



Facility Closure Investigation and Environmental Summary

Wardlaw 20-28 Wellhead

ECMC Remediation Project #20882

Weld County, Colorado

Attachments:

Figure 1 – General Location Map

Figure 2 – Wellhead Soil Sample and Field Screening Locations

Table 1 – Soil Sample and Field Screening Location Information

Table 2 – Soil Analytical Results Summary Table – Volatile Organics

Table 3 – Soil Analytical Results Summary Table – PAHs

Table 4 – Soil Analytical Results Summary Table – Soil Suitability

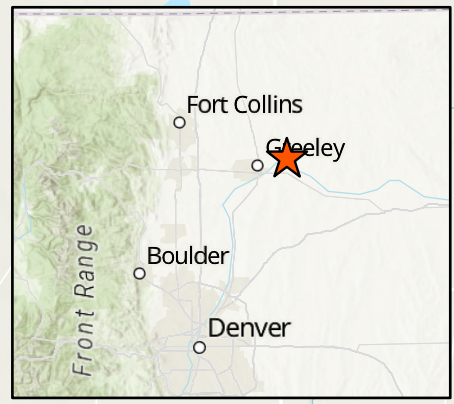
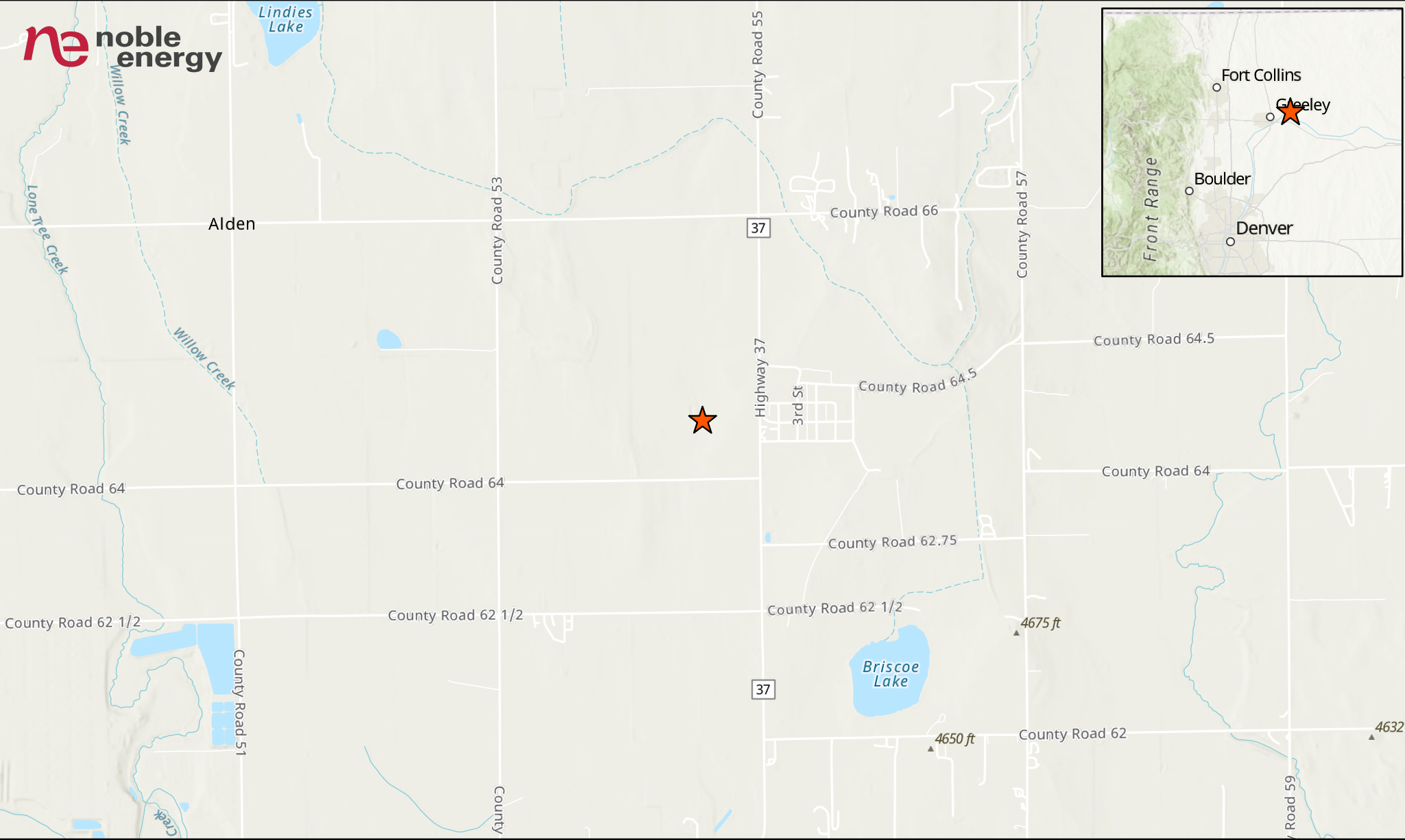
Table 5 – Soil Analytical Results Summary Table – Metals

Attachment A: Photographic Log

Attachment B: Facility Closure Checklists

FIGURES

Lindies Lake



LEGEND

 Site Location

 Miles
 1 inch = 0.5 Mile



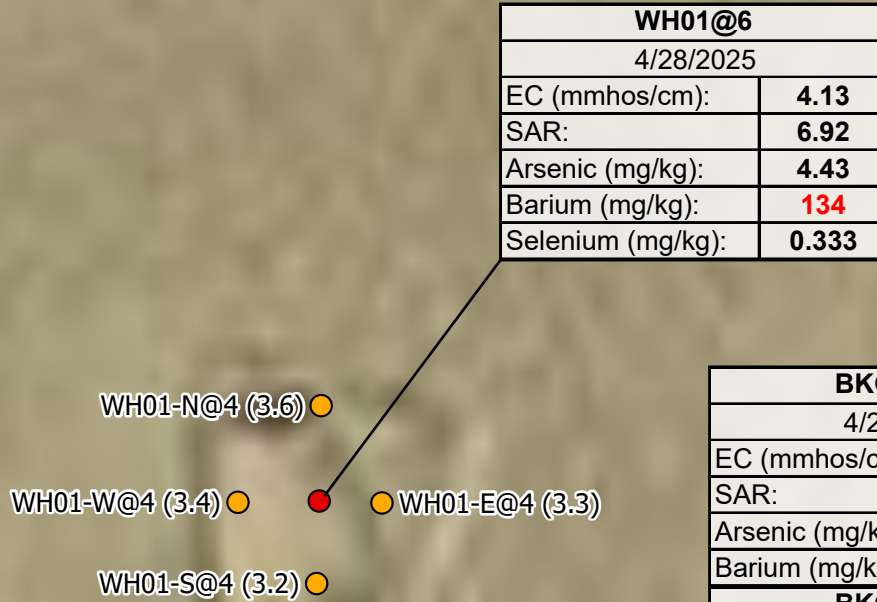
Project No:	025-286
Map By:	JW
Date:	06/12/2025

**WARDLAW 20-28 WELLHEAD
 GENERAL LOCATION MAP**
 NOBLE ENERGY
 SE 1/4 SE 1/4 SECTION 28
 T6N R64W, 6TH PM
 WELD COUNTY, COLORADO


ENTRADA
 CONSULTING GROUP

610 Garrison St., Unit T
 Lakewood, CO 80215
 303.378.4036

Figure
1



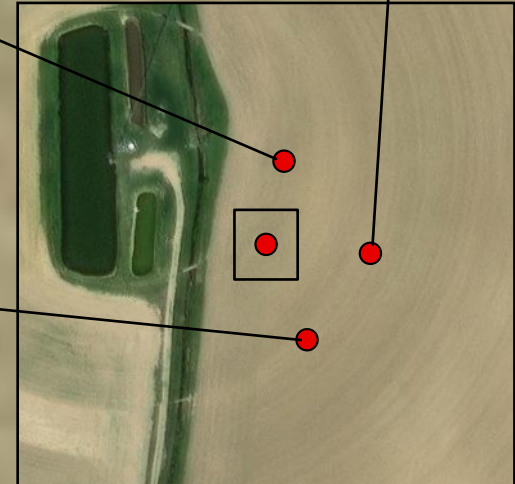
WH01@6	
4/28/2025	
EC (mmhos/cm):	4.13
SAR:	6.92
Arsenic (mg/kg):	4.43
Barium (mg/kg):	134
Selenium (mg/kg):	0.333

BKG01@4	
4/28/2025	
EC (mmhos/cm):	7.36
SAR:	7.25
Arsenic (mg/kg):	5.65
Barium (mg/kg):	93.1

BKG01@6	
4/28/2025	
EC (mmhos/cm):	7.16
SAR:	10.4
Boron (mg/L):	2.02
Arsenic (mg/kg):	5.80
Selenium (mg/kg):	0.324

BKG03@4	
4/28/2025	
EC (mmhos/cm):	6.62
Arsenic (mg/kg):	3.85
Barium (mg/kg):	85.5
BKG03@6	
4/28/2025	
EC (mmhos/cm):	7.13
SAR:	7.46
Arsenic (mg/kg):	3.61
Barium (mg/kg):	97.0

BKG02@4	
4/28/2025	
EC (mmhos/cm):	4.81
Arsenic (mg/kg):	4.42
Barium (mg/kg):	87.4
Selenium (mg/kg):	0.370
BKG02@6	
4/28/2025	
EC (mmhos/cm):	4.84
Arsenic (mg/kg):	4.72
Selenium (mg/kg):	0.274



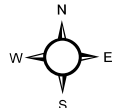
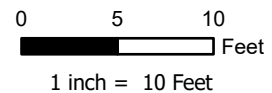
LABEL LEGEND
 XXXX@X: SAMPLE NAME @ DEPTH IN FEET
 WH: WELLHEAD SAMPLE
 BKG: BACKGROUND SAMPLE
 EC: ELECTRICAL CONDUCTIVITY
 SAR: SODIUM ADSORPTION RATIO
BOLD: ABOVE ECMC TABLE 915-1 STANDARDS
BOLD: ABOVE ECMC TABLE 915-1 GWSSL, REPRESENTATIVE OF BACKGROUND LEVELS

Legend

- Soil Sample
- Screening Location

NOTES:

- Sample Label (PID Result in ppm)
- ppm = parts per million
- PID = photoionization detector



Project No: 025-286
 Map By: JW
 Date: 06/12/2025

WARDLAW 20-28 WELLHEAD
SOIL SAMPLE AND FIELD SCREENING LOCATIONS
 NOBLE ENERGY
 SE 1/4 SE 1/4 SECTION 28
 T6N R64W, 6TH PM
 WELD COUNTY, COLORADO



610 Garrison St., Unit T
 Lakewood, CO 80215
 303.378.4036

Figure
 2

TABLES

TABLE 1
FIELD DATA SUMMARY TABLE
NOBLE 100322
WARDLAW 20-28 WELLHEAD, WELD COUNTY, COLORADO
REM # 20882

Sample ID	Sample Date	Depth (ft-bgs)	GPS Data Latitude/Longitude		VOC Concentration (ppm)
WH01@6	4/28/2025	6	40.453134	-104.549900	3.5
WH01-N@4	4/28/2025	4	40.453148	-104.549900	3.6
WH01-E@4	4/28/2025	4	40.453134	-104.549888	3.3
WH01-W@4	4/28/2025	4	40.453134	-104.549915	3.4
WH01-S@4	4/28/2025	4	40.453123	-104.549901	3.2
BKG01@4	4/28/2025	4	40.453100	-104.549410	3.0
BKG01@6	4/28/2025	6	40.453100	-104.549410	3.9
BKG02@4	4/28/2025	4	40.452792	-104.549712	6.0
BKG02@6	4/28/2025	6	40.452792	-104.549712	7.0
BKG03@4	4/28/2025	4	40.453430	-104.549813	9.6
BKG03@6	4/28/2025	6	40.453430	-104.549813	6.3

1. Global Positioning System (GPS) data is provided in decimal degrees using North American Datum (NAD) 83 UTMZone 13 North.
 2. Volatile organic compound (VOC) concentrations are measured in the field using a photoionization detector (PID).
- ppm - Parts per million
ft-bgs - feet below ground surface

TABLE 2
SUMMARY OF VOLATILE ORGANIC SOIL CHEMISTRY DATA
NOBLE 100322
WARDLAW 20-28 WELLHEAD, WELD COUNTY, COLORADO
REM # 20882

Sample ID	Sample Date	Depth (ft-bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	1,2,4-Trimethyl-Benzene (mg/kg)	1,3,5-Trimethyl-Benzene (mg/kg)	Naphthalene (mg/kg)	TPH (mg/kg)	TPH GRO (mg/kg)	TPH DRO (mg/kg)	TPH ORO (mg/kg)
ECMC Table 915-1 Limits (Residential SSL)			1.2	490	5.8	58	30	27	2	500	500**		
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.0026	0.69	0.78	9.9	0.0081	0.0087	0.0038	500	500**		
WH01@6	4/28/2025	6	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.002	<125.200	<0.200	<25.0	<100

1. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit

2. ** Summation of GRO+DRO+ORO must be less than 500 mg/kg

TPH-GRO = Total petroleum hydrocarbons - gasoline range organics

TPH-DRO = Total petroleum hydrocarbons - diesel range organics

TPH-ORO = Total petroleum hydrocarbons - oil range organics

ft-bgs - feet below ground surface

mg/kg - milligrams per kilogram

TABLE 3
SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON SOIL CHEMISTRY DATA
NOBLE 100322
WARDLAW 20-28 WELLHEAD, WELD COUNTY, COLORADO
REM # 20882

Sample ID	Sample Date	Depth (ft-bgs)	Acenaphthene (mg/kg)	Anthracene (mg/kg)	Benzo (a) Anthracene (mg/kg)	Benzo (a) Pyrene (mg/kg)	Benzo (b) Fluoranthene (mg/kg)	Benzo (k) Fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo (a,h) Anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno (1,2,3-cd) Pyrene (mg/kg)	Pyrene (mg/kg)	1-Methyl - Naphthalene (mg/kg)	2-Methyl- Naphthalene (mg/kg)
ECMC Table 915-1 Limits (Residential SSL)			360	1800	1.1	0.11	1.1	11	110	0.11	240	240	1.1	180	18	24
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.55	5.8	0.011	0.24	0.3	2.9	9	0.096	8.9	0.54	0.98	1.3	0.006	0.019
WH01@6	4/28/2025	6	<0.020	<0.020	<0.005	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.002	<0.002

1. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit
ft-bgs - feet below ground surface
mg/kg - milligrams per kilogram

TABLE 4
SUMMARY OF SOIL SUITABILITY FOR RECLAMATION
NOBLE 100322
WARDLAW 20-28 WELLHEAD, WELD COUNTY, COLORADO
REM # 20882

Sample ID	Sample Date	Depth (ft-bgs)	pH (Standard Units)	EC (mmhos/cm)	SAR (Standard Units)	Boron (mg/L)
ECMC Table 915-1 Soil Suitability Limits			6 - 8.3	<4	<6	2
WH01@6	4/28/2025	6	8.28	4.13	6.92	0.880
BKG01@4	4/28/2025	4	8.17	7.36	7.25	1.60
BKG01@6	4/28/2025	6	8.25	7.16	10.4	2.02
BKG02@4	4/28/2025	4	8.03	4.81	2.96	1.49
BKG02@6	4/28/2025	6	8.04	4.84	4.58	1.22
BKG03@4	4/28/2025	4	8.13	6.62	5.63	1.45
BKG03@6	4/28/2025	6	8.09	7.13	7.46	1.21
Maximum Background Concentration			8.25	7.36	10.4	2.02

1. **Bold** faced values exceed the ECMC Table 915-1 limit(s), but are within background concentrations.

2. Brown highlighted soil analytical values indicate a regulatory exceedance.

ft-bgs - feet below ground surface

EC - Electrical Conductivity

SAR - Sodium adsorption ratio

mmhos/cm - millimhos per centimeter

mg/L - milligrams per liter

TABLE 5
SUMMARY OF METALS IN SOIL CHEMISTRY DATA
NOBLE 100322
WARDLAW 20-28 WELLHEAD, WELD COUNTY, COLORADO
REM # 20882

Sample ID	Sample Date	Depth (ft-bgs)	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
ECMC Table 915-1 Limits (Residential SSL)			0.68	15000	71	0.3	3100	400	1500	390	390	23000
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
WH01@6	4/28/2025	6	4.43	134	<0.367	<0.20*	<44.4	<13.5	<25.1	0.333	<0.772	<357
BKG01@4	4/28/2025	4	5.65	93.1	<0.363	<0.20*	<43.9	<13.4	<24.8	<0.248	<0.764	<353
BKG01@6	4/28/2025	6	5.80	74.5	<0.331	<0.20*	<40.0	<12.2	<22.6	0.324	<0.696	<322
BKG02@4	4/28/2025	4	4.42	87.4	<0.318	<0.20*	<38.5	<11.7	<21.7	0.370	<0.669	<309
BKG02@6	4/28/2025	6	4.72	81.2	<0.356	<0.20*	<43.1	<13.1	<24.4	0.274	<0.750	<347
BKG03@4	4/28/2025	4	3.85	85.5	<0.351	<0.20*	<42.5	<12.9	<24.0	<0.240	<0.739	<342
BKG03@6	4/28/2025	6	3.61	97.0	<0.362	<0.20*	<43.8	<13.3	<24.8	<0.248	<0.762	<353
Maximum Background Concentration X 1.25			7.25	121	-	-	-	-	-	0.463	-	-

1. **Bold** faced values exceed the ECMC Table 915-1 limit(s), but are within 1.25x background concentrations.
 2. **Red** faced values exceed the ECMC Table 915-1 limit(s)
 3. Red & blue highlighted soil analytical values indicate an exceedance of the referenced soil screening level (SSL)
 4. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit
- * Indicates laboratory reporting or minimum detection limit in excess of SSL
ft-bgs - feet below ground surface
mg/kg - milligrams per kilogram

**ATTACHMENT A
PHOTOGRAPHIC LOG**

Wardlaw 20-28 Wellhead Photographic Log



Wardlaw 20-28 Wellhead Photographic Log



Wardlaw 20-28 Wellhead Photographic Log



**ATTACHMENT B
FACILITY CLOSURE CHECKLISTS**

Wellhead Closure Checklist

COGCC Rule 911.a.(4) Environmental Site Closure Assessment Field Form

Additional attachments (optional):		Pit Closure		Tank Battery Closure		Flowline Closure		Partially Buried Vault Closure
------------------------------------	--	-------------	--	----------------------	--	------------------	--	--------------------------------

Site Name & COGCC Facility Number: WARDLAW 20-28, 274275	Date: 4/28/2025	Remediation Project #: 20882
Associated Wells: N/A	Age of Site: 12/30/2004 - spud date	Number of Photos Attached: 3
Location: (GPS coordinates of wellhead or southeastern most wellhead for multiple) 40.453131 / -104.549878		Estimated Facility Size (acres): ~0.01

General Condition of Site: (General observations regarding housekeeping, corrosion, waste management, etc.)

Overall good.

USCS Soil Type: Clayey Sands (SC) Estimated Depth to Groundwater: Unknown as none encountered

Hydrocarbon Impacted Soils / Spills: (Note estimated size and if impact appears to be surficial or extends to an unknown depth)

None observed or encountered

Salt Crusted Soils or Impacted Vegetation: (Note estimated size and if impact appears to be surficial or extends to an unknown depth)

None observed or encountered

Wellhead(s)

Well API	05-123-22511					
Age	12/30/2004 - spud date					
Condition of surface around wellhead	Good					
PID Readings	3.2 - 3.6 PPM					
Condition of subsurface (staining present)	GOOD					
PID Readings	3.5 PPM					
Sample taken? Location/Sample ID#	WH01@6					
Photo Number(s)	1-3					

Other observations regarding wellheads:

Summary

Was impacted soil identified?
 No Yes - less than 10 cubic yards Yes - more than 10 cubic yards

Total number of samples field screened: 5 Total number of samples collected: 5

Highest PID Reading: 3.6 PPM Total number of samples submitted to lab for analysis: 1

If more than 10 cubic yards of impacted soil were observed:

Vertical extent: Estimated spill volume:

Lateral extent: Volume of soil removed:

Is additional investigation required?

Was groundwater encountered during the investigation?
 No Yes - not impacted or in contact with impacted soils Yes - groundwater impacted and/or in contact with impacted soils

Measured depth to groundwater: Was remedial groundwater removal conducted? Yes No

Date Groundwater was encountered: Commencement date of removal:

Sheen on groundwater? Yes No Volume of groundwater removed prior to sampling:

Free product observed? Yes No Volume of groundwater removed post sampling:

Total number of samples collected: Total Volume of groundwater removed:

Total number of samples submitted to lab for analysis: