EPWM - 010

GENERAL CORRESPONDENCE

2012 - 2015

Jones, Brad A., EMNRD

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Tuesday, April 01, 2014 9:35 AM
To: Jones, Brad A., EMNRD
Cc: David_Luna@xtoenergy.com
Subject: XTO Energy Nash Unit 29. API #: 30-015-29434.

Mr. Jones:

Per our phone conversation dated April 1, 2014, we will send you a complete printed amended report for your files. Last week you received only the amended pages to be inserted into the original report dated December 5, 2013.

We look forward to your final approval for closure.

Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

March 26, 2014

Mr. Brad Jones
NMOCD
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: C-144 Closure Report for the Poseidon Modular Impoundment.
Operator: XTO Energy. API #: 30-015-29434.
Unit Letter J Section 13 T23S R29E.

Dear Mr. Jones:

Per our phone conversation in January 2014, attached are modifications to the closure report for the above referenced site. Per your request, we only attached the pages that require replacement.

Replace the first five pages of the closure report with the eight pages attached. We edited the section titled "C-144 Closure Sampling and C-141 Spill Release Notification & Correction Action. The edits include:

- References to the C-141 Initial and Final reports with email support documentation.
- A discussion on chloride concentration profiles observed on location and in the background off-site sample.

Replace Page 5 of 5 of Form C-144. Box 22 was changed from "Alternative Closure Method" to "Waste Excavation and Removal"

Replace Appendix C with the attached Appendix C. The attached Appendix C includes approved Initial and Final C-141 reports.

Insert Appendix E.

Please contact me at 970-570-9535 if you have any questions or comments. Please contact David Hamilton at 505-266-5004 with questions regarding the chloride concentration profiles.

Sincerely,
R.T. Hicks Consultants

Andrew Parker 3/26/2014

Andrew Parker
Durango Field Office
Ph: 970-570-9535

Copy: David Luna, XTO Energy

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

December 5, 2013

Mr. Brad Jones
NMOCD
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: C-144 Closure Report for the Poseidon Modular Impoundment.
Operator: XTO Energy. API #: 30-015-29434.
Unit Letter J Section 13 T23S R29E.

Dear Mr. Jones:

R.T. Hicks consultants is pleased to submit this Closure Report for the above referenced location on the behalf of XTO Energy. Closure activities were performed in accordance with the approved C-144 application *"Nash Draw Unit #29 modular impoundment (Atlantis system) for temporary storage of treated produced water"* dated June 13, 2012. The location of the modular impoundment is on Plate 1. Plate 2 is a plat of the location.

On June 20th, 2012, XTO Energy began sending treated water from Halliburton's CleanWave system, located at Nash Unit #53 SWD, to the Poseidon Modular Impoundment (Poseidon tank). On June 25, 2012, the first well, Nash Unit 39H, was hydraulically fractured using treated water from the Poseidon tank. On September 26th, 2012, the last well, Nash Unit 49, was fractured using treated water from the Poseidon tank. The transfer completion date, in lieu of rig release date, was October 5, 2012 as noted on Form C-105 per approved C-144 plan.

CLOSURE NOTIFICATIONS

Closure activities for the Poseidon tank began on October 15, 2012. Notification of closure activities were sent to Mr. Bratcher (NMOCD), Mr. Jones (NMOCD), and Mr. Jim Amos (BLM) via email on October 12, 2012. Closure notification to the surface owner (BLM) was sent via certified mail return receipt. A copy of the receipt is presented in Appendix A.

Figure 1: One of the four roll-offs containing liner material that was transported to R360.

MODULAR IMPOUND CLOSURE

On October 15, 2012 Poseidon Concepts began the disassembly of the Poseidon tank. Due to the oily nature of remaining fluid in the

Poseidon tank, the fluid was removed using a vacuum truck and transported to R360 (formerly CRI) in Lea County, NM. The closure plan originally stated that remaining fluid would be injected into the Nash Unit 53 SWD (API#: 3001539400) well.

Poseidon Concepts transported all reusable pipes, pumps, and tank walls to their field yard. The tank liner was deposited into four 20-cu. yrd. roll-offs (Figure 1) and transported to R360 for proper disposal.

Operation Logs

Operation logs for the Poseidon tank and the CleanWave system are presented in Appendix B. As noted in Tables B-1 and B-2, on August 27th, 2012 the Poseidon tank liner seam split slightly 1-foot from the top of the tank and approximately 3 barrels of fluid escaped. Mr. Randy Green of XTO Energy mobilized water haul trucks to the site and lowered the water level to prevent further leakage. The water was transferred to Nash Draw 49 H and Nash Draw Unit # 57 H for use in well stimulation. Water levels in the tank were kept below the split and the seam was repaired to prevent further leakage. The release was reported on Form 141 and submitted to NMOCD District 2 on March 15, 2013.

C-144 Closure Sampling And C-141 Spill Release Notification & Correction Action

Submissions and Approvals

On October 12, 2012, Hicks Consultants provided a 72-hour closure notice to Mr. Bratcher of District 2 NMOCD. On November 8, 2012, Hicks Consultants provided District 2 NMOCD a 72-hour closure sampling notice. These notices were submitted via email. A copy of the emails and subsequent email correspondence is provided in Attachment E.

On November 13, 2012, Hicks Consultants collected two on-site 5-point composite soil samples (Plate 3) per the approved C-144 for the modular impoundment employed for hydraulic fracturing of five wells in 2012.

On February 11, 2013, in support of an interim reclamation ordered by the BLM-Carlsbad Office, Hicks Consultants performed soil characterization to determine whether chloride and EC concentrations would support vegetation for interim reclamation. The Trench Sample was referenced in the initial Release Notification and Corrective Action plan (discussed below) and assisted with defining the vertical and horizontal extend of chloride impacted soil.

After confirmation of a release from the Tank Composite, BG Composite, and Trench Sample, a spill "Release Notification and Corrective Action" Form C-141 was submitted to NMOCD District 2 on March 15, 2013 (see Appendix C). District 2 NMOCD approved the C-141 Initial Report on May 31, 2013. Hicks Consultants received notice of approval via email on June 5, 2013. The approval included conditions and stipulations as presented in Appendix E. Plate 4 shows the Corrective Action remediation area.

On June 24, 2013 Hicks Consultants sampled an off-site background location (Background Sample) per C-141/Part 29 approval conditions/stipulations for release event 2RP-1674.

After completion of reclamation, Hicks Consultants submitted the Final Report for the C-141 to NMOCD District 2 on December 5, 2013. The Final Report was approved by District 2 NMOCD on January 14, 2014. A copy of the Final Report is located in Appendix C.

Sampling Results

The point samples for the Tank Composite and BG Composite were collected approximately two inches below the caliche pad/soil interface at a depth of approximately 1-foot below ground surface. The Tank Composite sample exhibits a chloride concentration of 7,500 mg/kg (see Table 1); indicating production activities have impacted the western half of the caliche pad. The BG Composite sample exhibited a chloride concentration comparable to the Trench Sample (discussed below) at the 2 foot depth (3,480 mg/kg) interval.

Table 1: Soil chemistry summary results

Sample ID	Date	Depth (ft)	Chloride mg/kg	EC uS/cm	Benzene mg/kg	BTEX mg/kg	TPH mg/kg	GRO/DRO mg/kg
NMAC 19.15.17.13.B(1).b			500 or background		0.2	50	2,500	500
Tank Composite	11/13/2012	1.0	7,500	NS	<0.49	ND	<20	<10
BG Composite	11/13/2012	1.0	3,000	NS	<0.49	ND	<20	<10
Trench Sample	2/11/2013	2.0	3,480	8,010	NS	NS	NS	NS
Trench Sample	2/11/2013	4.0	2,120	3,020	NS	NS	NS	NS
Trench Sample	2/11/2013	6.0	2,000	7,050	NS	NS	NS	NS
Background Sample	6/24/2013	1.5	2,960	NS	NS	NS	NS	NS
Background Sample	6/24/2013	3.0	2,440	NS	NS	NS	NS	NS
Background Sample	6/24/2013	4.5	2,920	NS	NS	NS	NS	NS
Background Sample	6/24/2013	6.0	1,880	NS	NS	NS	NS	NS
Background Sample	6/24/2013	7.5	1,380	NS	NS	NS	NS	NS
Background Sample	6/24/2013	8.0	1,500	NS	NS	NS	NS	NS

Notes

1. ND = non-detect
2 NS = not sampled

The Trench Sample consisted of discrete samples at 2, 4, and 6 foot depths. Soil chloride concentrations at the Trench Sample (collected within the area of the Tank Composite sample) show chloride concentrations are decreasing with depth, from 3,480 mg/kg at 2 feet to 2,120 mg/kg at 4 feet. At 4 feet, the concentration is less than that encountered in the Background Sample trench at comparable depths (3.0 and 4.5 feet). We conclude that the majority of chloride impairment is contained in the production pad surface. Table 2 summarizes the lithology of the Trench Sample.

Table 2: Lithology of Trench Sample

Depth (ft)	Description
0 - 1	Caliche pad
1 - 4	Top soil (loamy sand), dark brown, moist
4 - 6	Top soil, reddish brown, moist
6	Medim sand w/caliche, hard, brown, moist

Note: native hard caliche was observed below 6 feet.

Comparing the on-site Trench Sample (Table 3) to the off-site Background Sample at depths below 2-feet bgs, the on-site chloride concentrations are either near or lower than off-site background concentrations.

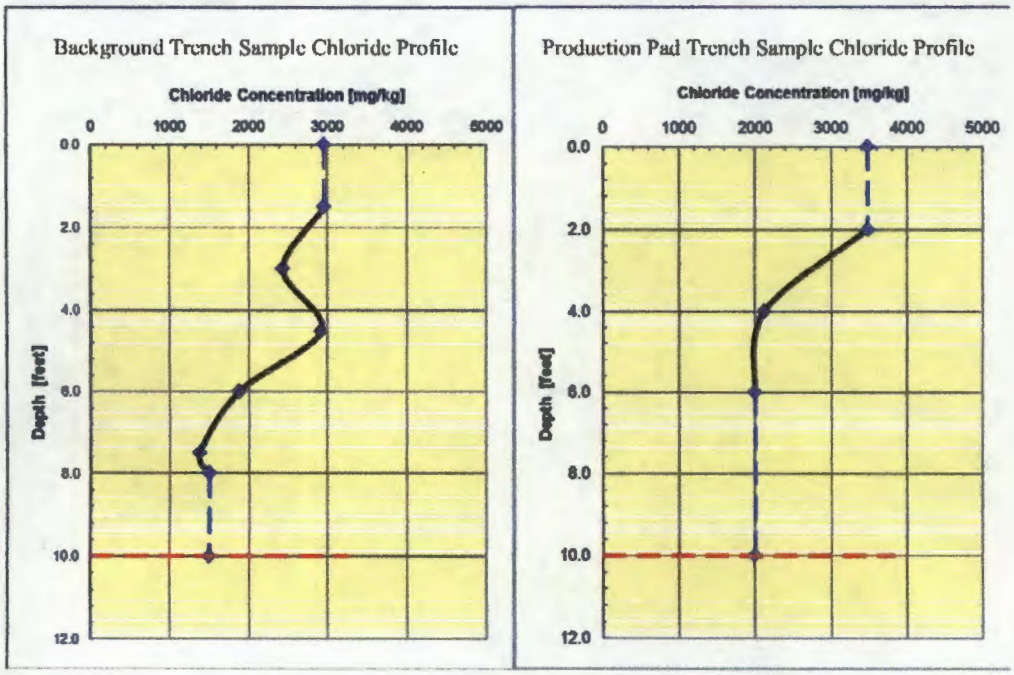
Table 1: Chloride concentration comparison between an on-site and off-site (background)

	Chloride (mg/kg)	
Depth (+/- 0.5 ft)	Trench Sample	Background Sample
1.5 - 2	3,480	2,960
4	2,120	2,920
6	2,000	1,880

The Background Sample (per condition of the C-141) was located in an area not impacted by past or current production activities.

Graphic 1, below, shows the chloride concentration data from Table 1 plotted at the appropriate depth for both the Background Sample trench and the Trench Sample located on the production pad (locations shown on Plate 3). From the ground surface to the depth of 10-feet, the mass of chloride per unit area can be calculated from these chloride concentration profiles.

Graphic 1 : *Concentrations for samples closest to the surface and at greatest depth are assumed as constant to both the ground surface and to a depth of 10 feet*



Multiplying each sample concentration by a moist soil density and a centered depth interval for each sample depth yields a chloride mass per area for that depth interval. The calculation is shown below:

Conc(z) [mg/kg] * rho [kg/m^3] * delta z [m] = Chloride Mass [kg/m^2]

where:

Conc is the chloride concentration from a particular depth (z)
rho is a moist soil density and assumed as constant from the surface to 10 feet
delta z is the depth interval for which a chloride concentration is taken as constant

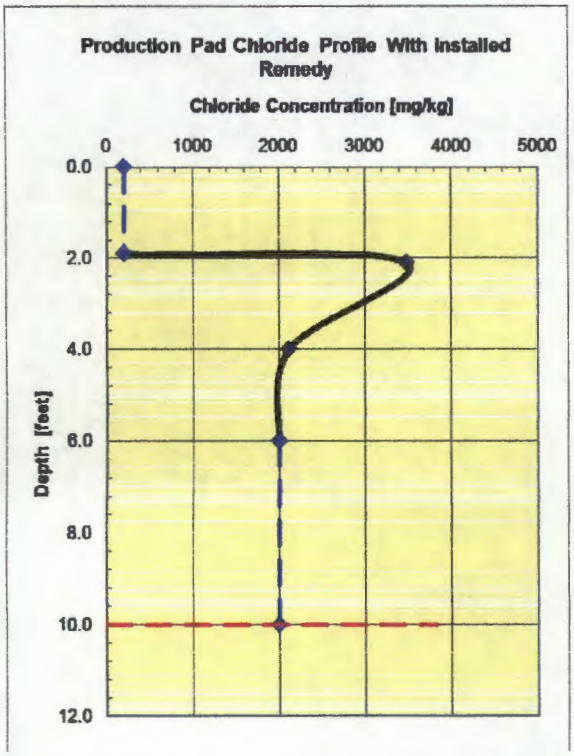
(We used a rho (moist soil density) of 1780 kg/m^3 calculated by using a porosity of 0.4 and a volumetric moisture content of 0.19 to reflect the moist conditions.)

Adding up the Chloride Mass per m^2 calculated for each depth interval yields a total chloride mass per m^2 for each profile. This sum represents the chloride mass between ground surface and a depth of 10 feet per square meter of surface area.

The Background Trench Sample Chloride Profile has a total chloride mass per m^2 of 12.09 kg/m^2. The Production Pad Trench Sample Chloride Profile has a total chloride mass/m^2 of 13.4 kg/m^2, a mass about 11% more than the Background Trench Sample Chloride Profile.

Graphic 2 presents the Production Pad Chloride Profile with the installed remedy.

Graphic 2: *The uppermost 2 feet of soil have been replaced with soil having an assumed chloride concentration of 200 mg/kg*



Performing the same calculations yields a total chloride mass per m^2 of 9.87 kg/m^2, a mass about 18% less than the Background Trench Chloride Profile.
Note that changing the assumed values within the calculation does not change the relative chloride mass/m^2 for the chloride concentration profiles. That is, while it does increase or decrease the calculated chloride mass/m^2 for each profile, their relative magnitudes are not changed.

The chemistry, lithology, and calculated chloride mass of the trench samples suggest that:

- soil at depths from 1 to 5 feet below surface have chloride and EC concentrations that will support vegetation. Re-vegetation of the impacted area is included in the C-141 remediation plan and also satisfies BLM's request for interim reclamation,
- the eastern portion of the location is not measurably impaired by production activities as the BG Composite sample result (3,000 mg/kg) is not different from the Background Sample at 1.5 feet below ground surface.
- The selected remedy lowered the chloride mass per m^2 in the upper 10-feet of the soil profile to less than that of the background trench location.

The removal of the upper 2-feet of soil within the remediation area as shown on Plate 2 remediated the observed higher chlorides and allowed for vegetation.

Current Status

The location is currently an active well site. To return the site to pre-existing conditions, the three "Y" shaped trenches associated with the modular impoundment were backfilled with caliche (Figure 2) and graded even with the existing production pad (Figure 3).

Figure 2: Backfilling a "Y" shaped trench with caliche.

Figure 3: Location reclaimed to pre-existing conditions graded even with the active production pad.

Please contact us at 505-266-5004 if you have any questions or comments.

Sincerely,
R.T. Hicks Consultants

Andrew Parker
Durango Field Office
Ph: 970-570-9535

Copy: David Luna, XTO Energy
Mike Bratcher, District 2 NMOCD

19.
Operator Application Certification:
I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): David Luna Title: Operations Engineer

Signature: David Luna Date: 06/13/2012

e-mail address: David_Luna@xtoenergy.com Telephone: 432-620-6742

20.
OCD Approval: ☒ Permit Application (including closure plan) ☐ Closure Plan (only) ☐ OCD Conditions (see attachment)

OCD Representative Signature: Approval Date: 6/14/12

Title: Environmental Engineer OCD Permit Number:

21.
Closure Report (required within 60 days of closure completion): Subsection K of 19.15.17.13 NMAC
Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ Closure Completion Date: November 13, 2012

22.
Closure Method:
☒ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
☐ If different from approved plan, please explain. Modular impoundment closure - hauled off-site

23.
Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:
Instructions: Please indentify the facility or facilities for where the liquids, drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.

Disposal Facility Name: R360 Disposal Facility Permit Number: R-9166

Disposal Facility Name: Disposal Facility Permit Number:

Were the closed-loop system operations and associated activities performed on or in areas that *will not* be used for future service and operations?
☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

Required for impacted areas which will not be used for future service and operations:
☐ Site Reclamation (Photo Documentation)
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique

24.
Closure Report Attachment Checklist: ***Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.***
☐ Proof of Closure Notice (surface owner and division)
☐ Proof of Deed Notice (required for on-site closure)
☐ Plot Plan (for on-site closures and temporary pits)
☐ Confirmation Sampling Analytical Results (if applicable)
☐ Waste Material Sampling Analytical Results (required for on-site closure)
☐ Disposal Facility Name and Permit Number
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique
☐ Site Reclamation (Photo Documentation)
On-site Closure Location: Latitude Longitude NAD: ☐1927 ☐ 1983

25.
Operator Closure Certification:
I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): David Luna Title: Operations Engineer

Signature: David Luna Date: 12/05/2013

e-mail address: David_Luna@xtoenergy.com Telephone: 432-620-6742

APPENDIX C

C-141 Initial and Final Reports

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

March 15, 2013

Mr. Mike Bratcher
NMOCD District 2
811 South First Street
Artesia, New Mexico 88210

Mr. Brad Jones
NMOCD
1220 S. St. Francis Drive
Santa Fe, NM

RE: Nash Draw Unit #29 modular impoundment spill report. API No: 30-015-29434

Dear Sirs:

R.T. Hicks Consultants is pleased to submit the enclosed Form C-141 Release Notification and Correction Action on the behalf of XTO Energy.

The release from the modular impoundment was brought to our attention during the submittal of the C-144 Closure Report submitted to Mr. Bratcher, via email, on December 17, 2012.

We will revise the C-144 closure report to include results of the remediation plan that is the subject of this spill report. Included in the revision, per request of Mr. Jones, will be the inclusion of the entire C-144 permit application and correction to applicable dates and signatures.

We will submit the report to Mr. Jones with a copy to Mr. Bratcher. Both submittals will be delivered via certified mail/return receipt.

If you have any questions please contact me at 970-570-9535.

Sincerely,
R.T. Hicks Consultants
Durango Field Office

Andrew Parker

Cc: David Luna, XTO Energy, via email
Jennifer Van Curen, BLM - Carlsbad Field Office, via certified mail/return receipt

RECEIVED
MAR 25 2013
NMOCD ARTESIA

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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 August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC

Release Notification and Corrective Action

nMLB1401430906

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company XTO Energy, Inc 5380	Contact David Luna
Address 200 N. Loraine, Suite 800 Midland, TX 79701	Telephone No. 432-620-6742
Facility Name Nash Unit #29	Facility Type Treated produced water modular impoundment

Surface Owner BLM	Mineral Owner	API No. 30-015-29434

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	13	23S	29E	1980	SOUTH	2310	EAST	EDDY

Latitude N 32.30322 Longitude W 103.93719

NATURE OF RELEASE

Type of Release Treated and non-treated produced water	Volume of Release < 5 bbls	Volume Recovered None
Source of Release Modular Impoundment - western edge	Date and Hour of Occurrence 8/27/12	Date and Hour of Discovery 8/27/12
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom? NA	
By Whom? NA	Date and Hour NA	
Was a Watercourse Reached? X ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. NA	

If a Watercourse was Impacted, Describe Fully.*

NA

Describe Cause of Problem and Remedial Action Taken.*

On August 27th, 2012 the modular impoundment liner detached from the top of the tank along the western edge releasing approximately 3 barrels of treated produced water. Mr. Randy Green of XTO Energy mobilized water haul trucks to the site and lowered the water level to prevent further leakage and reattached the liner to the top of the tank. The water was transferred to Nash Draw 49 H and Nash Draw Unit # 57 H. Soil sampling was conducted per C-144 closure requirements. The attached document presents the sampling results and proposes a remediation plan.

Describe Area Affected and Cleanup Action Taken.*

The release affected the southwest corner of the production pad, adjacent to the modular impoundment. The area of impact was approximately 15 X15 square feet. No cleanup action was taken due to limited access caused by the location of the modular impoundment along the edge of the production pad; beyond the modular impoundment heavy mesquite vegetation exists.

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: David Luna

Printed Name: David Luna

Title: Operations Engineer

E-mail Address: David_Luna@xtoenergy.com

Date: 3/15/13 Phone: 432-620-6742

OIL CONSERVATION DIVISION

Signed By Mike Bratcher

Approved by Environmental Specialist:

Approval Date: MAY 31 2013 Expiration Date:

Conditions of Approval: Attached ☐

Remediation per OCD Rule & Guidelines. SUBMIT REMEDIATION PROPOSAL NO LATER THAN: 7/1/2013

2RP-1674

* Attach Additional Sheets If Necessary

Soil Chemistry

On November 13, 2012, Hicks Consultants collected two 5-point soil samples on location for closure of the modular impoundment employed for hydraulic fracturing of five wells in 2012. On February 11, 2013 Hicks Consultants performed additional characterization to determine the vertical extent of chloride in soil near the western edge of the former modular impoundment, near the area of the reported release.

The location and chloride chemistry of the samples are presented on Plate 1. The chemistry is summarized in Table 1, below. Table 2 shows the lithology of the "Trench Sample". The laboratory certificate of analysis is attached.

The point samples for the Tank Composite and BG Composite were collected approximately two inches below the caliche pad/soil interface at a depth of approximately 1-foot. The Trench Sample consisted of discrete samples at 2, 4, and 6 foot depths.

Figure 1: Summary of soil chemistry

Sample ID	Date	Depth (ft)	Chloride mg/kg	EC uS/cm	Benzene mg/kg	BTEX mg/kg	TPH mg/kg	GRO/DRO mg/kg
NMAC 19.15.17.13.B(1).b			500 or background		0.2	50	2,500	500
Tank Composite	11/13/2012	1	7,500	NS	<0.49	ND	<20	<10
BG Composite	11/13/2012	1	3,000	NS	<0.49	ND	<20	<10
Trench Sample	2/11/2013	2	3,480	8,010	NS	NS	NS	NS
Trench Sample	2/11/2013	4	2,120	3,020	NS	NS	NS	NS
Trench Sample	2/11/2013	6	2,000	7,050	NS	NS	NS	NS

Notes

1. ND = non-detect
2 NS = not sampled

Figure 2: Lithology of Trench Sample

Depth (ft)	Description
0 - 1	Caliche pad
1 - 4	Top soil (loamy sand), dark brown, moist
4 - 6	Top soil, reddish brown, moist
6	Medim sand w/caliche, hard, brown, moist

Note: native hard caliche was observed below 6 feet.

The Tank Composite sample with a chloride concentration of 7,500 mg/kg indicates production activities have impacted the western half of the caliche pad. The BG Composite sample has a chloride concentration comparable to the Trench Sample at the 2 foot depth (3,480 mg/kg). Soil chloride concentrations at the Trench Sample that is within the area of the Tank Composite sample show chloride concentrations are decreasing with depth, from 3,480 mg/kg at 2 feet to 2,000 mg/kg at 6 feet and indicate that the majority of chloride impairment is limited to the production pad surface.

The chemistry and lithology of the Trench Sample suggests that:

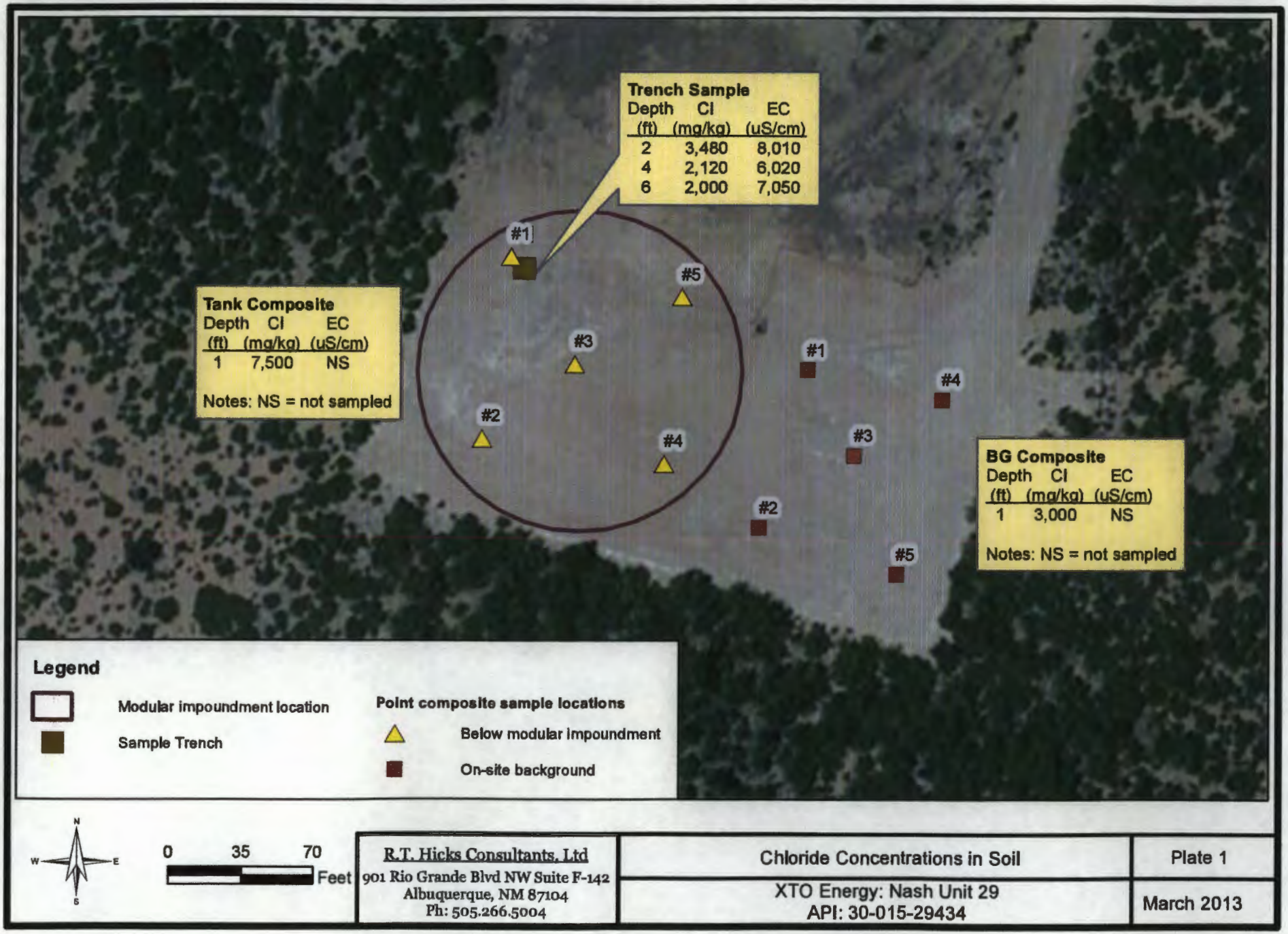
- the moist soil at a depth of 6 feet, which exhibits 2,000 mg/kg chloride, is likely impacted by shallow groundwater wicking up from the underlying brine groundwater zone,
- the moist soil near the surface (Trench Sample) is likely from recent precipitation events and past releases at the site, and
- soil at depths from 1 to 5 feet below surface have chloride and EC concentrations that will support vegetation. Re-vegetating the impacted area is included in the remediation plan and also satisfies BLM's request for interim reclamation.

The remediation plan is presented below.

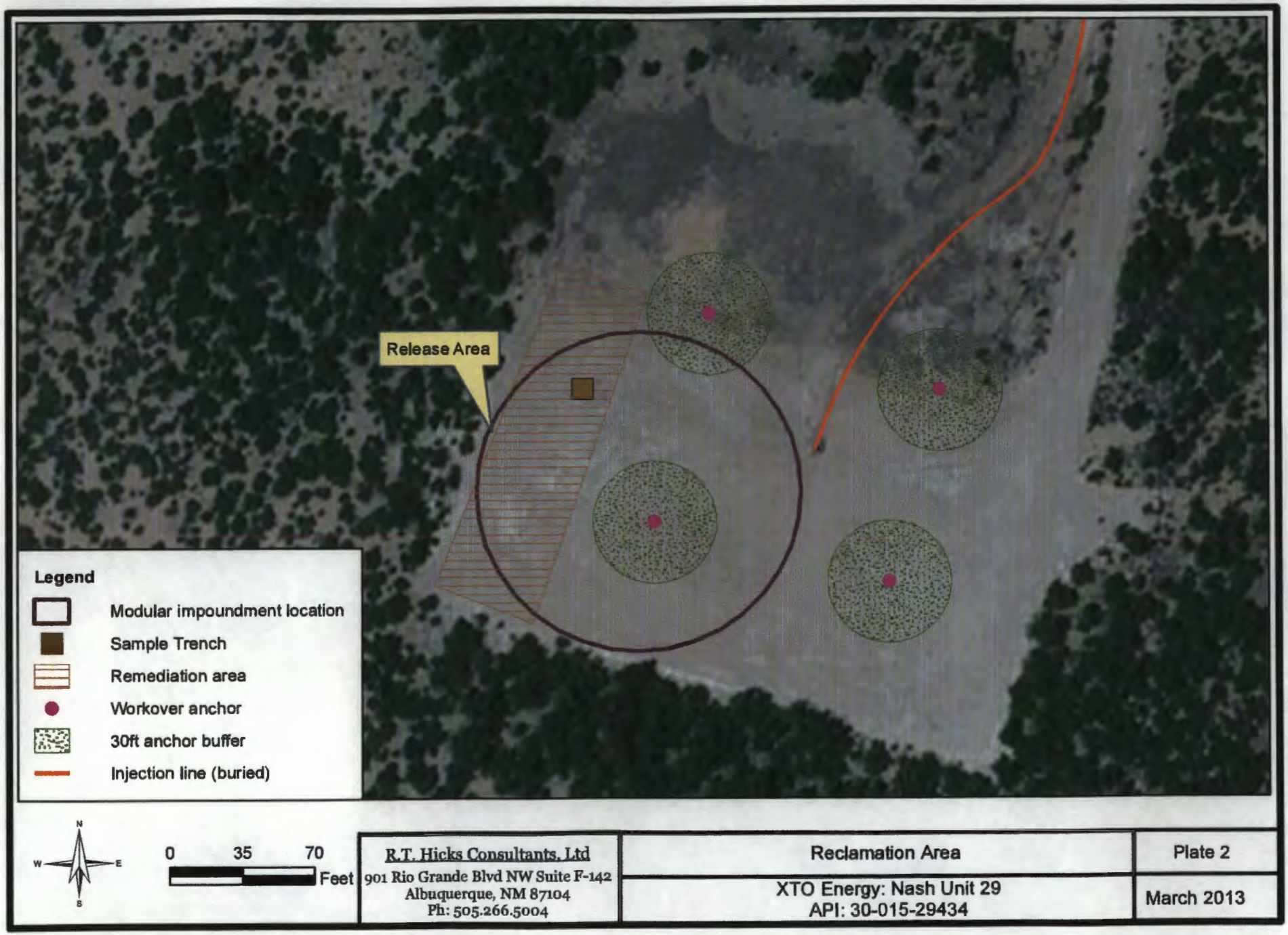
Remediation Plan

XTO Energy proposes to excavate and dispose of the western third (30%) of the caliche pad that was in contact with the modular impoundment. The 30% area includes the release area and out beyond to the edge of the caliche pad. Plate 2 identifies the area proposed for remediation. The excavated material will be transported to R360 or equivalent for proper disposal.

The remediated area will be contoured and seeded using BLM Seed Mixture Type 4 with Giant Sacaton seed added to the mixture. The excavated area is also subject to BLM's interim reclamation plan.



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Chloride Concentrations in Soil XTO Energy: Nash Unit 29 API: 30-015-29434	Plate 1 March 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Reclamation Area	Plate 2
	XTO Energy: Nash Unit 29 API: 30-015-29434	March 2013

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 29, 2012

Andrew Parker
R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: XTO Energy Nash Unit 29 OrderNo.: 1211653

Dear Andrew Parker:

Hall Environmental Analysis Laboratory received 2 sample(s) on 11/14/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Tank Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-001
Matrix: SOIL
Received Date: 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/20/2012 6:22:22 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/20/2012 6:22:22 AM
Surr: DNOP	102	77.6-140		%REC	1	11/20/2012 6:22:22 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/16/2012 2:32:25 PM
Surr: BFB	108	84-116		%REC	1	11/16/2012 2:32:25 PM
EPA METHOD 300.0: ANIONS						Analyst: **JRR**
Chloride	7500	300		mg/Kg	200	11/20/2012 6:54:44 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Toluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Naphthalene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1-Methylnaphthalene	ND	0.19		mg/Kg	1	11/21/2012 7:19:43 PM
2-Methylnaphthalene	ND	0.19		mg/Kg	1	11/21/2012 7:19:43 PM
Acetone	ND	0.73		mg/Kg	1	11/21/2012 7:19:43 PM
Bromobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromodichloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromoform	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromomethane	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
2-Butanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Carbon disulfide	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Carbon tetrachloride	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Chlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Chloroethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Chloroform	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Chloromethane	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
2-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
cis-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dibromo-3-chloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Dibromochloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Dibromomethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Tank Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-001 **Matrix:** SOIL **Received Date:** 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloroethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloroethene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,3-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
2,2-Dichloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloropropene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Hexachlorobutadiene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
2-Hexanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Isopropylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Isopropyltoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Methylene chloride	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
n-Butylbenzene	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
n-Propylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
sec-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Styrene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
tert-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
trans-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,3-Trichlorobenzene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Trichlorofluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,3-Trichloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Vinyl chloride	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Xylenes, Total	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Surr: 1,2-Dichloroethane-d4	93.2	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: 4-Bromofluorobenzene	92.4	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: Dibromofluoromethane	90.7	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: Toluene-d8	101	70-130		%REC	1	11/21/2012 7:19:43 PM
EPA METHOD 418.1: TPH						Analyst: **LRW**
Petroleum Hydrocarbons, TR	ND	20		mg/Kg	1	11/21/2012

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: BG Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-002 **Matrix:** SOIL **Received Date:** 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/20/2012 8:28:08 AM
Motor Oil Range Organics (MRO)	ND	51		mg/Kg	1	11/20/2012 8:28:08 AM
Surr: DNOP	98.6	77.6-140		%REC	1	11/20/2012 8:28:08 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/16/2012 3:01:11 PM
Surr: BFB	101	84-116		%REC	1	11/16/2012 3:01:11 PM
EPA METHOD 300.0: ANIONS						Analyst: **JRR**
Chloride	3000	150		mg/Kg	100	11/20/2012 7:07:09 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Toluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Naphthalene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1-Methylnaphthalene	ND	0.20		mg/Kg	1	11/21/2012 7:48:47 PM
2-Methylnaphthalene	ND	0.20		mg/Kg	1	11/21/2012 7:48:47 PM
Acetone	ND	0.74		mg/Kg	1	11/21/2012 7:48:47 PM
Bromobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromodichloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromoform	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromomethane	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
2-Butanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Carbon disulfide	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Carbon tetrachloride	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Chlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Chloroethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Chloroform	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Chloromethane	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
2-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
cis-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dibromo-3-chloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Dibromochloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Dibromomethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: BG Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-002 **Matrix:** SOIL **Received Date:** 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloroethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloroethene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,3-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
2,2-Dichloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloropropene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Hexachlorobutadiene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
2-Hexanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Isopropylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Isopropyltoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Methylene chloride	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
n-Butylbenzene	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
n-Propylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
sec-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Styrene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
tert-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
trans-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,3-Trichlorobenzene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Trichlorofluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,3-Trichloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Vinyl chloride	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Xylenes, Total	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Surr: 1,2-Dichloroethane-d4	94.2	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: 4-Bromofluorobenzene	87.7	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: Dibromofluoromethane	91.6	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: Toluene-d8	105	70-130		%REC	1	11/21/2012 7:48:47 PM
EPA METHOD 418.1: TPH						Analyst: **LRW**
Petroleum Hydrocarbons, TR	ND	20		mg/Kg	1	11/21/2012

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID	**MB-4894**	SampType:	**MBLK**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**4894**		RunNo:	**7001**				
Prep Date:	**11/19/2012**	Analysis Date:	**11/19/2012**		SeqNo:	**202928**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-4894**	SampType:	**LCS**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**4894**		RunNo:	**7001**				
Prep Date:	**11/19/2012**	Analysis Date:	**11/19/2012**		SeqNo:	**202929**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4901**	SampType: **MBLK**	TestCode: **EPA Method 418.1: TPH**
Client ID: **PBS**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203589** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	ND	20								

Sample ID **LCS-4901**	SampType: **LCS**	TestCode: **EPA Method 418.1: TPH**
Client ID: **LCSS**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203590** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	100	20	100.0	0	104	80	120			

Sample ID **LCSD-4901**	SampType: **LCSD**	TestCode: **EPA Method 418.1: TPH**
Client ID: **LCSS02**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203591** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	110	20	100.0	0	106	80	120	1.28	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4900**	SampType: **MBLK**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202423** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.9		10.00		98.8	77.6	140			

Sample ID **LCS-4900**	SampType: **LCS**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202424** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	47.4	122			
Surr: DNOP	4.0		5.000		80.2	77.6	140			

Sample ID **1211653-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **Tank Composite**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202426** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.97	0	106	12.6	148			
Surr: DNOP	4.8		5.097		94.6	77.6	140			

Sample ID **1211653-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **Tank Composite**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202569** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	51.18	0	104	12.6	148	0.773	22.5	
Surr: DNOP	5.1		5.118		98.8	77.6	140	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4851**	SampType: **MBLK**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **PBS**	Batch ID: **4851**	RunNo: **6951**
Prep Date: **11/15/2012**	Analysis Date: **11/16/2012**	SeqNo: **202014** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		99.3	84	116			

Sample ID **LCS-4851**	SampType: **LCS**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **LCSS**	Batch ID: **4851**	RunNo: **6951**
Prep Date: **11/15/2012**	Analysis Date: **11/16/2012**	SeqNo: **202015** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	97.3	74	117			
Surr: BFB	1000		1000		104	84	116			

Sample ID **1211653-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **Tank Composite**	Batch ID: **4851**	RunNo: **6951**
Prep Date: **11/15/2012**	Analysis Date: **11/16/2012**	SeqNo: **202020** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	4.9	24.63	0	118	70	130			
Surr: BFB	1100		985.2		109	84	116			

Sample ID **1211653-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **Tank Composite**	Batch ID: **4851**	RunNo: **6951**
Prep Date: **11/15/2012**	Analysis Date: **11/16/2012**	SeqNo: **202021** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	5.0	24.75	0	118	70	130	0.0876	22.1	
Surr: BFB	1100		990.1		109	84	116	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **mb-4851**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBS**	Batch ID: **4851**	RunNo: **7060**
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204634** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.10								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.10								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.10								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **mb-4851**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBS**	Batch ID: **4851**	RunNo: **7060**
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204634** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		93.2	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.4	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.3	70	130			
Surr: Toluene-d8	0.52		0.5000		103	70	130			

Sample ID **lcs-4851**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSS**	Batch ID: **4851**	RunNo: **7060**
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204635** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.050	1.000	0	101	70	130			
Toluene	1.1	0.050	1.000	0	108	80	120			
Chlorobenzene	1.0	0.050	1.000	0	101	70	130			
1,1-Dichloroethene	1.1	0.050	1.000	0	110	74	124			
Trichloroethene (TCE)	0.88	0.050	1.000	0	87.9	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		86.1	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **lcs-4851** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **LCSS** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204635** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.47		0.5000		93.7	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Sample ID **1211653-002ams** SampType: **MS** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **BG Composite** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204638** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.049	0.9804	0	92.9	80.9	118			
Toluene	0.95	0.049	0.9804	0	97.4	69.5	119			
Chlorobenzene	0.87	0.049	0.9804	0	88.9	75.7	115			
1,1-Dichloroethene	0.99	0.049	0.9804	0.01122	100	68.6	126			
Trichloroethene (TCE)	0.81	0.049	0.9804	0	82.4	68.7	115			
Surr: 1,2-Dichloroethane-d4	0.47		0.4902		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.42		0.4902		85.6	70	130			
Surr: Dibromofluoromethane	0.47		0.4902		95.4	70	130			
Surr: Toluene-d8	0.50		0.4902		102	70	130			

Sample ID **1211653-002amsd** SampType: **MSD** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **BG Composite** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204639** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.049	0.9891	0	93.3	80.9	118	1.30	20	
Toluene	0.98	0.049	0.9891	0	98.8	69.5	119	2.28	20	
Chlorobenzene	0.88	0.049	0.9891	0	89.3	75.7	115	1.32	20	
1,1-Dichloroethene	1.0	0.049	0.9891	0.01122	99.6	68.6	126	0.357	24.8	
Trichloroethene (TCE)	0.82	0.049	0.9891	0	83.3	68.7	115	1.99	20	
Surr: 1,2-Dichloroethane-d4	0.47		0.4946		95.9	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.41		0.4946		83.4	70	130	0	0	
Surr: Dibromofluoromethane	0.48		0.4946		96.6	70	130	0	0	
Surr: Toluene-d8	0.51		0.4946		104	70	130	0	0	

Sample ID **mb-4881** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **PBS** Batch ID: **4881** RunNo: **7060**

Prep Date: **11/19/2012** Analysis Date: **11/21/2012** SeqNo: **204640** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		93.5	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		88.8	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.1	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **lcs-4881**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSS**	Batch ID: **4881**	RunNo: **7060**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **204641** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.6	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.1	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.8	70	130			
Surr: Toluene-d8	0.53		0.5000		106	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: RT HICKS Work Order Number: 1211653

Received by/date: MG 11/14/12

Logged By: Anne Thorne 11/14/2012 10:50:00 AM Anne Thorne

Completed By: Anne Thorne 11/19/2012 Anne Thorne

Reviewed By: A 11/19/12

Chain of Custody

1. Were seals intact?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Coolers are present? (see 19. for cooler specific information)	Yes ☐	No ☐	NA ☑
5. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
7. Sample(s) in proper container(s)?	Yes ☑	No ☐	
8. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
12. Were any sample containers received broken?	Yes ☐	No ☑	
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Not Present			

Chain-of-Custody Record

Client: R.T. Hicks Consultants

Mailing Address: on file

Phone #: 505.266.5004

email or Fax#: andrew@rthicksconsult.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name: XTO Energy Nash Unit #29

Project #:

Project Manager: Andrew Parker

Sampler: Andrew Parker

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1211653	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F^-, Cl^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-})	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles (Y or N)
11.13.12	1254	soil	tank # 1 @ 8"	4oz glass	ice				↓	↓				↓		↓						
"	1256	"	tank # 2 @ 8"	"	"																	
"	1259	"	tank # 3 @ 8"	"	"																	
"	1303	"	tank # 4 @ 8"	"	"																	
"	1305	"	tank # 5 @ 8"	"	"																	
"	1311	"	BG # 1 @ 8"	"	"																	
"	1314	"	BG # 2 @ 8"	"	"																	
"	1317	"	BG # 3 @ 8"	"	"																	
"	1325	"	BG # 4 @ 8"	"	"																	
"	1327	"	BG # 5 @ 8"	"	"																	
"			Tank composite*			-001			X	X				X		X						
			Bio composite**			-002			X	X				X		X						

Date:	Time:	Relinquished by:	Received by:	Date	Time
11/14	10.50	Andrew	Michelle Gee	11/14/12	10:50
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks:
* Do not analyze point samples tank #1 - #5
** Do not analyze point samples Bio #1 → 5
Lab composite Tank #1-5; Lab composite Bio #1

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

CARDINAL Laboratories

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

February 18, 2013

ANDREW PARKER

R T HICKS CONSULTANTS

901 RIO GRANDE BLVD SUITE F-142

ALBUQUERQUE, NM 87104

RE: XTO NASH UNIT 29

Enclosed are the results of analyses for samples received by the laboratory on 02/13/13 7:00.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

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 (V1, 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:

R T HICKS CONSULTANTS
ANDREW PARKER
901 RIO GRANDE BLVD SUITE F-142
ALBUQUERQUE NM, 87104
Fax To: NONE

Received:	02/13/2013	Sampling Date:	02/11/2013
Reported:	02/18/2013	Sampling Type:	Soil
Project Name:	XTO NASH UNIT 29	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	UNIT 'J', SEC. 13, T23S, R29E		

Sample ID: SAMPLE TRENCH @ 2' BGS (H300404-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3480**	16.0	02/18/2013	ND	448	112	400	0.00	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**8010**	1.00	02/15/2013		476	95.2	500	0.752	

Sample ID: SAMPLE TRENCH @ 4' BGS (H300404-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2120**	16.0	02/18/2013	ND	416	104	400	3.77	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**6020**	1.00	02/15/2013		476	95.2	500	0.752	

Sample ID: SAMPLE TRENCH @ 6' BGS (H300404-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2000**	16.0	02/18/2013	ND	416	104	400	3.77	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**7050**	1.00	02/15/2013		476	95.2	500	0.752	

Cardinal Laboratories

*=Accredited Analyte

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

Celey D. Keene, Lab Director/Quality Manager

Cardinal Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name: R.T. Hicks Consultants	BILL TO
Project Manager: Andrew Parker	P.O. #:
Address:	Company: R.T. Hicks
City: State: Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner: Murchison	City:
Project Name: XTO Nash Unit 29	State: Zip:
Project Location: Unit 'J', Sec. 13, T23S, R29E	Phone #:
Sampler Name: Kristin Pope	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	Cl-	EC
#306404																
1	Sample trench @ 2' BGS	X	1			X							2.11.13	0840	X	X
2	Sample trench @ 4' BGS	X	1			X							"	0842	X	X
3	Sample trench @ 6' BGS	X	1			X							"	0850	X	X

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: Kristin Pope	Date: 3.13.13 Time: 0900	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #:
			REMARKS: email analyses to: andrew@rthicksconsult.com kristin @ "
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

55° #26

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

December 5, 2013

Mr. Mike Bratcher
NMOCD District 2
811 South First Street
Artesia, New Mexico 88210

RE: Nash Draw #29 modular impoundment final spill report. API No: 30-015-29434
2RP-1674

Mr. Bratcher:

R.T. Hicks Consultants is pleased to submit the enclosed Form C-141 "Release Notification and Correction Action" final report on the behalf of XTO Energy.

On September 23 - 27th, 2013; we performed reclamation activities in accordance with our remediation plan outline in the March 15 report. The remediation plan states:

> *XTO Energy proposes to excavate and dispose of the western third (30%) of the caliche pad that was in contact with the modular impoundment. The 30% area includes the release area and out beyond to the edge of the caliche pad. Plate 2 identifies the area proposed for remediation. The excavated material will be transported to R360 or equivalent for proper disposal.*
>
> *The remediated area will be contoured and seeded using BLM Seed Mixture Type 4 with Giant Sacaton seed added to the mixture. The excavated area is also subject to BLM's interim reclamation plan.*

Appendix A contains the C-141 Initial Report, dated March 15, 2013; which includes our remediation plan. Appendix B is a discussion on sampling and analysis during remedial activites. Appendix C contains the laboratory Certificate of Analysis. Photo documentation of remedial activities is located in Appendix D.

If you have any questions please contact me at 970-570-9535.

Sincerely,
R.T. Hicks Consultants
Durango Field Office

Andrew Parker

Cc: David Luna, XTO Energy, via email

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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

RECEIVED
DEC 09 2013
NMOCD ARTESIA

Form C-141
Revised August 8, 2011
Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

nMLB1404130906

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company XTO Energy, INC 5380	Contact David Luna
Address 200 W. Loraine, Ste 800 Midland TX, 79701	Telephone No. 432-620-6742
Facility Name Nash Draw #29	Facility Type Treated produced water modular impoundment

Surface Owner BLM	Mineral Owner	API No. 30-015-29434

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	13	23S	29E	1980	South	2310	East	Eddy

12/05/2013

Latitude N. 32.30322 Longitude W. 103.93719

NATURE OF RELEASE

Type of Release Treated and non-treated produced water	Volume of Release	Volume Recovered
Source of Release Modular Impoundment - western edge	Date and Hour of Occurrence	Date and Hour of Discovery 08/27/2012
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom? NA	
By Whom? NA	Date and Hour NA	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. NA	

If a Watercourse was Impacted, Describe Fully.*

NA

Describe Cause of Problem and Remedial Action Taken.*

On August 27th, 2012 the modular impoundment liner detached from the top of the tank along the western edge releasing approximately 3 barrels of treated produced water. Mr. Randy Green of XTO Energy mobilized water haul trucks to the site and lowered the water level to prevent further leakage and reattached the liner to the top of the tank. The water was transferred to Nash Draw 49 Hand Nash Draw Unit# 57 H for use in well stimulation. Soil sampling was conducted per C-144 closure requirements.

Describe Area Affected and Cleanup Action Taken.*

The release affected the southwest corner of the production pad, adjacent to the modular impoundment. The area of impact was approximately 15 X15 square feet. No cleanup action was taken due to limited access caused by the location of the modular impoundment along the edge of the production pad; beyond the modular impoundment heavy mosquito vegetation exists. On October 23 - 27, 2013; remedial activities were performed according to spill report submitted on March 18, 2013 (Release ID: 2RP-1674). Appendix B discusses remedial activities.

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.

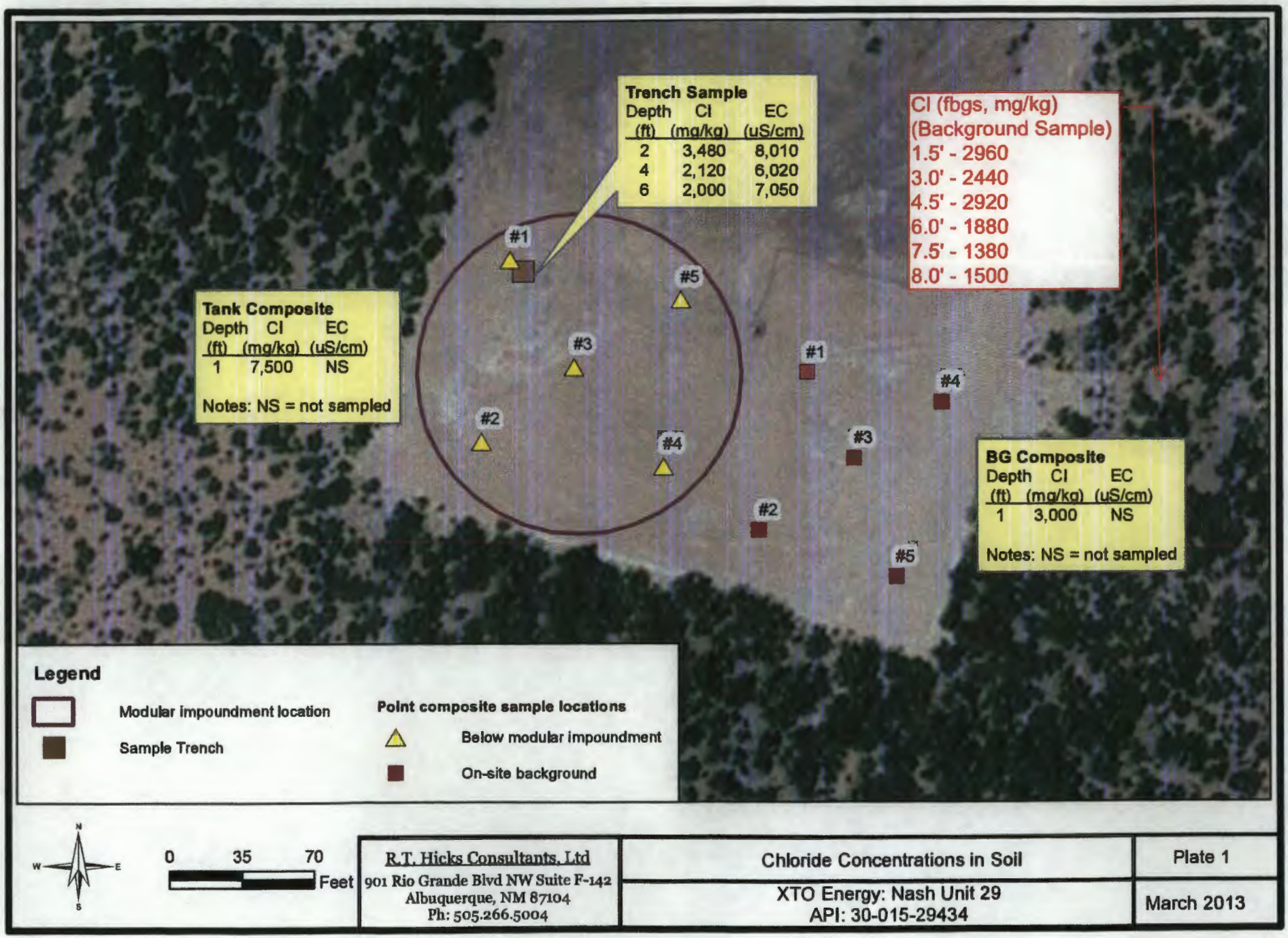
Signature: David Luna	OIL CONSERVATION DIVISION Signed By Mike Bratcher
Printed Name: David Luna	Approved by Environmental Specialist:
Title: Operations Engineer	Approval Date: JAN 14 2014 Expiration Date: N/A
E-mail Address: David_Luna@xtoenergy.com	Conditions of Approval: N/A - Final ☐ Attached
Date: 12/05/2013 Phone: 432-620-6742	

* Attach Additional Sheets If Necessary

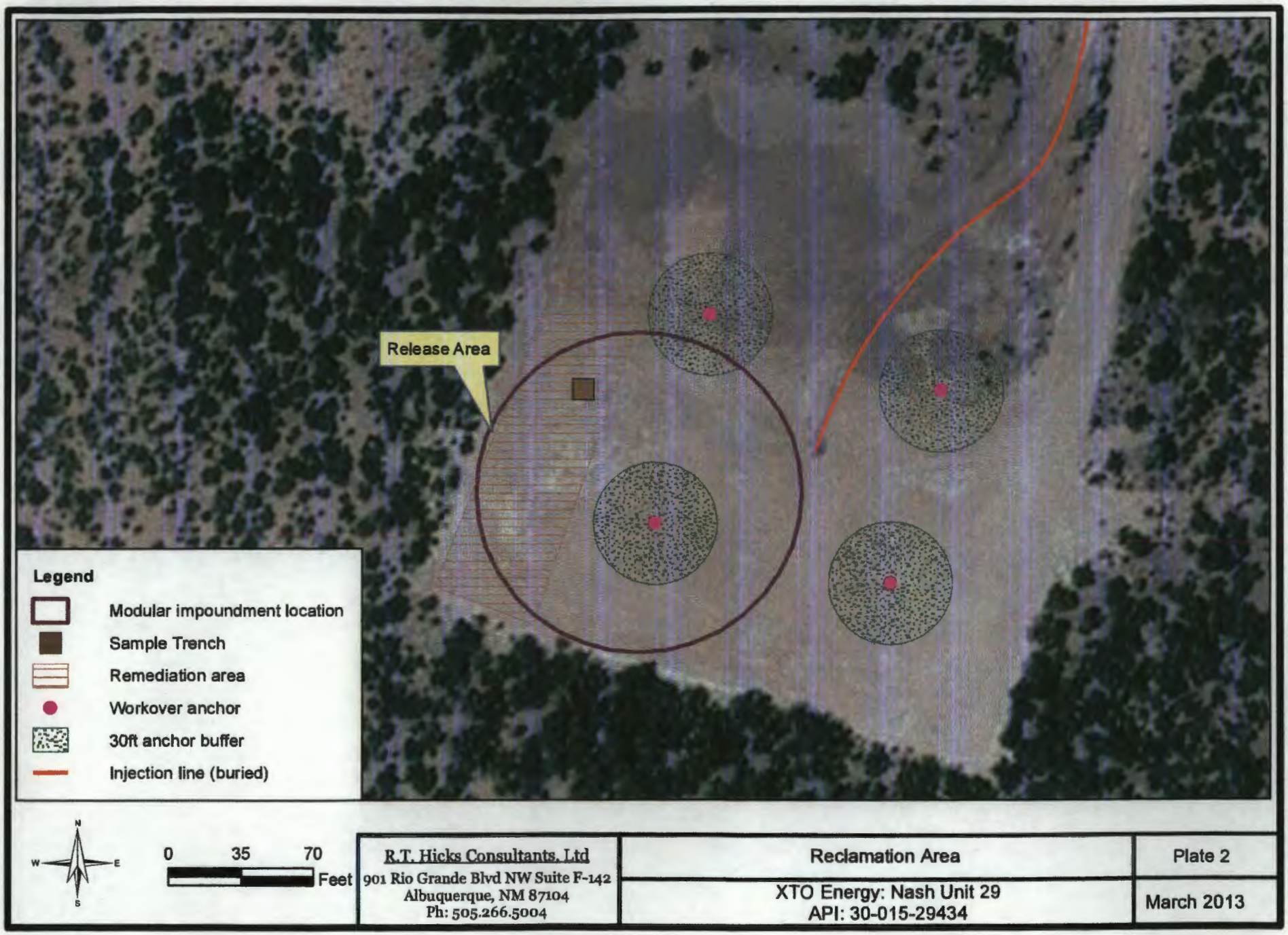
2RP-1674

Plates

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Chloride Concentrations in Soil	Plate 1
	XTO Energy: Nash Unit 29 API: 30-015-29434	March 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Reclamation Area	Plate 2
	XTO Energy: Nash Unit 29 API: 30-015-29434	March 2013

Appendix A

C-141 Initial Report

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

March 15, 2013

Mr. Mike Bratcher
NMOCD District 2
811 South First Street
Artesia, New Mexico 88210

Mr. Brad Jones
NMOCD
1220 S. St. Francis Drive
Santa Fe, NM

RE: Nash Draw Unit #29 modular impoundment spill report. API No: 30-015-29434

Dear Sirs:

R.T. Hicks Consultants is pleased to submit the enclosed Form C-141 Release Notification and Correction Action on the behalf of XTO Energy.

The release from the modular impoundment was brought to our attention during the submittal of the C-144 Closure Report submitted to Mr. Bratcher, via email, on December 17, 2012.

We will revise the C-144 closure report to include results of the remediation plan that is the subject of this spill report. Included in the revision, per request of Mr. Jones, will be the inclusion of the entire C-144 permit application and correction to applicable dates and signatures.

We will submit the report to Mr. Jones with a copy to Mr. Bratcher. Both submittals will be delivered via certified mail/return receipt.

If you have any questions please contact me at 970-570-9535.

Sincerely,
R.T. Hicks Consultants
Durango Field Office

Andrew Parker

Cc: David Luna, XTO Energy, via email
Jennifer Van Curen, BLM - Carlsbad Field Office, via certified mail/return receipt

RECEIVED
MAR 25 2013
NMOCD ARTESIA

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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 August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

nMLB1401430906

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company XTO Energy, Inc 5380	Contact David Luna
Address 200 N. Loraine, Suite 800 Midland, TX 79701	Telephone No. 432-620-6742
Facility Name Nash Unit #29	Facility Type Treated produced water modular impoundment

Surface Owner BLM	Mineral Owner	API No. 30-015-29434

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	13	23S	29E	1980	SOUTH	2310	EAST	EDDY

Latitude N 32.30322 Longitude W 103.93719

NATURE OF RELEASE

Type of Release Treated and non-treated produced water	Volume of Release < 5 bbls	Volume Recovered None
Source of Release Modular Impoundment - western edge	Date and Hour of Occurrence 8/27/12	Date and Hour of Discovery 8/27/12
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom? NA	
By Whom? NA	Date and Hour NA	
Was a Watercourse Reached? X ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. NA	

If a Watercourse was Impacted, Describe Fully.*

NA

Describe Cause of Problem and Remedial Action Taken.*

On August 27th, 2012 the modular impoundment liner detached from the top of the tank along the western edge releasing approximately 3 barrels of treated produced water. Mr. Randy Green of XTO Energy mobilized water haul trucks to the site and lowered the water level to prevent further leakage and reattached the liner to the top of the tank. The water was transferred to Nash Draw 49 H and Nash Draw Unit # 57 H. Soil sampling was conducted per C-144 closure requirements. The attached document presents the sampling results and proposes a remediation plan.

Describe Area Affected and Cleanup Action Taken.*

The release affected the southwest corner of the production pad, adjacent to the modular impoundment. The area of impact was approximately 15 X15 square feet. No cleanup action was taken due to limited access caused by the location of the modular impoundment along the edge of the production pad; beyond the modular impoundment heavy mesquite vegetation exists.

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: David Luna

Printed Name: David Luna

Title: Operations Engineer

E-mail Address: David_Luna@xtoenergy.com

Date: 3/15/13 Phone: 432-620-6742

* Attach Additional Sheets If Necessary

OIL CONSERVATION DIVISION

Signed By Mike Bratcher

Approved by Environmental Specialist:

Approval Date: MAY 31 2013 Expiration Date:

Conditions of Approval:

Remediation per OCD Rule & Guidelines. SUBMIT REMEDIATION PROPOSAL NO LATER THAN: 7/1/2013

Attached ☐

2RP-1674

Soil Chemistry

On November 13, 2012, Hicks Consultants collected two 5-point soil samples on location for closure of the modular impoundment employed for hydraulic fracturing of five wells in 2012. On February 11, 2013 Hicks Consultants performed additional characterization to determine the vertical extent of chloride in soil near the western edge of the former modular impoundment, near the area of the reported release.

The location and chloride chemistry of the samples are presented on Plate 1. The chemistry is summarized in Table 1, below. Table 2 shows the lithology of the "Trench Sample". The laboratory certificate of analysis is attached.

The point samples for the Tank Composite and BG Composite were collected approximately two inches below the caliche pad/soil interface at a depth of approximately 1-foot. The Trench Sample consisted of discrete samples at 2, 4, and 6 foot depths.

Figure 1: Summary of soil chemistry

Sample ID	Date	Depth (ft)	Chloride mg/kg	EC uS/cm	Benzene mg/kg	BTEX mg/kg	TPH mg/kg	GRO/DRO mg/kg
NMAC 19.15.17.13.B(1).b			500 or background		0.2	50	2,500	500
Tank Composite	11/13/2012	1	7,500	NS	<0.49	ND	<20	<10
BG Composite	11/13/2012	1	3,000	NS	<0.49	ND	<20	<10
Trench Sample	2/11/2013	2	3,480	8,010	NS	NS	NS	NS
Trench Sample	2/11/2013	4	2,120	3,020	NS	NS	NS	NS
Trench Sample	2/11/2013	6	2,000	7,050	NS	NS	NS	NS

Notes

1. ND = non-detect
2 NS = not sampled

Figure 2: Lithology of Trench Sample

Depth (ft)	Description
0 - 1	Caliche pad
1 - 4	Top soil (loamy sand), dark brown, moist
4 - 6	Top soil, reddish brown, moist
6	Medim sand w/caliche, hard, brown, moist

Note: native hard caliche was observed below 6 feet.

The Tank Composite sample with a chloride concentration of 7,500 mg/kg indicates production activities have impacted the western half of the caliche pad. The BG Composite sample has a chloride concentration comparable to the Trench Sample at the 2 foot depth (3,480 mg/kg). Soil chloride concentrations at the Trench Sample that is within the area of the Tank Composite sample show chloride concentrations are decreasing with depth, from 3,480 mg/kg at 2 feet to 2,000 mg/kg at 6 feet and indicate that the majority of chloride impairment is limited to the production pad surface.

The chemistry and lithology of the Trench Sample suggests that:

- the moist soil at a depth of 6 feet, which exhibits 2,000 mg/kg chloride, is likely impacted by shallow groundwater wicking up from the underlying brine groundwater zone,
- the moist soil near the surface (Trench Sample) is likely from recent precipitation events and past releases at the site, and
- soil at depths from 1 to 5 feet below surface have chloride and EC concentrations that will support vegetation. Re-vegetating the impacted area is included in the remediation plan and also satisfies BLM's request for interim reclamation.

The remediation plan is presented below.

Remediation Plan

XTO Energy proposes to excavate and dispose of the western third (30%) of the caliche pad that was in contact with the modular impoundment. The 30% area includes the release area and out beyond to the edge of the caliche pad. Plate 2 identifies the area proposed for remediation. The excavated material will be transported to R360 or equivalent for proper disposal.

The remediated area will be contoured and seeded using BLM Seed Mixture Type 4 with Giant Sacaton seed added to the mixture. The excavated area is also subject to BLM's interim reclamation plan.

Appendix B

Discussion of Sampling Results

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

APPENDIX B

SUMMARY OF BACKGROUND SAMPLING RESULTS

Between November 13, 2012 and June 24, 2013, soil samples were obtained to determine the magnitude, extent, and background hydrocarbon and chloride concentrations associated with the reported release. Table 1 summarizes the results of soil sampling. Plate 1 shows the locations of the soil samples.

Table 1: Soil chemistry summary results

Sample ID	Date	Depth (ft)	Chloride mg/kg	EC uS/cm	Benzene mg/kg	BTEX mg/kg	TPH mg/kg	GRO/DRO mg/kg
NMAC 19.15.17.13.B(1).b			500 or background		0.2	50	2,500	500
Tank Composite	11/13/2012	1.0	7,500	NS	<0.49	ND	<20	<10
BG Composite	11/13/2012	1.0	3,000	NS	<0.49	ND	<20	<10
Trench Sample	2/11/2013	2.0	3,480	8,010	NS	NS	NS	NS
Trench Sample	2/11/2013	4.0	2,120	3,020	NS	NS	NS	NS
Trench Sample	2/11/2013	6.0	2,000	7,050	NS	NS	NS	NS
Background Sample	6/24/2013	1.5	2,960	NS	NS	NS	NS	NS
Background Sample	6/24/2013	3.0	2,440	NS	NS	NS	NS	NS
Background Sample	6/24/2013	4.5	2,920	NS	NS	NS	NS	NS
Background Sample	6/24/2013	6.0	1,880	NS	NS	NS	NS	NS
Background Sample	6/24/2013	7.5	1,380	NS	NS	NS	NS	NS
Background Sample	6/24/2013	8.0	1,500	NS	NS	NS	NS	NS

Notes

1. ND = non-detect
2. NS = not sampled

On November 13, 2012, Hicks Consultants collected two on-site 5-point composite soil samples for closure of the modular impoundment employed for hydraulic fracturing of five wells in 2012.

The point samples for the Tank Composite and BG Composite were collected approximately two inches below the caliche pad/soil interface at a depth of approximately 1-foot. The Trench Sample consisted of discrete samples at 2, 4, and 6 foot depths. Table 2 summarizes the lithology of the Trench Sample.

Table 2: Lithology of Trench Sample

Depth (ft)	Description
0 - 1	Caliche pad
1 - 4	Top soil (loamy sand), dark brown, moist
4 - 6	Top soil, reddish brown, moist
6	Medim sand w/caliche, hard, brown, moist

Note: native hard caliche was observed below 6 feet.

The Tank Composite sample with a chloride concentration of 7,500 mg/kg (see Table 1) indicates production activities have impacted the western half of the caliche pad. The BG Composite sample has a chloride concentration comparable to the Trench Sample at the 2 foot depth (3,480 mg/kg).

On February 11, 2013; in support of the C-141 initial report submission, Hicks Consultants performed additional characterization to determine the vertical extent of chloride in soil near the western edge of the former modular impoundment, in proximity of the reported release. The "Trench Sample" identified in Table 1 and on Plate 1 represents the February 2013 sample.

Soil chloride concentrations at the Trench Sample (collected within the area of the Tank Composite sample) show chloride concentrations are decreasing with depth, from 3,480 mg/kg at 2 feet to 2,000 mg/kg at 6 feet and indicate that the majority of chloride impairment is limited to the production pad surface.

On June 24, 2013 we sampled an off-site background location (Background Sample) per C-141/Part 29 approval conditions/stipulations for release event 2RP-1674. The background location was located in an area not impacted by past or current production activities.

Table 3: Chloride concentration comparison between an on-site and off-site (background)

	Chloride (mg/kg)	
Depth (+/- 0.5 ft)	Trench Sample	Background Sample
1.5 - 2	3,480	2,960
4	2,120	2,920
6	2,000	1,880

Comparing the on-site Trench Sample (Table 3) to the off-site Background Sample at depths below 2-feet bgs, the on-site chloride concentrations are either near or lower than off-site background concentrations.

The chemistry and lithology of the trench samples suggest that:

- the moist soil at a depth of 6 feet, which exhibits approximately 2,000 mg/kg chloride, is likely impacted by shallow groundwater wicking up from the underlying brine groundwater zone,
- the moist soil near the surface (Trench Sample) was likely from recent precipitation events and past releases at the site,
- soil at depths from 1 to 5 feet below surface have chloride and EC concentrations that will support vegetation. Re-vegetation of the impacted area is included in the C-141 remediation plan and also satisfies BLM's request for interim reclamation, and
- the eastern portion of the location is not measurably impaired by production activities as the BG sample result (3,000 mg/kg) is not different from the background samples

Removing the upper 2-feet of soil within the remediation area as shown on Plate 2 will remediate the observed higher chlorides and allow for vegetation.

Appendix C

Certificate of Analyses

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 29, 2012

Andrew Parker
R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: XTO Energy Nash Unit 29 OrderNo.: 1211653

Dear Andrew Parker:

Hall Environmental Analysis Laboratory received 2 sample(s) on 11/14/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Tank Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-001 **Matrix:** SOIL **Received Date:** 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/20/2012 6:22:22 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/20/2012 6:22:22 AM
Surr: DNOP	102	77.6-140		%REC	1	11/20/2012 6:22:22 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/16/2012 2:32:25 PM
Surr: BFB	108	84-116		%REC	1	11/16/2012 2:32:25 PM
EPA METHOD 300.0: ANIONS						Analyst: **JRR**
Chloride	7500	300		mg/Kg	200	11/20/2012 6:54:44 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Toluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Naphthalene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1-Methylnaphthalene	ND	0.19		mg/Kg	1	11/21/2012 7:19:43 PM
2-Methylnaphthalene	ND	0.19		mg/Kg	1	11/21/2012 7:19:43 PM
Acetone	ND	0.73		mg/Kg	1	11/21/2012 7:19:43 PM
Bromobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromodichloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromoform	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Bromomethane	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
2-Butanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Carbon disulfide	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Carbon tetrachloride	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Chlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Chloroethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Chloroform	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Chloromethane	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
2-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
cis-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dibromo-3-chloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Dibromochloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Dibromomethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Tank Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-001 **Matrix:** SOIL **Received Date:** 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloroethane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloroethene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,3-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
2,2-Dichloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,1-Dichloropropene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Hexachlorobutadiene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
2-Hexanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Isopropylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Isopropyltoluene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	11/21/2012 7:19:43 PM
Methylene chloride	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
n-Butylbenzene	ND	0.15		mg/Kg	1	11/21/2012 7:19:43 PM
n-Propylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
sec-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Styrene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
tert-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
trans-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,3-Trichlorobenzene	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Trichlorofluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
1,2,3-Trichloropropane	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Vinyl chloride	ND	0.049		mg/Kg	1	11/21/2012 7:19:43 PM
Xylenes, Total	ND	0.097		mg/Kg	1	11/21/2012 7:19:43 PM
Surr: 1,2-Dichloroethane-d4	93.2	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: 4-Bromofluorobenzene	92.4	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: Dibromofluoromethane	90.7	70-130		%REC	1	11/21/2012 7:19:43 PM
Surr: Toluene-d8	101	70-130		%REC	1	11/21/2012 7:19:43 PM
EPA METHOD 418.1: TPH						Analyst: **LRW**
Petroleum Hydrocarbons, TR	ND	20		mg/Kg	1	11/21/2012

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: BG Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-002
Matrix: SOIL
Received Date: 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/20/2012 8:28:08 AM
Motor Oil Range Organics (MRO)	ND	51		mg/Kg	1	11/20/2012 8:28:08 AM
Surr: DNOP	98.6	77.6-140		%REC	1	11/20/2012 8:28:08 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/16/2012 3:01:11 PM
Surr: BFB	101	84-116		%REC	1	11/16/2012 3:01:11 PM
EPA METHOD 300.0: ANIONS						Analyst: **JRR**
Chloride	3000	150		mg/Kg	100	11/20/2012 7:07:09 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Toluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Methyl tert-butyl ether (MTBE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,4-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,3,5-Trimethylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichloroethane (EDC)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dibromoethane (EDB)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Naphthalene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1-Methylnaphthalene	ND	0.20		mg/Kg	1	11/21/2012 7:48:47 PM
2-Methylnaphthalene	ND	0.20		mg/Kg	1	11/21/2012 7:48:47 PM
Acetone	ND	0.74		mg/Kg	1	11/21/2012 7:48:47 PM
Bromobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromodichloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromoform	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Bromomethane	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
2-Butanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Carbon disulfide	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Carbon tetrachloride	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Chlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Chloroethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Chloroform	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Chloromethane	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
2-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Chlorotoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
cis-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
cis-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dibromo-3-chloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Dibromochloromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Dibromomethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: BG Composite
Project: XTO Energy Nash Unit 29
Collection Date: 11/13/2012
Lab ID: 1211653-002
Matrix: SOIL
Received Date: 11/14/2012 10:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
1,3-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,4-Dichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Dichlorodifluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloroethane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloroethene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,3-Dichloropropane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
2,2-Dichloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,1-Dichloropropene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Hexachlorobutadiene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
2-Hexanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Isopropylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Isopropyltoluene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
4-Methyl-2-pentanone	ND	0.49		mg/Kg	1	11/21/2012 7:48:47 PM
Methylene chloride	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
n-Butylbenzene	ND	0.15		mg/Kg	1	11/21/2012 7:48:47 PM
n-Propylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
sec-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Styrene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
tert-Butylbenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,1,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,2,2-Tetrachloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Tetrachloroethene (PCE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
trans-1,2-DCE	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
trans-1,3-Dichloropropene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,3-Trichlorobenzene	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,4-Trichlorobenzene	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,1-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,1,2-Trichloroethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Trichloroethene (TCE)	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Trichlorofluoromethane	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
1,2,3-Trichloropropane	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Vinyl chloride	ND	0.049		mg/Kg	1	11/21/2012 7:48:47 PM
Xylenes, Total	ND	0.099		mg/Kg	1	11/21/2012 7:48:47 PM
Surr: 1,2-Dichloroethane-d4	94.2	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: 4-Bromofluorobenzene	87.7	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: Dibromofluoromethane	91.6	70-130		%REC	1	11/21/2012 7:48:47 PM
Surr: Toluene-d8	105	70-130		%REC	1	11/21/2012 7:48:47 PM
EPA METHOD 418.1: TPH						Analyst: **LRW**
Petroleum Hydrocarbons, TR	ND	20		mg/Kg	1	11/21/2012

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4894**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **4894**	RunNo: **7001**
Prep Date: **11/19/2012**	Analysis Date: **11/19/2012**	SeqNo: **202928** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID **LCS-4894**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **4894**	RunNo: **7001**
Prep Date: **11/19/2012**	Analysis Date: **11/19/2012**	SeqNo: **202929** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4901**	SampType: **MBLK**	TestCode: **EPA Method 418.1: TPH**
Client ID: **PBS**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203589** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	ND	20								

Sample ID **LCS-4901**	SampType: **LCS**	TestCode: **EPA Method 418.1: TPH**
Client ID: **LCSS**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203590** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	100	20	100.0	0	104	80	120			

Sample ID **LCSD-4901**	SampType: **LCSD**	TestCode: **EPA Method 418.1: TPH**
Client ID: **LCSS02**	Batch ID: **4901**	RunNo: **7021**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **203591** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	110	20	100.0	0	106	80	120	1.28	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4900**	SampType: **MBLK**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202423** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.9		10.00		98.8	77.6	140			

Sample ID **LCS-4900**	SampType: **LCS**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202424** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	47.4	122			
Surr: DNOP	4.0		5.000		80.2	77.6	140			

Sample ID **1211653-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **Tank Composite**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202426** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.97	0	106	12.6	148			
Surr: DNOP	4.8		5.097		94.6	77.6	140			

Sample ID **1211653-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **Tank Composite**	Batch ID: **4900**	RunNo: **6989**
Prep Date: **11/19/2012**	Analysis Date: **11/20/2012**	SeqNo: **202569** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	51.18	0	104	12.6	148	0.773	22.5	
Surr: DNOP	5.1		5.118		98.8	77.6	140	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **MB-4851** SampType: **MBLK** TestCode: **EPA Method 8015B: Gasoline Range**

Client ID: **PBS** Batch ID: **4851** RunNo: **6951**

Prep Date: **11/15/2012** Analysis Date: **11/16/2012** SeqNo: **202014** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		99.3	84	116			

Sample ID **LCS-4851** SampType: **LCS** TestCode: **EPA Method 8015B: Gasoline Range**

Client ID: **LCSS** Batch ID: **4851** RunNo: **6951**

Prep Date: **11/15/2012** Analysis Date: **11/16/2012** SeqNo: **202015** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	97.3	74	117			
Surr: BFB	1000		1000		104	84	116			

Sample ID **1211653-001AMS** SampType: **MS** TestCode: **EPA Method 8015B: Gasoline Range**

Client ID: **Tank Composite** Batch ID: **4851** RunNo: **6951**

Prep Date: **11/15/2012** Analysis Date: **11/16/2012** SeqNo: **202020** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	4.9	24.63	0	118	70	130			
Surr: BFB	1100		985.2		109	84	116			

Sample ID **1211653-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015B: Gasoline Range**

Client ID: **Tank Composite** Batch ID: **4851** RunNo: **6951**

Prep Date: **11/15/2012** Analysis Date: **11/16/2012** SeqNo: **202021** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	5.0	24.75	0	118	70	130	0.0876	22.1	
Surr: BFB	1100		990.1		109	84	116	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1211653**

Hall Environmental Analysis Laboratory, Inc.

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **mb-4851**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**	
Client ID: **PBS**	Batch ID: **4851**	RunNo: **7060**	
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204634**	Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.10								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.10								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.10								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **mb-4851**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBS**	Batch ID: **4851**	RunNo: **7060**
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204634** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		93.2	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.4	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.3	70	130			
Surr: Toluene-d8	0.52		0.5000		103	70	130			

Sample ID **lcs-4851**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSS**	Batch ID: **4851**	RunNo: **7060**
Prep Date: **11/15/2012**	Analysis Date: **11/21/2012**	SeqNo: **204635** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.050	1.000	0	101	70	130			
Toluene	1.1	0.050	1.000	0	108	80	120			
Chlorobenzene	1.0	0.050	1.000	0	101	70	130			
1,1-Dichloroethene	1.1	0.050	1.000	0	110	74	124			
Trichloroethene (TCE)	0.88	0.050	1.000	0	87.9	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		86.1	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **lcs-4851** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **LCSS** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204635** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.47		0.5000		93.7	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Sample ID **1211653-002ams** SampType: **MS** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **BG Composite** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204638** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.049	0.9804	0	92.9	80.9	118			
Toluene	0.95	0.049	0.9804	0	97.4	69.5	119			
Chlorobenzene	0.87	0.049	0.9804	0	88.9	75.7	115			
1,1-Dichloroethene	0.99	0.049	0.9804	0.01122	100	68.6	126			
Trichloroethene (TCE)	0.81	0.049	0.9804	0	82.4	68.7	115			
Surr: 1,2-Dichloroethane-d4	0.47		0.4902		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.42		0.4902		85.6	70	130			
Surr: Dibromofluoromethane	0.47		0.4902		95.4	70	130			
Surr: Toluene-d8	0.50		0.4902		102	70	130			

Sample ID **1211653-002amsd** SampType: **MSD** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **BG Composite** Batch ID: **4851** RunNo: **7060**

Prep Date: **11/15/2012** Analysis Date: **11/21/2012** SeqNo: **204639** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.049	0.9891	0	93.3	80.9	118	1.30	20	
Toluene	0.98	0.049	0.9891	0	98.8	69.5	119	2.28	20	
Chlorobenzene	0.88	0.049	0.9891	0	89.3	75.7	115	1.32	20	
1,1-Dichloroethene	1.0	0.049	0.9891	0.01122	99.6	68.6	126	0.357	24.8	
Trichloroethene (TCE)	0.82	0.049	0.9891	0	83.3	68.7	115	1.99	20	
Surr: 1,2-Dichloroethane-d4	0.47		0.4946		95.9	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.41		0.4946		83.4	70	130	0	0	
Surr: Dibromofluoromethane	0.48		0.4946		96.6	70	130	0	0	
Surr: Toluene-d8	0.51		0.4946		104	70	130	0	0	

Sample ID **mb-4881** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**

Client ID: **PBS** Batch ID: **4881** RunNo: **7060**

Prep Date: **11/19/2012** Analysis Date: **11/21/2012** SeqNo: **204640** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		93.5	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		88.8	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.1	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1211653**

29-Nov-12

Client: R.T. Hicks Consultants, LTD

Project: XTO Energy Nash Unit 29

Sample ID **lcs-4881**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSS**	Batch ID: **4881**	RunNo: **7060**
Prep Date: **11/19/2012**	Analysis Date: **11/21/2012**	SeqNo: **204641** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.6	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.1	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		92.8	70	130			
Surr: Toluene-d8	0.53		0.5000		106	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: RT HICKS Work Order Number: 1211653

Received by/date: MG 11/14/12

Logged By: Anne Thorne 11/14/2012 10:50:00 AM Ann Thorne

Completed By: Anne Thorne 11/19/2012 Ann Thorne

Reviewed By: A 11/19/12

Chain of Custody

1. Were seals intact? Yes ☐ No ☐ Not Present ☑
2. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
3. How was the sample delivered? Client

Log In

4. Coolers are present? (see 19. for cooler specific information) Yes ☐ No ☐ NA ☑
5. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
7. Sample(s) in proper container(s)? Yes ☑ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
10. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
11. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
12. Were any sample containers received broken? Yes ☐ No ☑
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
14. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
15. Is it clear what analyses were requested? Yes ☑ No ☐
16. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Not Present			

Chain-of-Custody Record

Client: R.T. Hicks Consultants

Mailing Address: cc file

Phone #: 505.266.5004

email or Fax#: andrew@rthicksconsult.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name: XTO Energy Nash Unit #29

Project #:

Project Manager: Andrew Packer

Sampler: Andrew Packer

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1211755	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F^-, Cl^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-})	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles (Y or N)
11.13.12	1254	soil	tank # 1 @ 8"	4oz glass	ice				↓	↓				↓		↓						
"	1256	"	tank # 2 @ 8"	"	"																	
"	1259	"	tank # 3 @ 8"	"	"																	
"	1303	"	tank # 4 @ 8"	"	"																	
"	1305	"	tank # 5 @ 8"	"	"																	
"	1311	"	BG # 1 @ 8"	"	"																	
"	1314	"	BG # 2 @ 8"	"	"																	
"	1317	"	BG # 3 @ 8"	"	"																	
"	1325	"	BG # 4 @ 8"	"	"																	
"	1327	"	BG # 5 @ 8"	"	"																	
"			Tank composite*			-001			X	X				X		X						
			Bb composite **			-002			X	X				X		X						

Date: 11/14 Time: 10.50 Relinquished by: Andrew Packer

Received by: Date 11/14/12 Time 10:50

Date: Time: Relinquished by:

Received by: Date Time

Remarks:
* Do not analyze point samples tank #1 - #5
** Do not analyze point samples Bb #1 → 5
Lab composite Tank #1-5; Lab composite Bb #1

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

CARDINAL Laboratories

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

February 18, 2013

ANDREW PARKER

R T HICKS CONSULTANTS

901 RIO GRANDE BLVD SUITE F-142

ALBUQUERQUE, NM 87104

RE: XTO NASH UNIT 29

Enclosed are the results of analyses for samples received by the laboratory on 02/13/13 7:00.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

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 (V1, 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:

R T HICKS CONSULTANTS
ANDREW PARKER
901 RIO GRANDE BLVD SUITE F-142
ALBUQUERQUE NM, 87104
Fax To: NONE

Received:	02/13/2013	Sampling Date:	02/11/2013
Reported:	02/18/2013	Sampling Type:	Soil
Project Name:	XTO NASH UNIT 29	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	UNIT 'J', SEC. 13, T23S, R29E		

Sample ID: SAMPLE TRENCH @ 2' BGS (H300404-01)

Chloride, SM4S00Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3480**	16.0	02/18/2013	ND	448	112	400	0.00	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**8010**	1.00	02/15/2013		476	95.2	500	0.752	

Sample ID: SAMPLE TRENCH @ 4' BGS (H300404-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2120**	16.0	02/18/2013	ND	416	104	400	3.77	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**6020**	1.00	02/15/2013		476	95.2	500	0.752	

Sample ID: SAMPLE TRENCH @ 6' BGS (H300404-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2000**	16.0	02/18/2013	ND	416	104	400	3.77	

Conductivity 120.1 uS/cm **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Conductivity*	**7050**	1.00	02/15/2013		476	95.2	500	0.752	

Cardinal Laboratories *=Accredited Analyte

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

Celey D. Keene, Lab Director/Quality Manager

Cardinal Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	R.T. Hicks Consultants
Project Manager:	Andrew Parker
Address:	
City:	State: Zip:
Phone #:	Fax #:
Project #:	Project Owner: Murchison
Project Name:	XTO Nash Unit 29
Project Location:	Unit 'J', Sec. 13, T23S, R29E
Sampler Name:	Kristin Pope

BILL TO

P.O. #:	
Company:	R.T. Hicks
Attn:	
Address:	
City:	
State: Zip:	
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	Cl-	EC
H30040																
1	Sample trench @ 2' BGS	X	1			X							2.11.13	0840	X	X
2	Sample trench @ 4' BGS	X	1			X							"	0842	X	X
3	Sample trench @ 6' BGS	X	1			X							"	0850	X	X

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: Kristin Pope	Date: 2.13.13 Time: 0900	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #: REMARKS: email analyses to: andrew@rthicksconsult.com kristin @ "

Delivered By: (Circle One) Sampler - UPS - Bus - Other:

Sample Condition: Cool ☑ Yes ☐ No; Intact ☐ Yes ☐ No

CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

5.5° C #2

CARDINAL Laboratories

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

June 28, 2013

KRISTIN POPE

R T HICKS CONSULTANTS

901 RIO GRANDE BLVD SUITE F-142

ALBUQUERQUE, NM 87104

RE: XTO NASH UNIT 29

Enclosed are the results of analyses for samples received by the laboratory on 06/26/13 8:00.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

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 (V1, 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:

R T HICKS CONSULTANTS
KRISTIN POPE
901 RIO GRANDE BLVD SUITE F-142
ALBUQUERQUE NM, 87104
Fax To: NONE

Received:	06/26/2013	Sampling Date:	06/24/2013
Reported:	06/28/2013	Sampling Type:	Soil
Project Name:	XTO NASH UNIT 29	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	UNIT 'J', SEC. 13, T23S, R29E		

Sample ID: BACKGROUND @ 1.5' (H301491-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2960**	16.0	06/28/2013	ND	448	112	400	3.64	

Sample ID: BACKGROUND @ 3' (H301491-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2440**	16.0	06/28/2013	ND	448	112	400	3.64	

Sample ID: BACKGROUND @ 4.5' (H301491-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2920**	16.0	06/28/2013	ND	448	112	400	3.64	

Sample ID: BACKGROUND @ 6' (H301491-04)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1880**	16.0	06/28/2013	ND	448	112	400	3.64	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

R T HICKS CONSULTANTS
KRISTIN POPE
901 RIO GRANDE BLVD SUITE F-142
ALBUQUERQUE NM, 87104
Fax To: NONE

Received:	06/26/2013	Sampling Date:	06/24/2013
Reported:	06/28/2013	Sampling Type:	Soil
Project Name:	XTO NASH UNIT 29	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	UNIT 'J', SEC. 13, T23S, R29E		

Sample ID: BACKGROUND @ 7.5' (H301491-05)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1380**	16.0	06/28/2013	ND	448	112	400	3.64	

Sample ID: BACKGROUND @ 8' (H301491-06)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1500**	16.0	06/28/2013	ND	448	112	400	3.64	

Cardinal Laboratories

*=Accredited Analyte

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

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	R.T. Hicks Consultants	BILL TO	
Project Manager:	Kristin Pope	P.O. #:	
Address:		Company:	RT Hicks
City:	State: Zip:	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner: XTO	City:	
Project Name:	XTO Nash Draw 29	State: Zip:	
Project Location:	Eddy County	Phone #:	
Sampler Name:	K. Pope	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	Cl-
H301491															
1	Background @ 1.5'	G	1			~							06243		
2	" 3'		1										"		
3	" 4.5'		1										"		
4	" 6'		1										"		
5	" 7.5'		1										"		
6	" 8'		1										"		

Relinquished By: Kristin Pope	Date: 06263 Time: 0700	Received By: Douglas Pope	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By: Jodi Henson	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	5° C	Sample Condition Cool: ☐ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)

REMARKS: Email to andrew@rthicksconsult.com and kristin @ "

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

#54

Appendix D

Photo Documentation

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Figure 1: Stockpiling chloride impacted caliche near western 1/3 of location pad.

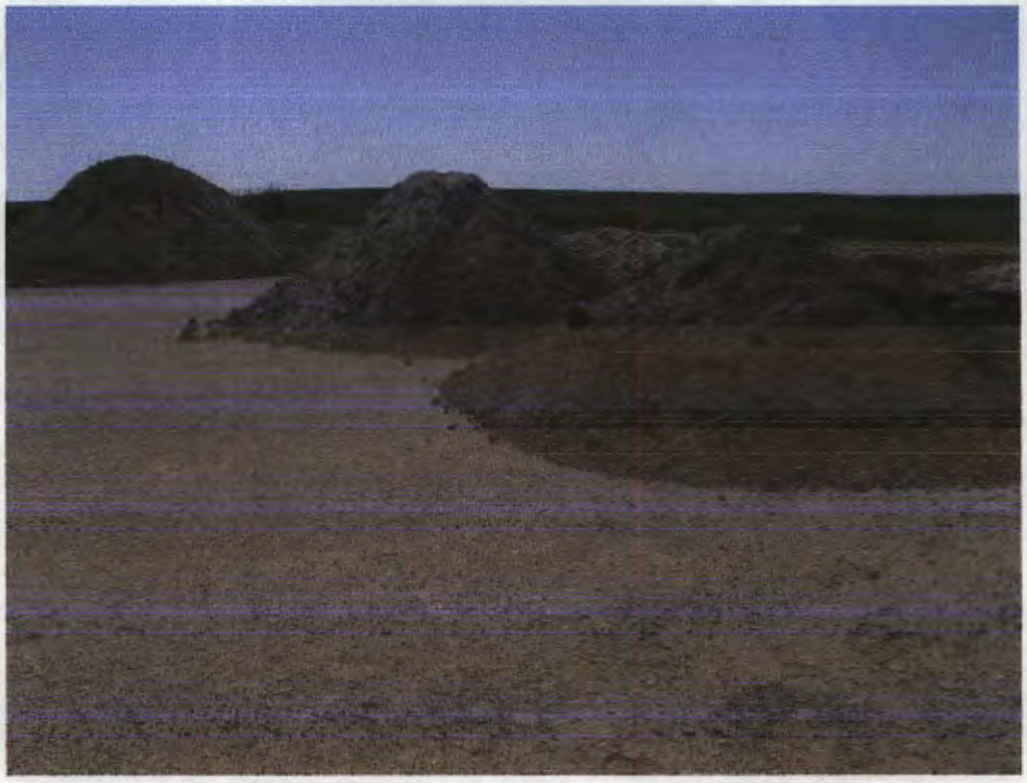


Figure 2: Stockpiled imapcted caclihe (two right soil piles) waiting transport to R360. The far left soil pile (background) is clean soil to be used for BLM interim reclamation activities.

Figure 3: Stockpiled chloride impacted caliche being loaded for trasnport to R360.

Figure 4: Western 1/3 of caliche pad removed and ready for ripping and seeding. Portions of the caliche pad were included in BLM interim reclamation activities.

Figure 5: Photo of remediated western 1/3 of caliche pad, viewing north. Area was ripped and seeded with BLM seed mixture #4 and Alkali Sacaton.

APPENDIX E

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Friday, October 12, 2012 12:06 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'Jones, Brad A., EMNRD'; 'David_Luna@xtoenergy.com'
Subject: 72-hour Notice of Closure for Nash Unit #29 Modular Impoundment

Mike:

Please accept this email as the 72-hour notice to NMOCD for closure of the Nash Unit #29 Modular Impoundment located in Section 13 T23S R29E Eddy County NM. Hicks Consultants will oversee closure activities as presented in the C-144. We will submit all required forms at the completion of the closure. We will begin closure activities after October 18th.

Please contact me if you have any questions.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Friday, October 12, 2012 12:21 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'Jones, Brad A., EMNRD'; 'David_Luna@xtoenergy.com'
Subject: RE: 72-hour Notice of Closure for Nash Unit #29 Modular Impoundment

More info:

This is for XTO Energy. API # 30-015-29434. Unit Letter J Section 13 T23S R29E.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Friday, October 12, 2012 12:06 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'Jones, Brad A., EMNRD'; 'David_Luna@xtoenergy.com'
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Please contact me if you have any questions.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Thursday, November 08, 2012 5:08 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'David_Luna@xtoenergy.com'
Subject: 72-hour Sampling Notice for Closure at Nash Unit #29 Modular Impoundment

Hello Mike:

Please accept this email as the 72-hour closure sampling notice for the below site:

Nash Unit #29 Modular Impoundment located in Section 13 T23S R29E Eddy County NM (API # 30-015-29434). Either on Tuesday Nov. 13 or Wednesday Nov. 14th we will perform post closure sampling as described in the June 13, 2012 C-144 Closure section. Please call me if you have any questions.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Friday, October 12, 2012 12:21 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'Jones, Brad A., EMNRD'; 'David_Luna@xtoenergy.com'
Subject: RE: 72-hour Notice of Closure for Nash Unit #29 Modular Impoundment

More info:

This is for XTO Energy. API # 30-015-29434. Unit Letter J Section 13 T23S R29E.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Friday, October 12, 2012 12:06 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'Jones, Brad A., EMNRD'; 'David_Luna@xtoenergy.com'
Subject: 72-hour Notice of Closure for Nash Unit #29 Modular Impoundment

Mike:

Please accept this email as the 72-hour notice to NMOCD for closure of the Nash Unit #29 Modular Impoundment located in Section 13 T23S R29E Eddy County NM. Hicks Consultants will oversee closure activities as presented in the C-144. We will submit all required forms at the completion of the closure. We will begin closure activities after October 18th.

Please contact me if you have any questions.

Andrew Parker
RT Hicks Consultants
Ph: 505-266-5004
Cell: 505-350-5535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Monday, December 17, 2012 10:39 AM
To: mike.bratcher@state.nm.us
Cc: Van Curen, Jennifer E (jvancure@blm.gov); David_Luna@xtoenergy.com
Subject: XTO Nash Unit #29 Closure Plan
Attachments: Closure Report for C-144 Nash Draw 29 Poseidon Tank.pdf

Mike:

Attached is the C-144 Closure Plan for Nash Unit #29 Modular Impoundment located in Section 13 T23S R29E Eddy County NM (API # 30-015-29434). Per the Pit Rule, we are only submitting the closure plan at the District level. As appropriate, we will let you determine whether it is necessary to forward the closure plan to Santa Fe.

Please contact us with any questions or comments.

Andrew Parker
RT Hicks Consultants
Cell: 505-350-5535 (Preferred)
Office: 505-266-5004

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Thursday, December 20, 2012 12:47 PM
To: mike.bratcher@state.nm.us
Cc: David_Luna@xtoenergy.com
Subject: Nash Unit #29 Poseidon Tank Interim Reclamation Update

Hello Mike:

I want to let you know the status of the interim reclamation as required by the BLM at the above referenced location. As stated in our closure report dated December 17, 2012, we will be submitting an interim reclamation plan to the BLM within the next few weeks. Before submitting such a plan, we will perform additional sampling at the location to determine if chloride concentrations in the soil is influenced by the brackish water of the nearby salt lake and to determine off-location chloride concentrations. We need to acquire this additional information in order to know how to properly reclaim the location. After we receive analytical results from our additional soil sampling, we will submit an interim reclamation plan to the BLM with a copy to NMOCD. Any near surface soils affected from the less than three barrel leak from the tank will be included in the interim reclamation.

Andrew Parker
RT Hicks Consultants
Cell: 505-350-5535 (Preferred)
Office: 505-266-5004

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Tuesday, June 04, 2013 7:06 AM
To: Jones, Brad A., EMNRD <brad.a.jones@state.nm.us> (brad.a.jones@state.nm.us); 'mike.bratcher@state.nm.us'
Cc: Van Curen, Jennifer E (jvancure@blm.gov); David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Mr. Jones and Mr. Bratcher:

I am concerned there is confusion who is reviewing the Nash Unit 29 Modular Impoundment Spill Report that contains a remediation plan. The spill report is dated March 15, 2013 and was submit to District 2 - Artesia and the Environmental Bureau – Santa Fe via certified mail . Please let me know at your convenience when we can expect a response so we can begin work on the remediation. During the remediation, we will also conduct interim reclamation for the BLM. BLM is anxious to see interim reclamation begin.

Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Sent: Wednesday, June 05, 2013 8:44 AM
To: Andrew Parker; Jones, Brad A., EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434
Attachments: Nash Draw 29 background sample.jpg

Andrew,

The review of the C-141/Part 29 release event will be handled by the District 2 office. There was a misunderstanding on my part as to who would oversee that portion of the project. OCD tracking number for this release event is **2RP-1674**. The remediation proposal submitted is approved with the following conditions/stipulations:

- Like approval by BLM
- Notify OCD 48 hours prior to commencement of remedial activities.
- Notify OCD 48 hours prior to obtaining samples where the analyses are to be presented to OCD
- A representative sample is to be obtained in an area off the location pad, unaffected by any activities that may have occurred related to any drilling, completion, production, injection or movement of produced fluids at this location. The analysis of this sample will be considered natural background for the area. Attached is a Google image indicating the preferred area to obtain this sample, assuming the area is unaffected by human and/or production activities.
- OCD may require additional remedial or investigatory actions after receipt and review of the above referenced sample analysis.
- A form C-141 marked Final Report, and a closure report, is to be submitted to OCD upon satisfactory completion of project.

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

If you have any questions or concerns, and for notifications, please contact me.

Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, NM 88210
O: 575-748-1283 X108
C: 575-626-0857
F: 575-748-9720

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Tuesday, June 04, 2013 7:06 AM
To: Jones, Brad A., EMNRD; Bratcher, Mike, EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Tuesday, June 11, 2013 9:13 AM
To: mike.bratcher@state.nm.us
Cc: David_Luna@xtoenergy.com; kristin@rthicksconsult.com
Subject: FW: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434
Attachments: Nash Draw 29 background sample_AlternateSmallSize.jpg

Mike:

Sorry for the large size in the earlier email. I removed the photos and reduce the aerial image showing the location of the proposed background sample. From my original email:

We staked the proposed background sample location. We had to move the suggested location east of the pad, rather than SE of the pad per your suggestion. The mesquite was to dense in your suggested location. We chose the proposed location as there is a small opening through the mesquite. Is the new proposed location acceptable to NMOCD that is located east of the well pad versus southeast of the well pad (see attached map)?

Our preliminary plan for sampling is to obtain a surface sample and a sample every 1.5 to 2 feet for chloride until 8 to 9 feet below ground surface is reached. We will field titrate for chloride and select representative samples for laboratory analysis. We will use a backhoe to obtain the samples.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Kristin Pope [mailto:kristin@rthicksconsult.com]
Sent: Monday, June 10, 2013 10:09 PM
To: 'Andrew Parker'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

I staked the background sample point approximately 50-60 ft off the eastern edge of the pad/road, due east of the well. The coordinates are 32.30312 N, 103.93643 W

Not able to connect to the server tonight for some reason, but next time I can, I'll post the attached pics in the file.

As soon as I get the go-ahead from you and OCD, I will coordinate w/Parker Energy and Gene for sampling.

Kristin Pope
R.T. Hicks Consultants
Carlsbad Field Office
575.302.6755

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Monday, June 10, 2013 9:44 AM
To: kristin@rthicksconsult.com
Cc: David_Luna@xtoenergy.comk
Subject: FW: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Kristin:

We need to obtain a background sample near the location noted on the attached map as part of the approval of our reclamation plan. Mr. Bratcher is not familiar with the site and his location is in the middle of mesquite. Obviously this will not work.

We will use Parker Energy for the backhoe trench sampling. We will call Gene to coordinate the backhoe when we are ready. But first, I need you to go down to the location and mark the backhoe trench location for the one call. Call me so we can discuss potential locations for the sample location other than Mr. Bratcher's mesquite location. I am thinking of collecting a sample for chloride at the surface and 1.5 foot intervals thereafter until we reach the extent of the backhoe reach; which should be approximately 8 to 9 feet. I am hoping to show increasing chloride with depth as we approach the brackish saturated zone.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Bratcher, Mike, EMNRD [mailto:mike.bratcher@state.nm.us]
Sent: Wednesday, June 05, 2013 8:44 AM
To: Andrew Parker; Jones, Brad A., EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
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Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Tuesday, June 11, 2013 11:22 AM
To: kristin@rthicksconsult.com
Subject: FW: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Looks like we have the go ahead. Please initiate the one call via Gene.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Bratcher, Mike, EMNRD [mailto:mike.bratcher@state.nm.us]
Sent: Tuesday, June 11, 2013 10:01 AM
To: Andrew Parker
Cc: David_Luna@xtoenergy.com; kristin@rthicksconsult.com
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Andrew,

The proposed location will be fine. I just want to use an undisturbed/unaffected area to get an idea of what natural background is for this area. It was a concern for some of the folks in SF that the background sample was obtained on the site pad, so I think what you are proposing should alleviate that issue.

Thanks,

Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, NM 88210
O: 575-748-1283 X108
C: 575-626-0857
F: 575-748-9720

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Tuesday, June 11, 2013 9:13 AM
To: Bratcher, Mike, EMNRD
Cc: David_Luna@xtoenergy.com; kristin@rthicksconsult.com
Subject: FW: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Andrew Parker
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Durango Field Office
(970) 570-9535

From: Kristin Pope [mailto:kristin@rthicksconsult.com]
Sent: Monday, June 10, 2013 10:09 PM
To: 'Andrew Parker'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Kristin Pope
R.T. Hicks Consultants
Carlsbad Field Office
575.302.6755

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Sent: Monday, June 10, 2013 9:44 AM
To: kristin@rthicksconsult.com
Cc: David_Luna@xtoenergy.comk
Subject: FW: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Kristin:

We need to obtain a background sample near the location noted on the attached map as part of the approval of our reclamation plan. Mr. Bratcher is not familiar with the site and his location is in the middle of mesquite. Obviously this will not work.

We will use Parker Energy for the backhoe trench sampling. We will call Gene to coordinate the backhoe when we are ready. But first, I need you to go down to the location and mark the backhoe trench location for the one call. Call me so we can discuss potential locations for the sample location other than Mr. Bratcher's mesquite location. I am thinking of collecting a sample for chloride at the surface and 1.5 foot intervals thereafter until we reach the extent of the backhoe

reach; which should be approximately 8 to 9 feet. I am hoping to show increasing chloride with depth as we approach the brackish saturated zone.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Bratcher, Mike, EMNRD [mailto:mike.bratcher@state.nm.us]
Sent: Wednesday, June 05, 2013 8:44 AM
To: Andrew Parker; Jones, Brad A., EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

Andrew,

The review of the C-141/Part 29 release event will be handled by the District 2 office. There was a misunderstanding on my part as to who would oversee that portion of the project. OCD tracking number for this release event is **2RP-1674**. The remediation proposal submitted is approved with the following conditions/stipulations:

- Like approval by BLM
- Notify OCD 48 hours prior to commencement of remedial activities.
- Notify OCD 48 hours prior to obtaining samples where the analyses are to be presented to OCD
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- OCD may require additional remedial or investigatory actions after receipt and review of the above referenced sample analysis.
- A form C-141 marked Final Report, and a closure report, is to be submitted to OCD upon satisfactory completion of project.

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

If you have any questions or concerns, and for notifications, please contact me.

Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, NM 88210
O: 575-748-1283 X108
C: 575-626-0857
F: 575-748-9720

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Tuesday, June 04, 2013 7:06 AM
To: Jones, Brad A., EMNRD; Bratcher, Mike, EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Monday, June 17, 2013 10:12 AM
To: mike.bratcher@state.nm.us
Cc: 'Kristin Pope'
Subject: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674 48 hour notice

Mr. Bratcher:

Per your reclamation plan condition of approval for NMOCD Release # 2RP-1674, please accept this email as the 48 hour notice for background sampling. The sampling is scheduled for Friday June 21, 2013. The condition of approval that is the topic of this email is noted below.

- Notify OCD 48 hours prior to obtaining samples where the analyses are to be presented to OCD

We plan to obtain one background soil sampling east of the location in an area that is undisturbed from past oil field operations. We proposed to obtain soil samples at the surface and every 1.5 to 2 feet below ground surface to approximately 8 feet below ground surface. We will field titrate for chloride and submit the sample showing the highest chloride for laboratory testing for chloride. Please contact me if you have any questions or comments.

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Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Wednesday, June 19, 2013 8:33 AM
To: mike.bratcher@state.nm.us
Subject: FW: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674 48 hour notice

Mr. Bratcher:

The background sampling was delayed until Monday June 24th, 2013.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Kristin Pope [mailto:kristin@rthicksconsult.com]
Sent: Wednesday, June 19, 2013 1:10 AM
To: 'Andrew Parker'
Subject: RE: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674 48 hour notice

Parker Energy "Mike" called me Tuesday and said they had to reschedule for Monday morning. Ugh. Sorry.

Kristin Pope
R.T. Hicks Consultants
Carlsbad Field Office
575.302.6755

From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Monday, June 17, 2013 10:12 AM
To: mike.bratcher@state.nm.us
Cc: 'Kristin Pope'
Subject: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674 48 hour notice

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Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Bratcher, Mike, EMNRD [mailto:mike.bratcher@state.nm.us]
Sent: Wednesday, June 05, 2013 8:44 AM
To: Andrew Parker; Jones, Brad A., EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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Thank you.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Friday, August 16, 2013 4:55 PM
To: 'Bratcher, Mike, EMNRD'
Cc: 'David_Luna@xtoenergy.com'
Subject: NMOCD 2RP-1674 - XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan
Attachments: Plate1_backgroundSample.pdf; Plate2_reclamationLayout.pdf; backgroundSamplingJune26_2013.pdf

Mike:

We sampled a background location per C-141/Part 29 approval conditions/stipulations for release event 2RP-1674. Attached is a map (Plate 1) showing the location and results of the Background Sample collected on June 24, 2013. Results are shown in the white box with red outline. Included is the laboratory Certificate of Analysis. We will follow this email with a hard copy to be sent via Certified Mail.

The Background Sample shows an average chloride concentration of 2,773 mg/kg between 1.5 and 4.5 feet below ground surface (bgs). Below 4.5 feet chloride concentration is less than 2,000 mg/kg. The Trench Sample shows a higher chloride concentration of approximately 520 mg/kg between 1.5 and 2-feet bgs. Comparing the Trench Sample to the Background Sample, the average chloride concentration in the Trench Sample between 4 and 6 feet bgs is lower.

- average concentration of chloride between 4 and 6 feet bgs in the Trench Sample is 2,060 mg/kg.
- average concentration of chloride between 4.5 and 6 feet bgs in the Background Sample is 2,400 mg/kg.

Removing the upper 2-feet of soil within the remediation area as shown on Plate 2 will remediate the observed higher chlorides.

For your convenience, we reproduced a portion of our remediation plan as presented in our March 15 spill report, below:

> *XTO Energy proposes to excavate and dispose of the western third (30%) of the caliche pad that was in contact with the modular impoundment. The 30% area includes the release area and out beyond to the edge of the caliche pad. Plate 2 identifies the area proposed for remediation. The excavated material will be transported to R360 or equivalent for proper disposal.*
> *The remediated area will be contoured and seeded using BLM Seed Mixture Type 4 with Giant Sacaton seed added to the mixture.*

We anticipate starting remedial activities within the next few weeks. We will notify NMOCD 48-hours prior to remedial activities.

Please contact me at 970-570-9535 if you have any questions or comments.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

From: Bratcher, Mike, EMNRD [mailto:mike.bratcher@state.nm.us]
Sent: Wednesday, June 05, 2013 8:44 AM
To: Andrew Parker; Jones, Brad A., EMNRD
Cc: Van Curen, Jennifer E; David_Luna@xtoenergy.com; 'Randall Hicks'
Subject: RE: XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan Status Inquiry - API No: 30-015-29434

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F: 575-748-9720

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Tuesday, September 17, 2013 10:04 AM
To: 'Bratcher, Mike, EMNRD'
Cc: 'David_Luna@xtoenergy.com'
Subject: RE: NMOCD 2RP-1674 - XTO Nash Unit 29 Modular Impoundment Spill Report and Remediation Plan

Mr. Bratcher:

This email is the 72-hour notice to perform the spill remediation for the above referenced site per the C-141 spill report. We will begin work on Monday September 23rd, 2013.

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Sent: Wednesday, October 23, 2013 9:37 AM
To: Andrew Parker
Subject: RE: Fall Color

Andrew,

That must be horrible to have such beautiful scenery all around you. Very nice.

I will try to get all the paperwork on my end together and imaged, but it will be at least next week before I can work on it.

Thanks,

Mike Bratcher
NMOCD District 2
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From: Andrew Parker [mailto:andrew@rthicksconsult.com]
Sent: Wednesday, October 23, 2013 9:14 AM
To: Bratcher, Mike, EMNRD
Subject: Fall Color

Mike:

Thanks for the suggestions on how to finalize the spill report. FYI: The last image online is the approved C-144 by Mr. Jones.

And a little view up the road from my house (see attached photo).

Andrew Parker
RT Hicks Consultants
Durango Field Office
(970) 570-9535

Andrew Parker

From: Andrew Parker <andrew@rthicksconsult.com>
Sent: Monday, January 13, 2014 10:14 AM
To: 'Bratcher, Mike, EMNRD'
Cc: David_Luna@xtoenergy.com
Subject: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674

Mr. Bratcher:

Per my phone message to you a few weeks ago, please upload the approved C-141 initial plan and final report to NMOCD imaging. I followed your recommendation to submit the C-144 final closure report that included the C-141 Final Closure Report to Mr. Jones prior to having a signed final report.

Mr. Jones called me and "dinged" me for :

- not including a signed/approved C-141 Final Report. I included the report but not the approved version.
- not including a signed/approved C-141 Intial Report. I did not think NMOCD-Santa Fe would want the extra paperwork. I was wrong.

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From: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Sent: Thursday, January 16, 2014 9:21 AM
To: Andrew Parker
Cc: David_Luna@xtoenergy.com
Subject: RE: XTO Nash Unit 29 C-141/Part 29 release event #2RP-1674

Andrew,

I just completed the imaging process for this project. The initial and final C-141 have made it to the well file (30-015-29434) and are available there now. Most of the entire project should be in the admin order file (2RP-1674), including the C-141s. I just checked and that is still uploading, some 600 + pages, but it should all be in there by end of day.

Sorry for the delay, but as always, I try to do the best I can with what resources I have available.

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RT Hicks Consultants
Durango Field Office
(970) 570-9535

May 22, 2012

Brad Jones
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Dr.
Santa Fe, NM 87505

Re: Part 34 Use Permit Application for Treating Produced Water using CleanWave™ Technology

Dear Mr. Jones:

By this letter application, XTO is requesting the Oil Conservation Division's approval of a Part 34 Use Permit for a project to recycle produced water in the Nash Draw, Brushy Canyon basin (the "Project"). The Project will use Halliburton Energy Services, Inc.'s ("HESI's") CleanWave™ water treatment technology. CleanWave™ uses proprietary treatment processes to generate water for reuse in fracturing fluids. By recycling a portion of the water produced in oil and gas operations, CleanWave™ is intended to minimize oil and gas wastes and fresh water consumption.

We understand that there is not an Oil Conservation Division form required to apply for a Part 34 Use Permit and that the information set forth below, which is consistent with information required under the Division's rules for management of produced water, including the division authorization allowed under New Mexico Administrative Code 19.15.34.12, is the information necessary to allow the Division to consider and authorize the Project.

1. **Applicant:** XTO Energy, Inc.

2. **Oil and Gas Registration Identification (OGRID) Number:** 5380

3. Contact Persons

David Luna
Senior Operations Engineer (SE New Mexico)
XTO Energy a subsidiary of ExxonMobil
Cell: 432-296-3955
Office: 432-620-6742
email: David_Luna@xtoenergy.com

Renee LeBas
Southern Region BD Manager - Water Solutions
Halliburton Energy Services, Inc.
281.575.3076 (direct)
281.687.6993 (mobile)
email: renee.lebas@halliburton.com

Jason C. Moore
Counsel
Halliburton Energy Services, Inc.
713.839.3283 (direct)
281.687.4308 (mobile)
713.839.4561 (fax)
email: jason.moore3@halliburton.com

4. Mailing Address:

XTO Energy, Inc.
200 N. Loraine, Ste. 800
Midland, TX 79705

Halliburton Energy Services, Inc.
2107 CityWest Boulevard (4-1335A)
Houston, Texas 77042-3051

5. Location of Proposed Project:

Basin/Field: Nash Draw/Brushy Canyon
Lease: Nash Unit
Well No: Nash Unit #4 (API No. 30-015-21777)
Location: Sec 13, T23S, R29E, Unit A

6. Surface Owner

NM State Land Office
Attachment A: Approval to place CleanWave on location

7. Purpose and expected results of proposed project:

The purpose of the Project is to conserve the use of fresh water and minimize oil and gas waste in hydraulic fracturing operations in New Mexico. By some estimates, oil and gas wells may require as much as 4 million gallons to complete hydraulic fracturing operations. Between 10% and 40% of the fluid volume used in fracturing operations flows back during the subsequent clean-up. And for every barrel of oil produced, approximately four barrels of water are produced. Up to 98% of oil and gas waste is co-produced water. In a time of increasingly scarce water in New Mexico, the CleanWave™ service offers a promising solution for hydraulic fracturing water needs in the state.

The Project is expected to result in "no fresh water" being utilized for hydraulic fracturing operations and less disposal of oil and gas waste water. The Project also expects to demonstrate the economic and technical viability of using produced water for hydraulic fracturing operations.

8. Engineering information:

HESI's mobile CleanWave™ system uses an electrical process that has the capacity to destabilize and coagulate suspended colloidal matter in water. When produced water passes through the electrocoagulation cells, the anodic process releases positively charged ions which bind onto the negatively charged colloidal particles in water resulting in coagulation. At the same time gas bubbles, produced at the cathode, attach to the coagulated matter causing it to float to the surface. Heavier coagulants sink to the bottom leaving clear produced water, suitable for use in fracing operations.

XTO's focus is to treat produced water to a standard suitable for reuse in fracturing. In doing so, the volume of wastewater sent for disposal is minimized. The treated produced water is used in fracturing, thus eliminating our need for freshwater.

9. Design and construction information:

Attachments B, C, & D [Site Layout, Topo, & Aerial Map] shows the planned layout and design of the Project equipment to be used at XTO well operations, with information on the location and size of receiving, processing, and storage areas. Existing above grade 1000 bbl tanks (3) will be used for storage of untreated produced water, while the treated produced water will also be temporarily stored in existing above grade 1000 bbl tanks (2).

The existing above grade tanks are surrounded by earthen berm that is lined with a 20 mil geomembrane. This is intended to lessen any impact by capturing fluids inside the containment in the event of an unplanned release.

The two chemicals that will be on location are Sodium Hydroxide 50% solution (Caustic Soda Solution) and Hydrochloric Acid. The chemicals are stored in 1000 gallon, double walled high density polyethylene (HDPE) storage tanks. They are placed (secondary containment) in separate HESI trailers that are enclosed containers. The containers are sealed and act as additional containment beyond the 2 tank walls. The caustic container can retain 3 times the caustic volume (3000 gallons) and the acid container can retain 2 times the acid volume (2000 gallons). There is leak detection sensors located at floor level in the 4 corners of the containers and overflow detection is performed by sensors in the overflow line near the top of the tank.

XTO will take reasonable actions to contain releases from known potential sources by using tarps, buckets, absorbent pads, diatomaceous earth, duck ponds at critical points to catch small leaks or spills until the source can be eliminated. XTO will follow 19.15.29 and or 19.15.30 of NMAC for notification requirements of any release. Form C-141 [Attachment E] will be used for reporting.

10. Operating information:

The Project is expected to proceed over a period of 120 days.

While the treatment period may extend longer than 120 days, XTO anticipates processing a total volume of less than 250,000 bbl of produced water. This produced water is supplied from the Nash 53 SWD Battery (API:30-015-39400, Sec 13, T23S, R29E, Unit A). The treated produced water will be used in fracing operations for the following wells with corresponding API.

Nash Unit #39	30-015-36951
Nash Unit #40	30-015-37166
Nash Unit #41	30-015-37165
Nash Unit #56	30-015-38992
Nash Unit #57	30-015-39303
Nash Unit #58	30-015-39304
Nash Unit #49	30-015-38663

The estimated maximum volume of untreated produced water to be stored at the facility will be 3,000 bbl.

The estimated maximum volume of treated produced water to be stored at the facility at any one time will be 2,000 bbl. The treated produced water will be stored at the facility for no more than 1 day. As the water is being treated it will be pumped to another site via an existing buried steel pipeline [Attachment F] owned and maintained by XTO .

Only produced water will be treated in the Project.

Attachment G [MSDS] includes the Material Safety Data Sheets for chemicals or additives used, if necessary, in the CleanWave™ recycling process.

Only XTO will use the treated produced water. The treated produced water will only be used in fracturing operations. Any produced water and treated produced water not used will be disposed of at XTO's Nash 53 SWD (API #30-015-39400: Sec 13, T23S, R29E, Unit H). This will occur at the end of the treating project during Closure. The removal process is discussed below in the Closure Plan.

Solids removed as part of the treatment process are expected to be less than 0.1 % of the total volume of produced water treated. The solids adhere to the "bubbles" that are produced from the electro-coagulation process. These lighter solids float on top (electro-flotation) and accumulate at one end of the 2-500 bbl above grade weir tanks. The heavier solids will slowly settle to the bottom of the 2-500 bbl settling tanks. These solids will be removed at the end of each fracture job. Each fracturing operation will require 40,000 bbl of treated produced water which will create about 40 bbl of solids (sludge). We are performing 6 fracturing jobs which will require 6 solids removal. The solids are removed by a vacuum truck. We will use Quality Transport Inc, approved C133 Hauler (#C133-239), for the solids removal. They will hook up a 3" vacuum hose to a 3" valve that draws from the bottom of the settling tanks. About 20 bbls of solids will be "sucked" in along with about 20 bbls of water. This will remove the heavy solids. The hose is then connected to a 3" valve on the weir tanks. It draws from the top and will remove about 20 bbls of solids that are floating on top. We will use a 50/50 mixture of solids sludge to produced water, which will create about 80 bbls. The sludge/waste will be disposed of in an approved disposal facility operated by Controlled Recovery Inc. (CRI), Permit R9166, 575-393-1071. This will be accompanied by a C-138 manifest [Attachment H].

XTO's BMP (Best Management Practices) will be followed during the solids removal process. This means that a drip pan will be placed under each connection that is used on the weir tanks and settling tanks. After the hose is disconnect, any remaining fluid in the hose will be caught in the drip pan. These fluids will then be pored over into the tanks. If Quality Transport has a more stringent method then their BMP will be followed.

An additional benefit of the CleanWave™ service is that it can result in significant reduction of truck use in water management. On average, each CleanWave™ unit working monthly would eliminate 175 truckloads of water, 6,300 miles of truck traffic and 900 hours of road time and emissions.

11. Monitoring information:

XTO will inspect equipment, processing, and storage areas as necessary. Produced water treatment units are equipped with emergency shutdown controls in each trailer that are automatically activated in the event of an unplanned release or when the system operates outside of engineered limits. Triggers for automatic shutdown include: minimum flow for running supply pumps is not met; differential pressure exceeds set points; temperature in the electro-coagulation cells is 10°F higher than manifold temperature; or effluent tanks are full and cannot receive more water. All environmental, injury and near miss incidents should be reported to XTO.

XTO will take reasonable actions to contain releases from known potential sources by using tarps, buckets, absorbent pads, diatomaceous earth, duck ponds at critical points to catch small leaks or spills until the source can be eliminated. XTO will follow 19.15.29 and or 19.15.30 of NMAC for notification requirements of any release. Form C-141 [Attachment E] will be used for reporting.

Real time analysis will be carried out constantly to measure turbidity and pH of treated water. Samples would be taken on a daily basis and transferred to HESI's district field lab to measure various analytes to ensure that the proposed processing will result in a recyclable product that meets the engineering standards for the proposed use. Attachment I [Water Quality Parameters and Ranges] provides information on water quality parameters to be tested.

12. Closure plan:

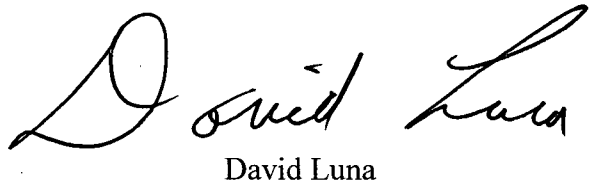
XTO will remove water, produced and treated produced, from all of the treating equipment (CleanWave unit, settling/weir tanks) at the end of the Project. This will be performed by using Quality Transport Inc, approved C133 Hauler (#C133-239), to pull the unused water from the settling tanks and weir tanks and transferring over into the existing above grade tanks on the same location. This will be performed using XTO BMP of a drip pan to catch any fluids that might drip out of the vacuum hose during connecting and disconnecting of the hose. It will then be disposed of in XTO's Nash 53 SWD (API #30-015-39400: Sec 13, T23S, R29E, Unit H). Any solids will be removed as per the Operating Information in Step #9 above. HESI will remove any of its own equipment and units used in the CleanWave™ treatment process. Once removed, the location will be restored back to the condition it was in prior to setting up for this project. Any staining will be cleaned by digging up the stained soil, bagging it, and sending it via Quality Transport to an approved disposal facility operated by Controlled Recovery Inc. (CRI), Permit R9166, 575-393-1071. This will be accompanied by a C-138 manifest [Attachment H]. The location will be inspected by XTO to verify that no vegetation outside the existing location has been disturbed. If any disturbance exists, then it will be contoured and seeded with the approve seeding from the State Land Office. The OCD will be notified of the closure. This will be done via a summary report that will include before and after photos.

Considering the information in this application, the Division's approval of this Project permit would be appropriate for the following reasons:

- The Division has long encouraged oil and gas waste minimization through recycling (*See* OCD Environmental Handbook Categories and Disposal Methods for Oil Field Wastes);
- The treated product will meet engineering standards for its intended use;
- The Division has approved previous projects for water recycling operations using the authority under NMAC 19.15.34.12;
- Similar mobile recycling projects are being approved in other states with promising results; and
- The potential benefits of waste minimization and conservation of water will be significant under the Project.

Please see the enclosed materials for further information on the CleanWave™ process and the planned operations. If you have any questions, please contact David Luna at 432-620-6742.

Sincerely,



David Luna

"Martinez, Pete" <PMartinez@slo.state.nm.us>
05/04/2012 03:03 PM

To "Dawson, Scott" <sdawson@slo.state.nm.us>, "'david_luna@xtoenergy.com'" <david_luna@xtoenergy.com>
cc "Martinez, Donald" <dwmartinez@slo.state.nm.us>
bcc
Subject RE: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Mr. Luna,

The New Mexico State Land office has reviewed your request to put some equipment used in treating produced water on an XTO location that is on State Lands. You have advised this office that XTO has a Battery on that location and will not go outside the current pad.

Our records reflect the following:

1. Murchison Oil and Gas Inc. is the current "Operator of Record" for the Nash Unit.
2. XTO has been approved as the "Sub-Operator" for the Nash Unit Delaware formation.
3. Your 2012 Plan of development was reviewed and all the wells in your request have been approved as part of the 2012 Plan of Development for the Nash Unit.

Please be advised that since all the wells in your request are on committed lands within the Nash Unit and the subject wells were in an approved plan of development, your request is approved.

As long as you remain in the unit boundaries no rights-of-ways or easements are required.

If you have any questions, or if we may be of further help, please don't hesitate to call on us.

Pete Martinez
Unitizations
New Mexico State Land Office
Oil, Gas & Minerals Division
Suite 217
310 Old Santa Fe Trail

Mailing Address:
P. O. Box 1148
Santa Fe, NM 87504-1148

Office: 505-827-5791
Fax: 505-827-4739
Email: pmartinez@slo.state.nm.us

Web Site:
www.nmstatelands.org

Attachment A

I am needing approval from the State Land Office to put some equipment, used in treating produced water, on an XTO location that is on State Lands.
We have a Battery on that location and will not go outside the current pad

From: Dawson, Scott
Sent: Friday, May 04, 2012 1:25 PM
To: Martinez, Pete
Subject: FW: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Pete,

I am coming down to talk to you about this.

Thanks,

Scott

From: David_Luna@xtoenergy.com [mailto:David_Luna@xtoenergy.com]
Sent: Thursday, May 03, 2012 3:38 PM
To: Dawson, Scott
Cc: Martinez, Donald; Armijo, Melissa
Subject: RE: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Scott,

Attached is the Nash Unit Wells. It shows the wells that are producing and the ones that we plan on

fracing this year.
Hope this helps.

David Luna

"Dawson, Scott" <
sdawson@slo.state.nm.us>

05/03/2012 04:12 PM

To"Martinez, Donald" <dwmartinez@slo.state.nm.us>, "'David_Luna@xtoenergy.com'" <David_Luna@xtoenergy.com>
cc"Armijo, Melissa" <marmijo@slo.state.nm.us>
SubjRE: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Donald, David and Melissa,

If all wells they are servicing are unit wells and within the Nash Unit – there are no right of ways required . Send me a map of the wells going into the system and we can review it.

Scott Dawson

Petroleum Engineering Specialist
NM State Land Office
Oil, Gas and Minerals Division
PO Box 1148
310 Old Santa Fe Trail
Santa Fe, New Mexico 87504-1148
Ph. 505-827-6628
Fax 505-827-4739
sdawson@slo.state.nm.us

Website:
www.nmstatelands.org

From: Martinez, Donald

Sent: Thursday, May 03, 2012 2:25 PM
To: 'David_Luna@xtoenergy.com'
Cc: Dawson, Scott; Armijo, Melissa
Subject: RE: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Mr. Luna,

Please forgive me however let us go over this with Scott and we will contact you later. Thank you.

Donald W. Martinez
New Mexico State Land Office
Surface Resources Division
PH: (505) 827-5731
Fax: (505) 827-5741

From: David_Luna@xtoenergy.com [mailto:David_Luna@xtoenergy.com]
Sent: Wednesday, May 02, 2012 12:51 PM
To: Martinez, Donald
Subject: Fw: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Forgot to attach.

----- Forwarded by David Luna/MID/CTOC on 05/02/2012 01:46 PM -----

David Luna/MID/CTOC

05/02/2012 01:45 PM

To dwmartinez@slo.state.nm.us
cc
Subject Fw: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project

Donald,

Attached is a map of what we are doing in the Nash Unit. We are going to take our produced water, clean it up, store it for up to 10 days, and then use it for fracing.
The location for the Halliburton treating facility (couple of trailers) is located on State of New Mexico surface. The storage area is on BLM. All of the transfer lines and frac wells are also BLM.
Should not need any easements from the State Land Office because we are using existing lines and tanks.
Let me know what you think.
Thanks,

David Luna
Senior Operations Engineer (SE New Mexico)
XTO Energy a subsidiary of ExxonMobil
200 N. Loraine, Suite 800
Midland, Tx. 79701
Cell: 432-296-3955
Office: 432-620-6742
email: David_Luna@xtoenergy.com

---- Forwarded by David Luna/MID/CTOC on 05/02/2012 01:40 PM ----

"Dawson, Scott" <
sdawson@slo.state.nm.us>

05/02/2012 11:42 AM

To "David_Luna@xtoenergy.com" <David_Luna@xtoenergy.com>
cc "Bloom, Greg" <gbloom@slo.state.nm.us>, "Roybal, Larry" <LRoybal@slo.state.nm.us>, "Martinez, Donald" <dwmartinez@slo.state.nm.us>
Subj FW: Treating produced water for fracing - Nash Draw Brushy Canyon Basin Project
ect

Mr. Luna,

We reviewed your proposed produced water treatment facility and concur with the purpose and expected results of the proposed project.

We agree that the expectations of the project is to conserve the use of fresh water and minimize oil and gas waste in hydraulic fracturing operations in New Mexico. We also believe the facility will be in the best interest of the State Land Office and oil and gas operations in the project area.

We want to make sure that XTO obtains all required rights of ways, easements and permits for the facility from the State Land Office. You can call Donald Martinez who is the Director of our Right of Way Division if you have any questions. His phone number is (505) 827-5731 and his e-mail address is dwmartinez@slo.state.nm.us

There are just a few items that we request of you:

1.) Can you let me know how the project is working for all parties when you get it in operation ?

2.) Can you let me know if the project extends beyond the expected period of 120 days?

3.) Can you send us a copy of your approved closure plan from the OCD at the end of the project ?

Thanks and if you have any questions, please contact either Donald or myself.

Scott Dawson
Petroleum Engineering Specialist
NM State Land Office
Oil, Gas and Minerals Division
PO Box 1148
310 Old Santa Fe Trail
Santa Fe, New Mexico 87504-1148
Ph. 505-827-6628
Fax 505-827-4739
sdawson@slo.state.nm.us

Website:
www.nmstatelands.org

From: Dawson, Scott
Sent: Thursday, April 26, 2012 4:18 PM
To: 'David_Luna@xtoenergy.com'
Subject: RE: Treating produced water for fracing

David,

We are still reviewing you proposed produced water treatment facility. I need to talk to my supervisors and staff on this facility before I can reply.

Thanks for sending all the information and documentation, and we will reply soon.

Scott Dawson
Petroleum Engineering Specialist
NM State Land Office
Oil, Gas and Minerals Division
PO Box 1148
310 Old Santa Fe Trail

Santa Fe, New Mexico 87504-1148
Ph. 505-827-6628
Fax 505-827-4739
sdawson@slo.state.nm.us

Website:
www.nmstatelands.org

From: David_Luna@xtoenergy.com [mailto:David_Luna@xtoenergy.com]
Sent: Wednesday, April 25, 2012 5:05 PM
To: Dawson, Scott
Subject: Treating produced water for fracing

Scott,

I am needing approval from the State Land Office to put some equipment, used in treating produced water, on an XTO location that is on State Lands.
We have a Battery on that location and will not go outside the current pad. The information is below:

Lease: Nash Unit
Well No: Nash Unit #4 (API No. 30-015-21777)
Location: Sec 13, T23S, R29E, Unit A
Lease: K-6606

I have been working with the OCD Environmental Engineer, Brad Jones, for the last month on an application to do this. He also need something from you stating that it is OK for us to use this equipment at that site.

I attached some maps and the "Application".

thanks in advance,

David Luna
Senior Operations Engineer (SE New Mexico)
XTO Energy a subsidiary of ExxonMobil
200 N. Loraine, Suite 800
Midland, Tx. 79701
Cell: 432-296-3955
Office: 432-620-6742
email: David_Luna@xtoenergy.com

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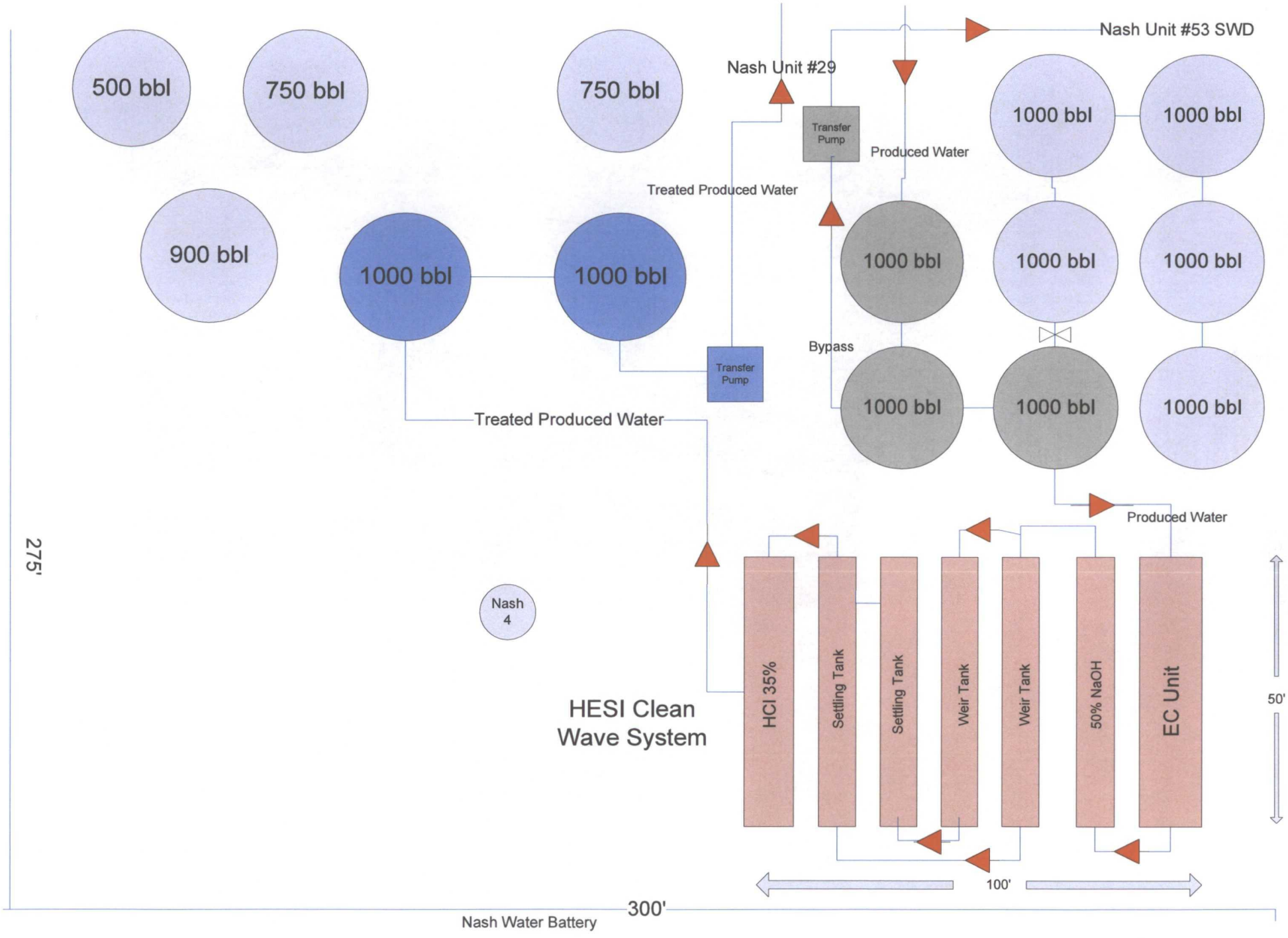
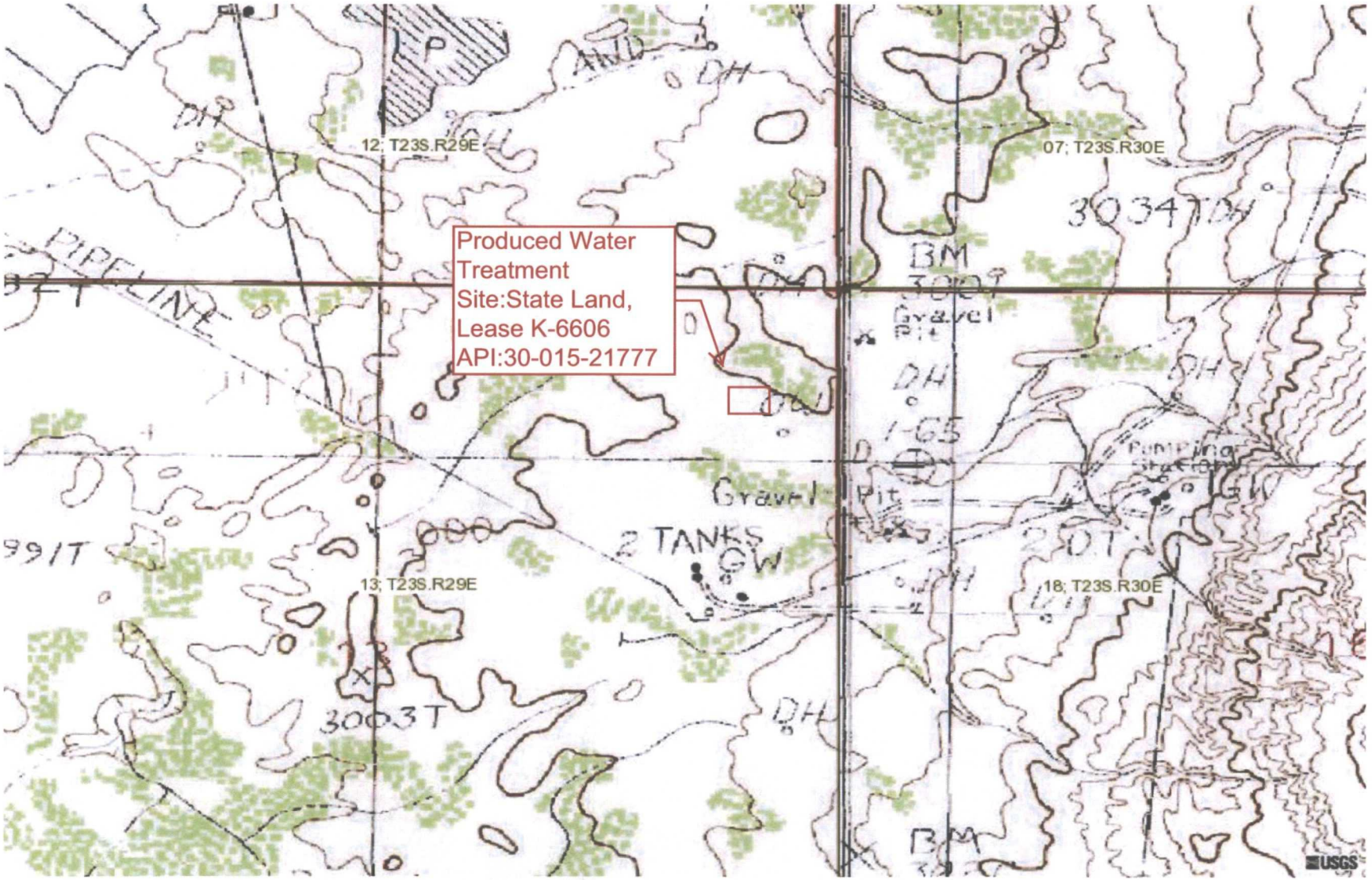


Attachment B



0 500 1000ft

N W E S

Petroleum Recovery Research Center	Topo around Water Treatment Site	Figure: ##
	Attachment C	Apr 20, 2012

0 500 1000ft

N
W E
S

Petroleum Recovery Research Center	Aerial around Water Treatment Site	Figure: ##
	Attachment D	Apr 20, 2012

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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 August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☐ Final Report

Name of Company	Contact
Address	Telephone No.
Facility Name	Facility Type

Surface Owner	Mineral Owner	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County

Latitude_____ **Longitude**_____

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Source of Release	Date and Hour of Occurrence	Date and Hour of Discovery
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☐ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

Describe Area Affected and Cleanup Action Taken.*

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:	OIL CONSERVATION DIVISION	
Printed Name:	Approved by Environmental Specialist:	
Title:	Approval Date:	Expiration Date:
E-mail Address:	Conditions of Approval:	Attached ☐
Date: Phone:		

* Attach Additional Sheets If Necessary

Attachment E

0 200 400ft

N
W E
S

Petroleum Recovery Research Center	Nash Unit Attacment F	Figure: ##
	Water Treatment and Storage Sites	Mar 14, 2012

MATERIAL SAFETY DATA SHEET

Sodium Hydroxide 50% Solution

MSDS Ref. No.: 1310-73-2-3
Date Approved: 05/13/2009
Revision No.: 5

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sodium Hydroxide 50% Solution

SYNONYMS: Caustic Soda Solution; Lye Solution; Sodium Hydrate Solution, White Caustic Solution

GENERAL USE: pH Control

This chemical is certified to ANSI/NSF Standard 60, Drinking Water Chemicals-Health Effects (as packaged in the original, unopened container). The maximum dosage level for this chemical is 200 mg/L

MANUFACTURER

FMC Wyoming Corporation
Alkali Chemicals Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)
msdsinfo@fmc.com (Email - General Information)

EMERGENCY TELEPHONE NUMBERS

(307) 872-2452 (Plant - Green River, WY)

(303) 595-9048 (Medical - Call Collect)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Water white liquid with no appreciable odor.
- Solution is corrosive to body tissues and metallic materials.
- Product may react violently with acids.

POTENTIAL HEALTH EFFECTS: Solution is corrosive and severely irritating to the eyes and skin.

Attachment G

MEDICAL CONDITIONS AGGRAVATED: Skin and lung disorders may be affected adversely by this material; an individual's specific medical condition and circumstances of exposure determine the likelihood of an adverse effect.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Hydroxide	1310-73-2	50	215-185-5	C; R35
Water	7732-18-5	50	231-791-2	Not classified

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Immediately flush with plenty of water while removing contaminated clothing and/or shoes, and thoroughly wash with soap and water. See a medical doctor immediately.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: Sodium hydroxide at this concentration is corrosive. Major burns to all surfaces may result. Prolonged dilution with water is required. Neutralization of eye burns is absolutely contraindicated; for skin, 2% acetic acid has been recommended, but washing with water is effective. Ingestion requires milk or water dilution, consideration of esphagoscopy and management for possible esophageal stricture.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Not applicable

FIRE / EXPLOSION HAZARDS: Non-combustible.

FIRE FIGHTING PROCEDURES: Not applicable

FLAMMABLE LIMITS: Not applicable

HAZARDOUS COMBUSTION PRODUCTS: None

SENSITIVITY TO IMPACT: Not Sensitive

SENSITIVITY TO STATIC DISCHARGE: Not Sensitive

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Wear personal protective equipment as recommended in Section 8, "Exposure Controls/Personal Protection" below.

Contain spill using absorbent material and place in an approved container.

Dispose of according to the method outlined in Section 13, "Disposal Considerations" below.

7. HANDLING AND STORAGE

HANDLING: During handling of liquid, prevent contact with skin and eyes by using adequate personal protective equipment (see Section 8, "Exposure Controls/Personal Protection" below). If the release of airborne material is likely, exhaust ventilation and/or respiratory protection may also be necessary.

STORAGE: Store in closed containers away from sources of heat.

COMMENTS: Use only in systems, processes and procedures in which effective ventilation has been provided to meet established exposure limits.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Hydroxide	2 mg/m^3 (ceiling)	2 mg/m^3 (PEL)	

ENGINEERING CONTROLS: Adequate engineering controls and/or personal protective equipment must be used to prevent contact with skin and eyes. Engineering controls and/or respirators may be necessary when the generation of airborne mists or fogs are possible.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Chemical goggles (and face shield if necessary) should be worn to prevent contact.

RESPIRATORY: When exposure above the established standard is likely, a respiratory protection program that complies with OSHA General Industry Standard 1910.134 should be implemented. Wear full face-piece respirators approved by MSHA / NIOSH if mists are expected.

PROTECTIVE CLOTHING: Rubber or vinyl apron. Rubber boots or rubber overshoes.

GLOVES: Impervious rubber or vinyl gloves with gauntlets. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

COMMENTS:

The information noted above provides general guidance for handling this product. Specific work environments and material handling practices will dictate the selection and use of personal protection equipment (PPE).

---

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	No appreciable odor
APPEARANCE:	Water white liquid
AUTOIGNITION TEMPERATURE:	Not applicable
BOILING POINT:	145 °C (293 °F)
COEFFICIENT OF OIL / WATER:	Not applicable
EVAPORATION RATE:	(butyl acetate = 1) Not available
FLASH POINT:	Non-combustible
FREEZING POINT:	4.4°C (40°F)
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Not available
PERCENT VOLATILE:	Not applicable
pH:	(as is) 13.7
SOLUBILITY IN WATER:	Infinite
SPECIFIC GRAVITY:	1.53 @ 15.5°C (60°F) (water = 1)
VAPOR DENSITY:	Not applicable
VAPOR PRESSURE:	6.33 mm Hg @ 40 °C (104 °F)

COMMENTS:

pH (1% solution): 13.0

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Contact with acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals, such as aluminum, magnesium and zinc.
STABILITY:	Slightly reactive
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals, such as aluminum, magnesium and zinc.
HAZARDOUS DECOMPOSITION PRODUCTS:	None

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Severely irritating, corrosive (rabbit) [RTECS 1986, NIOSH 1975]

SKIN EFFECTS: Severely irritating, corrosive (rabbit) [RTECS 1986, PB 234-899 1974]

DERMAL LD_{50}: Corrosive

ORAL LD_{50}: 400 mg/kg (rabbit) LDLo [PB 234-899 1974]

INHALATION LC_{50}: Corrosive

TARGET ORGANS: Skin, eyes, mucous membranes

ACUTE EFFECTS FROM OVEREXPOSURE: Sodium hydroxide is corrosive and may produce severe eye, skin and respiratory tract irritation and upper gastrointestinal tract damage. Ingestion of concentrated solutions has caused death in animals and humans. [Gosselin, Smith & Hodge, 1984; PB 234-899 1974]

CHRONIC EFFECTS FROM OVEREXPOSURE: Sodium hydroxide may produce inflammation of the eyes, skin, and mucous membranes. Esophageal carcinoma at the site of a chronic lye stricture has been reported. [Gosselin , Smith & Hodge 1984]

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	Not Listed (ACGIH)

---

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Bluegill sunfish: 48-hour LC_{50} = 99 mg/L
Mosquito fish: 96-hour LC_{50} = 125 mg/L
Brown shrimp (Crangon crangon): 48-hour LC_{50} = 30 - 100 mg/L

The damaging effects are mostly a consequence of the increase in pH. The upper pH limit tolerated by most freshwater fish is 8.4; the pH must generally be greater than 9 before the aqueous environment becomes lethal for fully developed fish. Freshwater algae are destroyed above pH 8.5. Concentrations of 20 to 100 mg/L have been reported to kill salmon, trout, carp and crayfish. [Ref. , Environment Canada, Environmental Protection Service, Sodium Hydroxide Environmental and Technical Information for Problem Spills. June 1984]

CHEMICAL FATE INFORMATION: The pH effect of sodium hydroxide in water is naturally reduced by the absorption of atmospheric carbon dioxide. This reduction is also effected by dilution with water and by the natural acidity of a given water body. There is no degradation of sodium hydroxide in waters, only loss by absorption or through chemical neutralization.

---

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of in accordance with all local, state and federal environmental rules and regulations. Check the pH of the waste to be disposed, if it is greater than 12.5 it must be handled as a RCRA hazardous waste.

---

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution
PRIMARY HAZARD CLASS / DIVISION:	8
UN/NA NUMBER:	UN 1824
PACKING GROUP:	II

LABEL(S):	Corrosive
PLACARD(S):	Corrosive
ADDITIONAL INFORMATION:	Sodium hydroxide is in an "RQ" quantity when this material meets or exceeds 2500 pounds per bulk package. 49 STCC Number: 4935240

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution

OTHER INFORMATION:
Cool containers with water if exposed to fire or excessive heat conditions.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
This product does not contain any toxic chemicals subject to the reporting requirements of Section 313, Title III of the SARA (Superfund Amendments and Reauthorization Act) of 1986.

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Listed

Chemical Name	RQ	
Sodium Hydroxide	1,000 lb	Category C

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
All components are listed or exempt.

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Hazard Classification / Division:	E
Ingredient Disclosure List:	Listed
Domestic Substance List:	All components are listed or exempt.

EU EINECS NUMBERS:

215-185-5 (sodium hydroxide)

HAZARD AND RISK PHRASE DESCRIPTIONS:

EC Symbols:	C	(Corrosive)
EC Risk Phrases:	R35	(Causes severe burns.)

16. OTHER INFORMATION

HMIS

Health	3
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	3
Flammability	0
Reactivity	1
Special	None

No special requirements

NFPA (National Fire Protection Association)

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
This MSDS replaces Revision #4, dated January 26, 2004.
Changes in information are as follows:
Section 1 (Product and Company Identification)
Section 8 (Exposure Controls / Personal Protection)
Section 14 (Transport Information)
Section 15 (Regulatory Information)
Section 16 (Other Information)

FMC - Trademark of FMC Corporation

HALLIBURTON

SAFETY DATA SHEET (2001/58/EC)

Product Trade Name: **HYDROCHLORIC ACID**

Revision Date: 04-Jan-2010

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of Substances or Preparation

Product Trade Name: HYDROCHLORIC ACID
Synonyms: None
Chemical Family: Inorganic acid
Application: Solvent

Company Undertaking Identification

Halliburton Energy Services
Halliburton House, Howemoss Place
Kirkhill Industrial Estate
Dyce
Aberdeen, AB21 0GN
United Kingdom

Emergency Phone Number: +44 1224 795277 or +1 281 575 5000

www.halliburton.com

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. HAZARDS IDENTIFICATION

Risk Phrases
R34 Causes burns.
R37 Irritating to respiratory system.

Hazard Overview May cause eye, skin, and respiratory burns. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	EINECS	UK WEL	Germany MAK/TRK	Netherlands MAC	EEC Classification
Hydrochloric acid	7647-01-0	30 - 60%	231-595-7	1 ppm	2 ppm	5 ppm	C; R34 Xi; R37

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Attachment G

Skin	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.
Eyes	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Unsuitable Extinguishing Media	None known.
Special Exposure Hazards	May form explosive mixtures with strong alkalis. Decomposition in fire may produce toxic gases. Reaction with steel and certain other metals generates flammable hydrogen gas. Do not allow runoff to enter waterways.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from alkalis. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Acid gas respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Full protective chemical resistant clothing. Rubber boots.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear colorless
Odor:	Pungent acrid
pH:	0.8
Specific Gravity @ 20 C (Water=1):	1.18
Density @ 20 C (kg/l):	1.16
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	110
Freezing Point/Range (C):	-46
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	26
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	35
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	36.5
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong alkalis.
Hazardous Decomposition Products	Flammable hydrogen gas. Chlorine. Hydrogen sulfide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Causes severe respiratory irritation.
Skin Contact	May cause skin burns.
Eye Contact	May cause eye burns.
Ingestion	Causes burns of the mouth, throat and stomach.
Aggravated Medical Conditions	Skin disorders.

Chronic Effects/Carcinogenicity Prolonged, excessive exposure may cause erosion of the teeth.

Other Information None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	LC50: 3124 ppm/1 hr. (Rat)
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR

UN1789,Hydrochloric Acid Solution, 8, II

Air Transportation

ICAO/IATA

UN1789,Hydrochloric Acid Solution, 8, II
RQ (Hydrochloric Acid - 2273 kg.)

Sea Transportation

IMDG

UN1789,Hydrochloric Acid Solution, 8, II
RQ (Hydrochloric Acid - 2273 kg.)
EmS F-A, S-B

Other Shipping Information

Labels: Corrosive

15. REGULATORY INFORMATION

EC Supply labeling Requirements This product is subject to the labeling requirements of EC Directives 67/548/EEC and 88/379/EEC as amended.

Classification C - Corrosive.

Risk Phrases
R34 Causes burns.
R37 Irritating to respiratory system.

Safety Phrases
S9 Keep container in a well ventilated place.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45 In case of accident or if you feel unwell, seek medical advice immediately.
S1/2 Keep locked up and out of reach of children.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

EINECS Inventory This product, and all its components, complies with EINECS

Germany, Water Endangering Classes (WGK) WGK 1: Low hazard to waters.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Component Classification
C - Corrosive.
R34 Causes burns.
R37 Irritating to respiratory system.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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-138
Revised August 1, 2011

*Surface Waste Management Facility Operator and Generator shall maintain and make this documentation available for Division inspection.

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. Generator Name and Address:

2. Originating Site:

3. Location of Material (Street Address, City, State or ULSTR):

4. Source and Description of Waste:

Estimated Volume _____ yd^3 / bbls Known Volume (to be entered by the operator at the end of the haul) _____ yd^3 / bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, _____, representative or authorized agent for _____ do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☐ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste. *Operator Use Only: Waste Acceptance Frequency ☐ Monthly ☐ Weekly ☐ Per Load*

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

I, _____, representative for _____ do hereby certify that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content and that the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 NMAC. The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of Section 15 of 19.15.36 NMAC.

5. Transporter:

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #:

Address of Facility:

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☐ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status:

☐ **APPROVED** ☐ **DENIED** (Must Be Maintained As Permanent Record)

PRINT NAME: _____ TITLE: _____ DATE: _____

SIGNATURE: _____ TELEPHONE NO.: _____

Surface Waste Management Facility Authorized Agent

Attachment H

HALLIBURTON

Field Laboratory Water Analysis Test Methods

Overview: Each field laboratory will use the water analysis test methods outlined in the table below in order to provide standardization of test procedures and uniformity of results throughout the NWA. At a minimum each field laboratory should be capable of performing the tests listed in columns "C", "D", and "E".

Definitions

"Standard Field Water Analysis": Tests to be performed as part of a routine analysis of a PE/Cement/Field water sample.
"Additional Field Water Tests": Tests that are performed as requested on a PE/Cement/Field water sample.
"Standard CleanWave Analysis": Tests to be performed as part of a routine CleanWave water sample.
"Additional CleanWave Tests": Tests that are performed as requested on a CleanWave sample. If a district lab does not have the equipment/materials to perform this testing it should be sent to the Vernal field lab for analysis. Labs should not purchase the equipment/materials for this testing because of how infrequently it is requested.

Test	Standard Field Water Analysis	Additional Field Water Tests	Standard CleanWave Analysis	Additional CleanWave Tests	Test Type/Method	Procedure
Bacteria		x - *(PE Water)*		x	VK Enterprises Serial Dilution Vials	DTC Analytical Procedure
Barium				x	HACH DR/2800 Spectrophotometer	HACH Method 8014
Bicarbonate	x		x		HCl Buret Titration	GLBP: WM-GL-HES-QM-221.030
Boron				x	HACH DR/2800 Spectrophotometer	HACH Method 10061
Calcium	x		x		EDTA Buret Titration	GLBP: WM-GL-HES-QM-221.090
Carbonate	x		x		HCl Buret Titration	GLBP: WM-GL-HES-QM-221.030
Carbohydrate		x - *(PE Water)*			Visual Observation[1]	TBD
Chloride	x		x		HACH QuanTab Test Strip	Refer To QuanTab Test Strip Container
Color			x		Visual Observation	Record Color Observed
Conductivity			x		HACH HQ14D Conductivity Meter	Refer To User Manual
Iron (total)	x		x		HACH DR/800 Series Colorimeter	HACH Method 8008
Magnesium	x		x		EDTA Buret Titration	GLBP: WM-GL-HES-QM-221.200
pH	x		x		pH Meter	Refer To User Manual
Potassium	x		x		HACH DR/2800 Spectrophotometer[2]	HACH Method 8049
Resistivity	x				Fann Model 88C Resistivity Meter	Refer To User Manual
Sodium	x				Calculation	GLBP: WM-GL-HES-QM-221.310
Specific Gravity	x		x		Hydrometer	GLBP: WM-GL-HES-QM-222.060
Strontium				x	Seachem Strontium Test Kit	Refer To Test Kit Instructions
Sulfate	x		x		HACH DR/800 Series Colorimeter	HACH Method 8051
Sulfide				x	HACH DR/2800 Spectrophotometer	HACH Method 8131
Tannin/Lignin		x - *(Cement Water)*			HACH DR/800 Series Colorimeter	HACH Method 8193
TDS	x				HACH HQ14D Conductivity Meter	Refer To User Manual
Temperature	x		x		Fann Model 88C Resistivity Meter	Refer To User Manual
Total Petroleum Hydrocarbons (TPH)				x	HACH DR/2800 Spectrophotometer	HACH Method 10050
Transmittance				x	RealTech UVT Field Meter	Refer To User Manual
Turbidity			x		HACH 2100Q Turbidity Meter	Refer To User Manual

[1]Test can be performed on HACH DR/2800 Spectrophotometer if available

[2]Test can be performed with 200-1500mg/L Baker Potassium Test Strips if HACH DR/2800 Spectrophotometer is not available

Pricing Information

Item	Vendor	Part Number	Price
DR/890 Colorimeter[1]	HACH	4847000	
DR/2800 Spectrophotometer	HACH	DR2800-01B1	
2100Q Turbididty Meter	HACH	2100Q01	
HQ14D Conductivity Meter	HACH	HQ14D53000000	
30-600mg/L Chloride QuanTab Test Strip	HACH	2744940	
300-6000mg/L Chloride QuanTab Test Strip	HACH	2751340	
RealTech UVT Meter	RealTech	TBD	
IRB Test Vials	VK Enterprises	BB-PR	
SRB Test Vials	VK Enterprises	BB-AB	
Syringes For Bacteria Vials	VK Enterprises	SY-3C	
Model 88C Resistivity Meter	Fann	207960	

[1]A DR/820 can be used if presently in a lab, however a DR/890 should be purchased when a lab requires a new colorimeter.

Attachment I

CleanWave/Stream Water Quality Parameters for Field and District Labs

Parameter	Desired Analytical Range	Max observed	Field Instrument	Current Hach Range	Lab Instrument	
pH	2-14	13	Hach HQ40d	0-14	Any decent lab-grade pH meter	
Conductivity (mS)	Auto-ranging to 250mS	252	Hach HQ40d	0-200	HQ14d or sensION5-cond meter (suggested)	
Turbidity (ntu)	0-1000	3000	Hach 2100Q	0-1000	Hach 2100Q or LaMotte 2020 (0-4000ntu range)	
Transmittance 254nm (% transmittance)	0-100%	100	Real Tech UVT Field Meter	n/a	Same as field, if needed	
Alkalinity (mg/l, as HCO3)	0-500	6,800	n/a		HCl titration	
Chloride (mg/l)	0-50k	137,000	n/a	0-6000	Quantab strip	
Sulfate (mg/l)	0-200	3880	n/a	Up to 900	spectrophotometer	
Iron, total (mg/L)	0-10, 0-100	192	n/a	0-3	spectrophotometer	
Calcium (mg/l)	0-20,000	30,600	Digital titrator	10-4000	Titration, total hardness	
Magnesium (mg/l)	0-2000	4,000	Digital titrator	10-4000	Titration, total hardness only	
Potassium (mg/l)	0-750	2,000	n/a	.1-7	spectrophotometer	
Sulfide (µg/l)			n/a	5-800	spectrophotometer	
Boron (mg/l)	0-50	400	n/a	.2-14	spectrophotometer	
Barium (mg/l)	0-500	400	n/a	2-100	spectrophotometer	
Strontium (mg/l)	0-250	700	n/a	n/a		
TPH	500	750	n/a	20	spectrophotometer	
Bacteria (Serial dilution)						