Wetlands Permitting – 4-6 months
- Private SWD well permitting, drilling, completion and equipping – 4-6 months
- De-Watering – 2-3 months
- Soil Remediation Activities- 6-9 months
 - Area 1 – 24-37 weeks for completion
 - Area 2 – 3-4 weeks for completion
 - Area 3 – 1-2 weeks for completion
 - Area 4 – 1 week for completion
 - Area 5 – 1-2 weeks for completion
 - Area 6 – 1 week for completion

Groundwater Remediation Activities – 29 years. Please refer to Groundwater Remediation Plan in Appendix P.

The soil remediation can be completed within 6-9 months, depending upon when the project starts. If the project can be planned to allow permitting to be completed and approved for a spring start-up, Approach and its' contractors estimate the project can be completed within 6-9 months, which would allow for all work to be completed before the following winter months.

7.7. COST ESTIMATE

Site	Cubic Yards (c.y.)	Disposal Costs/c.y.	Total Costs
Permitting			\$15,000
SWD Installation			\$350,000
De-Watering			\$275,000
SWD Tank Battery Site	526,831	140	\$73,756,340
C-5	21,872	140	\$3,062,080
C-3	2,463	140	\$344,820
C-2	1,953	140	\$273,420
C-7	2,125	140	\$297,500
C-9	637	140	\$89,180
NORM			\$49,950
Total Estimated Costs			\$78,513,290

According to the Groundwater Remediation Plan in Appendix P, the groundwater remediation costs range from \$5,610,107 to \$8,563,771. Groundwater Remediation Plan, App. P. Therefore, the total estimated costs for the soil remediation and groundwater treatment for full compliance with 29-B is \$84,123,397 to \$87,077,061.

8. 29-B Exception Remediation Plan

A plan that does not comply with 29-B may adversely affect future use of the property and also creates an additional source of contaminants to migrate downward into the shallow sands in the Confining Unit of the Chicot Aquifer and the underlying Chicot Aquifer.

8.1 Soil Remediation (29-B Exception)

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

SOIL

29-B specific soil standards are exceeded by EC, SAR, ESP, pH, Oil & Grease, Arsenic, and Selenium. Contaminants without specific 29-B compliance standards have been evaluated according to RECAP MO-1. The following contaminants evaluated by RECAP exceeded the LRS for MO-1: Barium, Benzene, TPH-GRO, TPH-DRO, TPH-ORO, Methylene Chloride and Benzo (a) pyrene, and Selenium, and should be remediated to comply with these standards. One (1) scenario that may be considered for remediation with exception in this area is to:

- (a) excavate, transport, and off-site disposal of all contaminants to a depth of 4' bgs as shown in the soil contaminant extent maps in Appendix A (72,901 c.y.) and
- (b) with the exception of salt-related contaminants specified in 29-B, excavate, transport, and off-site disposal of all contaminants to the total depth of their applicable non-compliant levels (~12,846 c.y.) as shown in the soil contaminant extent maps in Appendix A;

The cost estimate for the foregoing plan was prepared based on background concentrations for remediation standards for the 29-B Compliant Remediation plan, not according to the MO-1 LRS. Therefore, the actual cost will be less because the MO-1 LRS standard will be less.

PAH's were not analyzed from the highest TPH-DRO sample and will, therefore, be further evaluated during confirmation sampling after remediation.

Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

GROUNDWATER

Groundwater contaminants at this site are Arsenic, Chlorides, TDS, Barium, Benzene, Lead, TPH-GRO, TPH-DRO, C10-C12 Aliphatics and C12-C16 Aliphatics. These contaminants were evaluated according to RECAP MO-1 LRS, exceeded the LRS, and should be remediated to the MO-1 LRS. Please refer to the engineered groundwater remediation plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

The cost estimate for the foregoing plan was prepared based on background concentrations for remediation standards for the 29-B Compliant Remediation plan, not according to the MO-1 LRS. Therefore, the actual cost will be less because the MO-1 LRS standard will be less. Contaminants without specific 29-B compliance standards have been evaluated according to RECAP MO-1. The following contaminants evaluated by RECAP exceeded the LRS for MO-1: Barium, Benzene, Toluene, Ethylbenzene, Xylenes, 1,2-Dichloroethane, C10-C12 Aliphatics, C10-C12 Aromatics, C12-C16 Aliphatics and C12-C16 Aromatics, Lead and Methylene Chloride, and should be remediated.

66878 and 67773 (C-5 & 5-D) (HET Area 2)

SOIL

One (1) scenario that may be considered for remediation with exception in this area is to:

- (c) excavate, transport, and off-site disposal of all contaminants to a depth of 4' bgs as shown in the soil contaminant extent maps in Appendix B (7,005 c.y.); and
- (d) with the exception of salt-related contaminants specified in 29-B, excavate, transport, and off-site disposal of all contaminants to the total depth of their applicable non-compliant levels (3,936 c.y.) as shown in the soil contaminant extent maps in Appendix B;

Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded. The cost estimate for the foregoing plan was prepared based on background concentrations for remediation standards for the 29-B Compliant Remediation plan, not according to the MO-1 LRS. Therefore, the actual cost will be less because the MO-1 LRS standard will be less.

GROUNDWATER

Groundwater contaminants at this site are Barium, Chlorides, TDS, Benzene, Toluene, Ethylbenzene, TPH-GRO, TPH-DRO, C6-C8 Aliphatics, C8-C10 Aromatics, C10-C12 Aromatics, C12-C16 Aromatics, and Naphthalene. These contaminants were evaluated according to RECAP MO-1 LRS, exceeded the LRS, and should be remediated to the MO-1 LRS. Please refer to the engineered groundwater remediation plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

64709 (C-3) (HET Area 3)

SOIL

29-B specific soil contaminants at this site are EC, SAR, ESP, and pH. Contaminants without specific 29-B compliance standards have been evaluated according to RECAP MO-1. The following contaminants evaluated by RECAP exceeded the MO-1 LRS: TPH-DRO, TPH-ORO and Methylene Chloride, and should be remediated. One (1) scenario that may be considered for remediation would be to excavate, transport, and off-site disposal of all contaminants to a depth of 4' bgs as shown in the soil contaminant extent maps in Appendix C (1,291 c.y.). Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded. The cost estimate for the foregoing plan was prepared based on background concentrations for remediation standards for the 29-B Compliant Remediation plan, not according to the MO-1 LRS. Therefore, the actual cost will be less because the MO-1 LRS standard will be less.

GROUNDWATER

Groundwater contaminants at this site are Barium, Lead, Chlorides and TDS. These contaminants were evaluated according to RECAP MO-1 LRS, exceeded the LRS, and should be remediated to the MO-1 LRS. Please refer to the engineered groundwater remediation plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

63282 (C-2) (HET Area 4)

SOIL

Soil contaminants at this site are EC, SAR, ESP, and pH. One (1) scenario for remediation with exception in this area would be to excavate, transport, and off-site disposal of all salt-related parameters to a depth of 4 bgs, with a total of 1,860 c.y. Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

GROUNDWATER

Based on soil analytical results, groundwater was not sampled or analyzed.

68920 (C-7) (HET Area 5)

SOIL

29-B specific soil contaminants at this site are EC, SAR, ESP, pH, Oil & Grease, and Arsenic. Contaminants without specific 29-B compliance standards have been evaluated according to RECAP MO-1. The following contaminants evaluated by RECAP exceed the MO-1 LRS: Arsenic, Benzene, TPH-DRO and TPH-ORO, and should be remediated.

One (1) scenario that may be considered for remediation with exception is:

- (a) excavate, transport, and off-site disposal of all contaminants to a depth of 4' bgs as shown in the soil contaminant extent maps in Appendix E (1,882 c.y.); and
- (b) with the exception of salt-related contaminants specified in 29-B, excavate, transport, and off-site disposal of all contaminants to the total depth of their applicable non-compliant levels (78 c.y.) as shown in the soil contaminant extent maps in Appendix E.

Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded. The cost estimate for the foregoing plan was prepared based on background concentrations for remediation standards for the 29-B Compliant Remediation plan, not according to the MO-1 LRS. Therefore, the actual cost will be less because the MO-1 LRS standard will be less.

GROUNDWATER

Groundwater contaminants at this site are Arsenic, Chlorides and TDS exceed the RECAP LRS. These contaminants were evaluated according to RECAP MO-1 LRS, exceeded the LRS, and should be remediated to the MO-1 LRS. Please refer to the engineered groundwater remediation plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A

minimum of four consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

216967 (C-9) (HET Area 6)

SOIL

29-B specific soil contaminants at this site are: EC, SAR, ESP, pH, and TTBa. Contaminants without specific 29-B compliance standards have been evaluated according to RECAP MO-1. Neither of the non-29-B specific contaminants exceeded the MO-1 LRS. One (1) scenario that may be considered for remediation with exception is to excavate, transport, and off-site disposal of all contaminants to a depth of 4' bgs as shown in the soil contaminant extent maps in Appendix F (473 c.y.). Confirmation samples for all parameters/intervals will be performed prior to backfilling. Similar soils as those excavated will be backfilled to the ground surface, leveled, and re-seeded.

GROUNDWATER

Groundwater contaminants at the site are Chlorides, TDS, and Arsenic. These contaminants were evaluated according to RECAP MO-1 LRS, exceeded the LRS, and should be remediated to the MO-1 LRS. Please refer to the engineered groundwater remediation plan in Appendix P.

Initial groundwater monitoring prior to and at termination of groundwater remediation should, at a minimum, include the groundwater contaminants listed above as well as Radionuclides and PAH's. A minimum of 4 consecutive quarters of groundwater monitoring with compliant concentrations of all contaminants must be achieved.

8.2 Naturally Occurring Radioactive Material Remediation

A NORM survey was performed by Approach and identified 2 areas that exhibited twice the background NORM levels. These areas are depicted in Appendix V. BP's NORM expert also performed a NORM survey and identified several different additional areas of NORM contamination. Approach agrees with BP's NORM expert's proposed remediation costs, contingent upon confirmation samples documenting compliance with applicable LDEQ NORM regulations and levels.

8.3 Permitting (29-B Exception)

Corps of Engineers (COE) permitting will be required under the Nationwide 38 permit. The Corp of Engineers (COE) indicated the activities will be viewed as "Temporary Impacts" and mitigation will not be required.

The water from the de-watering will be processed and disposed via an on-site SWD. However, if the recovered water's salinity is reduced to a level not conducive for injection, then the water will be processed on-site by reverse-osmosis (RO) (costs of the RO equipment are included in the remediation

cost estimate) and reinjected into the shallow aquifer according to an injection permit, or discharged in accordance with a discharge permit.

Saltwater Disposal Well Permitting will be required prior to installing and receiving recovered groundwater.

8.4 Estimated Time Frame (29-B Exception)

The following are estimates to accomplish the remediation with 29-B exception according to the scenarios described in the previous section 8.2.

- Wetlands Permitting – 4-6 months
- Private SWD permitting, drilling, completion and equipping – 4-6 months
- Soil Remediation Activities- 6-9 months
 - Area 1 – 10-14 weeks for completion
 - Area 2 – 2-3 weeks for completion
 - Area 3 – 1-2 weeks for completion
 - Area 4 – 1 week for completion
 - Area 5 – 1-2 weeks for completion
 - Area 6 – 1 week for completion

Soil remediation according to the 29-B exception as described in 8.2 should likely be completed in the following time frames.

Groundwater Remediation Activities – 29 years (Please refer to Groundwater Remediation Plan in Appendix P.

The soil remediation can be completed within 6-9 months, depending upon when the project starts. If the project can be planned to allow permitting to be completed and approved for a spring start-up, Approach and its' contractors estimate the project can be completed within 6-9 months, which would allow for all work to be completed before the following winter months.

8.5 Cost Estimate (29-B Exception)

Neither BP nor Sweet Lake has requested an exception to 29-B. Nevertheless, in the event that LDNR determines that 1 or more exceptions to 29-B are appropriate, then the estimated costs to perform similar soil remediation will be 13,085,550 as shown below.

Site	Cubic Yards (c.y.)	Disposal Costs/c.y.	Total Costs
Permitting			\$15,000
SWD Installation			\$350,000
De-Watering			\$200,000
SWD Tank Battery Site	85,747	140	\$12,004,580
C-5	10,941	140	\$1,531,740
C-3	1,291	140	\$180,740
C-2	1,860	140	\$260,400
C-7	1,960	140	\$274,400
C-9	473	140	\$66,220
NORM			\$49,950
Total Estimated Costs			\$14,933,030

According to the Groundwater Remediation Plan in Appendix P, the groundwater remediation costs range from \$5,610,107 to \$8,563,771. Groundwater Remediation Plan, App. P. However, with less soil remediation via remediation with exception to 29-B, the groundwater remediation to RECAP standards without property restriction will be increased possibly as much as twice as much as the previously mentioned groundwater remediation costs in 7.6.1, which could result in groundwater remediation costs ranging from \$11,000,000 to \$17,000,000. Therefore, estimated costs for remediation with exception to 29-B may range from 25,933,030 - \$31,933,030.

9. REFERENCES

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SWEET LAKE LAND & OIL COMPANY
 C LEASE - SECTION 34, T 10S, R 6W
 SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412
 HET INVESTIGATION

GROUNDWATER ANALYTICAL DATA: NOVEMBER 2009 - PRESENT
 Groundwater Analytical Summary - HET Investigation (HET/AE Sample Result)

Sampler	Sample ID	Date	TX-1006										Hydrocarbons			
			C6-C8	C8-C10	C8-C10	C10-C12	C10-C12	C12-C16	C12-C16	C16-C21	C16-C35	C21-C35	8015C			
			Aliphatic	Aliphatic	Aromatic	Aliphatics	Aromatics	Aliphatics	Aromatics	Aromatics	Aliphatics	Aromatics	TPH-GRO	TPH-DRO	TPH-ORO	
			ppm	ppm	ppm											
HET	A1-MW1 8-18'	6/10/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW1 8-18'	6/10/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW2 8-18'	5/30/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW2 8-18'	5/30/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW3 6-16'	5/29/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW3 6-16'	5/29/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW4 6-16'	5/29/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW4 6-16'	5/29/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW5 6-16'	5/29/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW5 6-16'	5/29/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW6 8-18'	5/30/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW6 8-18'	5/30/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW7 8-18'	5/29/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
HET	A1-MW7 Duplicate 8-18'	5/29/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW7 8-18'	5/29/2013	NA	<0.1	1.2	0.71										
HET	A1-MW8 10-20'	6/10/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW8 10-20'	6/10/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW9 6-16'	5/31/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW9 6-16'	5/31/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW10 8-18'	6/10/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW10 8-18'	6/10/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW11 8-18'	6/10/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW11 8-18'	6/10/2013	NA	<0.1	<0.1	<0.1										
HET	A1-MW12 9-19'	5/30/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW12 9-19'	5/30/2013	NA	0.56	<0.1	<0.1										
HET	A1-MW13 9-19'	5/30/2013	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA	NA
Approach	A1-MW13 9-19'	5/30/2013	NA	<0.1	1.40	0.94										
Maximum			<0.15	0.56	1.40	0.94										
Background			ND	ND	ND	ND										

MW = Monitoring Well
 N/A= Not Applicable
 NA= Not Analyzed
 ND= Non detect

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412						
APPROACH ENVIRONMENTAL INVESTIGATION						
HET	SS1	3/26/2013				4.89
Approach	SS5	8/12/2009	9.29			
Approach	SS10	8/12/2009	13.3			
Approach	SS11	8/12/2009	9.32			
Approach	SS12	8/12/2009	16.5		34	
Approach	SS14	8/12/2009			14	
Approach	SS16	8/12/2009	14.4		16	
Approach	SS17	8/12/2009	30.3		16	
Approach	SS20	8/12/2009	9.11		14	
Approach	SS21	8/12/2009	24.2		21	
Approach	SS22	8/12/2009	8.92			
Approach	SS26	8/12/2009	24.5	25	19	
Approach	SS27	8/12/2009	53.1	75	29	
Approach	SS28	8/12/2009	15.9		25	
Approach	SS29	8/12/2009	8.7			
Approach	SS30	8/12/2009	12.9		19	
Approach	SS31	8/12/2009	11			
Approach	SS33	8/12/2009	19.6			
Approach	SS36	8/13/2009	48.7	89	27	
Approach	SS37	8/13/2009	27.1		16	
Approach	SS38	8/13/2009	52.1	29	15	
Approach	SS44	8/13/2009	35.2			
Approach	SS47	8/13/2009	35.3		21	
Approach	SS48	8/13/2009	42.8	100	34	
Approach	SS58	8/13/2009	72.4			
Approach	B#3 @ 6-10"	9/25/2008	11.9		23	
Approach	B#3 @ Surface	9/25/2008	35.1	100	35	
Approach	B#4 @ 6-10"	9/25/2008	32.8	100	23	
Approach	B#4 @ Surface	9/25/2008	74.5	100	27	
Approach	B#5 @ Surface	9/25/2008	43.4	100	23	
HET	BG1 2-4'	1/28/2013				5.35
Approach	SB1 4-6'	11/3/2009		90	29	
Approach	SB1 10-12'	11/3/2009		71	42	
Approach	SB1A 0-2'	4/2/2013		47.9		
Approach	SB1A 2-4'	4/2/2013		64.3		
Approach	SB1A 4-6'	4/2/2013		66.3		
Approach	SB1A 8-10'	4/2/2013		81.4	25.3	
HET	SB1A 8-10'	4/2/2013	10.5			
Approach	SB1A 12-14'	4/2/2013		108		
Approach	SB1A 18-20'	4/2/2013		33.1		
Approach	SB2 2-4'	11/3/2009	8.81	28	30	
Approach	SB3 2-4'	11/4/2009	9.25	67	43	

Soil Exceedances of LDNR Section 313 29B Standards

Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
Approach	SB3 8-10'	11/4/2009		100	31	
Approach	SB5 0-2'	11/12/2012			14	
HET	SB5 0-2'	11/12/2012			28	
Approach	SB5 2-4'	11/12/2012			17.3	
HET	SB5 2-4'	11/12/2012			31.5	
Approach	SB5 4-6'	11/12/2012			21.3	
HET	SB5 4-6'	11/12/2012		25.3	22.8	
Approach	SB6 0-2'	11/12/2012	9.53	40.5	29.7	
HET	SB6 0-2'	11/12/2012	18.6	27	58.1	
Approach	SB6 2-4'	11/12/2012		51.7		
HET	SB6 2-4'	11/12/2012	8.1		66.7	
Approach	SB6 4-6'	11/12/2012		44.6		
HET	SB6 4-6'	11/12/2012		62.3	22.1	
Approach	SB7 0-2'	11/12/2012				
Approach	SB7 2-4'	11/12/2012		32		
HET	SB7 2-4'	11/12/2012		31.9	30.6	
Approach	SB7 4-6'	11/12/2012		36		
HET	SB7 4-6'	11/12/2012		46.3		
Approach	SB8 0-2'	11/12/2012	8.83			
HET	SB8 0-2'	11/12/2012	11.5		27.6	
Approach	SB8 2-4'	11/12/2012			17.6	
HET	SB8 2-4'	11/12/2012			34.9	
Approach	SB8 4-6'	11/12/2012			24.6	
HET	SB8 4-6'	11/12/2012		34.8	29.2	
Approach	SB8 6-8'	1/8/2013		37.6	25.7	
HET	SB8 6-8'	1/8/2013		48.4	28.7	
Approach	SB8 8-10'	1/8/2013		56.7	16.7	
HET	SB8 8-10'	1/8/2013		35.2	34.3	
Approach	SB8 12-14'	1/8/2013		87.6	27.2	
HET	SB8 12-14'	1/8/2013	8.2	42	29.8	
Approach	SB8 14-16'	1/8/2013		82.3		
HET	SB8 14-16'	1/8/2013	11.5	32.6	35.4	
Approach	SB8A 16-18'	3/27/2013		74.2		
Approach	SB8A 18-20'	3/27/2013		51.1		
Approach	SB8A 20-22'	3/27/2013		36		
Approach	SB9 0-2'	11/12/2012	8.26			
HET	SB9 0-2'	11/12/2012	8.7		25.3	
Approach	SB9 2-4'	11/12/2012				
HET	SB9 2-4'	11/12/2012			16	
Approach	SB10 0-4'	11/13/2012		61	27.1	
HET	SB10 0-4'	11/13/2012	22.8	56	52.3	
Approach	SB10 4-6'	11/13/2012		31.2	18.4	
HET	SB10 4-6'	11/13/2012	9.3	34.5	45.7	
Approach	SB11 0-2'	11/13/2012		57.2		

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
HET	SB11 0-2'	11/13/2012	8.9	31.5	51.4	
Approach	SB11 2-4'	11/13/2012			15.2	
HET	SB11 2-4'	11/13/2012		29.8	50.2	
Approach	SB11 4-6'	11/13/2012			25.8	
HET	SB11 4-6'	11/13/2012		35	32.3	
Approach	SB12 0-2'	11/13/2012				
HET	SB12 0-2'	11/13/2012	11.9		15.6	
HET	SB12 4-6'	11/13/2012			17.7	
Approach	SB12 6-8'	11/13/2012		35.7		
HET	SB12 6-8'	11/13/2012			45.4	
Approach	SB12 8-10'	11/13/2012		35.6	19.5	
HET	SB12 8-10'	11/13/2012	10.7	27.8	77.9	
Approach	SB12 14-16'	11/13/2012		56.2		
HET	SB12 14-16'	11/13/2012	12.8		34.4	
HET	SB13 0-2'	11/13/2012			36.6	
HET	SB13 2-4'	11/13/2012		30.7	26.4	
HET	SB13 4-6'	11/13/2012			24.5	
Approach	SB13 8-10'	1/8/2013		83.6		
HET	SB13 8-10'	1/8/2013		34.5	25.7	
Approach	SB13 10-12'	1/8/2013		53.7		
HET	SB13 10-12'	1/8/2013		25.1	25.1	
Approach	SB13 12-14'	1/8/2013		64.1		
HET	SB13 12-14'	1/8/2013			21.6	
Approach	SB13 14-16'	1/8/2013		45.4		
HET	SB13 14-16'	1/8/2013		33.3	19	
HET	SB14 0-2'	11/13/2012			26.5	
HET	SB14 2-4'	11/13/2012		38.4	25.1	
HET	SB14 8-10'	11/13/2012	10.7	60.2	43.4	
HET	SB15 0-2'	11/13/2012			16.7	4.72
HET	SB15 2-4'	11/13/2012				4.78
Approach	SB15 4-6'	11/13/2012			18.1	
HET	SB15 4-6'	11/13/2012			23.4	
HET	SB15 6-8'	1/10/2013			24.5	
Approach	SB15 8-10'	1/10/2013		33.3	23.6	
HET	SB15 8-10'	1/10/2013			31.8	
Approach	SB15 10-12'	1/10/2013		56		
HET	SB15 10-12'	1/10/2013		35.8	21.2	
Approach	SB15 12-14'	1/10/2013		30.7		
HET	SB15 12-14'	1/10/2013			24.7	
Approach	SB15 14-16'	1/10/2013		38.9		
HET	SB15 14-16'	1/10/2013		31.2	18.2	
Approach	SB15 16-18'	1/29/2013		43.9		
Approach	SB15 18-20'	1/29/2013		25.5		
HET	SB16 0-2'	11/13/2012	12.4	47.4	29	5.41

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
HET	SB16 2-4'	11/13/2012			20.8	
Approach	SB16 4-6'	11/13/2012			16.8	
HET	SB16 4-6'	11/13/2012			23.8	
Approach	SB16 6-8'	1/10/2013			15.2	
HET	SB16 6-8'	1/10/2013			21	
Approach	SB16 8-10'	1/10/2013		66.1		
HET	SB16 8-10'	1/10/2013			24.8	
Approach	SB16 10-12'	1/10/2013		49.9		
HET	SB16 10-12'	1/10/2013		34.9	23.6	
Approach	SB16 12-14'	1/10/2013		38.8		
HET	SB16 12-14'	1/10/2013			20.3	
Approach	SB16 14-16'	1/10/2013		29.6		
HET	SB16 14-16'	1/10/2013			14.3	
HET	SB17 0-2'	11/13/2012	8.2		27.4	
HET	SB17 2-4'	11/13/2012			17.5	
Approach	SB17 6-8'	1/8/2013		27.7	18.3	
HET	SB17 6-8'	1/8/2013			21.2	
Approach	SB17 8-10'	1/8/2013		35.4		
HET	SB17 8-10'	1/8/2013		26.4	23.3	
Approach	SB17 10-12'	1/8/2013		47.8	17.3	
HET	SB17 10-12'	1/8/2013		29.2	26.5	
Approach	SB17 12-14'	1/8/2013		41.8		
HET	SB17 12-14'	1/8/2013		27.4	16.8	
Approach	SB17 14-16'	1/8/2013		51.1		
Approach	SB18 0-2'	11/13/2012	16	52.6	22.2	
HET	SB18 0-2'	11/13/2012	14.7	60.9	36.3	
Approach	SB18 2-4'	11/13/2012		26.2		
HET	SB18 2-4'	11/13/2012		45.5	18.5	
Approach	SB18 4-6'	11/13/2012		35.4		
HET	SB18 4-6'	11/13/2012		31.9	32.2	
Approach	SB19 0-2'	11/14/2012			17.3	
HET	SB19 0-2'	11/13/2012			24.6	
Approach	SB19 2-4'	11/14/2012		25.9	22	
HET	SB19 2-4'	11/14/2012		31.9	35.5	
Approach	SB19 4-6'	11/14/2012		32.6		
HET	SB19 4-6'	11/14/2012			35.2	
Approach	SB19A 6-8'	3/26/2013		28.3		
Approach	SB19A 10-12'	3/26/2013		46.2		
Approach	SB19A 12-14'	3/26/2013		38.9		
Approach	SB19A 14-16'	3/26/2013		37.1		
Approach	SB20 0-2'	11/16/2012	11.5			
HET	SB20 0-2'	11/16/2012	13.1		16.7	
Approach	SB20 4-6'	11/16/2012			26.5	
HET	SB20 6-8'	11/16/2012	8.1			

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
Approach	SB20 8-10'	11/16/2012		28.9		
HET	SB20 8-10'	11/16/2012			14.1	
Approach	SB21 0-2'	1/7/2013			16.3	
Approach	SB21 2-4'	1/7/2013		30		
Approach	SB21 12-14'	1/7/2013		49.4		
HET	SB21 12-14'	1/7/2013			15.4	
Approach	SB21 14-16'	1/7/2013		35.5		
Approach	SB22 0-4'	1/7/2013		45.3		
HET	SB22 0-4'	1/7/2013			15.8	
Approach	SB22 4-6'	1/7/2013		29.7	14.4	
HET	SB22 4-6'	1/7/2013			20	
HET	SB22 6-8'	1/7/2013			17.7	
Approach	SB22 12-14'	1/7/2013		87.2	14	
HET	SB22 12-14'	1/7/2013		34	26.4	
HET	SB22 14-16'	1/7/2013	8.9	33.6	22.5	
Approach	SB22 24-26'	1/7/2013		100	21.1	
HET	SB22 24-26'	1/7/2013	10.2	50.1	51.8	
Approach	SB22 26-28'	1/7/2013		100		
HET	SB22 26-28'	1/7/2013	9.6	58.5	46.8	
Approach	SB22A 28-30'	3/25/2013		70.8		
HET	SB22A 28-30'	3/25/2013	9.2			
Approach	SB22A 30-32'	3/25/2013		99.2		
HET	SB22A 30-32'	3/25/2013	9.3			
Approach	SB22A 38-40'	3/26/2013		35.6		
HET	SB24 6-8'	1/8/2013			14.6	
Approach	SB24 8-10'	1/8/2013		57.7		
Approach	SB24 10-12'	1/8/2013		30.7		
Approach	SB26 2-4'	1/28/2013			16.2	
HET	SB26 2-4'	1/28/2013			17	
Approach	SB26 6-8'	1/28/2013			14.3	
HET	SB26 6-8'	1/28/2013			16.4	
Approach	SB26 8-10'	1/28/2013		55.8		
Approach	SB26 10-12'	1/28/2013		27.8		
HET	SB26 10-12'	1/28/2013			15.4	
HET	SB26 12-14'	1/28/2013			14.2	
HET	SB27 8-10'	1/28/2013			15.2	
Approach	SB27 10-12'	1/28/2013		56.5		
HET	SB27 10-12'	1/28/2013			16.1	
Approach	SB27 12-14'	1/28/2013		31.8		
HET	SB27 12-14'	1/28/2013			17.7	
Approach	SB27 14-16'	1/28/2013		39.3		
HET	SB27 14-16'	1/28/2013			15.4	
HET	SB28 0-2'	1/29/2013				5.51
HET	SB28 12-14'	1/29/2013			16.3	

Soil Exceedances of LDNR Section 313 29B Standards

Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
Approach	SB29 0-2'	1/29/2013			17.6	
HET	SB29 0-2'	1/29/2013	11.7		21.5	
Approach	SB29 2-4'	1/29/2013			20.8	
HET	SB29 2-4'	1/29/2013			17.8	
Approach	SB29 4-6'	1/29/2013		44.9		
HET	SB29 4-6'	1/29/2013			20.8	
Approach	SB29 6-8'	1/29/2013		50.6		
HET	SB29 6-8'	1/29/2013			19.1	
Approach	SB29 8-10'	1/29/2013		34.9		
HET	SB29 8-10'	1/29/2013			23.3	
Approach	SB29 10-12'	1/29/2013		35.3		
HET	SB29 10-12'	1/29/2013			21.6	
Approach	SB29 12-14'	1/29/2013		30.2		
HET	SB29 12-14'	1/29/2013			19.4	
Approach	SB29 14-16'	1/29/2013		58.2		
Approach	SB30 0-2'	1/29/2013			38	
HET	SB30 0-2'	1/29/2013			20.2	
Approach	SB30 2-4'	1/29/2013		46.3	39.1	
HET	SB30 2-4'	1/29/2013	11.7	32.7	45.9	
Approach	SB30 4-6'	1/29/2013		103	20.3	
HET	SB30 4-6'	1/29/2013	12.4		48.1	
Approach	SB30 6-8'	1/29/2013		33.5	37.6	
HET	SB30 6-8'	1/29/2013	13.6	41.7	42.5	
Approach	SB30 8-10'	1/29/2013		125		
HET	SB30 8-10'	1/29/2013	15.8		40.4	
Approach	SB30 10-12'	1/29/2013		54.6	21.7	
HET	SB30 10-12'	1/29/2013	16.8	40.8	38.8	
Approach	SB30 12-14'	1/29/2013		76.3	16.2	
HET	SB30 12-14'	1/29/2013	12.8	32.6	39.4	
Approach	SB30 14-16'	1/29/2013		111		
HET	SB30 14-16'	1/29/2013	11.8		31.8	
Approach	SB31 8-10'	1/31/2013		64.4		
Approach	SB31 10-12'	1/31/2013		30.9		
HET	SB31 10-12'	1/31/2013			14.3	
Approach	SB34 0-2'	3/26/2013			14.5	
HET	SB34 0-2'	3/26/2013			30.5	
Approach	SB34 2-4'	3/26/2013		32.9		
Approach	SB34 4-6'	3/26/2013		44.9		
Approach	SB34 10-12'	3/26/2013		37.7		
Approach	SB34 12-14'	3/26/2013		44.7		
HET	SB34 12-14'	3/26/2013	8.9			
Approach	SB34 14-16'	3/26/2013		39.9		
HET	SB34 14-16'	3/26/2013	8.2			
HET	SB34 16-18'	3/26/2013	8.6			

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
Approach	SB35 0-2'	3/27/2013		127		
Approach	SB35 2-4'	3/27/2013		25.8		
Approach	SB35 4-6'	3/27/2013		26.3		
Approach	SB35 12-14'	3/27/2013		54.6		
Approach	SB35 14-16'	3/27/2013		50.7		
HET	SB38 0-2'	3/28/2013				5.99
HET	SB39 0-4'	3/28/2013				5.68
Approach	SB39 12-14'	3/28/2013		25.2		
HET	SB41 0-2'	4/1/2013				4.55
HET	SB42 0-2'	4/1/2013				5.37
MAXIMUM			74.5	127	77.9	5.99
SWD TANK BATTERY - WELL SITES S.N. 34829, 970411, 970412 (AREA 1)						
HET INVESTIGATION						
HET	A1-MW2 (0-1)	5/16/2013				5.41
HET	A1-MW2 (1-2)	5/16/2013				4.47
HET	A1-MW2 (2-3)	5/16/2013				4.7
HET	A1-MW2 (6-8)	5/16/2013				5.85
HET	A1-MW6 (0-1)	5/20/2013		28.2		
HET	A1-MW6 (1-2)	5/20/2013		29.4		
HET	A1-MW6 (2-3)	5/20/2013			26.2	
HET	A1-MW6 (13-15)	5/20/2013	10.1			
HET	A1-MW6 (15-17)	5/20/2013	10.8			
HET	A1-MW6 (26-28)	5/20/2013	8.09			
HET	A1-MW7 (1-2)	5/21/2013		27.3	40.9	
Approach	A1-MW7 (0-2)	5/21/2013				
HET	A1-MW7 (2-3)	5/21/2013			41.9	
HET	A1-MW7 (11-13)	5/21/2013	11.4			
HET	A1-MW7 (15-17)	5/21/2013	13.9			
HET	A1-MW8 (0-1)	5/21/2013	12.7	37.7	25.7	
HET	A1-MW8 (1-2)	5/21/2013		26.6	28.8	
HET	A1-MW8 (2-3)	5/21/2013			22.3	
HET	A1-MW8 (16-18)	5/21/2013	9.6			
Approach	A1-MW8 (16-18)	5/21/2013	9.71	44.6	16.3	
HET	A1-MW9 (0-1)	5/22/2013			35.1	
HET	A1-MW9 (1-2)	5/22/2013			45.1	
HET	A1-MW9 (2-3)	5/22/2013			35.4	
HET	A1-MW9 (16-18)	5/22/2013	8.5			
Approach	A1-MW9 (16-18)	5/22/2013	9.42	31.1	11.2	
HET	A1-MW12 (13-15)	5/23/2013	10.8			
HET	A1-MW12 (16-18)	5/23/2013	12.9			
HET	A1-MW12 (18-20)	5/23/2013	17.9			
Approach	A1-MW12 (18-20)	5/23/2013	19.6	42.2	14.7	
HET	A1-MW13 (1-2)	5/23/2013		29.1	37.7	
HET	A1-MW13 (2-3)	5/23/2013			39.3	

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
HET	A1-MW13 (13-15)	5/23/2013	8.8			
HET	A1-MW13 (15-17)	5/23/2013	10.5			
HET	A1-MW13 (18-20)	5/23/2013	11.2			
HET	A1-SB1 (0-1)	5/17/2013	18.6		20.4	
HET	A1-SB1 (16-18)	5/17/2013	9.7			
Approach	A1-SB1 (16-18)	5/17/2013	8.69	32.6	6.11	
HET	A1-SB2 (0-1)	5/17/2013	17	40.5	35.2	
HET	A1-SB2 (1-2)	5/17/2013	9.9		29.7	
HET	A1-SB2 (2-3)	5/17/2013	11.3		26.5	
HET	A1-SB2 (6-8)	5/17/2013	11.1			
Approach	A1-SB2 (6-8)	5/17/2013		57.2	17.8	
Approach	A1-SB4 (13-15)	5/20/2013		22.9		
Approach	A1-SB4 (16-18)	5/20/2013	8.87			
HET	A1-SB5 (0-1)	5/21/2013			22.7	
HET	A1-SB5 (1-2)	5/21/2013		27.2	45.2	
HET	A1-SB5 (2-3)	5/21/2013		29.5	36.7	
Approach	A1-SB5 (6-8)	5/21/2013		41.3	37.7	
HET	A1-SB6 (0-1)	5/21/2013	23.5	114	48.7	
HET	A1-SB6 (1-2)	5/21/2013	11.2	30.7	39	
HET	A1-B6 (2-3)	5/21/2013	8.3		39.2	
HET	A1-SB7 (0-1)	5/22/2013	19.8	35.1	24.5	
HET	A1-SB7 (1-2)	5/22/2013	9.1		20.7	
HET	A1-SB7 (2-3)	5/22/2013	10.1		24.9	
HET	A1-SB7 (6-8)	5/22/2013	12.6			
Approach	A1-SB7 (6-8)	5/22/2013	14	49.2		
HET	A1-SB8 (0-1)	5/23/2013				5.81
HET	A1-SB8 (1-2)	5/23/2013	12.4		45.3	
HET	A1-SB8 (2-3)	5/23/2013		40.8	68.3	
HET	A1-SB8 (6-8)	5/23/2013	15.9			
HET	A1-SB8 (10-12)	5/23/2013	17.7			
Approach	A1-SB8 (10-12)	5/23/2013	20.6	52.2	48.4	
HET	A1-SB8 (18-20)	5/23/2013	12.3			
HET	A1-SB9 (1-2)	5/24/2013			34.1	
HET	A1-SB9 (2-3)	5/24/2013		36.7	39.3	
HET	A1-SB9 (6-8)	5/24/2013	9.7			
HET	A1-SB9 (10-12)	5/24/2013	8.1			
HET	A1-SB9 (15-17)	5/24/2013	10.2			
HET	A1-SB10 (0-1)	5/24/2013			16.7	
HET	A1-SB10 (1-2)	5/24/2013		34.1	39.2	
HET	A1-SB10 (2-3)	5/24/2013	10.5	37	55.9	
HET	A1-SB10 (6-8)	5/24/2013	10.4			
HET	A1-SB10 (15-17)	5/24/2013	11.4			
HET	A1-SB11 (1-2)	5/29/2013			32.7	
HET	A1-SB11 (2-3)	5/29/2013			43.4	

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
HET	A1-SB11 (13-15)	5/29/2013	10.1			
HET	A1-SB11 (15-17)	5/29/2013	9.4			
HET	A1-SB12 (2-3)	5/29/2013			14.1	
HET	A1-SB12 (6-8)	5/29/2013	9.7			
HET	A1-SB12 (15-17)	5/29/2013	11			
GCAA	A1-GC1 (0-1)	8/12/2013				5.72
GCAA	A1-GC1 (1-2)	8/12/2013			45	
GCAA	A1-GC1 (2-3)	8/12/2013	8.4		48.2	
GCAA	A1-GC2 (0-1)	8/12/2013			27.5	5.32
GCAA	A1-GC2 (1-2)	8/12/2013			23.5	5.79
GCAA	A1-GC2 (2-3)	8/12/2013			28.5	5.85
GCAA	A1-GC3 (1-2)	8/12/2013			21.5	
GCAA	A1-GC3 (2-3)	8/12/2013			22.1	
GCAA	A1-GC4 (0-1)	8/12/2013				5.34
GCAA	A1-GC5 (1-2)	8/12/2013			33.6	
GCAA	A1-GC5 (2-3)	8/12/2013			50	
GCAA	A1-GC6 (0-1)	8/12/2013	13.8		24.8	
GCAA	A1-GC6 (1-2)	8/12/2013	9.5		22.9	
GCAA	A1-GC6 (2-3)	8/12/2013	8		19.6	
GCAA	A1-GC8 (0-1)	8/13/2013			26.9	
GCAA	A1-GC8 (1-2)	8/13/2013			20.1	
GCAA	A1-GC8 (2-3)	8/13/2013			41.7	
GCAA	A1-GC9 (0-1)	8/13/2013			23.6	5.92
GCAA	A1-GC9 (1-2)	8/13/2013			36.9	
GCAA	A1-GC9 (2-3)	8/13/2013		82.2	34.4	
GCAA	A1-GC10 (0-1)	8/13/2013				5.5
GCAA	A1-GC11 (0-1)	8/13/2013			14.9	
GCAA	A1-GC11 (1-2)	8/13/2013		27.8	25.6	
GCAA	A1-GC11 (2-3)	8/13/2013			23.4	
GCAA	A1-GC12 (0-1)	8/13/2013			19.6	
GCAA	A1-GC12 (1-2)	8/13/2013			16.2	
GCAA	A1-GC13 (0-1)	8/13/2013	8.6			5.58
GCAA	A1-GC13 (1-2)	8/13/2013			15.3	
GCAA	A1-GC13 (2-3)	8/13/2013			15.2	
GCAA	A1-GC14 (1-2)	8/13/2013	9.1		16.4	
GCAA	A1-GC14 (2-3)	8/13/2013	8.7			
MAXIMUM			23.5	114	68.3	4.47

**RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL**

Area 1- 34829, 970411, 970412

SOIL - Identification of the Limiting SO SS:

COC	Soil _{SSI}	Soil _{SSGW}	Limiting SS
Arsenic	12	100	12
Barium	550	2000	550
Benzene	1.5	0.051	0.051
Toluene	68	20	20
Ethylbenzene	160	19	19
Xylenes	18	150	18
TPH-GRO	65	65	65
TPH-DRO	65	65	65
TPH-ORO	180	10000	180
C6-C8 Aliphatics	1200	10000	1200
C8-C10 Aliphatics	120	5300	120
C8-C10 Aromatics	65	65	65
C10-C12 Aliphatics	230	10000	230
C10-C12 Aromatics	120	100	100
C12-C16 Aliphatics	370	10000	370
C12-C16 Aromatics	180	200	180
C16-C21 Aromatics	7100	2100	2100
C16-C35 Aliphatics	150	10000	150
C21-C35 Aromatics	180	10000	180
Methylene Chloride	19	0.017	0.017
Selenium	39	20	20
Acenaphthene	370	220	220
Acenaphthylene	350	88	88
Anthracene	2200	120	120
Benzo[a]anthracene	0.62	330	0.62
Benzo[a]pyrene	0.33	23	0.33
Benzo[b]fluoranthene	0.62	220	0.62
Benzo[k]fluoranthene	6.2	120	6.2
Chrysene	62	76	62
Dibenzo[a,h]anthracene	0.33	540	0.33
Fluoranthene	220	1200	220
Fluorene	280	230	230
Indeno[1,2,3-cd]pyrene	0.62	9.2	0.62
2-Methylnaphthalene	22	1.7	1.7
Naphthalene	6.2	1.5	1.5
Phenanthrene	2100	660	660
Pyrene	230	1100	230

SOIL – Evaluation of Soil Using a Leach Test:

(Please note that this table is not included in RECAP Form but is provided to illustrate the samples used were not appropriate for evaluating the soil to groundwater pathway.)

COC	Maximum COC Concentration Above Water Table & Location (mg/kg)	Concentration & Location of Sample SPLP'd (mg/kg)	Allowable SPLP Results (GW1 * 20)	Maximum SPLP Results (mg/L)	SPLP Exceeds Allowable?
Arsenic	10.2 (Dry)/ 8.5 (Wet) (SB1 10-12' (AE))	9.39 (Dry) (SB38 10-12' (HET))	0.2	<0.1	NA
Benzene	1.6 (SB18 8-10' (AE))	1.01 (SB22A 30-32 (HET))	0.1	0.0052	NA

Note: The SPLP results should not be used to evaluate the site because the samples from the highest exceedance were not analyzed and, for Benzene, were collected below the water table. Additionally, for Arsenic, Soil Non-Industrial (Soil_{SSI}) is the Limiting RECAP Standard, not Soil Protective of Groundwater (Soil_{SSGW}).

RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL

Area 1- 34829, 970411, 970412

SOIL – Identification of the AOIC:

COC	Maximum Concentration	Location of AOIC
Arsenic	31.2 (Dry)/ 22.9(Wet)	SB22A 30-32' (AE)
Barium	2840 (Dry)	A1-SB11 (4-6) (HET)
Benzene	1.8	SB22A 30-32' (AE)
Toluene	0.337	SB12 8-10 (HET)
Ethylbenzene	2.09	SB12 8-10 (HET)
Xylenes	5.24	SB12 8-10 (HET)
TPH-GRO	91	NORTH (AE)
TPH-DRO	7480	A1-MW13 (1-3) (HET)
TPH-ORO	8410	A1-MW13 (1-3) (HET)
C6-C8 Aliphatics	Not Analyzed	
C8-C10 Aliphatics		
C8-C10 Aromatics		
C10-C12 Aliphatics	<769	SB12 6-8' (HET)
C10-C12 Aromatics	<192	SB12 6-8' (HET)
C12-C16 Aliphatics	507/<769	A1-SB2 (1-3) (HET)/SB12 6-8' (HET)
C12-C16 Aromatics	208	A1-SB2 (1-3) (HET)
C16-C21 Aromatics	610	A1-SB2 (1-3) (HET)
C16-C35 Aliphatics	5600	SB12 6-8' (HET)
C21-C35 Aromatics	1400	SB12 6-8' (HET)
Methylene Chloride	0.16	SB8 2-4' (AE)
Selenium	27.7(Dry)/21.8(Wet)	SB22 24-26'(AE)
Acenaphthene	<0.33	NORTH (AE)
Acenaphthylene	<0.33	NORTH (AE)
Anthracene	<0.33	NORTH (AE)
Benzo[a]anthracene	<0.33	NORTH (AE)
Benzo[a]pyrene	0.34	NORTH (AE)
Benzo[b]fluoranthene	<0.33	NORTH (AE)
Benzo[k]fluoranthene	<0.33	NORTH (AE)
Chrysene	<0.33	NORTH (AE)
Dibenzo[a,h]anthracene	<0.33	NORTH (AE)
Fluoranthene	<0.33	NORTH (AE)
Fluorene	<0.33	NORTH (AE)
Indeno[1,2,3-cd]pyrene	<0.33	NORTH (AE)
2-Methylnaphthalene	0.043	SB1 4-6 (AE)
Naphthalene	<0.33	NORTH (AE)
Phenanthrene	0.51	NORTH (AE)
Pyrene	<0.33	NORTH (AE)

NOTE: Percent moisture was not reported for the maximum Barium COC, A1-SB11 (4-6) and therefore cannot be converted to a wet weight concentration.

NOTE: Fractionation data not used for reasons discussed in Section 6.3 of text.

RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL

Area 1- 34829, 970411, 970412

SO SOIL RECAP ASSESSMENT

COC	Limiting SS	Maximum Concentration	AOIC Exceeds LSS?
Arsenic	12	31.2 (Dry)/ 22.9(Wet)	Y
Barium	550	2840 (Dry)	Y
Benzene	0.051	1.8	Y
Toluene	20	0.337	N
Ethylbenzene	19	2.09	N
Xylenes	18	5.24	N
TPH-GRO	65	91	Y
TPH-DRO	65	7480	Y
TPH-ORO	180	8410	Y
C6-C8 Aliphatics	1200	Not Analyzed	
C8-C10 Aliphatics	120		
C8-C10 Aromatics	65		
C10-C12 Aliphatics	230		<769
C10-C12 Aromatics	100	<192	N-Conf*
C12-C16 Aliphatics	370	507/<769	Y*
C12-C16 Aromatics	180	208	Y*
C16-C21 Aromatics	2100	610	N*
C16-C35 Aliphatics	150	5600	Y*
C21-C35 Aromatics	180	1400	Y*
Methylene Chloride	0.017	0.16	Y
Selenium	20	27.7(Dry)/21.8(Wet)	Y
Acenaphthene	220	<0.33	N
Acenaphthylene	88	<0.33	N
Anthracene	120	<0.33	N
Benzo[a]anthracene	0.62	<0.33	N
Benzo[a]pyrene	0.33	0.34	Y
Benzo[b]fluoranthene	0.62	<0.33	N
Benzo[k]fluoranthene	6.2	<0.33	N
Chrysene	62	<0.33	N
Dibenzo[a,h]anthracene	0.33	<0.33	N
Fluoranthene	220	<0.33	N
Fluorene	230	<0.33	N
Indeno[1,2,3-cd]pyrene	0.62	<0.33	N
2-Methylnaphthalene	1.7	0.043	N
Naphthalene	1.5	<0.33	N
Phenanthrene	660	0.51	N
Pyrene	230	<0.33	N

NOTE: (Total) TPH shall not exceed 10,000.

NOTE: Confirmation Sampling (Conf) should be conducted after remediation to demonstrate that the RECAP Standard has been met at the sampling location where SQLs are higher than RECAP Standards.

*Fractionation data should not be relied upon for reasons discussed in Section 6.3 of text.

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 1- 34829, 970411, 970412

SOIL 0-15 ft bgs - Identification of the Limiting MO-1RS:

Health Effect	Noncarcinogenic Soil Constituents
Decreased body weight	TPH-GRO/TPH-DRO
Hematalogical effects	TPH-GRO/TPH-DRO
Liver effects	TPH-DRO/TPH-ORO, TPH-GRO/TPH-DRO
Kidney effects	Barium, TPH-DRO/TPH-ORO, TPH-GRO/TPH-DRO

NOTE: Fractionation data should not be relied upon for reasons discussed in Section 6.3 of the text.

COC	Soil_{ni}	Additivity Divisor	Final Soil_{ni}	Soil_{GW2}	DF2	Final Soil_{GW2}	Soil_{sat}	Limiting MO-1 RS
Arsenic	12	NA	12	100	NA	100	NA	12
Barium	5500	3	1833	2000	NA	2000	NA	1833
Benzene	1.5	NA	1.5	0.051	NA	0.051	900	0.051
TPH-GRO	650	3	217	65	NA	65	NA	65
TPH-DRO	650	3	217	65	NA	65	NA	65
TPH-ORO	1800	3	600	1000	NA	1000	NA	600
Methylene Chloride	19	NA	19	0.017	NA	0.017	2200	0.017
Benzo[a]pyrene	0.33	NA	0.33	23	NA	23	NA	0.33

NA= Not Applicable

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 1- 34829, 970411, 970412

SOIL 0-15 ft bgs – Identification of the AOIC:

COC	Maximum Concentration	95% UCL-AM Concentration	AOI Concentration
Arsenic	10.2 (Dry)/ 8.5 (Wet)	NA	10.2 (Dry)/ 8.5 (Wet)
Barium	2840 (Dry)	NA	2840 (Dry)
Benzene	1.6	NA	1.6
TPH-GRO	91	NA	91
TPH-DRO	7480	NA	7480
TPH-ORO	8410	NA	8410
Methylene Chloride	0.16	NA	0.16
Benzo[a]pyrene	0.34	NA	0.34

NA= Not Applicable

MO-1 SOIL 0-15 ft bgs RECAP ASSESSMENT:

COC	Limiting MO-1 RS	AOI Concentration	AOIC Exceeds MO-1 LRS?
Arsenic	12	10.2 (Dry)/ 8.5 (Wet)	N
Barium	1833	2840 (Dry)	Y
Benzene	0.051	1.6	Y
TPH-GRO	65	91	Y
TPH-DRO	65	7480	Y
TPH-ORO	600	8410	Y
Methylene Chloride	0.017	0.16	Y
Benzo[a]pyrene	0.33	0.34	Y

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 1- 34829, 970411, 970412

SOIL >15 ft bgs - Identification of the Limiting MO-1RS:

COC	Soil _{GW2}	DF2	Final Soil _{GW2}	Soil _{sat}	Limiting MO-1 RS
Arsenic	100	NA	100	NA	100
Benzene	0.051	NA	0.051	900	0.051
Selenium	20	NA	20	NA	20

NA= Not Applicable

SOIL >15 ft bgs – Identification of the AOIC:

COC	Maximum Concentration	95% UCL-AM Concentration	AOI Concentration
Arsenic	31.2(dry)/22.9(wet) (SB22A 30-32' (AE))	NA	31.2(dry)/22.9(wet) (SB22A 30-32' (AE))
Benzene	1.8 (SB22A 30-32 (AE))	NA	1.8 (SB22A 30-32 (AE))
Selenium	27.7(dry)/21.8(wet) (SB22 24- 26')(AE))	NA	27.7(dry)/21.8(wet) (SB22 24-26')(AE))

NA= Not Applicable

MO-1 SOIL >15 ft bgs RECAP ASSESSMENT:

COC	Limiting MO-1 RS	AOI Concentration	AOIC Exceeds MO-1 LRS?
Arsenic	100	31.2(dry)/22.9(wet) (SB22A 30- 32' (AE))	N
Benzene	0.051	1.8 (SB22A 30-32 (AE))	Y
Selenium	20	27.7(dry)/21.8(wet) (SB22 24- 26')(AE))	Y

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 1- 34829, 970411, 970412

GROUNDWATER - Identification of the SO SS:

COC	GW _{SS}
Arsenic	0.01
Chlorides	250
TDS	750
Barium	2
Benzene	0.005
Toluene	1
Ethylbenzene	0.7
Xylenes	10
Lead	0.015
TPH-GRO	0.15
TPH-DRO	0.15
TPH-ORO	0.15
C6-C8 Aliphatics	3.2
C8-C10 Aliphatics	0.15
C8-C10 Aromatics	0.15
C10-C12 Aliphatics	0.15
C10-C12 Aromatics	0.15
C12-C16 Aliphatics	0.15
C12-C16 Aromatics	0.15
C16-C21 Aromatics	0.15
C16-C35 Aliphatics	7.3
C21-C35 Aromatics	0.15
Acenaphthene	0.037
Acenaphthylene	0.10
Anthracene	0.0043
Benzo[a]anthracene	0.0078
Benzo[a]pyrene	0.00020
Benzo[b]fluoranthene	0.0048
Benzo[k]fluoranthene	0.0025
Chrysene	0.0016
Dibenzo[a,h]anthracene	0.0025
Fluoranthene	0.15
Fluorene	0.024
Indeno[1,2,3-cd]pyrene	0.0037
2-Methylnaphthalene	0.00062
Naphthalene	0.010
Phenanthrene	0.18
Pyrene	0.018

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 1- 34829, 970411, 970412

GROUNDWATER – Compliance Concentration:

COC	Compliance Concentration	Location of AOIC
Arsenic	0.03	A1-MW7 Duplicate (8'-18') (HET)
Chlorides	27200	MW1 (AE)
TDS	36400	A1-MW7 (8'-18') (AE)
Barium	10.9	A1-MW13 (9'-19') (AE)
Benzene	0.097	A1-MW12 (9'-19') (HET)
Toluene	0.014	A1-MW12 (9'-19') (AE)
Ethylbenzene	0.024	A1-MW12 (9'-19') (AE)
Xylenes	0.089	A1-MW12 (9'-19') (AE)
Lead	0.0211	SB41 (AE)
TPH-GRO	0.56	A1-MW12 9-19' (AE)
TPH-DRO	6.31	TMW15 (HET)
TPH-ORO	0.94	A1-MW13 9-19' (AE)
C6-C8 Aliphatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C8-C10 Aliphatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C8-C10 Aromatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C10-C12 Aliphatics (TX 1006)	0.753	TMW42 (HET)
C10-C12 Aromatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C12-C16 Aliphatics (TX 1006)	0.273	TMW42 (HET)
C12-C16 Aromatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C16-C21 Aromatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
C16-C35 Aliphatics (TX 1006)	2.56	TMW36 (HET)
C21-C35 Aromatics (TX 1006)	<0.150	AE Investigation, HET Investigation (HET)
Acenaphthene	<0.0002	MW1 (AE)
Acenaphthylene	<0.0002	MW1 (AE)
Anthracene	<0.001	MW1 (AE)
Benzo[a]anthracene	<0.0002	MW1 (AE)
Benzo[a]pyrene	<0.0002	MW1 (AE)
Benzo[b]fluoranthene	<0.0002	MW1 (AE)
Benzo[k]fluoranthene	<0.0002	MW1 (AE)
Chrysene	<0.0002	MW1 (AE)
Dibenzo[a,h]anthracene	<0.0002	MW1 (AE)
Fluoranthene	<0.0002	MW1 (AE)
Fluorene	<0.0002	MW1 (AE)
Indeno[1,2,3-cd]pyrene	<0.0002	MW1 (AE)
2-Methylnaphthalene	<0.0002	MW1 (AE)
Naphthalene	<0.0002	MW1 (AE)
Phenanthrene	<0.0002	MW1 (AE)
Pyrene	<0.0002	MW1 (AE)

NOTE: PAH's not collected from highest TPH-DRO/TPH-ORO.

NOTE: TMW15 not analyzed for TPH-ORO.

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 1- 34829, 970411, 970412

SO GROUNDWATER RECAP ASSESSMENT:

COC	GW _{SS}	Compliance Concentration	CC Exceeds SS?
Arsenic	0.01	0.03	Y
Chlorides	250	27200	Y
TDS	750	36400	Y
Barium	2	10.9	Y
Benzene	0.005	0.097	Y
Toluene	1	0.014	N
Ethylbenzene	0.7	0.024	N
Xylenes	10	0.089	N
Lead	0.015	0.0211	Y
TPH-GRO	0.15	0.56	Y
TPH-DRO	0.15	6.31	Y
TPH-ORO	0.15	0.94	Y
C6-C8 Aliphatics	3.2	<0.150	N
C8-C10 Aliphatics	0.15	<0.150	N
C8-C10 Aromatics	0.15	<0.150	N
C10-C12 Aliphatics	0.15	0.753	Y
C10-C12 Aromatics	0.15	<0.150	N
C12-C16 Aliphatics	0.15	0.273	Y
C12-C16 Aromatics	0.15	<0.150	N
C16-C21 Aromatics	0.15	<0.150	N
C16-C35 Aliphatics	7.3	2.56	N
C21-C35 Aromatics	0.15	<0.150	N
Acenaphthene	0.037	<0.0002	N
Acenaphthylene	0.1	<0.0002	N
Anthracene	0.0043	<0.001	N
Benzo[a]anthracene	0.0078	<0.0002	N
Benzo[a]pyrene	0.0002	<0.0002	N
Benzo[b]fluoranthene	0.0048	<0.0002	N
Benzo[k]fluoranthene	0.0025	<0.0002	N
Chrysene	0.0016	<0.0002	N
Dibenzo[a,h]anthracene	0.0025	<0.0002	N
Fluoranthene	0.15	<0.0002	N
Fluorene	0.024	<0.0002	N
Indeno[1,2,3-cd]pyrene	0.0037	<0.0002	N
2-Methylnaphthalene	0.00062	<0.0002	N
Naphthalene	0.01	<0.0002	N
Phenanthrene	0.18	<0.0002	N
Pyrene	0.018	<0.0002	N

NOTE: Fractionation data should not be relied upon for reasons discussed in Section 6.3 of text.

RECAP FORM 16
MANAGEMENT OPTION 1 SUBMITTAL FOR GROUNDWATER

Area 1- 34829, 970411, 970412

GROUNDWATER - Identification of the Limiting MO-1 RS:

COC	GW ₂	DF2	Final GW ₂	Water _{sol}	Limiting MO-1 RS
Arsenic	0.01	NA	0.01	NA	0.01
Chlorides	250	NA	250	NA	250
TDS	750	NA	750	NA	750
Barium	2	NA	2	NA	2
Benzene	0.005	NA	0.005	1800	0.005
Lead	0.015	NA	0.015	NA	0.015
TPH-GRO	0.34	NA	0.034	NA	0.34
TPH-DRO	0.34	NA	0.034	NA	0.34
TPH-ORO	1.1	NA	1.1	NA	1.1

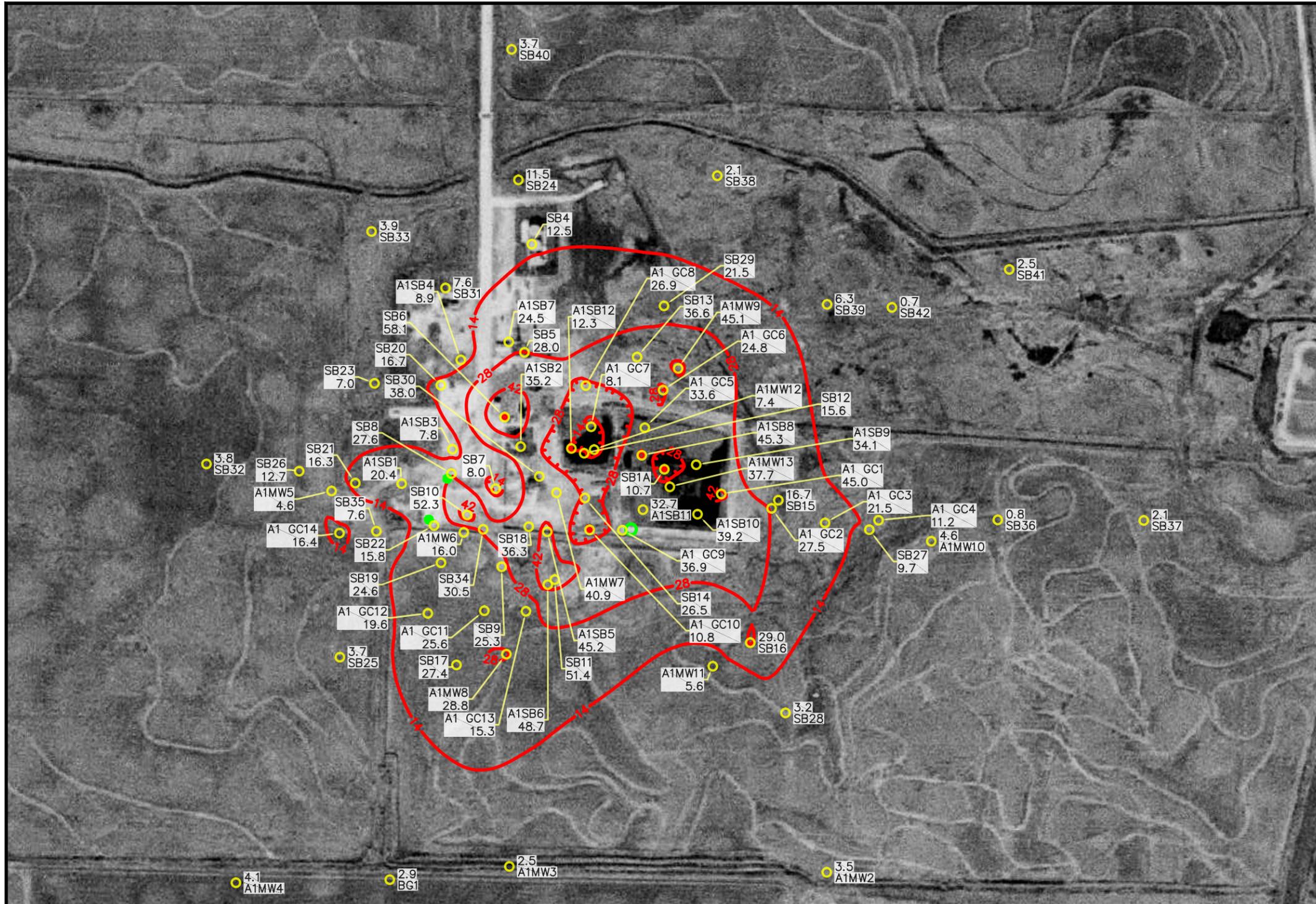
GROUNDWATER – Compliance Concentration:

COC	Compliance Concentration	Location of AOIC
Arsenic	0.03	A1-MW7 Duplicate (8'-18') (HET)
Chlorides	27200	MW1 (AE)
TDS	36400	A1-MW7 (8'-18') (AE)
Barium	10.9	A1-MW13 (9'-19') (AE)
Benzene	0.097	A1-MW12 (9'-19') (HET)
Lead	0.0211	SB41 (AE)
TPH-GRO	0.56	A1-MW12 9-19' (AE)
TPH-DRO	6.31	TMW15 (HET)
TPH-ORO	0.94	A1-MW13 9-19' (AE)

Note: TMW15 not analyzed for ORO.

MO-1 GROUNDWATER RECAP ASSESSMENT:

COC	Limiting MO-1 RS	Compliance Concentration	CC Exceeds MO-1 LRS?
Arsenic	0.01	0.03	Y
Chlorides	250	27200	Y
TDS	750	36400	Y
Barium	2	10.9	Y
Benzene	0.005	0.097	Y
Lead	0.015	0.0211	Y
TPH-GRO	0.34	0.56	Y
TPH-DRO	0.34	6.31	Y
TPH-ORO	1.1	0.94	N



- LEGEND:**
- SOIL BORING LOCATION
 - SB1 SOIL BORING ID
 - 11.9 SAR CONCENTRATION
 - CURRENT WELL SITE
 - FORMER WELL SITE
 - 25— SAR CONCENTRATION CONTOUR

NOTES:

- ALL AE SOIL BORINGS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET SOIL BORING AND MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- ALL CONCENTRATIONS WERE TRUNCATED AT ONE DECIMAL PLACE.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

**TOTAL AFFECTED LAND AREA:
~12.29 ACRES**

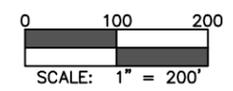


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGIC SURVEY



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 Toll Free: (866) 674-1993 Fax: (318) 222-2425

DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 200'

SWEET LAKE LAND & OIL COMPANY, LLC
 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

**SODIUM ADSORPTION RATIO (SAR)
 0-2' DEPTH INTERVAL**

FIGURE NUMBER
A-2-C



- LEGEND:**
- CURRENT WELL SITE
 - FORMER WELL SITE
 - LA 29-B SALT PARAMETERS
 - LA 29-B NON-SALT PARAMETERS
 - NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: ~10.65 ACRES
 LA 29-B NON-SALT: ~23,185 SQ. FT.
 NON LA 29-B: ~1.68 ACRES

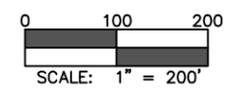


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 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

SOIL CONTAMINANT EXTENT MAP
 0-2' DEPTH INTERVAL

FIGURE NUMBER
 A-2-G



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: ~9.15 ACRES
 LA 29-B NON-SALT: ~3,962 SQ. FT.
 NON LA 29-B: ~1.38 ACRES

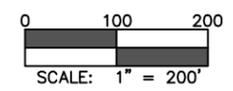


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 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

SOIL CONTAMINANT EXTENT MAP
 2-4' DEPTH INTERVAL

FIGURE NUMBER
 A-3-G



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B NON-SALT PARAMS.
- NON LA 29-B PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: ~10.65 ACRES
 LA 29-B NON-SALT: ~23,185 SQ. FT.
 NON LA 29-B: ~1.68 ACRES

- HET'S SOIL MIXING AREA (2 - 100'x100'x8' AREAS)
- GCAA'S MINOR SOIL RESTORATION AREA (0-3' BGS)
- GCAA'S MODERATE SOIL RESTORATION AREA (0-3' BGS)

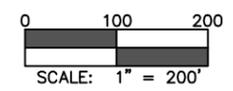


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGIC SURVEY



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 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

CONTAMINANT EXTENT MAP WITH RP REMEDIATION OVERLAYS
 0-2' DEPTH INTERVAL

FIGURE NUMBER
 A-19-A



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B NON-SALT PARAMS.
- NON LA 29-B PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: ~9.15 ACRES
 LA 29-B NON-SALT: ~3,962 SQ. FT.
 NON LA 29-B: ~1.38 ACRES

- HET'S SOIL MIXING AREA (2 - 100'x100'x8' AREAS)
- GCAA'S MINOR SOIL RESTORATION AREA (0-3' BGS)
- GCAA'S MODERATE SOIL RESTORATION AREA (0-3' BGS)

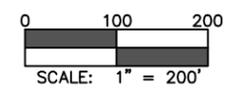


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 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

CONTAMINANT EXTENT MAP WITH RP REMEDIATION OVERLAYS
 2-4' DEPTH INTERVAL

FIGURE NUMBER
 A-19-B

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
WELL SITE S.N. 67773/66878 (C-5)						
APPROACH ENVIRONMENTAL INVESTIGATION						
Approach	SS49	8/13/2009	49.2	34	16	
Approach	SS51	8/13/2009	59.9			
HET	SB1 2-4'	11/15/2012			14.8	
Approach	SB2 0-2'	11/16/2012			15.2	
HET	SB2 0-2'	11/16/2012	8.500		14	
Approach	SB2 2-4'	11/16/2012	11.3			
HET	SB2 2-4'	11/16/2012			15.7	
Approach	SB2 4-6'	11/16/2012			15.6	
HET	SB2 4-6'	11/16/2012			18.5	
Approach	SB3 2-4'	11/16/2012		26.4		
HET	SB3 2-4'	11/16/2012			15.7	
Approach	SB3 4-6'	11/16/2012		27.6		
HET	SB3 4-6'	11/16/2012		25.9		
Approach	SB5 6-8'	11/4/2009		29		
Approach	SB6 2-4'	11/16/2012		53.9		
HET	SB6 2-4'	11/16/2012		50.1	24.8	
Approach	SB6 4-6'	11/16/2012		30.8		
HET	SB6 4-6'	11/16/2012			24.5	
Approach	SB6 6-8'	11/16/2012			25.7	
HET	SB6 6-8'	11/16/2012		25.9	23.9	
HET	SB8 0-2'	1/17/2013	8.100	27.7		4.63
HET	SB8 2-4'	1/17/2013			16.3	5.74
HET	SB8 4-6'	1/17/2013			15.2	
HET	SB8 8-10'	1/17/2013				4.30
Approach	SB9 0-2'	1/17/2013	13.9			5.69
HET	SB9 0-2'	1/17/2013	9.500	25.8	15.7	4.26
HET	SB9 2-4'	1/17/2013			19.8	
HET	SB9 6-8'	1/17/2013			15.3	
HET	SB9 8-10'	1/17/2013			15.2	
Approach	SB10 0-2'	1/17/2013				5.58
HET	SB10 0-2'	1/17/2013				5.21
Approach	SB10 8-10'	1/17/2013			15.4	
HET	SB10 8-10'	1/17/2013			14.9	5.42
HET	SB10 10-12'	1/17/2013			15.2	
HET	SB13 0-2'	4/1/2013				5.79
HET	SB14 0-2'	4/1/2013				4.80
HET	SB14 2-4'	4/1/2013				5.18
MAXIMUM			13.90	53.90	25.70	4.26

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
WELL SITE S.N. 67773/66878 (C-5) (Area 2)						
HET INVESTIGATION						
HET	A2-SB1 (0-1)	5/30/2013				5.53
HET	A2-SB1 (2-3)	5/30/2013			21.1	
Approach	A2-SB1 (6-8)	5/30/2013			24	
HET	A2-SB2 (0-1)	5/31/2013				5.45
HET	A2-SB2 (1-2)	5/31/2013			27.3	
HET	A2-SB2 (2-3)	5/31/2013		36.5	38.3	
Approach	A2-SB2 (6-8)	5/31/2013		31.5	27.1	
Approach	A2-SB2 (12-14)	5/31/2013			14	
HET	A2-MW3 (0-1)	5/30/2013				4.53
HET	A2-MW3 (1-2)	5/30/2013				5.27
HET	A2-SB3 (1-2)	5/31/2013			15.7	
HET	A2-SB3 (2-3)	5/31/2013			30.4	
Approach	A2-SB3 (11-13)	5/31/2013			33	5.74
HET	A2-MW4 (0-1)	6/3/2013			38.5	
HET	A2-MW4 (1-2)	6/3/2013		46.8	68.6	
HET	A2-MW4 (2-3)	6/3/2013			55.8	
Approach	A2-MW4 (2-3)	6/3/2013		50.7	36.9	
Approach	A2-MW4 (6-8)	6/3/2013		29.2		
HET	A2-SB4 (0-1)	6/3/2013			16.9	
HET	A2-SB4 (1-2)	6/3/2013		26.2	18.3	
HET	A2-SB4 (2-3)	6/3/2013			17.9	
Approach	A2-SB4 (2-3)	6/3/2013		38.8	16.5	
Approach	A2-SB4 (4-6)	6/3/2013		44.5	15.6	
HET	A2-SB4 (11-13)	6/3/2013				0.65
Approach	A2-MW5 (10-12)	6/3/2013		58.4	16	
HET	A2-SB5 (0-1)	6/4/2013				5.41
HET	A2-SB5 (1-2)	6/4/2013				5.28
HET	A2-SB5 (2-3)	6/4/2013				5.42
HET	A2-MW6 (0-1)	6/4/2013				5.14
HET	A2-MW6 (1-2)	6/4/2013				5.93
HET	A2-SB6 (1-2)	6/4/2013			17.5	
HET	A2-SB6 (2-3)	6/4/2013			14.1	
HET	A2-SB7 (0-1)	6/4/2013			26.2	
HET	A2-SB7 (1-2)	6/4/2013			30.9	
HET	A2-SB7 (2-3)	6/4/2013			24.6	
MAXIMUM			Not Applicable	58.4	68.6	0.65



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: 27,510 SQ. FT.
 LA 29-B NON-SALT: 9,739 SQ. FT.
 NON LA 29-B: 1,116 SQ. FT.

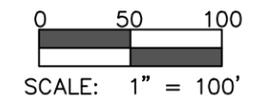


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITES 67773/66878
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

SOIL CONTAMINANT EXTENT MAP
 0-2' DEPTH INTERVAL

FIGURE NUMBER

B-2-G

DRAWN DATE: 4/5/2016 DRAWN BY: JPB SCALE: 1" = 100'



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:

LA 29-B SALT: 14,266 SQ. FT.

LA 29-B NON-SALT: 11,942 SQ. FT.

NON LA 29-B: 42,011 SQ. FT.

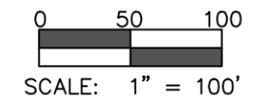


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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SOIL CONTAMINANT EXTENT MAP
 2-4' DEPTH INTERVAL

FIGURE NUMBER

B-3-1

DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 100'



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:

LA 29-B NON-SALT: 3,678 SQ. FT.
 NON LA 29-B: 1.09 ACRES

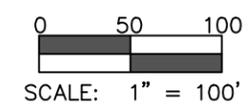


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 100'

SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITES 67773/66878
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

SOIL CONTAMINANT EXTENT MAP
 8-10' DEPTH INTERVAL

FIGURE NUMBER
 B-8-D



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:
 LA 29-B SALT: 27,510 SQ. FT.
 LA 29-B NON-SALT: 9,739 SQ. FT.
 NON LA 29-B: 1,116 SQ. FT.

- HET'S SOIL EXCAVATION AREA
 NORTH AREA: 25'x25'x10'
 SOUTH AREA: 50'x50'x8'-10'
- GCAA'S MINOR SOIL RESTORATION AREA (0-3' BGS)

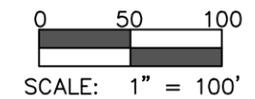


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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WELL SITES 67773/66878
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

CONTAMINANT EXTENT MAP WITH RP REMEDIATION OVERLAYS
 0-2' DEPTH INTERVAL

FIGURE NUMBER

B-12-A

DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 100'



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:

LA 29-B SALT: 14,266 SQ. FT.

LA 29-B NON-SALT: 11,942 SQ. FT.

NON LA 29-B: 42,011 SQ. FT.

- HET'S SOIL EXCAVATION AREA
 NORTH AREA: 25'x25'x10'
 SOUTH AREA: 50'x50'x8'-10'
- GCAA'S MINOR SOIL RESTORATION AREA
 (0-3' BGS)

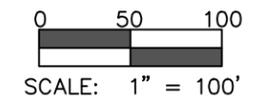


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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WELL SITES 67773/66878
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

CONTAMINANT EXTENT MAP WITH RP REMEDIATION OVERLAYS
 2-4' DEPTH INTERVAL

FIGURE NUMBER

B-12-B

DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 100'



LEGEND:

- CURRENT WELL SITE
- FORMER WELL SITE
- LA 29-B SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B SALT PARAMETERS
- LA 29-B NON-SALT PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING LA 29-B NON-SALT PARAMETERS
- NON LA 29-B PARAMETERS
- AREA OUTSIDE REMEDIATION ZONE WITH EXCEEDING NON LA 29-B PARAMETERS

NOTES:
 -FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
 -THE OVERLAPPING NON-SALT PARAMETER AREAS WERE EXCLUDED FROM THE SALT PARAMETER AREAS DURING TOTAL AREA CALCULATIONS.

TOTAL AFFECTED LAND AREAS:

LA 29-B NON-SALT: 3,678 SQ. FT.
 NON LA 29-B: 1.09 ACRES

HET'S SOIL EXCAVATION AREA
 NORTH AREA: 25'x25'x10'
 SOUTH AREA: 50'x50'x8'-10'

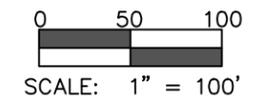


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY



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SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITES 67773/66878
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

CONTAMINANT EXTENT MAP WITH RP REMEDIATION OVERLAYS
 8-10' DEPTH INTERVAL

FIGURE NUMBER

B-12-E

DRAWN DATE: 4/5/2016
 DRAWN BY: JPB
 SCALE: 1" = 100'

Soil Exceedances of LDNR Section 313 29B Standards						
Sample ID	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
WELL SITE S.N. 64709 (C-3)						
APPROACH ENVIRONMENTAL INVESTIGATION						
Approach	64709 SS1	3/22/2010	22.5	30	27	
Approach	SB4 0-2'	11/15/2012	28.1	70.5	29.9	
HET	SB4 0-2'	11/15/2012	11.6	130	26.2	
Approach	SB4 2-4'	11/15/2012	9.73			
HET	SB4 2-4'	11/15/2012		35.1		4.47
Approach	SB4 4-6'	11/15/2012		58.1		
HET	SB4 6-8'	1/10/2013				5.47
HET	SB5 0-2'	11/15/2012			24.5	
HET	SB5 2-4'	11/15/2012				4.53
HET	SB6 2-4'	11/15/2012				5.12
HET	SB7 0-2'	1/10/2013				5.38
Approach	SB7 4-6'	1/10/2013				5.76
HET	SB7 4-6'	1/10/2013				4.67
HET	SB7 6-8'	1/10/2013				5.07
HET	SB8 0-2'	1/10/2013				5.7
Approach	SB8 4-6'	1/10/2013			20.4	5.99
HET	SB8 4-6'	1/10/2013				4.96
HET	SB8 6-8'	1/10/2013				4.76
Approach	SB9 0-4'	1/11/2013				3.82
HET	SB9 0-4'	1/11/2013				4.72
Approach	SB9 4-6'	1/11/2013				4.39
HET	SB9 4-6'	1/11/2013				5.11
HET	SB9 8-10'	1/11/2013				5.86
HET	SB10 0-2'	1/11/2013				5.48
HET	SB10 2-4'	1/11/2013				4.96
HET	SB11 0-2'	1/11/2013				5.98
Approach	SB11 2-4'	1/11/2013				4.94
HET	SB11 2-4'	1/11/2013				4.54
Approach	SB11 4-6'	1/11/2013				4.49
HET	SB11 6-8'	1/11/2013				4.98
HET	SB11 8-10'	1/11/2013				5.35
HET	SB12 0-2'	1/11/2013				5.36
Approach	SB12 2-4'	1/11/2013				4.57
HET	SB12 2-4'	1/11/2013				4.51
Approach	SB12 4-6'	1/11/2013				4.78
HET	SB12 4-6'	1/11/2013				4.29
Approach	SB12 8-10'	1/11/2013				5.9
HET	SB12 8-10'	1/11/2013				5.41
Approach	SB12 10-12'	1/11/2013				5.08
HET	SB12 10-12'	1/11/2013				5.23
MAXIMUM			28.1	130	29.9	3.82

Soil Exceedances of LDNR Section 313 29B Standards						
Sample ID	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 313			8	25	14	6-9
WELL SITE S.N. 64709 (C-3) (Area 3)						
HET INVESTIGATION						
HET	A3-MW1 (0-1)	6/4/2013				5.49
HET	A3-MW1 (1-2)	6/4/2013				5.04
HET	A3-MW1 (2-3)	6/4/2013				4.96
Approach	A3-MW1 (8-10)	6/4/2013				5.6
HET	A3-MW1 (15-17)	6/5/2013				4.68
HET	A3-MW2 (0-1)	6/5/2013				5.29
HET	A3-MW2 (1-2)	6/5/2013				5.1
HET	A3-MW2 (2-3)	6/5/2013				4.87
Approach	A3-MW2 (2-3)	6/5/2013				
HET	A3-MW2 (6-8)	6/5/2013				4.85
HET	A3-MW3 (1-2)	6/5/2013			22.9	
HET	A3-MW3 (2-3)	6/5/2013			19.4	5.49
Approach	A3-MW3 (2-3)	6/5/2013				4.96
HET	A3-MW3 (4-6)	6/5/2013				4.63
Approach	A3-MW3 (6-8)	6/5/2013				5.31
HET	A3-MW4 (2-3)	6/5/2013				4.82
Approach	A3-MW4 (2-3)	6/5/2013				5.64
HET	A3-MW5 (0-1)	6/5/2013				5.22
HET	A3-MW5 (1-2)	6/5/2013				5.04
HET	A5-MW5 (2-3)	6/5/2013				5.14
HET	A3-MW5 (8-10)	6/5/2013				5.62
Approach	A3-MW5 (12-14)	6/5/2013		39.3		7.6
HET	A3-SB1 (0-1)/SB56	6/4/2013				5.58
HET	A3-SB1 (1-2)/SB56	6/4/2013				5.82
HET	A3-SB1 (2-3)/SB56	6/4/2013				5.3
HET	A3-SB2 (0-1)/SB57	6/4/2013				5.88
HET	A3-SB2 (1-2)/SB57	6/4/2013				5.9
HET	A3-SB2 (2-3)/SB57	6/4/2013			17.1	5.24
HET	A3-SB2 (8-10)/SB57	6/4/2013				5.19
HET	A3-SB3 (2-3)	6/4/2013			19.8	5.01
Approach	A3-SB3 (2-3)	6/4/2013				5.94
HET	A3-SB3 (8-10)	6/4/2013				5.52
HET	A3-SB4 (0-1)	6/4/2013	20	26.9	47.2	
HET	A3-SB4 (1-2)	6/4/2013	8.7	30	23.3	
HET	A3-SB4 (2-3)	6/4/2013			15.4	4.09
HET	A3-SB4 (4-6)	6/4/2013				4.41
HET	A3-SB4 (6-8)	6/4/2013				5.4
HET	A3-SB5 (0-1)	6/5/2013				5.58
HET	A3-SB5 (1-2)	6/5/2013				5.35
HET	A3-SB5 (2-3)	6/5/2013			15.3	5.63
GC	GC2 (2-3)	8/13/2013			15.8	
GC	GC3 (2-3)	8/13/2013				4.73
MAXIMUM			20	39.5	47.2	4.09-9.46

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 303			8	25	14	6-9
WELL SITE S.N. 63282 (C-2)						
APPROACH ENVIRONMENTAL INVESTIGATION						
Approach	SS59	8/13/2009	21.4		17	
HET	SB1 0-2'	11/15/2012	8.8		20.4	4.51
Approach	SB1 2-4'	11/15/2012			14.2	
HET	SB1 2-4'	11/15/2012			20.7	4.47
HET	SB3 0-1'	1/15/2013			15.7	
HET	SB3 0-4'	11/15/2012			16.3	
MAXIMUM			21.4	22.91	20.4	4.47
WELL SITE S.N. 63282 (C-2) (Area 4)						
HET INVESTIGATION						
HET	A4-SB3 (1-2)	6/6/2013				4.77
HET	A4-SB3 (2-3)	6/6/2013				4.98
HET	A4-SB4 (0-1)	6/6/2013				5.43
HET	A4-SB4 (1-2)	6/6/2013			15.4	4.73
HET	A4-SB5 (0-1)	6/6/2013				5.9
HET	A4-SB5 (1-2)	6/6/2013				5.78
HET	A4-SB5 (2-3)	6/6/2013				5.04
HET	A4-SB6 (0-1)	6/6/2013	9.6	43.3	31.7	
HET	A4-SB6 (1-2)	6/6/2013	8.3	32.6	34.1	5.96
HET	A4-SB6 (2-3)	6/6/2013	8.1		42	5.02
HET	A4-SB6 (4-6)	6/6/2013			17.5	
MAXIMUM			9.6	43.3	42	4.73

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 303			8	25	14	6-9
WELL SITE S.N. 68920 (C-7)						
APPROACH ENVIRONMENTAL INVESTIGATION						
HET	SS9	3/25/2013				5.94
HET	SS10	3/25/2013				5.57
HET	SS11	3/25/2013			23.2	
Approach	SS61	8/13/2009	22.1	27	29	
HET	SB2 0-4'	11/14/2012				4.63
HET	SB3 2-4'	11/14/2012				4.92
Approach	SB4 0-1'	1/15/2013		28.7	22.8	
HET	SB4 0-1'	1/15/2013	9.8	52.1	27	
HET	SB5 0-2'	11/14/2012				5.35
HET	SB5 2-4'	11/14/2012				5.18
HET	SB7 0-2'	1/16/2013			17.4	
HET	SB8 2-4'	1/17/2013				4.86
MAXIMUM			22.1	52.1	29	4.63
WELL SITE S.N. 68920 (C-7)						
HET INVESTIGATION						
HET	A5-MW2 (1-2)	6/10/2013				4.96
HET	A5-MW2 (2-3)	6/10/2013				4.44
HET	A5-SB1 (0-1)	6/7/2013			18.4	
HET	A5-SB2 (1-2)	6/7/2013			14.5	
MAXIMUM			Not Applicable	Not Applicable	18.4	4.41

**RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL**

Area 5 - 68920

SOIL- Identification of the Limiting SO SS:

COC	Soil _{SSni}	Soil _{SSGW}	Limiting SS
Acetone	170	1.5	1.5
Arsenic	12	100	12
Barium	550	2000	550
Benzene	1.5	0.051	0.051
Toluene	68	20	20
Ethylbenzene	160	19	19
Xylenes	18	150	18
TPH-GRO	65	65	65
TPH-DRO	65	65	65
TPH-ORO	180	10000	180
C6-C8 Aliphatics	1200	10000	1200
C8-C10 Aliphatics	120	5300	120
C8-C10 Aromatics	65	65	65
C10-C12 Aliphatics	230	10000	230
C10-C12 Aromatics	120	100	100
C12-C16 Aliphatics	370	10000	370
C12-C16 Aromatics	180	200	180
C16-C21 Aromatics	7100	2100	2100
C16-C35 Aliphatics	150	10000	150
C21-C35 Aromatics	180	10000	180
Methylene Chloride	19	0.017	0.017
MTBE (methyl tert-butyl ether)	650	0.077	0.077
Acenaphthene	370	220	220
Acenaphthylene	350	88	88
Anthracene	2200	120	120
Benzo[a]anthracene	0.62	330	0.62
Benzo[a]pyrene	0.33	23	0.33
Benzo[b]fluoranthene	0.62	220	0.62
Benzo[k]fluoranthene	6.2	120	6.2
Chrysene	62	76	62
Dibenzo[a,h]anthracene	0.33	540	0.33
Fluoranthene	220	1200	220
Fluorene	280	230	230
Indeno[1,2,3-cd]pyrene	0.62	9.2	0.62
2-Methylnapthalene	22	1.7	1.7
Naphthalene	6.2	1.5	1.5
Phenanthrene	2100	660	660
Pyrene	230	1100	230

SOIL – Evaluation of Soil Using a Leach Test:

(Please note that this table is not included in RECAP Form but is provided to illustrate the samples used were not appropriate for evaluating the soil to groundwater pathway.)

COC	Allowable SPLP Results (GW1 * 20)	Maximum SPLP Results (mg/L)	SPLP Exceeds Allowable?
No RECAP Parameters SPLPd			

**RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL**

Area 5 - 68920

SOIL – Identification of the AOIC:

COC	Maximum Concentration	Location of AOIC
Acetone	0.12	SB2 4-6' (AE)
Arsenic	36.1(wet); 43.5 (dry)	SB4 0-1' (AE)
Barium	1126.4 (wet); 1280(dry)	A5-SB2 (1-2) (HET)
Benzene	0.408	SB2 0-4' (HET)
Toluene	<0.252	SB1 0-2' (HET)
Ethylbenzene	1.48	SB2 0-4' (HET)
Xylenes	6.34	SB2 0-4' (HET)
TPH-GRO		Not Analyzed
TPH-DRO	1620	A5-SB1 (0-2) (HET)
TPH-ORO	1640	A5-SB1 (0-2) (HET)
C6-C8 Aliphatics		Not Analyzed
C8-C10 Aliphatics		
C8-C10 Aromatics		
C10-C12 Aliphatics	<971	SB1 0-2' (HET)
C10-C12 Aromatics	<388	SB1 0-2' (HET)
C12-C16 Aliphatics	1360	SB1 0-2' (HET)
C12-C16 Aromatics	115 / <388	A5- SB1 (0-2) (HET)/ SB1 0-2' (HET)
C16-C21 Aromatics	1230	SB1 0-2' (HET)
C16-C35 Aliphatics	15200	SB1 0-2' (HET)
C21-C35 Aromatics	3050	SB1 0-2' (HET)
Methylene Chloride	0.057/ <0.504	SB7 2-4' (AE)/SB1 0-2' (HET)
MTBE (methyl tert-butyl ether)	<0.252	SB1 0-2' (HET)
Acenaphthene		Not Analyzed
Acenaphthylene		
Anthracene		
Benzo[a]anthracene		
Benzo[a]pyrene		
Benzo[b]fluoranthene		
Benzo[k]fluoranthene		
Chrysene		
Dibenzo[a,h]anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene		
2-Methylnapthalene		
Naphthalene		
Phenanthrene		
Pyrene		

**RECAP FORM 10
SCREENING OPTION SUBMITTAL FOR SOIL**

Area 5 - 68920

SO SOIL RECAP ASSESSMENT

COC	Limiting SS	Maximum Concentration	AOIC Exceeds LSS?
Acetone	1.5	0.12	N
Arsenic	12	36.1(wet); 43.5 (dry)	Y
Barium	550	1126.4 (wet); 1280(dry)	Y
Benzene	0.051	0.408	Y
Toluene	20	<0.252	N
Ethylbenzene	19	1.48	N
Xylenes	18	6.34	N
TPH-GRO	65	Not Analyzed	
TPH-DRO	65	1620	Y
TPH-ORO	180	1640	Y
C6-C8 Aliphatics	1200	Not Analyzed	
C8-C10 Aliphatics	120		
C8-C10 Aromatics	65		
C10-C12 Aliphatics	230	<971	N-Conf
C10-C12 Aromatics	100	<388	N-Conf
C12-C16 Aliphatics	370	1360	Y
C12-C16 Aromatics	180	115 / <388	N-Conf
C16-C21 Aromatics	2100	1230	N
C16-C35 Aliphatics	150	15200	Y
C21-C35 Aromatics	180	3050	Y
Methylene Chloride	0.017	0.057/ <0.504	Y
MTBE	0.077	<0.252	N-Conf
Acenaphthene	220	Not Analyzed	
Acenaphthylene	88		
Anthracene	120		
Benzo[a]anthracene	0.62		
Benzo[a]pyrene	0.33		
Benzo[b]fluoranthene	0.62		
Benzo[k]fluoranthene	6.2		
Chrysene	62		
Dibenzo[a,h]anthracene	0.33		
Fluoranthene	220		
Fluorene	230		
Indeno[1,2,3-cd]pyrene	0.62		
2-Methylnapthalene	1.7		
Naphthalene	1.5		
Phenanthrene	660		
Pyrene	230		

NOTE: Confirmation sampling (Conf) should be conducted after remediation to demonstrate that the RECAP Standard has been met at the sampling location where SQLs are higher than RECAP Standards.

NOTE: Fractionation results should not be used for reasons discussed in Section 6.3 of the text.

NOTE: (Total) TPH shall not exceed 10,000.

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 5 - 68920

SOIL 0-15 ft bgs - Identification of the Limiting MO-1RS:

Health Effect	Soil Constituents
Skin effects (hyperpigmentation and keratosis);	Arsenic
Vascular effects	Arsenic
Hematological effects	TPH-DRO
Decreased body weight	TPH-DRO
Liver effects	TPH-DRO/TPH-ORO
Kidney effects	Barium, TPH-DRO/TPH-ORO

NOTE: TPH-DRO additivity effects taken from RECAP Appendix G Table 1 for C8-C16 Aliphatics and Aromatics.

NOTE: TPH-DRO/TPH-ORO additivity effects taken from RECAP Appendix G Table 1 for C16-C35 Aliphatics and Aromatics.

COC	Soil _{ni}	Additivity Divisor	Final Soil _{ni}	Soil _{GW2}	DF2	Final Soil _{GW2}	Soil _{sat}	Limiting MO-1 RS
Arsenic	12	NA	12	100	NA	100	NA	12
Barium	5500	2	2750	2000	NA	2000	NA	2000
Benzene	1.5	NA	1.5	0.051	NA	0.051	900	0.051
TPH-DRO	650	2	325	10000	NA	10000	NA	325
TPH-ORO	1800	2	900	10000	NA	10000	NA	900
Methylene Chloride	19	NA	19	0.017	NA	0.017	2200	0.017

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 5 - 68920

SOIL 0-15 ft bgs – Identification of the AOIC:

COC	Maximum Concentration	95% UCL-AM Concentration	AOI Concentration
Arsenic	36.1(wet); 43.5 (dry)	NA	36.1(wet); 43.5 (dry)
Barium	1126.4 (wet); 1280(dry)	NA	1126.4 (wet); 1280(dry)
Benzene	0.408	NA	0.408
TPH-DRO	1620	NA	1620
TPH-ORO	1640	NA	1640
Methylene Chloride	0.057/ <0.504	NA	0.057/ <0.504

MO-1 SOIL 0-15 ft bgs RECAP ASSESSMENT:

COC	Limiting MO-1 RS	AOI Concentration	AOIC Exceeds MO-1 LRS?
Arsenic	12	36.1(wet); 43.5 (dry)	Y
Barium	2000	1126.4 (wet); 1280(dry)	N
Benzene	0.051	0.408	Y
TPH-DRO	325	1620	Y
TPH-ORO	900	1640	Y
Methylene Chloride	0.017	0.057/ <0.504	N-Conf

NOTE: Confirmation sampling (Conf) should be conducted after remediation to demonstrate that the RECAP Standard has been met at the sampling location where SQLs are higher than RECAP Standards.

**RECAP FORM 11A
MANAGEMENT OPTION 1 SUBMITTAL FOR SOIL**

Area 5 - 68920

SOIL >15 ft bgs - Identification of the Limiting MO-1RS:

COC	Soil _{GW2}	DF2	Final Soil _{GW2}	Soil _{sat}	Limiting MO-1 RS
Not Analyzed					

SOIL >15 ft bgs – Identification of the AOIC:

COC	Maximum Concentration	95% UCL-AM Concentration	AOI Concentration
Not Analyzed			

MO-1 SOIL >15 ft bgs RECAP ASSESSMENT:

COC	Limiting MO-1 RS	AOI Concentration	AOIC Exceeds MO-1 LRS?
Not Analyzed			

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 5 - 68920

GROUNDWATER - Identification of the SO SS:

COC	GW _{SS}
Arsenic	0.01
Chlorides	250
TDS	750
Barium	2
Benzene	0.005
Toluene	1
Ethylbenzene	0.7
Xylenes	10
TPH-GRO	0.15
TPH-DRO	0.15
TPH-ORO	0.15
C6-C8 Aliphatics	3.2
C8-C10 Aliphatics	0.15
C8-C10 Aromatics	0.15
C10-C12 Aliphatics	0.15
C10-C12 Aromatics	0.15
C12-C16 Aliphatics	0.15
C12-C16 Aromatics	0.15
C16-C21 Aromatics	0.15
C16-C35 Aliphatics	7.3
C21-C35 Aromatics	0.15
Acenaphthene	0.037
Acenaphthylene	0.10
Anthracene	0.0043
Benzo[a]anthracene	0.0078
Benzo[a]pyrene	0.00020
Benzo[b]fluoranthene	0.0048
Benzo[k]fluoranthene	0.0025
Chrysene	0.0016
Dibenzo[a,h]anthracene	0.0025
Fluoranthene	0.15
Fluorene	0.024
Indeno[1,2,3-cd]pyrene	0.0037
2-Methylnaphthalene	0.00062
Naphthalene	0.010
Phenanthrene	0.18
Pyrene	0.018

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 5 - 68920

GROUNDWATER – Compliance Concentration:

COC	Compliance Concentration	Location of AOIC
Arsenic	0.13	A5-TMW8 (HET)
Chlorides	2350	A5-MW1 (6'-16') (HET)
TDS	5510	A5-TMW7 (AE)
Barium	0.937	A5-TMW8 (AE)
Benzene	<0.005	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET and AE)
Toluene	<0.005	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET and AE)
Ethylbenzene	<0.005	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET and AE)
Xylenes	<0.015	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET and AE)
TPH-GRO	<0.1	A5-TMW6, A5-TMW7, A5-TMW8 (AE and HET), A5-MW1, A5-MW2, A5-MW3 (AE)
TPH-DRO	1.96	A5-TMW7 (HET)
TPH-ORO	0.19	A5-MW2 (6'-16') (AE)
C6-C8 Aliphatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C8-C10 Aliphatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C8-C10 Aromatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C10-C12 Aliphatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C10-C12 Aromatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C12-C16 Aliphatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C12-C16 Aromatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C16-C21 Aromatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C16-C35 Aliphatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
C21-C35 Aromatics (TX 1006)	<0.150	A5-TMW6, A5-TMW7, A5-TMW8, A5-MW1, A5-MW2, A5-MW3 (HET)
Acenaphthene		Not Analyzed
Acenaphthylene		
Anthracene		
Benzo[a]anthracene		
Benzo[a]pyrene		
Benzo[b]fluoranthene		
Benzo[k]fluoranthene		
Chrysene		
Dibenzo[a,h]anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene		
2-Methylnaphthalene		
Naphthalene		
Phenanthrene		
Pyrene		

RECAP FORM 15
SCREENING OPTION SUBMITTAL FOR GROUNDWATER

Area 5 - 68920

NOTE: TPH-ORO not analyzed at TMW7.

SO GROUNDWATER RECAP ASSESSMENT:

COC	GW _{SS}	Compliance Concentration	CC Exceeds SS?
Arsenic	0.01	0.13	Y
Chlorides	250	2350	Y
TDS	750	5510	Y
Barium	2	0.937	N
Benzene	0.005	<0.005	N
Toluene	1	<0.005	N
Ethylbenzene	0.7	<0.005	N
Xylenes	10	<0.015	N
TPH-GRO	0.15	<0.1	N
TPH-DRO	0.15	1.96	N-Frac
TPH-ORO	0.15	0.19	N-Frac
C6-C8 Aliphatics	3.2	<0.150	N
C8-C10 Aliphatics	0.15	<0.150	N
C8-C10 Aromatics	0.15	<0.150	N
C10-C12 Aliphatics	0.15	<0.150	N
C10-C12 Aromatics	0.15	<0.150	N
C12-C16 Aliphatics	0.15	<0.150	N
C12-C16 Aromatics	0.15	<0.150	N
C16-C21 Aromatics	0.15	<0.150	N
C16-C35 Aliphatics	7.3	<0.150	N
C21-C35 Aromatics	0.15	<0.150	N
Acenaphthene	0.037	Not Analyzed	
Acenaphthylene	0.1		
Anthracene	0.0043		
Benzo[a]anthracene	0.0078		
Benzo[a]pyrene	0.0002		
Benzo[b]fluoranthene	0.0048		
Benzo[k]fluoranthene	0.0025		
Chrysene	0.0016		
Dibenzo[a,h]anthracene	0.0025		
Fluoranthene	0.15		
Fluorene	0.024		
Indeno[1,2,3-cd]pyrene	0.0037		
2-Methylnaphthalene	0.00062		
Naphthalene	0.01		
Phenanthrene	0.18		
Pyrene	0.018		

NOTE: Fractionation (Frac) results from the highest overall TPH-DRO, TMW7 (HET), and TPH-ORO, A5-MW2 (AE), samples were used to evaluate TPH-DRO and TPH-ORO.

**RECAP FORM 16
MANAGEMENT OPTION 1 SUBMITTAL FOR GROUNDWATER**

Area 5 - 68920

GROUNDWATER - Identification of the Limiting MO-1 RS:

COC	GW ₂	DF2	Final GW ₂	Water _{sol}	Limiting MO-1 RS
Arsenic	0.010	NA	0.010	NA	0.010
Chlorides	250	NA	250	NA	250
TDS	750	NA	750	NA	750

GROUNDWATER – Compliance Concentration:

COC	Compliance Concentration	Location of AOIC
Arsenic	0.13	TMW8 (HET)
Chlorides	2350	A5-MW1 (6'-16') (HET)
TDS	5510	TMW7 (AE)

MO-1 GROUNDWATER RECAP ASSESSMENT:

COC	Limiting MO-1 RS	Compliance Concentration	CC Exceeds MO-1 LRS?
Arsenic	0.01	0.13	Y
Chlorides	250	2350	Y
TDS	750	5510	Y

NOTE: PAH's not analyzed.

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 303			8	25	14	6-9
WELL SITE S.N. 216967 (C-9)						
APPROACH ENVIRONMENTAL INVESTIGATION						
Approach	SS10	3/25/2013		29		
HET	SS10	3/25/2013			19.7	
Approach	SB1 0-2'	11/14/2012	9.09	33.7		
HET	SB1 0-2'	11/14/2012	8.6		25	
Approach	SB2 0-4'	11/14/2012		28.9		
Approach	SB2 4-6'	11/14/2012		37.6		
Approach	SB3 0-2'	11/14/2012		36.3		
HET	SB8 4-6'	1/15/2013				4.77
HET	SB9 0-2'	1/15/2013				5.13
HET	SB9 2-4'	1/15/2013				4.31
MAXIMUM			9.09	37.6	25	4.31-8.59

Soil Exceedances of LDNR Section 313 29B Standards						
Sampler	Sample ID	Date Sampled	EC (Specific Conductance - mmhoms/cm)	ESP (%)	SAR	pH (Std Units)
LDNR SECTION 303			8	25	14	6-9
WELL SITE S.N. 216967 (C-9) (Area 6)						
HET INVESTIGATION						
HET	A6-MW2 (1-2)	6/10/2013				5.13
HET	A6-MW3 (1-2)	6/11/2013				4.82
HET	A6-MW3 (2-3)	6/11/2013				5.1
HET	A6-MW4 (0-1)	6/11/2013			17.8	
HET	A6-MW4 (1-2)	6/11/2013				5.75
Maximum			Not Applicable	Not Applicable	17.8	4.82-8.53

BACKGROUND CONCENTRATIONS

MW	Chloride	TDS	Arsenic	Barium	Lead
A1-MW3	313	994	<0.01	0.11	<0.01
TMW 38 (aka SB38)	308	937	<0.01	0.07	<0.015
TMW 40 (aka SB40)	306	873	<0.01	0.10	<0.01
A2-MW1	144	498	<0.01	0.20	<0.015
A6-MW2	91	380	<0.01	0.51	<0.015
Average	232	736	<0.01	0.20	<0.015
Background Concentration	250	750	<0.01	0.20	<0.015

MW	Benzene	Toluene	Ethyl benzene	Xylenes	TPH-GRO	TPH-DRO	TPH-ORO
A1-MW3	<0.005	<0.005	<0.005	<0.015	<0.1	<0.1	<0.1
TMW 38 (aka SB38)	<0.005	<0.005	<0.005	<0.015	<0.1	<0.128	NA
TMW 40 (aka SB40)	<0.005	<0.005	<0.005	<0.015	<0.100	<0.128	NA
A2-MW1	<0.005	<0.005	<0.005	<0.015	<0.1	<0.1	<0.1
A6-MW2	<0.005	<0.005	<0.005	<0.015	<0.1	<0.1	<0.1
Average	<0.005	<0.005	<0.005	<0.015	<0.1	<0.11	<0.1
Background Concentration	<0.005	<0.005	<0.005	<0.015	<0.1	<0.13	<0.1

MW	Aliphatics C6-C8	Aromatics >C8-10	Aromatics >C10-12	Aromatics >C12-16	Aliphatics >C12-16	Aliphatics C16-C35	2-Methyl naphthalene	Napthalene
A1-MW3	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	<0.005
TMW 38 (aka SB38)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA
TMW 40 (aka SB40)	<0.150	<0.150	<0.150	<0.150	<0.150	1.57	NA	NA
A2-MW1	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	<0.005
A6-MW2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	NA	NA
Average	<0.15	<0.15	<0.15	<0.15	<0.15	See note	NA	NA
Background Concentration	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.0002	<0.005

All results reported in mg/L, except pH which is reported in standard units.

The maximum of HET or Approach Environmental's results was used when 2 results were available for the same parameter, interval and sample location.

NA = Not Analyzed

NOTE: Confirmation Sampling should be conducted to verify the presence of Aliphatics C16-C35.

Appendix V

Approach Environmental NORM Map



LEGEND:

- AREA WHERE N.O.R.M. SURVEY READING WAS GREATER THAN 2X BACKGROUND READINGS
- 60 N.O.R.M. SURVEY READING (MICROROENTGENS/HOUR)

*N.O.R.M. SURVEY WAS CONDUCTED IN MARCH 2010 WITH A LUDLUM MODEL 3 SURVEY METER (S/N 266497) AND A LUDLUM MODEL 44-2 SCINTILLATION DETECTOR (S/N PR286172).

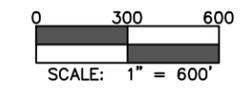


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY

Approach Environmental
 151 Freestate Blvd., Suite B
 Shreveport, Louisiana 71107
 Toll Free: (866) 674-1993 Fax: (318) 222-2425

DRAWN DATE: 4/6/2016
 DRAWN BY: JPB
 SCALE: 1" = 600'

SWEET LAKE LAND & OIL COMPANY, LLC
 EAST BELL CITY FIELD
 SECTION 34, TOWNSHIP 10S, RANGE 6W
 CALCASIEU PARISH, LOUISIANA

NATURALLY OCCURRING RADIOACTIVE MATERIAL
 (N.O.R.M.) SURVEY FINDINGS

FIGURE NUMBER

Appendix W

Groundwater Remediation Plan Addendum



TERRA • SOLVE
ENVIRONMENTAL CONSULTANTS

3216 Commander Drive, Suite 103 • Carrollton, Texas 75006-2518 • (972) 267-1900 • Fax (972) 267-1902
www.terra-solve.com

April 8, 2016

Mr. Guy E. Wall
Wall, Bullington, & Cook, LLC
540 Elmwood Park Boulevard
New Orleans, LA 70123

**RE: ADDENDUM NO. 1
GROUNDWATER RESTORATION PLAN**

**SWEET LAKE LAND AND OIL CO., LLC V. OLEUM OPERATING CO., LC, et al
SWD TANK BATTERY SITE
EAST BELL CITY FIELD
SECTION 34, TOWNSHIP 10S, RANGE 6W
CALCASIEU PARISH, LOUISIANA**

TERRA-SOLVE PROJECT NO. 12903A

Dear Mr. Wall:

Terra-Solve, Inc. (Terra-Solve) has prepared this addendum to the Groundwater Restoration Plan dated March 1, 2016, prepared by Terra-Solve, in response to the revised volumes and contaminant plumes that were determined by Approach Environmental, LLC (Approach) and furnished to Terra-Solve. The revised volumes and additional constituents are summarized as follows:

Area 1

- Addition of TPH-GRO – 21,911 sq. ft.
- Addition of TPH-ORO – 6.62 acres.
- Change in arsenic volume from 9.69 to 9.54 acres.

Addendum 1 Response: The additional TPH-GRO and TPH-ORO areas are contained within the originally evaluated 25.21 acre TPH-DRO plume. The cleanup time was based on the average properties of all TPH ranges, therefore there is no significant change in the estimated cleanup time or costs. The slight change in the plume size for arsenic has no significant change to the originally estimated cleanup time or cost.

Area 2

- Addition of TPH-GRO – 17,958 sq. ft.
- Change in benzene from 19,602 to 19,536 sq. ft.

Addendum 1 Response: The additional TPH-GRO area is contained within the originally evaluated 1.48 acre TPH-DRO plume. The cleanup time was based on the average properties of all TPH ranges, therefore there is no significant change in the estimated cleanup time or costs. The slight

Mr. Guy E. Wall

April 8, 2016

Page 2

change in the plume size for benzene has no significant change to the originally estimated cleanup time or cost.

Area 3

- Addition of Lead – 8,853 sq. ft.
- Change in TPH-DRO volume from 1.33 to 1.31 acres.

Addendum 1 Response: The cation exchange media in the proposed groundwater treatment system to remove barium will also remove lead. There is no significant change in the estimated cleanup time or costs due to the additional area of lead contamination. The slight change in the plume size for TPH-DRO has no significant change to the originally estimated cleanup time or cost.

Area 5

- Addition of barium – 16,112 sq. ft.
- Change in chloride and TDS from 16,117 to 16,112 sq. ft.
- Change in TPH-DRO from 15,899 to 15,901 sq. ft.
- Change in arsenic from 9,583 to 9,584 sq. ft.

Addendum 1 Response: The additional barium area results in no significant change in the estimated cleanup time or costs. The slight change in the plume size for chloride, TDS, TPH-DRO and arsenic has no significant change to the originally estimated cleanup time or cost.

Area 6

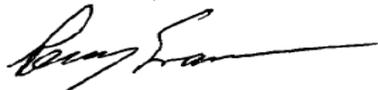
- Addition of barium – 37,775 sq. ft.
- Change in chloride from 33,062 sq. ft. to 33,057 sq. ft.
- Change in TDS from 33,541 sq. ft. to 33,536 sq. ft.
- Change in TPH-D from 24,829 sq. ft. to 24,848 sq. ft.

Addendum 1 Response: The additional barium area results in no significant change in the estimated cleanup time or costs. The slight change in the plume size for chloride, TDS, and TPH-DRO has no significant change to the originally estimated cleanup time or cost.

Terra-Solve appreciates the opportunity to provide you with our professional consulting services. Please contact Terra-Solve at (972) 267-1900 if you have any questions concerning this project.

Respectfully,

Terra-Solve, Inc.



Perry W. Evans, P.E. (LA #37991), P.G. (LA #567)

Civil Engineer / Geoscientist



- LEGEND:**
- MONITORING WELL LOCATION
 - SB25 MONITORING WELL ID
 - 11.9 BARIUM CONCENTRATION (mg/L)
 - CURRENT WELL SITE
 - FORMER WELL SITE
 - 970411 WELL SERIAL NUMBER
 - 25— BARIUM CONCENTRATION CONTOUR (mg/L)

NOTES:

- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET SOIL BORING AND MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- ALL CONCENTRATIONS WERE TRUNCATED AT TWO DECIMAL PLACES.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

**TOTAL AFFECTED LAND AREA:
~16,112 SQ. FT.**

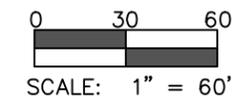


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY

Approach Environmental
 151 Freestate Blvd., Suite B
 Shreveport, Louisiana 71107
 Toll Free: (866) 674-1993 Fax: (318) 222-2425

DRAWN DATE: 2/28/2016
 DRAWN BY: JPB
 SCALE: 1" = 60'

SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITE 68920
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

TRUE TOTAL BARIUM
 IN GROUNDWATER

FIGURE
 NUMBER



- LEGEND:**
- MONITORING WELL LOCATION
 - MW1 MONITORING WELL ID
 - 11.9 TPH-ORO CONCENTRATION (mg/L)
 - CURRENT WELL SITE
 - FORMER WELL SITE
 - TPH-ORO CONCENTRATION CONTOUR (mg/L)

NOTES:

- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- ALL CONCENTRATIONS WERE TRUNCATED AT TWO DECIMAL PLACES.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

**TOTAL AFFECTED LAND AREA:
~6.62 ACRES**



IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGIC SURVEY



Approach Environmental
 151 Freestate Blvd., Suite B
 Shreveport, Louisiana 71107
 Toll Free: (866) 674-1993 Fax: (318) 222-2425

DRAWN DATE: 2/23/2016
 DRAWN BY: JPB
 SCALE: 1" = 200'

SWEET LAKE LAND & OIL COMPANY, LLC
 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

TOTAL PETROLEUM HYDROCARBONS - OIL RANGE ORGANICS (TPH-ORO)
 IN GROUNDWATER

FIGURE NUMBER



LEGEND:

- MONITORING WELL LOCATION
- MW1 MONITORING WELL ID
- 11.9 TPH-GRO CONCENTRATION (mg/L)
- CURRENT WELL SITE
- FORMER WELL SITE
- 0.15 — TPH-GRO CONCENTRATION CONTOUR (mg/L)

NOTES:

- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- ALL CONCENTRATIONS WERE TRUNCATED AT TWO DECIMAL PLACES.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

**TOTAL AFFECTED LAND AREA:
~21,911 SQ. FT.**

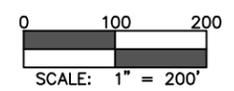


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGIC SURVEY

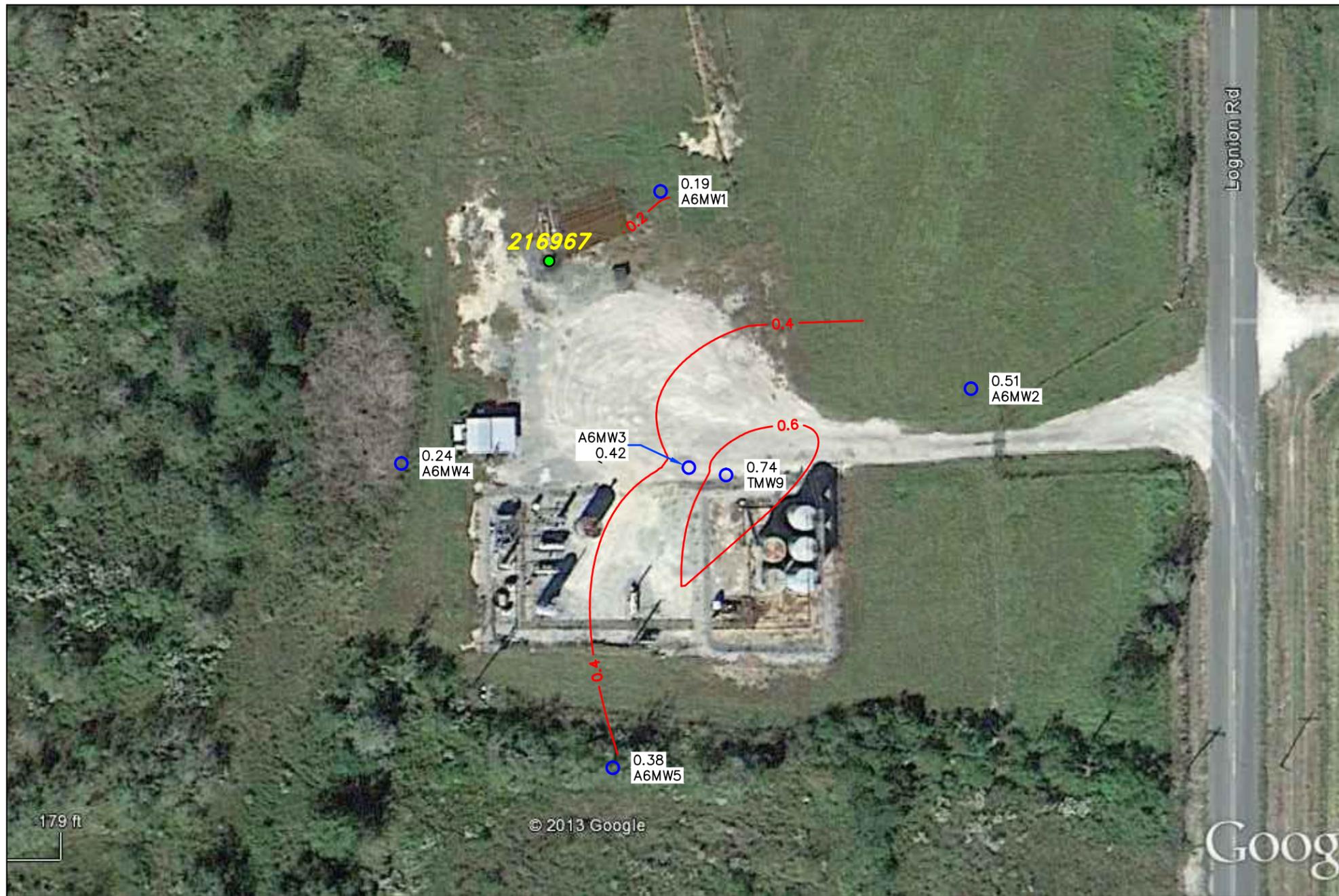
Approach Environmental
 151 Freestate Blvd., Suite B
 Shreveport, Louisiana 71107
 Toll Free: (866) 674-1993 Fax: (318) 222-2425

DRAWN DATE: 2/25/2016
 DRAWN BY: JPB
 SCALE: 1" = 200'

SWEET LAKE LAND & OIL COMPANY, LLC
 SWD TANK BATTERY AREA
 WELL SITES 34829, 970411, & 970412
 E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

TOTAL PETROLEUM HYDROCARBONS - GASOLINE RANGE ORGANICS (TPH-GRO)
 IN GROUNDWATER

FIGURE NUMBER



LEGEND:

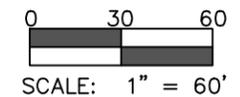
- MONITORING WELL LOCATION
- MW25 MONITORING WELL ID
- 11.9 BARIUM CONCENTRATION (mg/L)
- CURRENT WELL SITE
- FORMER WELL SITE
- 970411 WELL SERIAL NUMBER
- 25— BARIUM CONCENTRATION CONTOUR (mg/L)

NOTES:

- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET SOIL BORING AND MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

**TOTAL AFFECTED LAND AREA:
~37,775 SQ. FT.**

IMAGE SOURCE: 10/27/2012 AERIAL FROM GOOGLE EARTH 2013



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SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITE 216967
E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

BARIUM
IN GROUNDWATER

FIGURE
NUMBER

DRAWN DATE: 2/23/2016
DRAWN BY: JPB
SCALE: 1" = 60'



LEGEND:

- MONITORING WELL LOCATION
- MW5 MONITORING WELL ID
- 11.9 TPH-GRO CONCENTRATION (mg/L)
- CURRENT WELL SITE
- FORMER WELL SITE
- 970411 WELL SERIAL NUMBER
- 25 TPH-GRO CONCENTRATION CONTOUR (mg/L)

NOTES:

- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27-28, 2013 BY LOWE ENGINEERS, LLC.
- HET SOIL BORING AND MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- ALL CONCENTRATIONS WERE TRUNCATED AT TWO DECIMAL PLACES.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

TOTAL AFFECTED LAND AREA:
~17,958 SQ. FT.

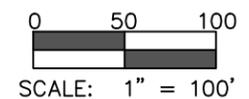


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY

Approach Environmental
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Shreveport, Louisiana 71107
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SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITES 67773/66878
E. BELL CITY FIELD - SECTION 34, TOWNSHIP 10S, RANGE 6W

TOTAL PETROLEUM HYDROCARBONS - GASOLINE RANGE ORGANICS (TPH-GRO)
IN GROUNDWATER

FIGURE
NUMBER

DRAWN DATE: 2/23/2016
DRAWN BY: JPB
SCALE: 1" = 100'



LEGEND:

- MONITORING WELL LOCATION
- MW5 MONITORING WELL ID
- 11.9 LEAD CONCENTRATION (mg/L)
- CURRENT WELL SITE
- FORMER WELL SITE
- 970411 WELL SERIAL NUMBER
- LEAD CONCENTRATION CONTOUR (mg/L)
- SALTWATER FLOW LINE

NOTES:

- AREA CALCULATIONS WERE BASED ON A BACKGROUND LEAD CONCENTRATION IN GROUNDWATER OF 0.015 PPM.
- ALL AE MONITORING WELLS, CURRENT WELL SITES AND SALTWATER FLOW LINES WERE SURVEYED ON MARCH 27–28, 2013 BY LOWE ENGINEERS, LLC.
- HET SOIL BORING AND MONITORING WELL COORDINATES WERE OBTAINED FROM THE SEPT. 3, 2013 EXPERT REPORT PREPARED BY HET.
- FORMER WELL SITE LOCATION COORDINATES WERE OBTAINED FROM THE LDNR SONRIS DATABASE.
- CONCENTRATIONS WERE TRUNCATED AT THREE DECIMAL PLACES.
- FOR SAMPLE LOCATIONS WITH MULTIPLE SAMPLE RESULTS AVAILABLE FOR THE SELECTED INTERVAL, THE HIGHEST OF THE SAMPLE RESULTS WAS USED TO CONTOUR.

TOTAL AFFECTED LAND AREA:

~8,853 SQ. FT.

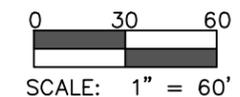


IMAGE SOURCE: 1971 AERIAL FROM US GEOLOGICAL SURVEY

Approach Environmental
 151 Freestate Blvd., Suite B
 Shreveport, Louisiana 71107
 Toll Free: (866) 674-1993 Fax: (318) 222-2425

SWEET LAKE LAND & OIL COMPANY, LLC

WELL SITE 64709
 E. BELL CITY FIELD – SECTION 34, TOWNSHIP 10S, RANGE 6W

**LEAD
 IN GROUNDWATER**

FIGURE
 NUMBER

DRAWN DATE: 2/23/2016
 DRAWN BY: JPB
 SCALE: 1" = 60'

Appendix X

Soil Areas and Volume Calculations

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Inteval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres	
0-2' Interval	EC	129734.00					
		722.97					
		310.22					
		2397.21					
		6876.60					
		14677.81					
		15928.30					
			170647.12	2	341294.24	12640.53	3.92
	ESP	39130.12					
		116997.52					
		3290.91					
			159418.54	2	318837.08	11808.78	3.66
	SAR	537630.84					
		1520.18					
-741.28							
-81.94							
-35.75							
-2763.32							
		535528.74	2	1071057.47	39668.80	12.29	
Benzene		3538.16	2	7076.33	262.09	0.08	
Meth Cl.		71358.05	2	142716.11	5285.78	1.64	
O&G		23185.00	2	46370.00	1717.41	0.53	
Salt Extent	562645.93						
	-95657.51						
	-2763.32						
	-81.94						
	-35.75						
	-375.04						
		463732.38	2	927464.752	34350.55	10.65	
Non-Salt Extent		95657.51	2	191315.02	7085.74	2.20	

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
2-4' Interval	EC	8690.96				
		6850.26				
		1712.13				
		224.50				
		298.48				
		87.55				
		12.15				
		17876.04	2	35752.07	1324.15	0.41
	ESP	166015.30				
		-2839.21				
		-1443.92				
883.27						
162615.44	2	325230.88	12045.59	3.73		
SAR	456071.0703					
	-1314.068					
	-723.4301					
	-45.1904					
	-35.0988					
	1588.7644					
455542.05	2	911084.09	33743.86	10.46		
Benzene	3538	2	7076	262.07	0.08	
Meth Cl.	40636.56					
	17565.23					
58201.80	2	116403.60	4311.24	1.34		
O&G	3961.97	2	7923.93	293.48	0.09	
Salt Extent	458192.82					
	2604.76					
	224.50					
	883.27					
	1588.76					
	301.66					
	-35.10					
	-1152.37					
	-63878.80					
398729.51	2	797459.03	29535.52	9.15		
Non-Salt Extent	63878.80	2	127757.60	4731.76	1.47	

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Inteval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
4-8' Interval	EC	33282.87				
		14418.00				
		11401.24				
		520.04				
		59622.15	4	238488.61	8832.91	1.37
	ESP	387642.70				
		-258.69				
		387384.01	4	1549536.03	57390.22	8.89
	SAR	476449.68				
		-320.06				
-152.67						
1843.20						
	478825.643	4	1915302.57	70937.13	10.99	
Salt Extent	539419.25					
	1005.49					
	1843.20					
	542267.93	4	2169071.74	80335.99	12.45	
4-6' Interval	Benz	39286.25	2	78572.49	2910.09	0.90
	Meth Cl.	87243.83	2	174487.67	6462.51	2.00
	O&G	13031.24	2	26062.47	965.28	0.30
	Non-Salt Extent	127168.30	2	254336.60	9419.87	2.92
6-8' Interval	Benz	24470.16	2	48940.33	1812.60	0.56
	Meth Cl.	9412.91	2	18825.82	697.25	0.22
	O&G	8575.41	2	17150.83	635.22	0.20
	Non-Salt Extent	38909.80	2	77819.60	2882.21	0.89

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres	
8-14' Interval	EC	106096.28					
		106096.28	6	636577.69	23576.95	2.44	
	ESP	948995.40 -97.64					
		948897.76	6	5693386.54	210866.17	21.78	
	SAR	670691.33 180.59					
		670871.93	6	4025231.55	149082.65	15.40	
	Salt Extent	948897.76 149.12 2880.12 4676.65					
956603.65		6	5739621.91	212578.59	21.96		
8-10' Interval	Benz	59495.60	2	118991.21	4407.08	1.37	
	Meth Cl.	100859.41	2	201718.83	7471.07	2.32	
	O&G	2594.33	2	5188.6568	192.17	0.06	
	Non-Salt Extent	137484.43	2	274968.862	10184.03	3.16	
10-12' Interval	Meth Cl.	35209.46	2	70418.912	2608.11	0.81	
	Non-Salt Extent	35209.46	2	70418.912	2608.11	0.81	
12-14' Interval	Meth Cl.	4243.88 4933.41					
		9177.2963	2	18354.5926	679.80	0.21	
	Non-Salt Extent	9177.30	2	18354.5926	679.80	0.21	

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
14-20' Interval	EC	247516.20				
		247516.20	6	1485097.18	55003.60	5.68
	ESP	786261.41				
		786261.41	6	4717568.48	174724.76	18.05
	SAR	167430.22 51670.40				
		219100.61	6	1314603.68	48689.03	5.03
	Salt Interval	786261.41 1134.26				
787395.67		6	4724374.03	174976.82	18.08	
20-30' Interval	EC	1870.52				
		1870.52	10	18705.25	692.79	0.04
	ESP	17551.05				
		17551.05	10	175510.48	6500.39	0.40
	SAR	7500.35				
		7500.35	10	75003.48	2777.91	0.17
	Salt Interval	17551.05 927.76				
18478.80		10	184788.05	6844.00	0.42	
24-26' Interval	Benz	12364.99	2	24729.973	915.92	0.28
	Selenium	1460.11	2	2920.2186	108.16	0.03
	Non-Salt Extent	12364.99	2	24729.973	915.92	0.28

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
26-28' Interval	Benz	11465.31	2	22930.6194	849.28	0.26
	Selenium	1044.58	2	2089.167	77.38	0.02
	Non-Salt Extent	11465.31	2	22930.6194	849.28	0.26
28-30' Interval	Benz	12244.48	2	24488.9652	907.00	0.28
	Non-Salt Extent	12244.48	2	24488.9652	907.00	0.28
30-40' Interval	EC	238.31				
		238.31	10	2383.05	88.26	0.01
	ESP	9382.24				
		9382.24	10	93822.38	3474.90	0.22
	Salt Interval	9382.24				
		9382.24	10	93822.38	3474.90	0.22
30-32' Interval	Benz	10265.59	2	20531.1702	760.41	0.24
	Arsenic	9965.50	2	19930.9924	738.18	0.23
	Non-Salt Extent	11177.60	2	22355.2084	827.97	0.26

SWD Tank Battery Area (34829/970411/970412) (HET Area 1)

Groundwater

Parameter	FT²	Acres
Chlorides (250 ppm background)	1510563.09 1510563.09	34.68
TDS (750 ppm background)	1510563.09 1510563.09	34.68
TPH-DRO	1099720.12 -1207.0164 -303.02 1098210.08	25.21
TPH-GRO	21910.79	0.50
TPH-ORO	288246.90	6.62
Barium (0.20 ppm background)	1390269.73 1390269.73	31.92
Arsenic (0.01 ppm background)	333960.00 81646.98 415606.98	9.54
Tota Affected Area	1510563.09	34.68

WELL SITES 67773/66878 (C-5, 5-D) (HET Area 2)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
0-2' Interval	EC	2353.13				
		5024.03				
		7377.16	2	14754.32	546.46	0.17
	ESP	37.80				
		6429.58				
		7050.83	2	14101.67	522.28	0.16
	SAR	28191.56				
		779.10				
		28970.66	2	57941.31	2145.97	0.67
	Meth Cl.	1116.44	2	2232.89	82.70	0.03
O&G	7622.49	2	15244.97	564.63	0.17	
Barium	3232.16	2	6464.33	239.42	0.07	
Salt Extent	30480.53					
	2493.94					
	-1674.36					
	-3790.39					
	27509.73	2	55019.4532	2037.76	0.63	
Non-Salt Extent	10847.25	2	21694.51	803.50	0.25	

WELL SITES 67773/66878 (C-5, 5-D) (HET Area 2)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
2-4' Interval	EC	2445.41				
		2445.41	2	4890.82	181.14	0.06
	ESP	20254.21				
		20254.21	2	40508.41	1500.31	0.46
	SAR	49761.89				
		49761.89	2	99523.79	3686.07	1.14
	Benzene	29017.88	2	58035.754	2149.47	0.67
	Meth Cl.	28233.80				
		28233.80	2	56467.60	2091.39	0.65
	1,2-Dichloroethane	11852.76	2	23705.5152	877.98	0.27
	O&G	5412.37				
		1985.80				
		7398.17	2	14796.34	548.01	0.17
	Barium	8321.06	2	16642.11	616.37	0.19
Salt Extent	6074.30					
	3809.71					
	4382.48					
	14266.49	2	28532.99	1056.78	0.33	
Non-Salt Extent	43875.80	2	87751.60	3250.06	1.01	
4-8' Interval	ESP	18667.08				
		18667.08	4	74668.34	2765.49	0.43
	SAR	35523.75				
		35523.75	4	142094.98	5262.78	0.82
	Salt Extent	35523.75				
5252.02						
	40775.77	4	163103.08	6040.85	0.94	

WELL SITES 67773/66878 (C-5, 5-D) (HET Area 2)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
4-6' Interval	Benz	5545.91	2	11091.82	410.81	0.13
	Meth Cl.	4188.42	2	8376.84	310.25	0.10
	O&G	12790.21 3643.98				
		16434.20	2	32868.40	1217.35	0.38
	Non-Salt Extent	22531.99	2	45063.99	1669.04	0.52
6-8' Interval	Benz	9774.31	2	19548.62	724.02	0.22
	Meth Cl.	7650.80	2	15301.60	566.73	0.18
	Non-Salt Extent	9837.21	2	19674.41	728.68	0.23
8-14' Interval	ESP	9402.71				
		9402.71	6	56416.24	2089.49	0.22
	SAR	18783.00				
		18783.00	6	112697.98	4174.00	0.43
	Salt Extent	18783.00 3136.47				
	21919.47	6	131516.80	4870.99	0.50	
8-10' Interval	Benz	15817.37	2	31634.7422	1171.66	0.36
	Meth Cl.	46802.55	2	93605.10	3466.86	1.07
	O&G	3677.70	2	7355.398	272.42	0.08
	Non-Salt Extent	47592.47	2	95184.9432	3525.37	1.09

WELL SITES 67773/66878 (C-5, 5-D) (HET Area 2)

Depth Interval	Parameter	FT²	Vertical Depth	FT³	Yd³	Acres
10-12' Interval	Benz	5875.21	2	11750.4286	435.20	0.13
	Meth Cl.	5661.00	2	11322.0036	419.33	0.13
	O&G	1929.20	2	3858.4034	142.90	0.04
	Non-Salt Extent	7823.63	2	15647.266	579.53	0.18
12-14' Interval	O&G	420.56	2	841.121	31.15	0.01
	Non-Salt Extent	420.56	2	841.121	31.15	0.01

WELL SITES 67773/66878 (C-5, 5-D) (HET Area 2)

Groundwater

Parameter	FT²	Acres
Chloride (250 ppm background)	71460.11	
	71460.11	1.64
TDS (750 ppm background)	71467.77	
	71467.77	1.64
Benzene	19536.25	
	19536.25	0.45
TPH-DRO	64350.86	1.48
TPH-GRO	17958.30	0.41
Barium (0.20 ppm background)	69425.89	1.59
Total Affected Area	71467.77	1.64

WELL SITE 64709 (C-3) (HET Area 3)

Depth Interval	Parameter	FT²	Vertical Depth	FT³	Yd³	Acres	
0-2' Interval	EC	1812.48 1841.67					
		3654.14	2	7308.29	270.68	0.08	
	ESP	1552.88 85.38					
		1638.26	2	3276.52	121.35	0.04	
	SAR	8742.83 -702.63					
		8040.20	2	16080.39	595.57	0.18	
	Salt Extent	8040.20 183.73 49.68					
8273.60		2	16547.2064	612.86	0.19		
2-4' Interval	EC	280.29					
		280.29	2	560.58	20.76	0.01	
	ESP	697.17					
		697.17	2	1394.34	51.64	0.02	
	SAR	7441.73 680.47 537.30					
		8659.50	2	17319.01	641.44	0.20	
	Salt Extent	8659.50 497.75					
9157.25		2	18314.50	678.31	0.21		

WELL SITE 64709 (C-3) (HET Area 3)

Depth Interval	Parameter	FT²	Vertical Depth	FT³	Yd³	Acres
4-8' Interval	ESP	1069.04				
		1069.04	4	4276.16	158.38	0.02
	SAR	155.47				
		155.47	4	621.90	23.03	0.00
	Salt Extent	1314.97				
		1314.97	4	5259.89	194.81	0.03
8-14' Interval	ESP	4401.08				
		4401.08	6	26406.50	978.02	0.10
	Salt Extent	4401.08				
		4401.08	6	26406.50	978.02	0.10

WELL SITE 64709 (C-3) (HET Area 3)

Groundwater

Parameter	FT²	Acres
Chloride (250 ppm background)	60200.75	
	60200.75	1.38
TDS (750 ppm background)	60200.75	
	60200.75	1.38
TPH-DRO	56862.37	1.31
Barium (0.20 ppm background)	60200.75	1.38
Lead (0.015 ppm background)	4355.06	
	4498.04	
	8853.10	0.20
Total Affected Area	60200.75	1.38

WELL SITE 63282 (C-2) (HET Area 4)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
0-2' Interval	EC	6116.86				
		6116.86	2	12233.72	453.10	0.14
	ESP	3740.55				
		3740.55	2	7481.10	277.08	0.09
	SAR	11707.53				
		11707.53	2	23415.07	867.22	0.27
Salt Extent	11707.53 830.33					
	12537.86	2	25075.719	928.73	0.29	
2-4' Interval	EC	243.43				
		243.43	2	486.86	18.03	0.01
	SAR	12565.68				
		12565.68	2	25131.36	930.79	0.29
	Salt Extent	12565.68				
		12565.68	2	25131.36	930.79	0.29
4-6' Interval	SAR	1256.64				
		1256.64	2	2513.27	93.08	0.03
	Salt Extent	1256.64				
		1256.64	2	2513.27	93.08	0.03

WELL SITES 68920 (C-7) (HET Area 5)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres
0-2' Interval	EC	507.06				
		507.06	2	1014.12	37.56	0.01
	ESP	7018.10				
		7018.10	2	14036.21	519.86	0.16
	SAR	13476.69				
		13476.69	2	26953.37	998.27	0.31
	Benzene	3701.11	2	7402.22	274.16	0.08
	O&G	3286.16	2	6572.31	243.42	0.08
	Arsenic	11420.68	2	22841.37	845.98	0.26
	Salt Extent	1648.04				
2590.49						
424.11						
-211.72						
	4450.92	2	8901.839	329.70	0.10	
Non-Salt Extent	17259.46	2	34518.91	1278.48	0.40	
2-4' Interval	Benzene	3701.11	2	7402.2206	274.16	0.08
	Meth Cl.	2254.89	2	4509.77	167.03	0.05
	Non-Salt Extent	5956.00	2	11911.99	441.18	0.14
4-6' Interval	Benz	1049.44	2	2098.89	77.74	0.02
	Non-Salt Extent	1049.44	2	2098.89	77.74	0.02

WELL SITE 68920 (C-7) (HET Area 5)

Groundwater

Parameter	FT²	Acres
Chloride (250 ppm background)	16112.06	
	16112.06	0.37
TDS (750 ppm background)	16112.06	
	16112.06	0.37
TPH-DRO	15900.70	0.37
Barium (0.2 ppm background)	16112.06	0.37
Arsenic (0.01 ppm background)	9583.78	0.22
Total Affected Area	16112.06	0.37

WELL SITE 216967 (C-9) (HET Area 6)

Depth Interval	Parameter	FT ²	Vertical Depth	FT ³	Yd ³	Acres	
0-2' Interval	EC	137.87					
		137.87	2	275.74	10.21	0.00	
	ESP	1514.30					
		581.96					
		113.96					
			2210.21	2	4420.43	163.72	0.05
	SAR	798.96					
		2660.21					
		79.87					
			3539.03	2	7078.06	262.15	0.08
	Barium	1256.64					
		1256.64	2	2513.27	93.08	0.03	
Salt Extent	798.96						
	2660.21						
	79.87						
	1514.30						
		5053.33	2	10106.6536	374.32	0.12	
Non-Salt Extent	1256.64						
	1256.64	2	2513.27	93.08	0.03		
2-4' Interval	ESP	76.19					
		76.19	2	152.38	5.64	0.00	
	Salt Extent	76.19					
		76.19	2	152.38	5.64	0.00	
4-6' Interval	ESP	2211.53					
		2211.53	2	4423.06	163.82	0.05	
	Salt Extent	2211.53					
		2211.53	2	4423.06	163.82	0.05	

WELL SITE 216967 (C-9) (HET Area 6)

Groundwater

Parameter	FT²	Acres
Chloride (250 ppm background)	33057.08	0.76
TDS (750 ppm background)	33536.08	0.77
TPH-DRO	24847.60	0.57
Barium (0.2 ppm background)	37775.38	0.87
Total Affected Area	37911.63	0.87