GW – 028

2015 Annual Discharge Permit Report

PART 13 OF 16

March 2016

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company
Project: Monthly RO Reject

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **A30709**	RunNo: **30709**
Prep Date:	Analysis Date: **12/8/2015**	SeqNo: **937841** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		103	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130			
Surr: Dibromofluoromethane	10		10.00		104	70	130			
Surr: Toluene-d8	10		10.00		102	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **A30709**	RunNo: **30709**
Prep Date:	Analysis Date: **12/8/2015**	SeqNo: **937842** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	23	1.0	20.00	0	114	70	130			
Toluene	22	1.0	20.00	0	109	70	130			
Chlorobenzene	22	1.0	20.00	0	110	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly RO Reject

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **A30709**	RunNo: **30709**
Prep Date:	Analysis Date: **12/8/2015**	SeqNo: **937842** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	22	1.0	20.00	0	110	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		106	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	10		10.00		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company
Project: Monthly RO Reject

Sample ID	**MB-22700**	SampType:	**MBLK**	TestCode:	**EPA Method 8310: PAHs**					
Client ID:	**PBW**	Batch ID:	**22700**	RunNo:	**30775**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940029**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	2.0								
2-Methylnaphthalene	ND	2.0								
Benzo(a)pyrene	ND	0.070								
Surr: Benzo(e)pyrene	13		20.00		63.6	33.4	129			

Sample ID	**LCS-22700**	SampType:	**LCS**	TestCode:	**EPA Method 8310: PAHs**					
Client ID:	**LCSW**	Batch ID:	**22700**	RunNo:	**30775**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940030**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	69	2.0	80.00	0	86.7	54.6	110			
1-Methylnaphthalene	69	2.0	80.20	0	86.6	49.1	116			
2-Methylnaphthalene	69	2.0	80.00	0	86.8	52.5	111			
Benzo(a)pyrene	0.45	0.070	0.5020	0	89.6	62	107			
Surr: Benzo(e)pyrene	13		20.00		66.6	33.4	129			

Sample ID	**1512236-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 8310: PAHs**					
Client ID:	**R.O. Reject**	Batch ID:	**22700**	RunNo:	**30775**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940035**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	67	2.0	80.00	0	83.3	21.6	109			
1-Methylnaphthalene	69	2.0	80.20	0	85.5	15.8	102			
2-Methylnaphthalene	68	2.0	80.00	0	85.2	11.4	99			
Benzo(a)pyrene	0.45	0.070	0.5020	0	89.6	25	123			
Surr: Benzo(e)pyrene	14		20.00		68.2	33.4	129			

Sample ID	**1512236-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8310: PAHs**					
Client ID:	**R.O. Reject**	Batch ID:	**22700**	RunNo:	**30775**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940036**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	57	2.0	80.00	0	70.8	21.6	109	16.2	20	
1-Methylnaphthalene	58	2.0	80.20	0	72.2	15.8	102	16.9	20	
2-Methylnaphthalene	58	2.0	80.00	0	72.2	11.4	99	16.5	20	
Benzo(a)pyrene	0.39	0.070	0.5020	0	77.7	25	123	14.3	20	
Surr: Benzo(e)pyrene	12		20.00		57.8	33.4	129	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly RO Reject

Sample ID	**MB-22770**	SampType:	**MBLK**	TestCode:	**Total Phenolics by SW-846 9067**					
Client ID:	**PBW**	Batch ID:	**22770**	RunNo:	**30802**					
Prep Date:	**12/14/2015**	Analysis Date:	**12/14/2015**	SeqNo:	**941057**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics, Total Recoverable	ND	2.5								

Sample ID	**LCS-22770**	SampType:	**LCS**	TestCode:	**Total Phenolics by SW-846 9067**					
Client ID:	**LCSW**	Batch ID:	**22770**	RunNo:	**30802**					
Prep Date:	**12/14/2015**	Analysis Date:	**12/14/2015**	SeqNo:	**941058**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics, Total Recoverable	22	2.5	20.00	0	111	64.4	135			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly RO Reject

Sample ID	**MB-R31007**	SampType:	**MBLK**	TestCode:	**EPA 335.4: Total Cyanide Subbed**					
Client ID:	**PBW**	Batch ID:	**R31007**	RunNo:	**31007**					
Prep Date:		Analysis Date:	**12/9/2015**	SeqNo:	**948210**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	ND	0.0100								

Sample ID	**LCS-R31007**	SampType:	**LCS**	TestCode:	**EPA 335.4: Total Cyanide Subbed**					
Client ID:	**LCSW**	Batch ID:	**R31007**	RunNo:	**31007**					
Prep Date:		Analysis Date:	**12/9/2015**	SeqNo:	**948211**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	0.504		0.5000	0	101	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly RO Reject

Sample ID	**MB-R31278**	SampType:	**MBLK**	TestCode:	**EPA 903.1: Ra 226 and EPA 904.0: Ra 228-Subbed**
Client ID:	**PBW**	Batch ID:	**R31278**	RunNo:	**31278**
Prep Date:		Analysis Date:	**12/17/2016**	SeqNo:	**957749** Units: **pCi/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Radium-226	0.341	0.735								
Radium-226 ±	0.446	0.735								
Radium-228	0.0606	0.609								
Radium-228 ±	0.268	0.609								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512236**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly RO Reject

Sample ID	**MB-22696**	SampType:	**MBLK**	TestCode:	**SM2540C MOD: Total Dissolved Solids**					
Client ID:	**PBW**	Batch ID:	**22696**	RunNo:	**30818**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/13/2015**	SeqNo:	**941671**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID	**LCS-22696**	SampType:	**LCS**	TestCode:	**SM2540C MOD: Total Dissolved Solids**					
Client ID:	**LCSW**	Batch ID:	**22696**	RunNo:	**30818**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/13/2015**	SeqNo:	**941672**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1000	20.0	1000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

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: NAVAJO REFINING CO Work Order Number: 1512236 RcptNo: 1

Received by/date: JA 12/04/15

Logged By: Celina Sessa 12/4/2015 9:20:00 AM Celina Sessa

Completed By: Celina Sessa 12/4/2015 2:30:37 PM Celina Sessa

Reviewed By: AG 12/04/15

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? Courier

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: 6 (<2 or >12 unless noted)
Adjusted? NO
Checked by: JA

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	1.3	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refinery

Mailing Address: P.O. Box 159 Artesia,

NM 88211-0159

Phone #: 575-748-3311

email or Fax#: 575-746-5451

QA/QC Package:

X Standard ☐ Level 4 (Full Validation)

☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:

X Standard ☐ Rush_____

Project Name:

Monthly R.O. Reject

Project #: P.O. # 167796

Project Manager:

Robert Combs

Sampler: Elizabeth Salsberry

On Ice: X Yes ☐ No

Sample Temperature: 1.3

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. 1512236	8260B:WQCC List VOCs	8270C: WQCC list SVOCs	6010B: WQCC Metals	335.4: Total Cyanide	7470: Mercury	8015: GRO, DRO, ORO	8082: PCBs	Radioactivity (Ra-226+Ra-228)	Sulfate Chloride	Phenols	Fluoride	Nitrate/Nitrite	Total Dissolved Solids	PH	504.1:EDB	Air Bubbles (Y or N)
12/3/15	9:00	liquid	R.O. Reject	2 - 500ml P	1-unpres 1-H2SO4	-001									X		X	X	X	X		Y
12/3/15	9:00	liquid	R.O. Reject	3-40ml VOA	HCL		X															
12/3/15	9:00	liquid	R.O. Reject	1-500ml P	HNO3						X											
12/3/15	9:00	liquid	R.O. Reject	1-125ml P	HNO3				X													
12/3/15	9:00	liquid	R.O. Reject	1-500ml P	NaOH					X												
12/3/15	9:00	liquid	R.O. Reject	2- 1L P	HNO3									X								
12/3/15	9:00	liquid	R.O. Reject	3-40ml VOA	Na2S2O3																X	
12/3/15	9:00	liquid	R.O. Reject	2 - 1L Glass	unpres								X									
12/3/15	9:00	liquid	R.O. Reject	1 - 1L Glass	unpres			X														
12/3/15	9:00	liquid	R.O. Reject	3-40ml VOA	HCl							X										
12/3/15	9:00	liquid	R.O. Reject	1-250mlGlass	unpres							X										
12/3/15	9:00	liquid	R.O. Reject	1 - 1L Glass	H2SO4											X						
12/3/15	9:00	liquid	Trip Blank	2-40ml VOA	HCL	-002																

Date	Time	Relinquished by:	Received by:	Date	Time
12/3/15	1:30	Elizabeth Salsberry			
				12/04/15	0920
Date	Time	Relinquished by:	Received by:	Date	Time

Remarks:

Metals: As, Al, Ba, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, U, Zn

VOCs: 1,1,1-Trichloroethane; 1,1,2,2-Tetrachloroethene; 1,1,2,2-Tetrachloroethylene; 1,1,2-Trichloroethane; 1,1,2-Trichloroethylene; 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dibromoethane; 1,2-Dichloroethane; Benzene; Carbon Tetrachloride; Chloroform; Dichloromethane; Ethylbenzene; Toluene; Total Xylenes; Vinyl Chloride

SVOCs: benzo(a)pyrene, phenol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene

Navajo Refining Company, LLC
501 E. Main
Artesia, NM 88210
(Tel) 575.748.3311
(Fax) 575.746.5451

Monthly RO Reject Sample Details Attachment

HOLLYFRONTIER
The HollyFrontier Companies

Project Name	Biannual RO Reject
Samplers Name	Elizabeth Salsberry
Samplers Affiliation	Navajo Refining Co. LLC
Start Date and Time	12/3/2015 @ 8:55 a.m.
End Date and Time	12/3/2015 @ 9:10 a.m.

Sample Type	
Grab	☑
Time Weighted Composite	☐
Flow Weighted Composite	☐

Parts / Sample Intervals	One

Physical Property	
Solid	☐
Liquid	☑
Sludge	☐

Type of Sampler	Directly to sample jars

Outfall / Sample Location: ☑ North Field R.O. Reject Discarge ☐ South Field R.O. Reject Discarge

				Preservatives								
Container	Size	Material	# of Containers	Neat (None)	HCL	HNO3	H2SO4	NaOH	Na2S2O3	NaHSO4	Other	Analysis and/or Method Requested
1	500ml	Plastic	2	X			X					pH, Cl, F, S04, NO2/NO3, TDS
2	40ml	VOA	3		X							8015 GRO
3	500ml	Plastic	1			X						6020 total metals, 7470 Hg
4	125ml	Plastic	1			X						6020 Dissolved Metals
5	500ml	Plastic	2					X				Cyanide
6	1L	Plastic	3			X						Radium 226/228
7	40ml	VOA	2		X							8260 see attached list
8	1L	Glass	1	X								8270 see attached list
9	1L	Glass	2	X								8082 PCBs
10	40ml	VOA	2	X								8015 DRO
11	40ml	VOA	2		X							Radium 226/228

Field Data (Weather, Observations, Etc): 12/3/2015 Tmp.35.6 °F, Humidity 70% , Wind Dir. North, Wind Speed 6.9 mph , Conditions Clear

Date and Time.

Field Temp. 62.5F Field pH 7.46

Storage Method	
Ice	☑
Refrigerated	☐
Other	☐

Shipping Media	
Ice	☑
Other	☐

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

January 06, 2016

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

RE: Monthly Temporary RO Reject OrderNo.: 1512238

Dear Robert Combs:

Hall Environmental Analysis Laboratory received 2 sample(s) on 12/4/2015 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. In order to properly interpret your results it is imperative that you review this report in its entirety. 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. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1512238**
Date Reported: **1/6/2016**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Monthly Temporary RO Reject
Lab ID: 1512238-001 **Matrix:** AQUEOUS

Client Sample ID: Temporary R.O. Reject
Collection Date: 12/3/2015 9:30:00 AM
Received Date: 12/4/2015 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **JLF**	
Arsenic	ND	0.0010		mg/L	1	12/11/2015 2:40:29 PM	A30798
Lead	ND	0.00050		mg/L	1	12/11/2015 2:40:29 PM	A30798
Selenium	ND	0.0010		mg/L	1	12/11/2015 2:40:29 PM	A30798
Uranium	ND	0.00050		mg/L	1	12/11/2015 2:40:29 PM	A30798
EPA 903.1: RA 226 AND EPA 904.0: RA 228-SUBBED						Analyst: **SUB**	
Radium-226	1.44	0.825		pCi/L	1	12/17/2016	R31278
Radium-226 ±	0.725	0.825		pCi/L	1	12/17/2016	R31278
Radium-228	0.534	0.587		pCi/L	1	12/17/2016	R31278
Radium-228 ±	0.304	0.587		pCi/L	1	12/17/2016	R31278
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Fluoride	2.5	0.10		mg/L	1	12/5/2015 4:17:53 AM	A30652
Chloride	53	25		mg/L	50	12/23/2015 3:24:38 AM	A31049
Sulfate	1300	25		mg/L	50	12/23/2015 3:24:38 AM	A31049
Nitrate+Nitrite as N	1.7	1.0		mg/L	5	12/23/2015 3:49:28 AM	R31049
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **SRM**	
Total Dissolved Solids	2550	20.0	*	mg/L	1	12/13/2015 1:47:00 PM	22696
EPA 335.4: TOTAL CYANIDE SUBBED						Analyst: **SUB**	
Cyanide	ND	0.0100		mg/L	1	12/15/2015	R31009
SM4500-H+B: PH						Analyst: **MRA**	
pH	7.92	1.68	H	pH units	1	12/7/2015 1:42:27 PM	R30658
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.020		mg/L	1	12/14/2015 2:36:49 PM	B30821
Barium	ND	0.0020		mg/L	1	12/14/2015 2:36:49 PM	B30821
Boron	ND	0.040		mg/L	1	12/14/2015 2:36:49 PM	B30821
Cadmium	ND	0.0020		mg/L	1	12/16/2015 3:13:38 PM	B30889
Chromium	ND	0.0060		mg/L	1	12/14/2015 2:36:49 PM	B30821
Cobalt	ND	0.0060		mg/L	1	12/14/2015 2:36:49 PM	B30821
Copper	0.014	0.0060		mg/L	1	12/14/2015 2:36:49 PM	B30821
Iron	ND	0.020		mg/L	1	12/14/2015 2:36:49 PM	B30821
Manganese	ND	0.0020		mg/L	1	12/14/2015 2:36:49 PM	B30821
Molybdenum	ND	0.0080		mg/L	1	12/17/2015 2:24:13 PM	B30929
Nickel	ND	0.010		mg/L	1	12/16/2015 3:13:38 PM	B30889
Silver	ND	0.0050		mg/L	1	12/17/2015 2:24:13 PM	B30929
Zinc	0.021	0.010		mg/L	1	12/16/2015 3:13:38 PM	B30889
EPA METHOD 245.1: MERCURY						Analyst: **DBD**	
Mercury	ND	0.00020		mg/L	1	12/11/2015 11:08:25 AM	22710

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
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Project: Monthly Temporary RO Reject
Lab ID: 1512238-001 **Matrix:** AQUEOUS

Client Sample ID: Temporary R.O. Reject
Collection Date: 12/3/2015 9:30:00 AM
Received Date: 12/4/2015 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.010		µg/L	1	12/9/2015	22664
EPA METHOD 8082: PCB'S						Analyst: **SCC**	
Aroclor 1016	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1221	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1232	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1242	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1248	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1254	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Aroclor 1260	ND	1.0		µg/L	1	12/11/2015 4:36:04 PM	22699
Surr: Decachlorobiphenyl	73.2	17.7-151		%REC	1	12/11/2015 4:36:04 PM	22699
Surr: Tetrachloro-m-xylene	53.2	20.6-151		%REC	1	12/11/2015 4:36:04 PM	22699
EPA METHOD 8015M/D: DIESEL RANGE						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	12/7/2015 2:27:15 PM	22645
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	12/7/2015 2:27:15 PM	22645
Surr: DNOP	92.8	72-136		%REC	1	12/7/2015 2:27:15 PM	22645
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	12/10/2015 1:17:04 AM	A30727
Surr: BFB	85.9	49.5-130		%REC	1	12/10/2015 1:17:04 AM	A30727
EPA METHOD 8310: PAHS						Analyst: **SCC**	
Naphthalene	ND	2.0		µg/L	1	12/11/2015 8:41:32 AM	22700
1-Methylnaphthalene	ND	2.0		µg/L	1	12/11/2015 8:41:32 AM	22700
2-Methylnaphthalene	ND	2.0		µg/L	1	12/11/2015 8:41:32 AM	22700
Benzo(a)pyrene	ND	0.070		µg/L	1	12/11/2015 8:41:32 AM	22700
Surr: Benzo(e)pyrene	56.1	33.4-129		%REC	1	12/11/2015 8:41:32 AM	22700
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
Benzene	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Toluene	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Ethylbenzene	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Carbon Tetrachloride	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Chloroform	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,1-Dichloroethane	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,1-Dichloroethene	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Methylene Chloride	ND	3.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770

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
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Temporary R.O. Reject
Project: Monthly Temporary RO Reject
Collection Date: 12/3/2015 9:30:00 AM
Lab ID: 1512238-001 **Matrix:** AQUEOUS **Received Date:** 12/4/2015 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
1,1,1-Trichloroethane	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
1,1,2-Trichloroethane	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Trichloroethene (TCE)	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Vinyl chloride	ND	1.0		µg/L	1	12/10/2015 11:52:43 AM	R30770
Xylenes, Total	ND	1.5		µg/L	1	12/10/2015 11:52:43 AM	R30770
Surr: 1,2-Dichloroethane-d4	108	70-130		%REC	1	12/10/2015 11:52:43 AM	R30770
Surr: 4-Bromofluorobenzene	93.4	70-130		%REC	1	12/10/2015 11:52:43 AM	R30770
Surr: Dibromofluoromethane	93.9	70-130		%REC	1	12/10/2015 11:52:43 AM	R30770
Surr: Toluene-d8	96.6	70-130		%REC	1	12/10/2015 11:52:43 AM	R30770
TOTAL PHENOLICS BY SW-846 9067						Analyst: **SCC**	
Phenolics, Total Recoverable	ND	2.5		µg/L	1	12/14/2015	22770

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
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Trip Blank
Project: Monthly Temporary RO Reject
Collection Date:
Lab ID: 1512238-002
Matrix: TRIP BLANK
Received Date: 12/4/2015 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.010		µg/L	1	12/9/2015	22664
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
Benzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Toluene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Ethylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Naphthalene	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1-Methylnaphthalene	ND	4.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
2-Methylnaphthalene	ND	4.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Acetone	11	10		µg/L	1	12/10/2015 1:47:44 PM	R30770
Bromobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Bromodichloromethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Bromoform	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Bromomethane	ND	3.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
2-Butanone	ND	10		µg/L	1	12/10/2015 1:47:44 PM	R30770
Carbon disulfide	ND	10		µg/L	1	12/10/2015 1:47:44 PM	R30770
Carbon Tetrachloride	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Chlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Chloroethane	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Chloroform	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Chloromethane	ND	3.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
2-Chlorotoluene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
4-Chlorotoluene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
cis-1,2-DCE	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Dibromochloromethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Dibromomethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2-Dichlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,3-Dichlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,4-Dichlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Dichlorodifluoromethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1-Dichloroethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1-Dichloroethene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2-Dichloropropane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770

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
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Navajo Refining Company
Client Sample ID: Trip Blank
Project: Monthly Temporary RO Reject
Collection Date:
Lab ID: 1512238-002 **Matrix:** TRIP BLANK **Received Date:** 12/4/2015 9:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
1,3-Dichloropropane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
2,2-Dichloropropane	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1-Dichloropropene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Hexachlorobutadiene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
2-Hexanone	ND	10		µg/L	1	12/10/2015 1:47:44 PM	R30770
Isopropylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
4-Isopropyltoluene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
4-Methyl-2-pentanone	ND	10		µg/L	1	12/10/2015 1:47:44 PM	R30770
Methylene Chloride	ND	3.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
n-Butylbenzene	ND	3.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
n-Propylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
sec-Butylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Styrene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
tert-Butylbenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
trans-1,2-DCE	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1,1-Trichloroethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,1,2-Trichloroethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Trichloroethene (TCE)	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Trichlorofluoromethane	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
1,2,3-Trichloropropane	ND	2.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Vinyl chloride	ND	1.0		µg/L	1	12/10/2015 1:47:44 PM	R30770
Xylenes, Total	ND	1.5		µg/L	1	12/10/2015 1:47:44 PM	R30770
Surr: 1,2-Dichloroethane-d4	104	70-130		%REC	1	12/10/2015 1:47:44 PM	R30770
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	12/10/2015 1:47:44 PM	R30770
Surr: Dibromofluoromethane	104	70-130		%REC	1	12/10/2015 1:47:44 PM	R30770
Surr: Toluene-d8	110	70-130		%REC	1	12/10/2015 1:47:44 PM	R30770

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
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **MB-B**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B30821**	RunNo: **30821**
Prep Date:	Analysis Date: **12/14/2015**	SeqNo: **941747** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Boron	ND	0.040								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID **LCS-B**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B30821**	RunNo: **30821**
Prep Date:	Analysis Date: **12/14/2015**	SeqNo: **941748** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.52	0.020	0.5000	0	103	85	115			
Boron	0.51	0.040	0.5000	0	102	85	115			
Chromium	0.51	0.0060	0.5000	0	101	85	115			
Cobalt	0.50	0.0060	0.5000	0	99.5	85	115			
Copper	0.49	0.0060	0.5000	0	98.5	85	115			
Iron	0.53	0.020	0.5000	0	105	85	115			
Manganese	0.50	0.0020	0.5000	0	100	85	115			

Sample ID **LLLCS-B**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **B30821**	RunNo: **30821**
Prep Date:	Analysis Date: **12/14/2015**	SeqNo: **941749** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020	0.01000	0	104	50	150			
Boron	ND	0.040	0.04000	0	99.4	50	150			
Chromium	0.0067	0.0060	0.006000	0	112	50	150			
Cobalt	ND	0.0060	0.006000	0	70.0	50	150			
Copper	ND	0.0060	0.006000	0	91.2	50	150			
Iron	0.023	0.020	0.02000	0	114	50	150			
Manganese	0.0022	0.0020	0.002000	0	108	50	150			

Sample ID **MB-B**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B30821**	RunNo: **30821**
Prep Date:	Analysis Date: **12/14/2015**	SeqNo: **941846** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company
Project: Monthly Temporary RO Reject

Sample ID	**LCS-B**	SampType:	**LCS**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**LCSW**	Batch ID:	**B30821**		RunNo:	**30821**				
Prep Date:		Analysis Date:	**12/14/2015**		SeqNo:	**941847**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.0020	0.5000	0	97.5	85	115			

Sample ID	**LLLCS-B**	SampType:	**LCSLL**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**BatchQC**	Batch ID:	**B30821**		RunNo:	**30821**				
Prep Date:		Analysis Date:	**12/14/2015**		SeqNo:	**941848**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020	0.002000	0	93.0	50	150			

Sample ID	**MB-B**	SampType:	**MBLK**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**PBW**	Batch ID:	**B30889**		RunNo:	**30889**				
Prep Date:		Analysis Date:	**12/16/2015**		SeqNo:	**944219**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	0.0020								
Nickel	ND	0.010								
Zinc	ND	0.010								

Sample ID	**LCS-B**	SampType:	**LCS**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**LCSW**	Batch ID:	**B30889**		RunNo:	**30889**				
Prep Date:		Analysis Date:	**12/16/2015**		SeqNo:	**944220**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.49	0.0020	0.5000	0	98.9	85	115			
Nickel	0.47	0.010	0.5000	0	94.5	85	115			
Zinc	0.48	0.010	0.5000	0	95.7	85	115			

Sample ID	**LLLCS-B**	SampType:	**LCSLL**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**BatchQC**	Batch ID:	**B30889**		RunNo:	**30889**				
Prep Date:		Analysis Date:	**12/16/2015**		SeqNo:	**944221**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	0.0020	0.002000	0	78.5	50	150			
Nickel	ND	0.010	0.005000	0	78.8	50	150			
Zinc	ND	0.010	0.005000	0	67.0	50	150			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	1512238-001GMS	SampType:	MS		TestCode:	EPA Method 200.7: Dissolved Metals				
Client ID:	Temporary R.O. Rej	Batch ID:	B30889		RunNo:	30889				
Prep Date:		Analysis Date:	12/16/2015		SeqNo:	944261	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.53	0.0020	0.5000	0	106	70	130			
Nickel	0.50	0.010	0.5000	0	99.2	70	130			
Zinc	0.52	0.010	0.5000	0.02057	100	70	130			

Sample ID	1512238-001GMSD	SampType:	MSD		TestCode:	EPA Method 200.7: Dissolved Metals				
Client ID:	Temporary R.O. Rej	Batch ID:	B30889		RunNo:	30889				
Prep Date:		Analysis Date:	12/16/2015		SeqNo:	944265	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.51	0.0020	0.5000	0	103	70	130	3.15	20	
Nickel	0.48	0.010	0.5000	0	95.3	70	130	4.04	20	
Zinc	0.50	0.010	0.5000	0.02057	96.7	70	130	3.48	20	

Sample ID	MB-B	SampType:	MBLK		TestCode:	EPA Method 200.7: Dissolved Metals				
Client ID:	PBW	Batch ID:	B30929		RunNo:	30929				
Prep Date:		Analysis Date:	12/17/2015		SeqNo:	945585	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	ND	0.0080								
Silver	ND	0.0050								

Sample ID	LCS-B	SampType:	LCS		TestCode:	EPA Method 200.7: Dissolved Metals				
Client ID:	LCSW	Batch ID:	B30929		RunNo:	30929				
Prep Date:		Analysis Date:	12/17/2015		SeqNo:	945586	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.49	0.0080	0.5000	0	98.3	85	115			
Silver	0.098	0.0050	0.1000	0	98.0	85	115			

Sample ID	LLLCS-B	SampType:	LCSLL		TestCode:	EPA Method 200.7: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	B30929		RunNo:	30929				
Prep Date:		Analysis Date:	12/17/2015		SeqNo:	945587	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.0097	0.0080	0.008000	0	122	50	150			
Silver	0.0051	0.0050	0.005000	0	103	50	150			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**1512238-001GMS**	SampType: **MS**		TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**Temporary R.O. Rej**	Batch ID: **B30929**		RunNo: **30929**					
Prep Date:		Analysis Date: **12/17/2015**		SeqNo: **945617**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.49	0.0080	0.5000	0.003550	97.6	70	130			
Silver	0.10	0.0050	0.1000	0	103	70	130			

Sample ID	**1512238-001GMSD**	SampType: **MSD**		TestCode: **EPA Method 200.7: Dissolved Metals**					
Client ID:	**Temporary R.O. Rej**	Batch ID: **B30929**		RunNo: **30929**					
Prep Date:		Analysis Date: **12/17/2015**		SeqNo: **945621**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.49	0.0080	0.5000	0.003550	97.9	70	130	0.380	20	
Silver	0.11	0.0050	0.1000	0	105	70	130	2.48	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A30798**	RunNo: **30798**
Prep Date:	Analysis Date: **12/11/2015**	SeqNo: **941051** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.025	0.0010	0.02500	0	98.6	85	115			
Lead	0.013	0.00050	0.01250	0	101	85	115			
Selenium	0.024	0.0010	0.02500	0	97.2	85	115			
Uranium	0.013	0.00050	0.01250	0	101	85	115			

Sample ID **LLLCS**	SampType: **LCSLL**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A30798**	RunNo: **30798**
Prep Date:	Analysis Date: **12/11/2015**	SeqNo: **941054** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010	0.001000	0	94.6	50	150			
Lead	0.00052	0.00050	0.0005000	0	103	50	150			
Selenium	ND	0.0010	0.001000	0	90.5	50	150			
Uranium	0.00050	0.00050	0.0005000	0	101	50	150			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A30798**	RunNo: **30798**
Prep Date:	Analysis Date: **12/11/2015**	SeqNo: **941056** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010								
Lead	ND	0.00050								
Selenium	ND	0.0010								
Uranium	ND	0.00050								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-22710**	SampType:	**MBLK**	TestCode:	**EPA Method 245.1: Mercury**				
Client ID:	**PBW**	Batch ID:	**22710**	RunNo:	**30788**				
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940469**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-22710**	SampType:	**LCS**	TestCode:	**EPA Method 245.1: Mercury**				
Client ID:	**LCSW**	Batch ID:	**22710**	RunNo:	**30788**				
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940470**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB**	SampType:	**MBLK**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBW**	Batch ID:	**A30652**	RunNo:	**30652**					
Prep Date:		Analysis Date:	**12/5/2015**	SeqNo:	**936397**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								

Sample ID	**LCS**	SampType:	**LCS**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSW**	Batch ID:	**A30652**	RunNo:	**30652**					
Prep Date:		Analysis Date:	**12/5/2015**	SeqNo:	**936398**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.51	0.10	0.5000	0	102	90	110			

Sample ID	**1512238-001EMS**	SampType:	**MS**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**Temporary R.O. Rej**	Batch ID:	**A30652**	RunNo:	**30652**					
Prep Date:		Analysis Date:	**12/5/2015**	SeqNo:	**936404**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.9	0.10	0.5000	2.456	82.0	75.3	111			

Sample ID	**1512238-001EMSD**	SampType:	**MSD**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**Temporary R.O. Rej**	Batch ID:	**A30652**	RunNo:	**30652**					
Prep Date:		Analysis Date:	**12/5/2015**	SeqNo:	**936405**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2.8	0.10	0.5000	2.456	77.0	75.3	111	0.876	20	

Sample ID	**MB**	SampType:	**MBLK**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBW**	Batch ID:	**R31049**	RunNo:	**31049**					
Prep Date:		Analysis Date:	**12/22/2015**	SeqNo:	**949718**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate+Nitrite as N	ND	0.20								

Sample ID	**LCS**	SampType:	**LCS**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSW**	Batch ID:	**R31049**	RunNo:	**31049**					
Prep Date:		Analysis Date:	**12/22/2015**	SeqNo:	**949719**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate+Nitrite as N	3.4	0.20	3.500	0	95.9	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **A31049**	RunNo: **31049**
Prep Date:	Analysis Date: **12/23/2015**	SeqNo: **949774** 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: **A31049**	RunNo: **31049**
Prep Date:	Analysis Date: **12/23/2015**	SeqNo: **949775** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.8	0.50	5.000	0	96.8	90	110			
Sulfate	10	0.50	10.00	0	99.7	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-22664**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**22664**	RunNo:	**30705**					
Prep Date:	**12/8/2015**	Analysis Date:	**12/9/2015**	SeqNo:	**937923**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-22664**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**22664**	RunNo:	**30705**					
Prep Date:	**12/8/2015**	Analysis Date:	**12/9/2015**	SeqNo:	**937924**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.10	0.010	0.1000	0	101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **MB-22645**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **PBW**	Batch ID: **22645**	RunNo: **30655**
Prep Date: **12/7/2015**	Analysis Date: **12/7/2015**	SeqNo: **936459** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	0.98		1.000		98.3	72	136			

Sample ID **LCS-22645**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **LCSW**	Batch ID: **22645**	RunNo: **30655**
Prep Date: **12/7/2015**	Analysis Date: **12/7/2015**	SeqNo: **936460** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	4.9	1.0	5.000	0	97.6	52.4	154			
Surr: DNOP	0.44		0.5000		87.9	72	136			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **5ML RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **A30727**	RunNo: **30727**
Prep Date:	Analysis Date: **12/9/2015**	SeqNo: **938906** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	18		20.00		92.4	49.5	130			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **A30727**	RunNo: **30727**
Prep Date:	Analysis Date: **12/9/2015**	SeqNo: **938907** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.48	0.050	0.5000	0	95.4	80	120			
Surr: BFB	23		20.00		113	49.5	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-22699**	SampType:	**MBLK**	TestCode:	**EPA Method 8082: PCB's**					
Client ID:	**PBW**	Batch ID:	**22699**	RunNo:	**30771**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**939925**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	1.0								
Aroclor 1221	ND	1.0								
Aroclor 1232	ND	1.0								
Aroclor 1242	ND	1.0								
Aroclor 1248	ND	1.0								
Aroclor 1254	ND	1.0								
Aroclor 1260	ND	1.0								
Surr: Decachlorobiphenyl	2.0		2.500		78.4	17.7	151			
Surr: Tetrachloro-m-xylene	1.1		2.500		44.0	20.6	151			

Sample ID	**LCS-22699**	SampType:	**LCS**	TestCode:	**EPA Method 8082: PCB's**					
Client ID:	**LCSW**	Batch ID:	**22699**	RunNo:	**30771**					
Prep Date:	**12/9/2015**	Analysis Date:	**12/11/2015**	SeqNo:	**940026**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	2.0	1.0	5.000	0	39.4	9.01	142			
Aroclor 1260	3.0	1.0	5.000	0	59.3	25.6	164			
Surr: Decachlorobiphenyl	1.8		2.500		73.2	17.7	151			
Surr: Tetrachloro-m-xylene	1.1		2.500		43.2	20.6	151			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939923** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	97.7	70	130			
Toluene	20	1.0	20.00	0	101	70	130			
Chlorobenzene	20	1.0	20.00	0	99.6	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	93.0	70	130			
Trichloroethene (TCE)	20	1.0	20.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		106	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.6	70	130			
Surr: Dibromofluoromethane	9.7		10.00		96.7	70	130			
Surr: Toluene-d8	9.6		10.00		96.2	70	130			

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939927** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939927** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939927** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.7		10.00		87.4	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		97.2	70	130			
Surr: Dibromofluoromethane	8.7		10.00		87.5	70	130			
Surr: Toluene-d8	10		10.00		105	70	130			

Sample ID **1512238-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **Temporary R.O. Rej**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939930** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	17	1.0	20.00	0	83.3	70	130			
Toluene	21	1.0	20.00	0	106	70	130			
Chlorobenzene	19	1.0	20.00	0	96.8	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	95.6	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	87.8	70	130			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		91.2	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		99.8	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.3	70	130			
Surr: Toluene-d8	10		10.00		104	70	130			

Sample ID **1512238-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **Temporary R.O. Rej**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939931** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	92.2	70	130	10.2	20	
Toluene	23	1.0	20.00	0	114	70	130	7.19	20	
Chlorobenzene	19	1.0	20.00	0	93.0	70	130	4.00	20	
1,1-Dichloroethene	17	1.0	20.00	0	82.9	70	130	14.2	20	
Trichloroethene (TCE)	19	1.0	20.00	0	94.0	70	130	6.87	20	
Surr: 1,2-Dichloroethane-d4	10		10.00		103	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.0		10.00		89.9	70	130	0	0	
Surr: Dibromofluoromethane	10		10.00		102	70	130	0	0	
Surr: Toluene-d8	12		10.00		117	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R30770**	RunNo: **30770**
Prep Date:	Analysis Date: **12/10/2015**	SeqNo: **939958** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	94.0	70	130			
Toluene	23	1.0	20.00	0	113	70	130			
Chlorobenzene	20	1.0	20.00	0	101	70	130			
1,1-Dichloroethene	17	1.0	20.00	0	83.9	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	97.5	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		106	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	11		10.00		114	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **MB-22700**	SampType: **MBLK**	TestCode: **EPA Method 8310: PAHs**
Client ID: **PBW**	Batch ID: **22700**	RunNo: **30775**
Prep Date: **12/9/2015**	Analysis Date: **12/11/2015**	SeqNo: **940029** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	2.0								
2-Methylnaphthalene	ND	2.0								
Benzo(a)pyrene	ND	0.070								
Surr: Benzo(e)pyrene	13		20.00		63.6	33.4	129			

Sample ID **LCS-22700**	SampType: **LCS**	TestCode: **EPA Method 8310: PAHs**
Client ID: **LCSW**	Batch ID: **22700**	RunNo: **30775**
Prep Date: **12/9/2015**	Analysis Date: **12/11/2015**	SeqNo: **940030** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Naphthalene	69	2.0	80.00	0	86.7	54.6	110			
1-Methylnaphthalene	69	2.0	80.20	0	86.6	49.1	116			
2-Methylnaphthalene	69	2.0	80.00	0	86.8	52.5	111			
Benzo(a)pyrene	0.45	0.070	0.5020	0	89.6	62	107			
Surr: Benzo(e)pyrene	13		20.00		66.6	33.4	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-22770**	SampType:	**MBLK**	TestCode:	**Total Phenolics by SW-846 9067**					
Client ID:	**PBW**	Batch ID:	**22770**	RunNo:	**30802**					
Prep Date:	**12/14/2015**	Analysis Date:	**12/14/2015**	SeqNo:	**941057**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics, Total Recoverable	ND	2.5								

Sample ID	**LCS-22770**	SampType:	**LCS**	TestCode:	**Total Phenolics by SW-846 9067**					
Client ID:	**LCSW**	Batch ID:	**22770**	RunNo:	**30802**					
Prep Date:	**12/14/2015**	Analysis Date:	**12/14/2015**	SeqNo:	**941058**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phenolics, Total Recoverable	22	2.5	20.00	0	111	64.4	135			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-R31009**	SampType:	**MBLK**	TestCode:	**EPA 335.4: Total Cyanide Subbed**					
Client ID:	**PBW**	Batch ID:	**R31009**	RunNo:	**31009**					
Prep Date:		Analysis Date:	**12/15/2015**	SeqNo:	**948228**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	ND	0.0100								

Sample ID	**LCS-R31009**	SampType:	**LCS**	TestCode:	**EPA 335.4: Total Cyanide Subbed**					
Client ID:	**LCSW**	Batch ID:	**R31009**	RunNo:	**31009**					
Prep Date:		Analysis Date:	**12/15/2015**	SeqNo:	**948229**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cyanide	0.514		0.5000	0	103	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID	**MB-R31278**	SampType:	**MBLK**	TestCode:	**EPA 903.1: Ra 226 and EPA 904.0: Ra 228-Subbed**
Client ID:	**PBW**	Batch ID:	**R31278**	RunNo:	**31278**
Prep Date:		Analysis Date:	**12/17/2016**	SeqNo:	**957749** Units: **pCi/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Radium-226	0.341	0.735								
Radium-226 ±	0.446	0.735								
Radium-228	0.0606	0.609								
Radium-228 ±	0.268	0.609								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1512238**

06-Jan-16

Client: Navajo Refining Company

Project: Monthly Temporary RO Reject

Sample ID **MB-22696**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **22696**	RunNo: **30818**
Prep Date: **12/9/2015**	Analysis Date: **12/13/2015**	SeqNo: **941671** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-22696**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **22696**	RunNo: **30818**
Prep Date: **12/9/2015**	Analysis Date: **12/13/2015**	SeqNo: **941672** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1000	20.0	1000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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 Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

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: NAVAJO REFINING CO Work Order Number: 1512238 RcptNo: 1

Received by/date: JA 12/04/15

Logged By: **Celina Sessa** 12/4/2015 9:20:00 AM Celina Sessa

Completed By: **Celina Sessa** 12/4/2015 3:08:09 PM Celina Sessa

Reviewed By: 12/07/15

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?	Courier		

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: 6 (<2 or >12 unless noted)

Adjusted? NO

Checked by: JA

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	1.3	Good	Yes			

Chain-of-Custody Record

Client: Navajo Refinery

Mailing Address: P.O. Box 159 Artesia, NM 88211-0159

Phone #: 575-748-3311

email or Fax#: 575-746-5451

QA/QC Package:
X Standard ☐ Level 4 (Full Validation)
☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
X Standard ☐ Rush _____

Project Name:
Monthly Temporary R.O. Reject

Project #: P.O. # 167795

Project Manager:
Robert Combs

Sampler: Elizabeth Salsberry

On Ice: X Yes ☐ No

Sample Temperature: 1.0

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. 1512238	8260B:WQCC List VOCs	8270C: WQCC list SVOCs	6010B: WQCC Metals	335.4: Total Cyanide	7470: Mercury	8015: GRO, DRO, ORO	8082: PCBs	Radioactivity (Ra-226+Ra-228)	Sulfate Chloride	Phenols	Fluoride	Nitrate/Nitrite	Total Dissolved Solids	PH	504.1:EDB	Air Bubbles (Y or N)
12/3/15	9:30	liquid	Temporary R.O. Reject	2 - 500ml P	1-unpres 1-H2SO4	-001									X		X	X	X	X		Y
12/3/15	9:30	liquid	Temporary R.O. Reject	3-40ml VOA	HCL	-001	X															
12/3/15	9:30	liquid	Temporary R.O. Reject	1-500ml P	HNO3						X											
12/3/15	9:30	liquid	Temporary R.O. Reject	1-125ml P	HNO3				X													
12/3/15	9:30	liquid	Temporary R.O. Reject	1-500ml P	NaOH					X												
12/3/15	9:30	liquid	Temporary R.O. Reject	2- 1L P	HNO3									X								
12/3/15	9:30	liquid	Temporary R.O. Reject	3-40ml VOA	Na2S2O3																X	
12/3/15	9:30	liquid	Temporary R.O. Reject	2 - 1L Glass	unpres								X									
12/3/15	9:30	liquid	Temporary R.O. Reject	1 - 1L Glass	unpres			X														
12/3/15	9:30	liquid	Temporary R.O. Reject	3-40ml VOA	HCl							X										
12/3/15	9:30	liquid	Temporary R.O. Reject	1-250mlGlass	unpres							X										
12/3/15	9:30	liquid	Temporary R.O. Reject	1 - 1L Glass	H2SO4											X						
12/3/15	9:30	liquid	Trip Blank	2-40ml VOA	HCL	-002																

Date:	Time:	Relinquished by:	Received by:	Date Time
12/3/15	1:30	Elizabeth Salsberry		
Date:	Time:	Relinquished by:	Received by:	Date Time
				12/04/15 0920

Remarks:
Metals: As, Al, Ba, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, U, Zn
VOCs: 1,1,1-Trichloroethane; 1,1,2,2-Tetrachloroethane; 1,1,2,2-Tetrachloroethylene; 1,1,2-Trichloroethane; 1,1,2-Trichloroethylene; 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dibromoethane; 1,2-Dichloroethane; Benzene; Carbon Tetrachloride; Chloroform; Dichloromethane; Ethylbenzene; Toluene; Total Xylenes; Vinyl Chloride
SVOCs: benzo(a)pyrene, phenol, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene

Navajo Refining Company, LLC
501 E. Main
Artesia, NM 88210
(Tel) 575.748.3311
(Fax) 575.746.5451

Monthly Temporary RO Reject Sample Details

HOLLYFRONTIER
The HollyFrontier Companies

Project Name	Biannual RO Reject
Samplers Name	Elizabeth Salsberry
Samplers Affiliation	Navajo Refining Co. LLC
Start Date and Time	12/3/2015 @ 9:20 a.m.
End Date and Time	12/3/2015 @ 9:35 a.m.

Sample Type	
Grab	☑
Time Weighted Composite	☐
Flow Weighted Composite	☐

Parts / Sample Intervals	One

Physical Property	
Solid	☐
Liquid	☑
Sludge	☐

Type of Sampler	Directly to sample jars

Outfall / Sample Location: ☑ North Field R.O. Reject Discarge ☐ South Field R.O. Reject Discarge

				Preservatives								
Container	Size	Material	# of Containers	Neat (None)	HCL	HNO3	H2SO4	NaOH	Na2S2O3	NaHSO4	Other	Analysis and/or Method Requested
1	500ml	Plastic	2	X			X					pH, Cl, F, S04, NO2/NO3, TDS
2	40ml	VOA	3		X							8015 GRO
3	500ml	Plastic	1			X						6020 total metals, 7470 Hg
4	125ml	Plastic	1			X						6020 Dissolved Metals
5	500ml	Plastic	2					X				Cyanide
6	1L	Plastic	3			X						Radium 226/228
7	40ml	VOA	2		X							8260 see attached list
8	1L	Glass	1	X								8270 see attached list
9	1L	Glass	2	X								8082 PCBs
10	40ml	VOA	2	X								8015 DRO
11	40ml	VOA	2		X							Radium 226/228

Field Data (Weather, Observations, Etc): 12/3/2015 Tmp 39.2 °F, Humidity 61% , Wind Dir. NNE, Wind Speed3.5 mph. Conditions Clear

Date and Time:

Field Temp. 66.3F Field pH 7.56

Storage Method	
Ice	☑
Refrigerated	☐
Other	☐

Shipping Media	
Ice	☑
Other	☐

Appendix C

Leaks, Spills, and Releases

C.1 April 12, 2015 – Wastewater Pipeline near the Evaporation Ponds Area

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: Navajo Refining Company, L.L.C.	Contact: Micki Schultz
Address: 501 E. Main St., Artesia, NM 88210	Telephone No.: 575-746-5281
Facility Name: Navajo Refining Company, L.L.C.	Facility Type: Petroleum Refinery

Surface Owner: Navajo Refining Company, L.L.C.	Mineral Owner N/A	API No. N/A

LOCATION OF RELEASE

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

Latitude 32°51'0.32''N **Longitude** 104°20'20.03''W

NATURE OF RELEASE

Type of Release: Non-hazardous treated wastewater effluent	Volume of Release: > 25 bbls	Volume Recovered: 75 bbls
Source of Release: Small hole in pipeline approximately 3 miles east of Artesia	Date and Hour of Occurrence: 04/12/15, Unknown time	Date and Hour of Discovery: 04/12/15 10:30 am
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? NM Oil Conservation Division Santa Fe– Left message to Carl Chavez NM Oil Conservation Division Artesia – Left message, return call by Randy Dade NMED Hazardous Waste Bureau – Left message National Response Center – Incident report # 1113386	
By Whom? Ray Smalts	Date and Hour 04/12/15 ~13:15 - 13:30	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. None	

If a Watercourse was Impacted, Describe Fully.*
N/A

Describe Cause of Problem and Remedial Action Taken.*
Pipeline leak was discovered during daily visual monitoring of the pipeline route. Wastewater effluent discharge pumps located at the refinery were shut down and a vacuum truck was dispatched to the scene to remove the water which had accumulated with rain water in a low-lying depression in the pipeline path across a field. The vacuumed water was returned to the refinery wastewater treatment unit.

Describe Area Affected and Cleanup Action Taken.*
Pooled water was removed by vacuum truck and the pipeline was repaired. Any additional corrective actions will be presented in a Final C-141 report including analytical reports, map markups, photos, and any waste disposal records.

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: Robert Combs	Approved by Environmental Specialist:	
Title: Environmental Specialist	Approval Date:	Expiration Date:
E-mail Address:	Conditions of Approval:	Attached ☐
Date: Phone:		

* Attach Additional Sheets If Necessary

Markovich, Michelle

From: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Sent: Thursday, December 10, 2015 3:51 PM
To: Combs, Robert
Cc: Denton, Scott; Griswold, Jim, EMNRD
Subject: RE: Navajo Refinery (GW-028) Wastewater Pipeline Break near the Evaporation Ponds Area Revised Work Plan Review

Robert:

Please see OCD requirements in red text below.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
Environmental Engineer
Oil Conservation Division- Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Phone: (505) 476-3490
Main Phone: (505) 476-3440
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: www.emnrd.state.nm.us/ocd
Why not prevent pollution, minimize waste, reduce operation costs, and move forward with the rest of the Nation? To see how, go to "Publications" and "Pollution Prevention" on the OCD Website.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]
Sent: Wednesday, December 02, 2015 5:32 PM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Cc: Denton, Scott <Scott.Denton@HollyFrontier.com>
Subject: RE: Navajo Refinery (GW-028) Wastewater Pipeline Break near the Evaporation Ponds Area Revised Work Plan Review

Carl,
Please see below for our responses to comments, as well as the attached, updated workplan. It looks as though our discussion was on 10/13/15; some content is to that effect. Please feel free to call if we need to discuss further.
Thanks,
Robert

The New Mexico Oil Conservation Division (OCD) reviewed the Work Plan (WP) dated August 21, 2015 and has the following comments/recommendations:

1) Pg. 2/4: OCD discussed the statistically developed UTLs developed in the Evaporation Pond Area and NMED indicated that no background values have been accepted by NMED at the time of this review. Therefore, OCD cannot condone the use of UTLs for comparison in the Soil Borings and Groundwater at this time. Table 1 includes UTLs and that is ok, but it is not appropriate to use the UTLs from this background soil study as alternative action levels for screening potential impacts from the wastewater line release. Navajo understands that the purpose of the upgradient boring and temporary monitor well is to determine soil and groundwater

□

concentrations from an area not impacted by the release.***[Chavez, Carl J, EMNRD]*** No, the temporary MW serves as a background location to assess pollutants in soils and water media at both locations.

2) Pg. 2/4: OCD prefers a location for the alternate Soil Boring (SB) / Temporary MW (TMW) toward the SW away from the evaporation pond area and in a location that is not suspect for contamination. The environmental analytical laboratory test data results will be used for comparison with this SB/TMW. The reasoning behind the proposed location of the 'background' well is that the area NW of the release is topographically and hydraulically upgradient/crossgradient from the spill area. We feel that this area is appropriate for the soil boring/TMW installation, not southwest of the spill area.
3) Pg. 3/4: OCD requires in addition to the WP that soil sampling occur every 10 ft. from ground surface to the water table. Groundwater sampling at the water table is required. As we discussed this morning, depth to groundwater in the area at approximately 10 ft. below ground surface. We proposed in the WP to sample the intervals 0-1', 3-4' and the capillary zone. We will modify the WP to collect samples at 0-1', 4-5' and the capillary zone (just above the water table).***[Chavez, Carl J, EMNRD]*** A groundwater sample must also be taken.
4) Pg. 3/4: The soil and groundwater sampling constituents of concern shall include WQCC Metals. In groundwater, Total Dissolved Solids and pH shall be added to the list. PSH shall be reported within 24 hours of discovery to the OCD. As we discussed, we will change the groundwater analyte list to be the same as the soil analytes, and add TDS and pH. We will continue to run only iron and manganese, as these were the only metals that exceeded WQCC in the sample of the effluent water. We do not believe that there would be other metals present that would be attributable to this release.***[Chavez, Carl J, EMNRD]*** Run RCRA 8 Metals.
5) Pg. 3/4: Same as No. 1 above. The SB/TMW data results will be compared against each other and the Tables 1 and 2 to develop conclusions. As indicated in No. 1 above, UTLs will not be considered in the evaluation of data. The TMWs shall be properly abandoned per No. 6 below after OCD approves a proposal to PA the TMWs. Noted, no comment.
6) Pg. 3/4 Second Paragraph from Bottom: The WP as proposed with the exception that at least 10 ft. of screen w/ top of screen set ~ 5 ft. above the water table. Also, OCD would like the wells to be pulled out after use w/ bentonite pellets inserted into the borehole to surface and then hydrated to expand. We will add a description of our planned plugging and abandonment activities in the workplan. Sorry for this oversight.
7) Pg. 4/4 Second Paragraph: The constituents of concern list should be similar to No. 4 above. Please see response to #4.

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

From: [illegible]
Sent: [illegible]
To: [illegible]
Cc: [illegible]
Subject: [illegible]

Robert and Scott:

The New Mexico Oil Conservation Division (OCD) reviewed the Work Plan (WP) dated August 21, 2015 and has the following comments/recommendations:

1) Pg. 2/4: OCD discussed the statistically developed UTLs developed in the Evaporation Pond Area and NMED indicated that no background values have been accepted by NMED at the time of this review. Therefore, OCD cannot condone the use of UTLs for comparison in the Soil Borings and Groundwater at this time. Table 1 includes UTLs and that is ok, but it is not appropriate to use the UTLs from this background soil study as alternative action levels for screening potential impacts from the wastewater line release.
2) Pg. 2/4: OCD prefers a location for the alternate Soil Boring (SB) / Temporary MW (TMW) toward the SW away from the evaporation pond area and in a location that is not suspect for contamination. The environmental analytical laboratory test data results will be used for comparison with this SB/TMW.
3) Pg. 3/4: OCD requires in addition to the WP that soil sampling occur every 10 ft. from ground surface to the water table. Groundwater sampling at the water table is required.
4) Pg. 3/4: The soil and groundwater sampling constituents of concern shall include WQCC Metals. In groundwater, Total Dissolved Solids and pH shall be added to the list. PSH shall be reported within 24 hours of discovery to the OCD.
5) Pg. 3/4: Same as No. 1 above. The SB/TMW data results will be compared against each other and the Tables 1 and 2 to develop conclusions. As indicated in No. 1 above, UTLs will not be considered in the evaluation of data. The TMWs shall be properly abandoned per No. 6 below after OCD approves a proposal to PA the TMWs.
6) Pg. 3/4 Second Paragraph from Bottom: The WP as proposed with the exception that at least 10 ft. of screen w/ top of screen set ~ 5 ft. above the water table. Also, OCD would like the wells to be pulled out after use w/ bentonite pellets inserted into the borehole to surface and then hydrated to expand.
7) Pg. 4/4 Second Paragraph: The constituents of concern list should be similar to No. 4 above.

Please contact me if you have questions. Thank you.

From: Combs, Robert [mailto:Robert.Combs@HollyFrontier.com]
Sent: Tuesday, September 01, 2015 10:42 AM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Subject: Test 2

Carl,
Please let me know if you receive this file or if it again is encrypted. You should not have to register to read our emails. This is a problem on our end and we will work to resolve it.
Thanks,
Robert

Robert Combs
Environmental Specialist
The HollyFrontier Companies
P.O. Box 159
Artesia, NM 88211-0159
office: 575-746-5382
cell: 575-308-2718
fax: 575-746-5451
Robert.Combs@hollyfrontier.com

CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged and confidential.If you received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any attachments.Unless expressly stated, nothing

contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.
CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged and confidential.If you received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any attachments.Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.

CONFIDENTIALITY NOTICE: This e-mail, and any attachments, may contain information that is privileged and confidential.If you received this message in error, please advise the sender immediately by reply e-mail and do not retain any paper or electronic copies of this message or any attachments.Unless expressly stated, nothing contained in this message should be construed as a digital or electronic signature or a commitment to a binding agreement.

ARCADIS
Infrastructure · Water · Environment · Buildings

Arcadis U.S., Inc.
2929 Briarpark Drive
Suite 300
Houston
Texas 77042
Tel 713 953 4800
Fax 713 977 4620
www.arcadis-us.com

Mr. Scott Denton
Environmental Manager
Navajo Refining Company, LLC
501 East Main
Artesia, New Mexico 88211

ENVIRONMENT

Subject:
Final Work Plan for the Soil and Groundwater Investigation at the Wastewater Pipeline Break near the Evaporation Ponds Area, Navajo Refining Company Artesia Refinery

Date:
October 14, 2015

Contact:
Pamela R. Krueger

Phone:
713.953.4816

Email:
pam.krueger@arcadis-us.com

Our ref:
TX001155

Dear Mr. Denton:

Arcadis is providing this final work plan discussing soil and groundwater investigation to be performed in relation to the reported release of wastewater that occurred approximately 1,500 feet south of the inactive former Evaporation Ponds (EPs) associated with the Navajo Refining Company, L.L.C. (NRC) Artesia Refinery (Refinery). The EPs are a Resource Conservation and Recovery Act (RCRA) regulated unit. Documentation of the information relevant to the release was provided on June 11, 2015. Based on several conversations with the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD), the proposed assessment has been revised as discussed in this final work plan.

It is our understanding that the release occurred due to a break in the pipeline that conveys treated wastewater from the Refinery to injection wells located approximately 12 miles east of the Refinery. The break occurred approximately three miles east of the Refinery, and south of the Evaporation Ponds (Figure 1).

The wastewater that is conveyed through the pipeline is sampled quarterly and analyzed for waste characterization purposes. A copy of the first quarter 2015 wastewater analytical report is provided in Attachment 1 to this letter. The sample was analyzed for total metals, anions, cations, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), corrosivity, reactivity, ignitability, specific conductance, specific gravity, total dissolved solids (TDS), and pH. In addition, the sample was analyzed for eight metals using the toxicity characteristic leaching procedure (TCLP).

The analytical results indicate that the wastewater is not corrosive, not reactive, not ignitable, not toxic (no TCLP metals detected), and contains no VOCs above the New Mexico Water Quality Control Commission (WQCC) standards. The following compounds were reported above the WQCC standards:

- Phenol was reported at 0.0081 mg/L, above the WQCC standard of 0.005mg/L
- Iron was reported at 3.7 mg/L, above the WQCC standard of 1.0 mg/L
- Manganese was reported at 0.25 mg/L, above the WQCC standard of 0.2 mg/L
- Chloride was reported at 300 mg/L, above the WQCC standard of 250 mg/L
- Fluoride was reported at 11 mg/L, above the WQCC standard of 1.6 mg/L
- Sulfate was reported at 2,100 mg/L, above the WQCC standard of 600 mg/L
- TDS was reported at 3,710 mg/L, above the WQCC standard of 1,000 mg/L

Arcadis understands that the OCD requested that a soil and groundwater investigation be performed to evaluate whether additional remedial actions are required.

Although the wastewater sample analytical results do exceed the WQCC standards for water quality parameters, including chloride, it should be noted that the area in which the release occurred is known to have elevated chloride concentrations in soil and groundwater, along with other cations, anions and total metals. In 2013, as part of the Phase IV Corrective Action Investigation of the EPs, Arcadis collected soil samples from 12 soil borings and analyzed the samples for thirteen total metals and for three anions, including chloride, fluoride, and sulfate. A statistical evaluation of the background soil sample results was performed to determine an appropriate upper tolerance limit (UTL) for the data obtained. A copy of the statistical evaluation memo is provided as Attachment 2 to this letter, including a table with a summary of the UTLs calculated for each parameter evaluated.

Figure 1 shows the locations of the background soil samples collected in 2013 (locations BG-01 through BG-12). The borings were located on both sides of the Pecos River, in locations both to the east and west of the EPs. These areas were selected based on their proximity to the EPs, yet outside of the RCRA-regulated unit and outside of the area of potential impacts from the operation of the EPs. Thus, these soil borings were considered representative of the native conditions of soil in the vicinity of the EPs. As a result, it should be appropriate to use the UTLs from this background soil study as alternative action levels for screening potential impacts from the wastewater line release. However, the New Mexico Environment Department (NMED) has not yet reviewed and accepted the background soil UTLs and thus OCD has stated that they may not accept the UTLs as screening criteria. Therefore, the UTLs are presented for informational purposes and will not be used to

evaluate whether additional soil remediation is warranted as a result of the wastewater pipeline release.

As per the OCD requests, soil samples and groundwater samples will be collected as close as possible to the pipeline break and from a location approximately 50 feet to the northwest, or hydraulically upgradient, of the pipeline break. The OCD requested that a background location be selected southwest of the pipeline break; however, NRC reiterated that a location to the northwest of the pipeline break would be more representative of upgradient, background conditions. Data from soil and groundwater samples collected from the location closest to the pipeline break will be compared to the data from soil and groundwater samples collected from the location to the northwest of the pipeline break. The two soil boring locations are shown on Figure 1.

The soil borings will be installed by a State of New Mexico licensed well driller, using a truck-mounted hollow-stem auger rig. Soil samples will be collected continuously and screened using a photo-ionization detector (PID) and visual observations. Discrete soil samples will be collected for laboratory analysis from the following depths below ground surface: 0-1 feet (surface), 4-5 feet (1 foot below the bottom of the pipeline), and capillary zone above encountered groundwater. The soil samples will be analyzed for the following:

- Total Petroleum Hydrocarbons (TPH):
  - Gasoline Range Organics (GRO)
  - Diesel Range Organics (DRO)
  - Oil Range Organics (ORO)
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- Chloride
- Fluoride
- Sulfate
- Iron
- Manganese
- Phenol

The soil analytical results from the location closest to the pipeline break will be compared to the soil analytical results from the upgradient, background location as well as to the lower of the OCD spill cleanup guidelines and/or the residential or soil-leaching-to-groundwater soil screening levels (SSLs) published by the NMED. Table 1 presents the proposed screening levels for the analytical suite.

The soil borings will be extended to five feet below the observed depth of groundwater, which is anticipated to be approximately 10 feet below the ground surface. The temporary monitoring wells will be constructed of 2-inch polyvinyl chlorinated (PVC) casing with 5 feet of 0.010-inch well screen. Solid 2-inch diameter PVC casing will be attached to the screen interval and extended to the ground surface. Clean sand will be placed in the annular space to approximately 2 feet above the well screen top as filter pack, then a two-foot bentonite seal will be placed above the filter pack. The PVC casing will be cut off approximately 3 feet above the ground surface. Since the wells will be temporary, a manhole and pad will not be installed.

Both temporary wells will be developed by bailing or pumping to remove fine-grained materials. Water quality parameters will be monitored throughout the development process and development will be considered complete when the parameters have stabilized. The volume of development water will be recorded and the development water will be disposed of in the refinery process wastewater system.

Groundwater samples will be collected from each of the two temporary monitoring wells, unless there is more than 0.03 feet of phase-separated hydrocarbons (PSH) present in the wells. Groundwater samples will be collected no sooner than 24 hours after the temporary wells have been developed. The groundwater samples will be analyzed for the same parameters as the soil samples (listed above) plus pH and total dissolved solids.

After the groundwater samples have been collected, the temporary wells will be removed and the borings will be properly abandoned. The PVC casing and screen will be removed and disposed of in refinery waste bins. The borings will be filled with bentonite chips and hydrated, or may be filled with lean cement using a tremie tool. The driller will prepare and submit both well installation permits and well abandonment plans for both of the temporary well locations and obtain approval from the Office of the State Engineer (OSE) prior to installation and abandonment of the temporary wells. A final plugging report will be submitted to the OSE by the driller following completion of the abandonment of the temporary wells.

The groundwater analytical results from the temporary well closest to the pipeline break will be compared to the results from the upgradient, background temporary well as well as the WQCC standards. The WQCC standards do not include a value for TPH, therefore, the NMED screening value for TPH in groundwater will be used for comparison purposes. Table 2 provides a summary of the groundwater screening values.

A letter report will be prepared and submitted to OCD, documenting the field activities and the analytical results of the investigation. The letter report will include documentation submitted to OSE, analytical reports, and survey information for the

boring and temporary well locations. Summary tables will be included in the letter report comparing the soil and groundwater analytical results from the location closest to the pipeline break to the results from the upgradient, background location. The tables will also provide comparisons of all analytical results to the soil and groundwater screening levels presented in this work plan. If additional delineation or remedial actions are warranted, they will be proposed in the letter report.

Should you have any questions or comments, please feel free to contact me at 713.953.4816.

Sincerely,

Arcadis U.S., Inc.

Pamela R. Krueger
Principal-in-Charge

Enclosures:
Figure 1
Table 1
Table 2
Attachment 1: Wastewater Analytical Report

ARCADIS

Tables

Table 1
Proposed Action Levels for Soil Delineation
Wastewater Line Leak, Artesia, NM

Parameter	OCD Spill Guideline [a] (mg/kg)	Residential SSL (mg/kg)	DAF 20 SSL (mg/kg)	Background UTL (mg/kg)
TPH GRO	100	--	--	--
TPH DRO	100	1000	--	--
TPH ORO	100	1000	--	--
Benzene	10	17.8	0.0380	--
Ethylbenzene	--	75.1	0.262	--
Toluene	--	5228	12.1	--
Xylenes	--	871	2.98	--
BTEX	50	--	--	--
Chloride	--	--	--	5264
Fluoride	--	--	--	17.9
Sulfate	--	--	--	9336
Iron	--	--	--	17344
Manganese	--	--	--	488
Phenol	--	18490	52.3	--

[a] Ranking criteria score of >19 based on depth to groundwater
Values shaded in grey are the proposed action levels
BTEX = benzene, toluene, ethylbenzene, total xylenes combined
DAF 20 = dilution attenuation factor of 20
DRO = diesel range organics
GRO = gasoline range organics
mg/kg = milligrams per kilogram
ORO = oil range organics
SSL = soil screening level
TPH = total petroleum hydrocarbons
UTL = upper tolerance limit, provided for informational purposes only

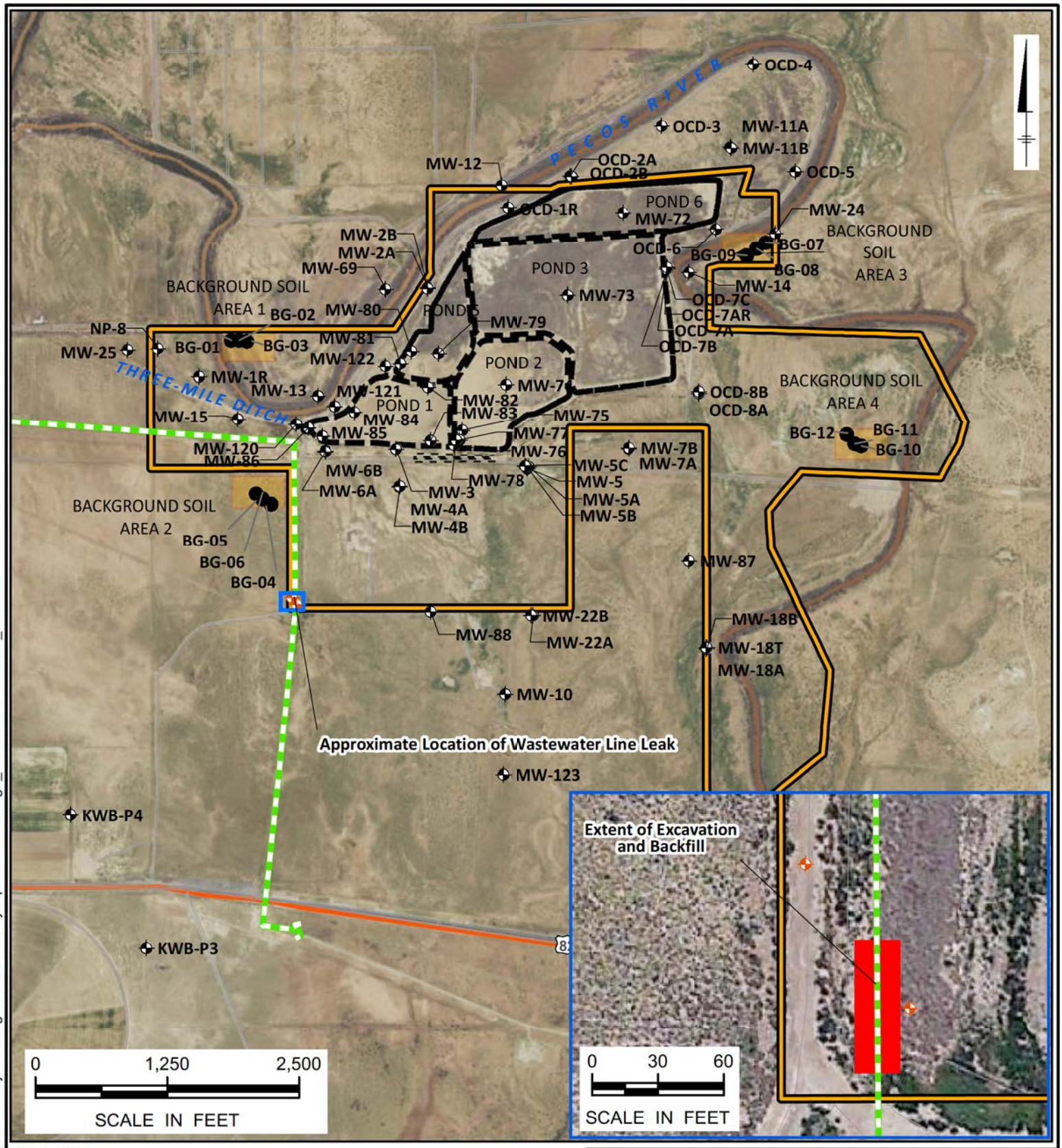
Table 2
Proposed Action Levels for Groundwater Delineation
Wastewater Line Leak, Artesia, NM

Parameter	WQCC Standard (mg/L)	NMED TPH Screening Level (mg/L)
TPH GRO	--	--
TPH DRO	--	0.2
TPH ORO	--	0.2
Benzene	0.01	--
Ethylbenzene	0.75	--
Toluene	0.75	--
Xylenes	0.62	--
Chloride	250	--
Fluoride	1.6	--
Sulfate	600	--
Iron	1	--
Manganese	0.2	--
Phenol	0.005	--

DRO = diesel range organics
GRO = gasoline range organics
mg/kg = milligrams per kilogram
NMED = New Mexico Environment Department
ORO = oil range organics
TPH = total petroleum hydrocarbons
WQCC = Water Quality Control Commission

ARCADIS

Figure



LEGEND

- EXISTING MONITORING WELLS
- PROPOSED BORINGS/TEMPORARY WELLS
- BACKGROUND SOIL SAMPLES
- WASTE WATER
- APPROXIMATE PIPELINE LOCATION
- NAVAJO PROPERTY BOUNDARY
- POND BOUNDARIES
- PHASE IV BACKGROUND SAMPLE LOCATION
- EXTENT OF EXCAVATION AND BACKFILL

NAVAJO REFINING COMPANY
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

APPROXIMATE LOCATION OF WASTEWATER LINE LEAK

ARCADIS

FIGURE 1

Document Path: Z:\GIS\PROJECTS_ENV\NavajoRefining\ArtesiaRefinery\Pipeline Break\Fig1_wastewaterLineLeak_letter.mxd

Attachment 1

Wastewater Analytical Report