

AP - _____110_____

**DEFERRED
CORRECTIVE ACTION**

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, March 24, 2015 4:20 PM
To: 'Speer, Julie'
Cc: Griswold, Jim, EMNRD; Robert.Combs@hollyfrontier.com; Stone, Brian (Brian.Stone@HollyFrontier.com); Gilbert, Bryan; Sahba, Arsin
Subject: RE: Navajo Lovington Refinery (AP-110) - April 2012 Cooling Tower Release Request for Closure

Ms. Speer:

Good afternoon. The New Mexico Oil Conservation Division (OCD) is in receipt of the above subject request.

Due to the nature of the release and situation with the 30-mil liner and soil contamination relative to the water table, OCD will not request a final C-141 Form for this release at this time.

Instead, OCD will file this e-mail message and the corrective action (CA) report into a “Deferred Corrective Action” (action) folder in AP-110, which means the final CA will not need to occur until decommission of surface equipment or closure of the facility, etc. occurs.

A note in RBDMS AP-110 will also be added to document this action.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive, Santa Fe, New Mexico 87505
O: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Web: <http://www.emnrd.state.nm.us/ocd/>

“Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?” To see how, please go to: “Pollution Prevention & Waste Minimization” at <http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental>



From: Speer, Julie [<mailto:JSpeer@trcsolutions.com>]

Sent: Monday, February 09, 2015 2:43 PM

To: Chavez, Carl J, EMNRD

Cc: Griswold, Jim, EMNRD; Robert.Combs@hollyfrontier.com; Stone, Brian (Brian.Stone@HollyFrontier.com); Gilbert,

Bryan; Sahba, Arsin

Subject: Navajo Lovington Refinery (AP-110) - April 2012 Cooling Tower Release Request for Closure

Carl,

Attached please find the letter documenting additional soil investigation and liner assessment related to the April 2012 cooling tower release at Navajo Refining Company's Lovington Refinery. No hard copy will be sent unless otherwise requested.

Thank you,
Julie Speer, PG, EIT
Associate Project Manager



505 East Huntland Drive, Suite 250, Austin, TX 78752
T: 512.684.3148 | F: 512.329.8750 | C: 512.431.8184

jspeer@trcsolutions.com | www.trcsolutions.com

Chavez, Carl J, EMNRD

From: Speer, Julie <JSpeer@trcsolutions.com>
Sent: Monday, February 09, 2015 2:43 PM
To: Chavez, Carl J, EMNRD
Cc: Griswold, Jim, EMNRD; Robert.Combs@hollyfrontier.com; Stone, Brian (Brian.Stone@HollyFrontier.com); Gilbert, Bryan; Sahba, Arsin
Subject: Navajo Lovington Refinery (AP-110) - April 2012 Cooling Tower Release Request for Closure
Attachments: Lovington Cooling Tower Release - Request for Closure FINAL to OCD 020915.pdf

Carl,

Attached please find the letter documenting additional soil investigation and liner assessment related to the April 2012 cooling tower release at Navajo Refining Company's Lovington Refinery. No hard copy will be sent unless otherwise requested.

Thank you,
Julie Speer, PG, EIT
Associate Project Manager



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505 East Huntland Drive
Suite 250
Austin, TX 78752

512.329.6080 PHONE
512.329.8750 FAX

www.TRCSolutions.com

February 9, 2015

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive,
Santa Fe, New Mexico 87505

Re: April 2012 Cooling Tower Release - Request for Closure, Navajo Refining Company, Lea Refinery, Lovington, New Mexico, AP-110

Dear Mr. Chavez:

On behalf of Navajo Refining Company (NRC), TRC Environmental Corporation (TRC) is submitting this letter to document results of additional investigations related to the April 2012 cooling tower release at the NRC Lovington Refinery (refinery). In addition, this letter supplements recent communication between NRC and the New Mexico Oil Conservation Division (NMOCD) regarding the presence of a liner that was previously installed adjacent to the cooling tower by the previous refinery owner/operator.

BACKGROUND

The NRC cooling tower release occurred on April 30, 2012, as operators were adding “makeup water” (reverse osmosis permeate supplemented with freshwater) to the basin of the refinery cooling tower. The cooling tower water level increased more quickly than anticipated and approximately 10 barrels of cooling water overflowed to the ground surface along the northeast and northwest sides of the cooling tower.

Initial release investigation activities were conducted by NRC personnel on January 16, 2013, and included the collection of two surface soil samples (Cooling Tower Background sample and Cooling Tower Spill Area sample [CTSA]). Additional soil investigation was conducted by TRC on June 20 and 21, 2013, based on the January 2013 soil sample analytical results. The June 2013 investigation included the advancement of a soil boring (TB-1) to 15 feet below ground surface (bgs), collection of surface soil samples (TB-1 through TB-5), and collection of a vertical delineation sample (TB-1 [14-15 feet bgs]). The results of the January 2013 and June 2013 investigations were documented in a letter report that was submitted to NMOCD on July 29,

2013, and indicated further investigation was required to delineate the lateral extent of chloride in surface soil.

The NMOCD provided comments to the July 2013 letter report in e-mails dated August 20, 2013, and January 15, 2014, and requested the removal of impacted surface soils surrounding the cooling tower using best professional judgment and confirmation sampling. TRC conducted additional surface soil investigation activities on August 20, 2014, to better define the potential excavation limits. The August 2014 investigation included the collection and field-screening of surface soil samples from within and adjacent to the cooling tower release area. Select soil samples were submitted for laboratory analysis based on the field-screening results. During the August 2014 investigation, a heavy-duty plastic liner was encountered at three of the sample locations (TB-1, TB-2, and CTSA) at depths ranging from approximately 1 to 2 feet bgs.

The liner encountered during the August 2014 investigation was determined to be part of two liners that were installed by the former refinery owner/operator (Southern Union Company) during backfilling activities associated with remedial excavation of metal-impacted soils in 1990. According to the October 1990 "Cooling Tower Supplemental Remedial Report" prepared by Geraghty & Miller, Inc. for Southern Union Company, 30-mil plastic liners were installed immediately northwest and northeast of the cooling tower at a depth of approximately 1.5 feet bgs between two one-foot thick compacted clay layers. The clay layers and liners installed at these locations were collectively referred to as a "cap" in the October 1990 Geraghty & Miller report. The October 1990 Geraghty & Miller report was provided to NMOCD in an e-mail dated November 21, 2014. The approximate location of the liners relative to the cooling tower, April 2012 NRC cooling tower spill area, and the 2013 and 2014 soil sample locations are shown in Figure 1. As shown on Figure 1, the liners are present over a majority of the area impacted by the April 2012 NRC cooling tower spill.

NRC notified the NMOCD regarding the discovery of the 30-mil liners and the August 2014 investigation results in an e-mail on November 10, 2014. NRC and NMOCD conducted a conference call and discussed the potential of leaving the impacted soil and liners surrounding the cooling tower in place on November 21, 2014. The NMOCD indicated during the conference call that the soil and liners may be allowed to remain in place if the integrity of the liners is intact and the liners can be shown to be effectively preventing the vertical migration of contaminants. The NMOCD also indicated that the appropriate clean-up level for chloride is 600 milligrams per kilogram (mg/kg).

A summary of the August 2014 soil investigation activities and December 2014 liner assessment and request for closure regarding the April 2012 NRC cooling tower spill are provided below.

AUGUST 2014 SOIL INVESTIGATION ACTIVITIES

Additional soil investigation was conducted by TRC on August 20, 2014. The investigation included the collection of surface soil samples using a decontaminated shovel or hand auger at locations immediately adjacent to previous soil sample locations (TB-1, TB-2, TB-3, and CTSA) within the release area and adjacent to the release area (TB-6 through TB-11). The intent of collecting additional samples at previous sample locations was to better define the vertical extent of impacted soil at these locations. However, the maximum sample depth that could be reached using a shovel or hand auger at these locations was restricted by the hardness of the surface soil. The location of soil samples collected during the 2013 and 2014 investigations are presented on Figure 1.

Surface soil samples were field-screened using a soil salinity meter (Myron L Agri-Meter™). Select soil samples were submitted for laboratory analysis based on field screening results for chloride and/or sulfate by Method E300. Select soil samples were also analyzed for chloride and/or sulfate synthetic precipitation leaching potential (SPLP) as follows:

- TB-1 (0 to 1 feet bgs and above liner) was analyzed for chloride and sulfate SPLP; and
- TB-1 (1 to 1.1 feet bgs and below liner) was analyzed for chloride SPLP.

As stated above, a heavy-duty plastic liner was encountered during sampling activities at sample locations TB-1, TB-2, and CTSA at depths ranging from approximately 1 to 2 feet bgs. Soil samples were collected from immediately beneath the liner at these three locations. A knife was utilized in order to bypass the liner as the shovel and hand auger could not penetrate the liner due to the strength of the liner and the hardness of the underlying soil.

August 2014 Soil Investigation Results

The 2013 and 2014 field and laboratory investigation results are presented in Table 1. The laboratory analytical report for the August 2014 samples is provided as Attachment A (laboratory analytical reports for the other samples shown on Table 1 have been previously provided to NMOCD). The laboratory results were compared to site-specific cleanup levels previously agreed upon by NMOCD in a January 15, 2014, e-mail and during the November 21, 2014, conference call.

The samples and depths at which the liner was encountered are indicated on Table 1 with a red dashed line. As shown on the table, the liner appears to have effectively prevented the vertical migration of chloride and sulfate at concentrations above the cleanup levels to the soils beneath the liner at two of the sample locations (TB-2 and CTSA). The liner at sample location TB-1 effectively prevented the vertical migration of sulfate and reduced the chloride concentration beneath the liner by 77 percent at a depth of 1-1.1 feet bgs and by 99 percent at a depth of 14-15

feet bgs. SPLP chloride results of two soil samples collected at TB-1 (one from a depth above the liner [0-1 feet] and one from a depth immediately below the liner [1-1.1 feet bgs]) show the soil above the liner at TB-1 could leach at concentrations above the New Mexico Water Quality Control Commission (WQCC) human health groundwater standards (absent the liner), but the soil beneath the liner (1-1.1 feet bgs) would not leach at concentrations above the WQCC human health groundwater standards.

LINER ASSESSMENT

On December 16, 2014, TRC collected a sample of the liner to assess the integrity and physical condition of the liner. An approximate one square foot sample was collected from the northeastern corner of the liner using a backhoe. The location of the liner sample is shown on Figure 1. The liner sample was visually inspected for structural integrity and determined to be free of any cracks, pinholes, stains, deformation, or any other indication of degradation or damage (except where damaged by the backhoe bucket teeth) that would indicate the integrity of the liner has been compromised. The physical strength of the liner was assessed by attempting to tear or deform the sample by hand. The sample could not be stretched or deformed by hand. Photographic documentation of the liner sample is provided as Attachment B.

The October 1990 Geraghty & Miller report did not include any additional specifications of the 30-mil liners. Based on the installation descriptions and photographs provided in the October 1990 Geraghty & Miller report and TRC's observations, the liners were installed in general agreement with the International Association of Geosynthetic Installers' (IAGI's) "HDPE and LLDPE Geomembrane Installation Specification".

REQUEST FOR CLOSURE

The results of the 2013 and 2014 investigations and the December 2014 liner assessment indicate that the liners installed by Southern Union Company in 1990 are in good condition and the "cap" (liners and clay layers) is effectively preventing the potential vertical migration of chloride and sulfate associated with April 2012 cooling tower release. NRC requests no further action be required in regards to the April 2012 cooling tower release based on the following:

- The "cap" is effectively preventing vertical migration of chloride and sulfate to underlying soils at concentrations above the soil cleanup levels.
- The "cap" is effectively preventing the leaching of chloride and sulfate to groundwater at concentrations above New Mexico WQCC human health groundwater standards.
- The "cap" is present over a majority of the area impacted by the April 2012 NRC cooling tower spill.
- The chloride- and sulfate-impacted surface soils around the cooling tower do not pose a risk to refinery workers.

Mr. Carl J. Chavez

February 9, 2015

Page 5

- The uppermost groundwater-bearing unit beneath the site is greater than 100 feet bgs, including at wells located near the cooling tower.
- Chloride has not been detected above WQCC human health standards in wells MW-11, MW-28, and MW-29, the nearest down-gradient monitor wells, since the April 2012 cooling tower spill.

Pending NMOCD's approval of this closure request, NRC will submit a final "Release Notification and Corrective Action" Form C-141.

If you have any questions or concerns, please do not hesitate to contact Robert Combs of NRC at (575) 746-5382, Bryan Gilbert of TRC at (512) 684-3104, or Julie Speer of TRC at (512) 684-3148.

Sincerely,



Bryan Gilbert, P.G.
Project Manager

Sincerely,



Julie Speer, P.G., E.I.T.
Associate Project Manager

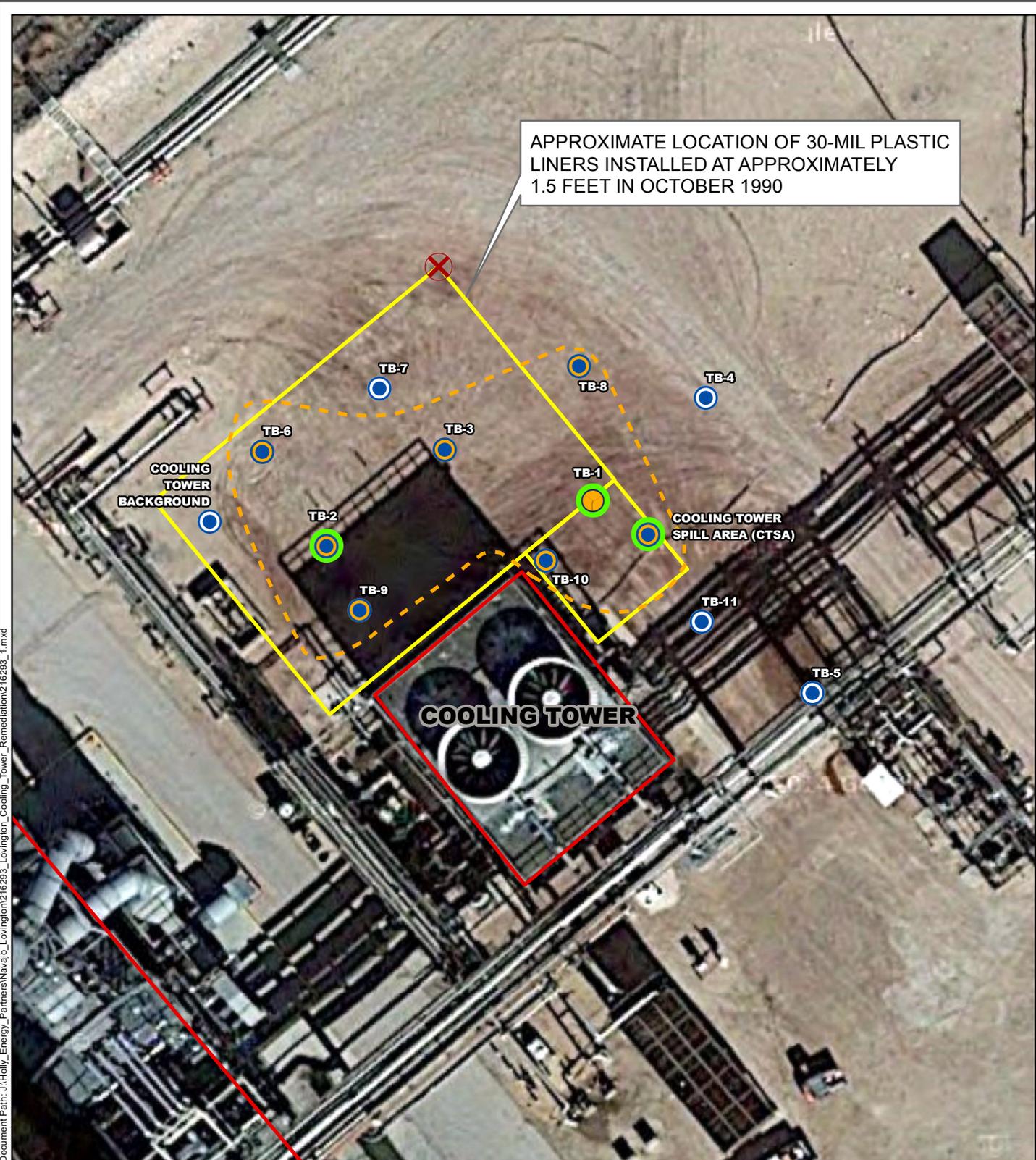
Attachments:

- Figure 1 – April 2012 Cooling Tower Spill Soil Sampling Location Map
- Table 1 – Summary of April 2012 Cooling Tower Spill Soil Sample Results
- Attachment A – Hall Environmental Laboratory Analytical Report
- Attachment B – Photograph of Liner Sample

cc: Jim Griswold, NMOCD Environmental Bureau, Santa Fe, New Mexico
Robert Combs, NRC, Artesia, New Mexico
Brian Stone, NRC, Artesia, New Mexico
Arsin Sahba, TRC, Austin, Texas



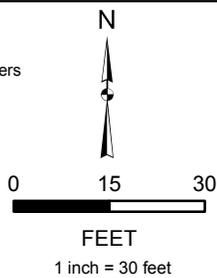
FIGURE



Document Path: J:\Holly_Energy_Partners\Navajo_Lovington\216293_Lovington_Cooling_tower_Remediation\216293_1.mxd

LEGEND

-  Soil Boring
-  Surface Soil Samples
-  Sample Exceeded Clean-Up Levels
-  Vertical Delineation
-  Plastic Liner Sample
-  Approximate Extent of 30-Mil Plastic Liners
-  Area of Impacted Soil (Approximate)
-  Buildings



**APRIL 2012 COOLING TOWER SPILL
SOIL SAMPLE LOCATION MAP**

NAVAJO REFINING COMPANY
LEA REFINERY LOVINGTON, NM

PROJECT NO: 216293

MXD: 216293_1

AUTHOR: KVILLATORO

DATE: 1/30/2015



505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE

1

Table

**Table 1. Summary of April 2012 Cooling Tower Spill Soil Sample Results
Navajo Lovington Refinery, Lovington, NM**

Sample Location	Date	Depth	Field readings		Lab Results			
			Meter Reading (mmhos/cm)	Total Salt Equivalent (ppm)	Total Chloride (mg/kg)	Total Sulfate (mg/kg)	SPLP Chloride (mg/L)	SPLP Sulfate (mg/L)
Cooling Tower Background Sample					419	1,310	WQCC GW Standard ⁽³⁾ (mg/L)	
Cleanup Level (mg/Kg)					600	2,080	250	600
TB-1	Aug 2014	0-1	5.0	3,200	5,600	3,500	370	120
	Aug 2014	1.0-1.1 ⁽¹⁾	-(²)	-	1,300	600	48	-
	June 2013	14-15	-	-	82.8	99.5	-	-
TB-1 (Duplicate)	Aug 2014	0-1	-	-	5,200	2,900	-	-
TB-2	Jan 2013	0-0.5	-	-	2,080	2,650	-	-
	Aug 2014	0-1	3.9	2,496	-	-	-	-
	Aug 2014	1-2	0.7	448	-	-	-	-
	Aug 2014	2.0-2.1 ⁽¹⁾	-(²)	-	410	500	-	-
TB-3	Jan 2013	0-0.5	-	-	1,530	1,990	-	-
	Aug 2014	0-1	3.1	1,984	-	-	-	-
	Aug 2014	1-1.1	-(²)	-	1,200	830	-	-
TB-4	Jan 2013	0-0.5	-	-	47.7	83.3	-	-
TB-5	Jan 2013	0-0.5	-	-	12.8	20.0	-	-
TB-6	Aug 2014	0-1	1.5	960	970	780	-	-
TB-7	Aug 2014	0-1	0.8	512	400	820	-	-
TB-8	Aug 2014	0-1	1.4	896	670	510	-	-
TB-9	Aug 2014	0-1	1.9	1,216	1,400	780	-	-
TB-10	Aug 2014	0-1	2.4	1,536	1,500	1,400	-	-
TB-11	Aug 2014	0-1	0.5	320	370	510	-	-
CTSA	Jan 2013	0-1	-	-	2,140	536	-	-
	Aug 2014	0-1	4.0	2,560	-	-	-	-
	Aug 2014	1.0-1.1 ⁽¹⁾	-(²)	-	450	960	-	-

Notes:

- Highlighted and bold cells exceed applicable cleanup level or standard
- Sulfate soil cleanup level based on Oil Conservation Division's email dated 1/15/2014
- Chloride soil cleanup level based on November 21, 2014, conference call between NRC and NMOCD.
- Dissolved salt equivalency determined using the conversion 1 mmho/cm = 640 ppm
- (1) Sample depth interval limited due to hand auger refusal and limited sample recovery.
- (2) Insufficient sample volume recovered to conduct field reading.
- (3) New Mexico Water Quality Control Commission Human Health Standards for Groundwater
- Not analyzed
- ppm - parts per million
- mmho/cm - millimhos per centimeter
- SPLP - Synthetic Precipitation Leaching Procedure
- 30-mil plastic liner present

ATTACHMENT A

Hall Environmental Laboratory Analytical Report



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

October 02, 2014

Robert Combs
Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: Loving to Lea Refinery

OrderNo.: 1408C59

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 13 sample(s) on 8/26/2014 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued September 03, 2014.

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.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a white background.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109



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

Case Narrative

WO#: 1408C59
Date: 10/2/2014

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery

Analytical Notes Regarding SPLP:

The following samples were leached using EPA method 1312:

TB-1 0.0'-1.0' SPLP

TB-1 1.0'-1.1' SPLP

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-001A

Client Sample ID: TB-2 2.0'-2.1'
Collection Date: 8/20/2014 3:40:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	410	30		mg/Kg	20	8/26/2014 4:02:28 PM	14961
Sulfate	500	30		mg/Kg	20	8/26/2014 4:02:28 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-002A

Client Sample ID: CTSA 1.0'-1.1'
Collection Date: 8/20/2014 3:45:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	450	30		mg/Kg	20	8/26/2014 4:39:41 PM	14961
Sulfate	960	30		mg/Kg	20	8/26/2014 4:39:41 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-003A

Client Sample ID: TB-1 1.0'-1.1'
Collection Date: 8/20/2014 3:50:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	1300	75		mg/Kg	50	8/28/2014 6:51:39 PM	14961
Sulfate	600	30		mg/Kg	20	8/26/2014 4:52:06 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-003B

Client Sample ID: TB-1 1.0'-1.1'
Collection Date: 8/20/2014 3:50:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	48	3.3		mg/L	20	10/1/2014 3:35:35 AM	R21571

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-004A

Client Sample ID: TB-3 1.0'-1.1'
Collection Date: 8/20/2014 3:55:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	1200	30		mg/Kg	20	8/26/2014 5:04:31 PM	14961
Sulfate	830	30		mg/Kg	20	8/26/2014 5:04:31 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1408C59

Date Reported: 10/2/2014

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-005A

Client Sample ID: TB-6 0.0'-1.0'
Collection Date: 8/20/2014 4:00:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	970	30		mg/Kg	20	8/26/2014 5:16:56 PM	14961
Sulfate	780	30		mg/Kg	20	8/26/2014 5:16:56 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-006A

Client Sample ID: TB-7 0.0'-1.0'
Collection Date: 8/20/2014 4:05:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	400	30		mg/Kg	20	8/26/2014 5:29:20 PM	14961
Sulfate	820	30		mg/Kg	20	8/26/2014 5:29:20 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-007A

Client Sample ID: TB-8 0.0'-1.0'
Collection Date: 8/20/2014 4:10:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	670	30		mg/Kg	20	8/26/2014 5:41:45 PM	14961
Sulfate	510	30		mg/Kg	20	8/26/2014 5:41:45 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-008A

Client Sample ID: TB-9 0.0'-1.0'
Collection Date: 8/20/2014 4:15:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	1400	75		mg/Kg	50	8/28/2014 7:04:04 PM	14961
Sulfate	780	30		mg/Kg	20	8/26/2014 5:54:09 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-009A

Client Sample ID: TB-10 0.0'-1.0'
Collection Date: 8/20/2014 4:20:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	1500	75		mg/Kg	50	8/28/2014 7:16:29 PM	14961
Sulfate	1400	30		mg/Kg	20	8/26/2014 6:31:23 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-010A

Client Sample ID: TB-11 0.0'-1.0'
Collection Date: 8/20/2014 4:25:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	370	30		mg/Kg	20	8/26/2014 6:43:48 PM	14961
Sulfate	510	30		mg/Kg	20	8/26/2014 6:43:48 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-011A

Client Sample ID: TB-1 0.0'-1.0'
Collection Date: 8/20/2014 4:50:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	5600	750		mg/Kg	500	8/28/2014 7:28:53 PM	14961
Sulfate	3500	750		mg/Kg	500	8/28/2014 7:28:53 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-012A

Client Sample ID: DUP-1
Collection Date: 8/20/2014 11:59:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	5200	300		mg/Kg	200	8/28/2014 7:41:17 PM	14961
Sulfate	2900	30		mg/Kg	20	8/26/2014 7:08:38 PM	14961

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Analytical Report

Lab Order: **1408C59**

Date Reported: **10/2/2014**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Loving to Lea Refinery
Lab ID: 1408C59-013A

Client Sample ID: TB-1 0.0'-1.0' SPLP
Collection Date: 8/26/2014
Matrix: Leachate

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: LGP
Chloride	370	10	*	mg/L	20	8/27/2014 1:11:48 AM	R20831
Sulfate	120	10		mg/L	20	8/27/2014 1:11:48 AM	R20831

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

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
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1408C59

02-Oct-14

Client: Navajo Refining Company

Project: Loving to Lea Refinery

Sample ID MB-14961	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBS	Batch ID: 14961		RunNo: 20829							
Prep Date: 8/26/2014	Analysis Date: 8/26/2014		SeqNo: 606221		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								
Sulfate	ND	1.5								

Sample ID LCS-14961	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSS	Batch ID: 14961		RunNo: 20829							
Prep Date: 8/26/2014	Analysis Date: 8/26/2014		SeqNo: 606222		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.1	90	110			
Sulfate	29	1.5	30.00	0	96.9	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1408C59

02-Oct-14

Client: Navajo Refining Company

Project: Loving to Lea Refinery

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R20831		RunNo: 20831							
Prep Date:	Analysis Date: 8/26/2014		SeqNo: 606285		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R20831		RunNo: 20831							
Prep Date:	Analysis Date: 8/26/2014		SeqNo: 606286		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.4	90	110			
Sulfate	9.8	0.50	10.00	0	97.7	90	110			

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R20831		RunNo: 20831							
Prep Date:	Analysis Date: 8/26/2014		SeqNo: 606339		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R20831		RunNo: 20831							
Prep Date:	Analysis Date: 8/26/2014		SeqNo: 606340		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.6	90	110			
Sulfate	9.9	0.50	10.00	0	98.5	90	110			

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R21571		RunNo: 21571							
Prep Date:	Analysis Date: 9/30/2014		SeqNo: 632137		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R21571		RunNo: 21571							
Prep Date:	Analysis Date: 9/30/2014		SeqNo: 632138		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.5	90	110			

Qualifiers:

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

Client Name: NAVAJO REFINING COM

Work Order Number: 1408C59

RcptNo: 1

Received by/date: OS 08/25/14

Logged By: **Celina Sessa** 8/25/2014 8:35:00 AM *Celina Sessa*

Completed By: **Celina Sessa** 8/25/2014 9:11:29 AM *Celina Sessa*

Reviewed By: *[Signature]* 08/25/14

Chain of Custody

1. Custody seals intact on sample bottles? Yes No Not Present
2. Is Chain of Custody complete? Yes No Not Present
3. How was the sample delivered? FedEx

Log In

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

16. 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: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.7	Good	Yes			

ATTACHMENT B

Photograph of Liner Sample

