



Cathodic Protection
Final Construction Report



Crude Helium P/L
Cimarron, KS

Project Manager:
Rusty Gann

Construction Completed:
December 29th, 2016

Reviewed By:
Rusty Gann



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I. Overview

a. Scope of Work

i. Appendix A – Summary

Deep Anode Groundbed Installation

- The groundbed hole will be 8 inches in diameter and 200 feet deep.
- The hole will be a “below ground completion”.
- Twenty (20) feet of SDR 26 surface casing will be cemented in place per KCC requirements. Additional casing maybe required in some geographical areas.
- Ten (10) 2660Z Anotec High Silicon Cast Iron Tubular anodes will be utilized with a calculated capacity of 22 amps for 30 years.
- Anode lead wires will be #8 dual extruded HMWPE/Halar leads terminated in a 10 circuit fiberglass junction box mounted below the rectifier.
- A 1” vent will be installed & manufactured by Loresco in the coke column. The remainder from the top of the coke column to surface will be standard schedule 40 PVC pipe terminated at the rectifier.
- Loresco SWS Coke will be utilized for the anode backfill top loaded from the bottom of the hole to 20’ above the top anode.
- Drill fluid and cuttings will be contained above ground. A muddy puppy will contain the fluids and a roll-off box will be utilized to contain the solids.
- An approved KCC disposal service will be utilized to remove any drill spoils from the groundbed if required. Documentation will be provided to BLM for all disposal transactions.
- MESA will clean up and return the work site as close to the same condition as before work began.
- MESA will supply potable water for drilling. Water from creeks, ponds, or lakes is prohibited.
- A driller’s log shall be maintained during drilling operations and submitted to BLM in MESA’s final report. The log shall contain soil type information for each five or ten foot increment of drilling.
- Prior to loading anodes into the hole, an electrical log shall be performed to determining final anode placement. Readings will be taken at 5 foot intervals. The log shall be provided to BLM in the final report.



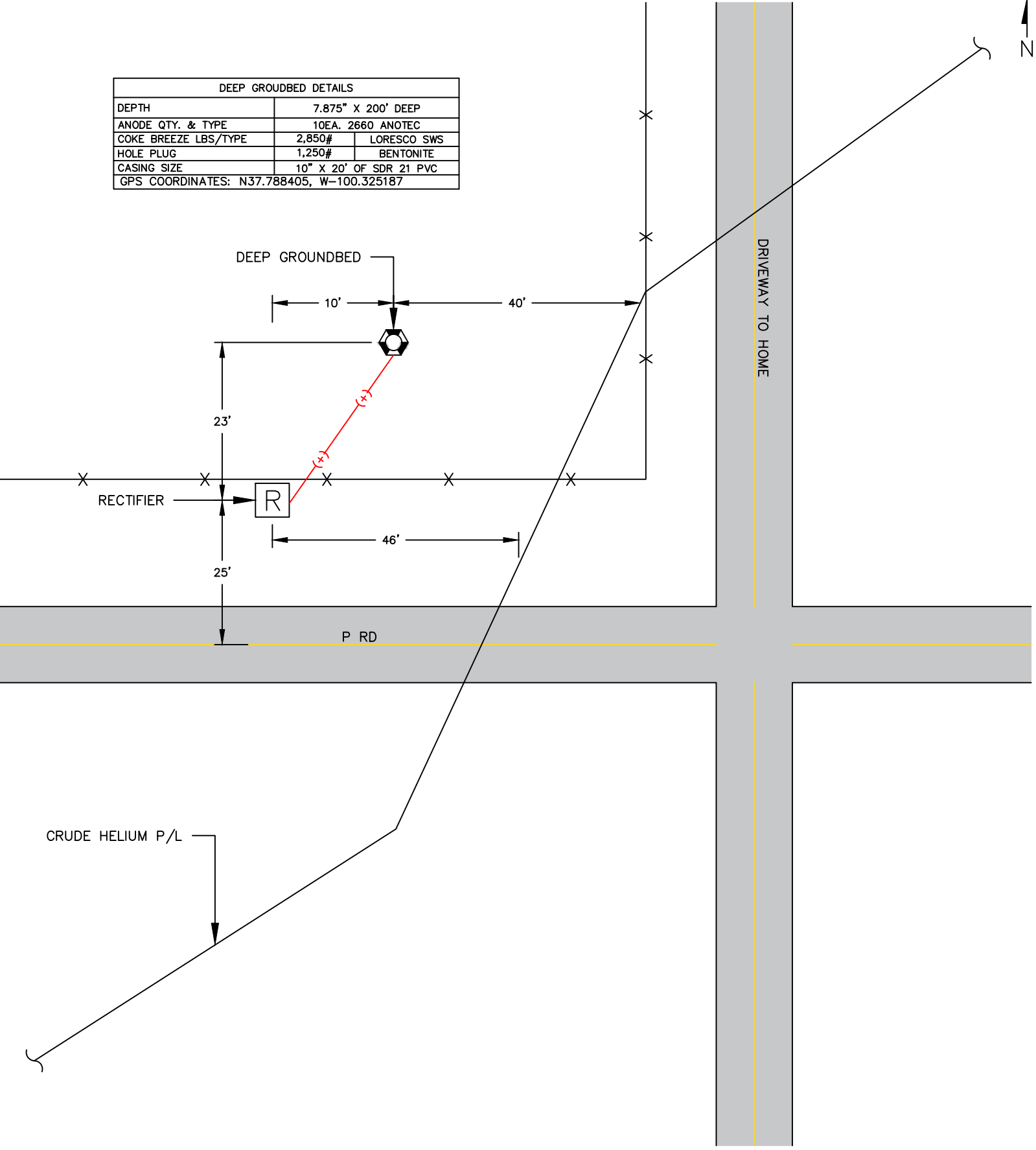
The following Materials were used:

Materials	
Description	Quantity Unit
#2 HMWPE Stranded Black	50 Feet
#8 Halar Stranded Black (Anode Lead)	1,850 Feet
1" Loresco All-Vent Pipe	120 Feet
1" Schedule 40 PVC Pipe	140 Feet
8" Schedule 40 PVC Cap	1 Each
8" Schedule 40 PVC Pipe	20 Feet
Anotec 2660 Cast Iron (LL=230,CC=10)	10 Each
10 Circuit Fiberglass Junction Box	1 Each
Loresco SWS (50# Bag)	57 Each
Miscellaneous Supplies	1 Each
Pure Gold Med Chips (50# Bag)	38 Each

MESA Scope of Work:

1. Provided all labor, materials and equipment to install the Deep Groundbed per the specifications described above.
2. Work (6) day weeks - 10 hours/day schedules.
3. Came equipped with all necessary safety equipment.

DEEP GROUNDBED DETAILS	
DEPTH	7.875" X 200' DEEP
ANODE QTY. & TYPE	10EA. 2660 ANOTEC
COKE BREEZE LBS/TYPE	2,850# LORESCO SWS
HOLE PLUG	1,250# BENTONITE
CASING SIZE	10" X 20' OF SDR 21 PVC
GPS COORDINATES: N37.788405, W-100.325187	



NOTES:

REV	DESCRIPTION	DATE	BY	CHK
REVISION				

MESA

TULSA, OK | Dallas-Ft. Worth, TX | Houston, TX | Tallahassee, FL | Wapakoneta, OH

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CLIENT NAME & ADDRESS:
BUREAU OF LAND MANAGEMENT
 801 S. FILLMORE ST
 AMARILLO, TX 79101

DESCRIPTION: CATHODIC PROTECTION LAYOUT DEEP GROUNDBED INSTALLATION CRUDE HELIUM P/L			
KS	CIMMARON	GRAY	
JOB NO.: 10-16-6736	SCALE: DO NOT SCALE	SHEET: 1 OF 1	
DRAWN BY: LW/WM	DRAWN DATE: 01/17/17	CHK'D BY: RG	CHK'D DATE: 01/17/17
DWG NO.: BLM-06092-0			REV: 0

CONSTRUCTION RECTIFIER REPORT



1. CLIENT INFORMATION:

Client	BLM	Job Number	10-16-6736
Facility	CRUDE HELIUM P/L CIMMARON	Calibrated Instrument	FLUKE-177
County	GRAY	State	KS
		Serial No.	97001156

2. RECTIFIER INFORMATION:

New Rectifier Existing Rectifier

Manufacturer	UNIVERSAL	Rectifier ID Number	23		
Model No.	ASAI	Power Vendor	VICTORY ETC CORP		
Serial No.	131618	Acct #	N/A	KWH Meter #	6039776F
		KWH Reading	04083		
DC Volts	30	AC Volts	115/230	Max Coarse	3
		Shunt Amp	15		
DC Amps	15	AC Amps	5.5/2.8	Max Fine	6
		Shunt mV	50		
GPS Coordinates	Latitude	N	Longitude	W	
RMU Type	N/A	Serial Number	N/A		

3. PRE-ENERGIZED CHECK LIST:

12 Lead Installed with Negative

Potentials (Volts - Fixed Reference Cell Method)				Potential Difference Neg. Cable vs. Structure			
Positive	0.215	Negative	-0.732	Structure	-0.633	DC Volts	

4. GROUND BED TYPE:

Conventional	<input type="checkbox"/>	Replacement	<input type="checkbox"/>	New	<input type="checkbox"/>
Deep Well	<input checked="" type="checkbox"/>	Replacement	<input type="checkbox"/>	New	<input checked="" type="checkbox"/>
HDD	<input type="checkbox"/>	Replacement	<input type="checkbox"/>	New	<input type="checkbox"/>
LINEAR	<input type="checkbox"/>	Replacement	<input type="checkbox"/>	New	<input type="checkbox"/>
MESH	<input type="checkbox"/>	Replacement	<input type="checkbox"/>	New	<input type="checkbox"/>

5. ENERGIZED INFORMATION:

No AC Power

Coarse Tap Setting	1	of	3	AC Volts	248	DC Volts	-4.99	DC Amps	4.05
Fine Tap Setting	3	of	6	AC Amps	2.80	DC mV	13.50	Structure PS	-887.000
Calculated Ground Bed Resistance				-1.23	Calculated Rectifier Efficiency				

6. JUNCTION BOX INFORMATION:

Anode Junction Box						Comments	
Cir.	Amp	Cir.	Amp	Cir.	Amp		
1	5.50	11		21			
2	2.60	12		22			
3	1.50	13		23			
4	1.20	14		24			
5	1.60	15		25			
6	5.30	16		26			
7	4.80	17		27			
8	4.30	18		28			
9	7.70	19		29			
10	4.60	20		30			
Shunt		mV	Amp				39.10

Remarks: _____

Technician/Foreman _____ WESLEY MORRISON _____ Date _____ 12/29/2016 _____



Job No. 10-16-6736
 Client BUREAU OF LAND MANAGEMENT
 Location CRUDE HELIUM P/L CIMARRON, KS

PO/WO No. _____ Date 12/28/2016
 Drilling Co.: DARLING DRILLING CO.
 GPS: Lat: 37.788405 Long: -100.325187

Calibrated Instrument Used: FLUKE-177 S/N 97001156

Depth	Logging Volts: 14.16		Geological Log	Depth	Logging Volts: 14.16		Geological Log	No.	Depth	No Coke	With Coke	
	Amps	Ohms			Amps	Ohms						
5			0-3 TOP SOIL	205			BLACK SHALE	1	190	1.40	3.70	
10			3-10 BROWN CLAY	210				2	180	0.80	3.60	
15				215				3	170	0.60	2.90	
20			10-19 MED.-COURSE SAND	220				4	160	0.60	3.60	
25				225				5	150	1.70	3.10	
30				230				6	140	1.90	4.40	
35			19-35 TAN CLAYFINE	235				7	130	1.70	4.70	
40			SAND MIX	240				8	120	1.50	4.60	
45				245				9	110	2.20	4.60	
50	1.00			250				10	100	1.30	3.90	
55	1.20		35-55 FINE SAND	255				11				
60	1.20			260				12				
65	1.10			265				13				
70	1.80			270				14				
75	1.40			275				15				
80	1.30			280				16				
85	0.90			285				17				
90	1.00			290				18				
95	1.30			295				19				
100	1.30		55-100 TAN CLAY, CALICHE	300				20				
105	1.90		FINE SAND W/ STRKS OF	305				21				
110	2.20		SAND	310				22				
115	1.80			315				23				
120	1.50			320				24				
125	1.30			325				25				
130	1.70			330				26				
135	1.90			335				27				
140	1.90		100-140 TAN CLAY	340				28				
145	1.90			345				29				
150	1.70			350				30				
155	0.70			355				31				
160	0.60			360				32				
165	0.60			365				33				
170	0.60			370				34				
175	0.80			375				35				
180	0.80			380				36				
185	1.50			385				37				
190	1.40		140-190 MED. COURSE	390					Volts	14.16	14.16	
195	1.40		GRAVEL W/STRKS TAN CLAY	395					Amps	13.70	39.10	
200	1.30	10.89	190-201 DARK BROWNISH	400					Ohms	1.03	0.36	
Hole Dia.:		7.875"	Total Depth:		200'		Casing Feet:	20'	Dia.:	10"	Type:	SDR-21 PVC
No. Anodes:		10	Size and Type:		2660 ANOTEC		Anode Lead:		Size:	#8	Type:	HALAR
Lbs. Coke:		2,850#	Coke Type:		LORESCO SWS		Top of Coke Column:	90'	Vent:	1"ALL VENT		
Lbs. Plug		1,250#	Plug Type:		PURE GOLD MED CHIPS		Top of Plug:	5'				