AMARILLO
921 North Bivins
Amarillo, Texas 79107
Phone 806.467.0607
Fax 806.467.0622

ARTESIA
408 West Texas Ave.
Artesia, New Mexico 88210
Phone 575.746.8768
Fax 575.746.8905

AUSTIN
911 West Anderson Lane
Suite 202
Austin, Texas 78757
Phone 512.989.3428
Fax 512.989.3487

HOBBS
318 East Taylor Street
Hobbs, New Mexico 88240
Phone 575.393.4261
Fax 575.393.4658

MIDLAND
2901 State Hwy 349
Midland, Texas 79706
Phone 432.522.2133
Fax 432.522.2180

SAN ANTONIO
17170 Jordan Rd
Suite 102
Selma, Texas 78154
Phone 210.265.8025
Fax 210.568.2191

TULSA
525 South Main Street
Suite 535
Tulsa, Oklahoma 74103
Phone 918.742.0871
Fax 918.382.0232

ENVIRONMENTAL CONSULTING
ENGINEERING
DRILLING
CONSTRUCTION
SPILL MANAGEMENT
GENERAL CONTRACTING

Toll Free: 866.742.0742
www.talonlpe.com

Febuary 22, 2011

Mr. Mike Bratcher
NMOCD District 2
1301 West Grand Avenue
Artesia, NM 88210

Subject: **Soil Assessment and Remediation Work Plan**
Quantum Resources Management, LLC, New Mexico
State 647 AC 711 Water Flood Station release

Dear Mr. Bratcher,

Quantum Resources Management, LLC has contracted Talon/LPE (Talon) to perform soil assessment and remediation services at the referenced State 647 AC 711 Water Flood Station release. Talon's proposed work plan to perform soil assessment and remediation activities consists of the following:

Incident Date

December 6, 2010

Background Information

The State 647 AC 711 Water Flood Station is located approximately nineteen (19) miles southeast of Artesia, New Mexico. The legal location for the site is Section 27, Township 18 South and Range 28 East in Eddy County, New Mexico. More Specifically the latitude and longitude for the release are 32.71420 North and -104.17128 West.

This site lies on undulating plains and low hills consisting of wind worked sandy deposits. Drainage courses in this area are normally dry. The local surface and shallow geology includes silty soils under lain by sand stone and hard caliches, providing an impermeable barrier to the migration of fluids in the area of the release. The New Mexico State Engineer web site indicates the nearest ground water data to be in S35-T18S-R28E. The ground water in Section 35 is reported to be at an average depth of 65' below ground surface (bgs). A copy of the referenced groundwater information is presented in Appendix I.

The ranking for this site is 10 based on the as following:

Depth to ground water	50'-100'
Wellhead Protection Area	>1000'
Distance to surface water body	>1000'

Incident Description

On December 6, 2010 the flow line at the State 647 AC No. 711 Water Flood Station ruptured. The flow line was taken out of service, repaired and placed back into service. Approximately twenty-five to thirty (25-30) barrels of produced water were released. A vacuum truck was brought to the location and twenty (20) barrels of produced water were recovered. The impacted area is on the flow line right of way approximately fifty-four feet (54') south of the water flood station. The impacted area is estimated to be one hundred and eleven feet (111') long by one hundred fifty-fifty feet (155') wide. The impacted area was excavated to a depth of 1-foot deep and the excavated soil was placed on a liner.

Actions Taken

On January 11, 2011 Talon/LPE personnel were on the site to begin the assessment and soil sampling for the construction of a work plan. Grab soil samples were collected utilizing a split spoon auger drill rig. Grab soil samples were collected from one foot (1') below ground surface (bgs) to a depth of fourteen feet (14') bgs. A hard rock barrier was encounter at two (2) feet bgs and soil samples were unable to be collected at that depth.

The grab soil samples were collected by Talon personnel wearing clean nitrile gloves. The soil samples were placed in laboratory provided sample containers, stored on ice or refrigerated, and transported to Cardinal Labs in Hobbs New Mexico for analysis of chlorides using Method SM4500CL-B. The complete laboratory report is attached as Appendix II.

Analytical Results

Analytical results received from Cardinal Laboratories are summarized below:

Sample, Depth	Chlorides
S-1, 1'	8800 ppm
S-1, 4'	224
S-1, 6'	128
S-1, 8'	144
S-1, 14'	96

Summary and Conclusions

- Groundwater in the project vicinity is greater than 50-feet below land surface per the New Mexico State Engineer Database.
- A hard rock layer was encountered at 2-feet below land surface.
- Based upon the results of the field and laboratory data obtained for this investigation, the vertical impacts for the chloride release have been defined above the background levels to less than 4-feet below land surface.
- Based on the depth to groundwater and the chlorides levels detected in the soil at this location, it is unlikely that the chloride impacts identified from this release will pose a threat to groundwater.

Proposed Remedial Actions

- The impacted soil will be excavated to the top of the rock barrier (approximately 2' bgs) and transported to an NMOCD approved solid waste disposal facility.
- Soil samples will be collected from the excavated area. The soil samples will be submitted to laboratories for TPH analysis using Method 8015M and BTEX analysis using Method 8021B. The chlorides will be tested using Method SM4500Cl-B.
- When analytical results indicate that soil samples are below the Recommended Remediation Action Levels (TPH 1000 mg/kg, BTEX <50 mg/kg, Benzene <10 mg/kg and chlorides 1000 mg/kg or as agree upon), corrective actions will be concluded.
- Analytical results will be submitted to the New Mexico Oil Conservation Division (NMOCD) Artesia office. When permission is granted by NMOCD, the excavated area will be backfilled back to grade using new material transported from a local borrow pit.
- A final report detailing all site activities, analytical results and a final C-141 Form will be provided to the NMOCD.

Should you have any questions or if further information is required, please do not hesitate to contact us at 575-746-8768.

Respectfully submitted,

Talon/LPE

Mike Stubblefield
Project Manager

David J. Adkins
District Manager

APPENDIX I

Groundwater Data

Initial C-141 Form

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	Sub basin	Use	County	Q 64	Q 16	Q 4	Sec	Twp	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
RA 09588		DOM	ED		1	2	33	18S	28E	576976	3619384*	757	300		
L 03348 APPRO		DOM	LE	4	3	4	35	18S	28E	580236	3618135*	3012	105	65	40
CP 00361		PRO	ED		1	3	09	19S	28E	576195	3615347*	4595	365	265	100
CP 00361 EXPL		EXP	ED	3	1	3	09	19S	28E	576094	3615246*	4724	365	265	100

Average Depth to Water: **198 feet**

Minimum Depth: **65 feet**

Maximum Depth: **265 feet**

Record Count: 4

UTMNAD83 Radius Search (in meters):

Easting (X): 577663 **Northing (Y):** 3619702 **Radius:** 5000

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	Sub basin	Use	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
L 03348 APPRO		DOM	LE	4	3	4	35	18S	28E	580236	3618135*	105	65	40
RA 09588		DOM	ED		1	2	33	18S	28E	576976	3619384*	300		

Average Depth to Water: **65 feet**

Minimum Depth: **65 feet**

Maximum Depth: **65 feet**

Record Count: 2

PLSS Search:

Township: 18S **Range:** 28E

***UTM location was derived from PLSS - see Help**

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

30-015-02056

nMCB1035430698

Release Notification and Corrective Action

OPERATOR

X Initial Report ☐ Final Report

Name of Company Melrose Oil & Gas 184860	Contact Garrett Newton
Address 1905 West Sears Ave., Artesia, New Mexico 88210	Telephone No. 575-513-0230
Facility Name State 647 AC 711 Water flood Station #86	Facility Type Water Flood Station

Surface Owner	Mineral Owner	Lease No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
M	27	18S	28E	990'	South	330'	West	EDDY

Latitude 32.71420 Longitude 104.17128

NATURE OF RELEASE

Type of Release Produced Waters	Volume of Release 25-30 bbls	Volume Recovered 20 bbls
Source of Release Flow line	Date and Hour of Occurrence 12/6/2010 AM	Date and Hour of Discovery 12/6/2010 AM
Was Immediate Notice Given? X Yes ☐ No Not Required	If YES, To Whom? NMOCD/Mike Bratcher	
By Whom? Garrett Newton	Date and Hour 12/6/2010 am.	
Was a Watercourse Reached? ☐ Yes X No	If YES, Volume Impacting the Watercourse.	

RECEIVED
DEC 15 2010
NMOCD ARTESIA

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
The flow line located of the State 647 AC 711 Water flood Station ruptured. The flow line was taken out of service and then repaired. A vacuum truck was brought to the site and 20 bbls of produced waters were recovered.

Describe Area Affected and Cleanup Action Taken.*
The affected area was located approximately fifty-four (54') feet on the south of the Water flood station. The affected area was measured to be one hundred and eleven (111') feet long by one hundred and fifty-five (155') wide. The saturated soil from the impacted area was excavated and stockpiled on a liner. Talon/LPE has been contracted to construct a work plan for the correction of the release.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:

Printed Name: Garrett Newton

Title: Field Supervisor

E-mail Address: gnewton@pvtnetworks.net

Date: 12/14/2010 Phone: 513-0230

Attach Additional Sheets If Necessary

OIL CONSERVATION DIVISION

Approved by District Supervisor
Signed By Mike Bratcher

Approval Date: DEC 20 2010

Expiration Date:

Conditions of Approval:

REMEDIATION per OCD Rules and Guidelines. SUBMIT REMEDIATION PROPOSAL BY: 1/20/2011

Attached ☐

2RP-501

APPENDIX II

Laboratory Report

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

January 25, 2011

MIKE STUBBLEFIELD

TALON LPE

408 W. TEXAS AVE.

ARTESIA, NM 88210

RE: STATE 647 AC 711 WATERFLOOD STATION

Enclosed are the results of analyses for samples received by the laboratory on 01/21/11 11:05.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene
Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

TALON LPE
MIKE STUBBLEFIELD
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received:	01/21/2011	Sampling Date:	01/11/2011
Reported:	01/25/2011	Sampling Type:	Soil
Project Name:	STATE 647 AC 711 WATERFLOOD STATI	Sampling Condition:	Cool & Intact
Project Number:	701395.002.01	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S.1 1' (H100154-01)

Chloride, SM4500Cl-B mg/kg **Analyzed By: LR**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**8800**	16.0	01/24/2011	ND	432	108	400	0.00	

Sample ID: S.1 4' (H100154-02)

Chloride, SM4500Cl-B mg/kg **Analyzed By: LR**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**224**	16.0	01/24/2011	ND	432	108	400	0.00	

Sample ID: S.1 6' (H100154-03)

Chloride, SM4500Cl-B mg/kg **Analyzed By: LR**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**128**	16.0	01/24/2011	ND	432	108	400	0.00	

Sample ID: S.1 8' (H100154-04)

Chloride, SM4500Cl-B mg/kg **Analyzed By: LR**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	01/24/2011	ND	432	108	400	0.00	

Sample ID: S.1 14' (H100154-05)

Chloride, SM4500Cl-B mg/kg **Analyzed By: LR**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	01/24/2011	ND	432	108	400	0.00	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240
(505) 393-2326 FAX (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name:	Talon / LPE	BILL TO	
Project Manager:	Mike Stubblefield	P.O. #:	
Address:	408 W. Texas Ave.	Company:	Talon/LPE
City:	Artesia State: NM. Zip: 88210	Attn:	
Phone #:	575-441-7254 Fax #: 575-746-8905	Address:	
Project #:	701395.002.01 Project Owner: Quantum Res.	City:	
Project Name:	State 647 AC 211 Waterflood Station	State: Zip:	
Project Location:		Phone #:	
Sampler Name:	Mike Stubblefield	Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Total Chlorides
H17015-1	S-1 1'	G				✓							1/11/2011	11:20A	✓
2	S-1 4'	G				✓							1/11/2011	11:29A	✓
3	S-1 6'	G				✓							1/11/2011	11:36A	✓
4	S-1 8'	G				✓							1/11/2011	11:42A	✓
5	S-1 14'	G				✓							1/11/2011	12:11P	✓

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 1/20/2011 Time: 4:00 pm	Received By:	
Relinquished By:	Date: 1/21/11 Time: 11:05	Received By:	Jodi Henson
Delivered By: (Circle One) Sampler - UPS - Bus - (Other)	6°C	Sample Condition Cool / Intact ☑ Yes ☑ Yes ☐ No ☐ No	CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#26