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ANNUAL REPORTS





June 1, 2018

Carl Chavez New Mexico Oil Conservation Division Environmental Bureau 1220 South St. Francis Dr Santa Fe, NM 87505

UPS Tracking #: 7724 9367 8011

RE: Western Refining Southwest, Inc. - Bloomfield Terminal 2017 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UICI-011 API # - 30- 45-35747

Mr. Chavez,

Western Refining Southwest, Inc. – Bloomfield Terminal ("Western") is submitting the 2017 Annual Class I Well Report documenting the operations of the facility's Class I non-hazardous injection well during 2017.

If you need more information, please contact me at (505) 632-4166.

Sincerely,

oly

Kelly Robinson Environmental Supervisor Western Refining Southwest, Inc.

ANNUAL CLASS I WELL REPORT Waste Disposal Well #2 January – December 2017



Western Refining Southwest, Inc. Bloomfield Terminal Bloomfield, New Mexico Permit # - UICI-011 API # - 30-45-35747

June 1, 2018

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2017 on Waste Disposal Well #2 (WDW-#2) at the Western Refining Bloomfield ("Western") facility. The following is a summary of well operations and well testing activities performed in 2017.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2017 was 3,126,913 gallons. The well was officially brought on-line in March 2017. Table 1 provides a summary of the wells operation in 2017.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis, with the following exception. A quarterly sample was not collected during the fourth quarter of 2017 due to the fact that the injection well pump unexpected failed in December 2017. The well did not return to service until the first quarter of 2018. Quarterly samples were collected during the 1st, 2nd, and 3rd quarters of 2017. Analytical results did not exhibit characteristics of being a hazardous waste. A summary of the analytical results is provided in Table 2. A copy of the analytical laboratory reports, included the Quality Assurance / Quality Control (QA/QC) results area provided in Attachment A.

Braidenhead Tests – On March 8, 2017 and June 8th, 2017, Western Refining conducted the Bradenhead Test with a representative of NMOCD present to observe. The well passed both tests. A copy of the respective Sundry notifications and test results are provided in Attachment B – Sundry Notifications.

Mechanical Integrity Tests – On March 8, 2017 and June 8, 2017 Western Refining conducted the Mechanical Integrity Test with a representative of NMOCD present to observe. The well passed both tests. A copy of the respective Sundry notifications and the test results are provided in Attachment B – Sundry Notifications.

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Fall-Off Test – A pressure fall-off test (FOT) and bottom hole pressure survey were conducted between October 2, 2017 and October 13, 2017. The well tests were connected in accordance with United States Enviroonmental protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Fall-off Test Guidelines dated December 3, 2007. A Rest Report summarizing the results of the Fall-Off Test and pressure survey was submitted to NMOCD on December 12, 2017. A revised Test Report was submitted March 20, 2018 in response to comments received from NMOCD on February 21, 2018. A copy of the revised 2017n Fall-Off Test Report is provided in Attachment C of this report.

Area of Review (AOR) – Western contracted William M. Cobb & Associates to conduct an Area of Review within a 1-mile radius of WDW #2. The results of this review are provided in Attachment D of this report.

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2017 on Waste Disposal Well #2 (WDW #2). The disposal well was part of the Western Bloomfield Terminal facility operations. The facility is located south of Bloomfield, New Mexico in San Juan County. The physical address of the facility is as follows:

Bloomfield Terminal

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Terminal is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

1.1 Well Information

Well Name & Number: OCD UIC: Well Classification: API Number: Legal Location: Physical Address: Waste Disposal Well #2 UICI-011 Class I Non-hazardous 30-045-35747 2028 FNL, 111 FEL, H S27 T29N R11W #50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2017 on WDW #2 located at the Bloomfield facility:

- 3/8/2017 Bradenhead, Mechanical Integrity, and High-Pressure Testing
- 3/8/2017 Initial Start-Up of Injection Well Operations
- 03/31/17 1st Quarter 2017 Sampling Event
- 04/22/17 2nd Quarter 2017 Sampling Event
- 5/8/17-6/7/17 Entrada Formation Stimulation Activities
- 6/8/2017 Bradenhead, MIT, and High-Pressure Test
- 09/13/2017 3rd Quarter 2017 Sampling Event
- 10/2 10/13 Fall-Off Test with downhole pressure survey

A copy of the Well Schematic is provided in Figure 1.

2.1 Well Operations

The initial start-up of WDW-2 commenced March 8, 2017. Treated wastewaters from the on-site Wastewater Treatment System (WWTS) are transferred from the on-site Aeration Ponds to WDW-2 when the well is operational. When the well pump is not operational, treated wastewaters are transferred to the on-site evaporation ponds, located on the south side of County Road 4990.

Total injected wastewater volumes, well injection pressures, injection flow rates, and annual casing pressures are continuously monitored and stored into a company database. In 2017, operation of the injection well did not exceed the permitted injection pressure limit of 1,465 psi. Refer to Table 1 for a summary of the 2017 operational data.

Monthly total volumes disposed of through the injection well and average injection pressure readings are reported monthly to NMOCD through the on-line C-115 reporting web-link. A total of 3,126,913 gallons of treated wastewaters were injected into WDW-2 in 2017. Copies of these reports are provided as an attachment (Attachment A).

2.2 Quarterly Sampling and Chemical Analysis

Samples were collected of the injection water on a quarterly basis and analyzed for the following pursuant to Permit Condition 2.A. of UICI-011 dated July 20, 2016:

- pH;
- Oxidation Reduction Potential;
- Specific Conductance;
- Specific gravity;
- Temperature;
- Major dissolved cations and anions; and
- EPA RCRA characteristically hazardous constituents.

First quarter samples were collected on March 21, 2017. Second quarter samples were collected on June 22, 2017. Third quarter samples were collected on September 13, 2017. Fourth quarter samples were scheduled to be collected in December 2017. Due to an unexpected mechanical failure of the injection wells pump, injection of waters into the well ceased December 11, 2017 until such time that repairs to the pump could be completed. The well did not resume operation until first quarter 2018. Therefore there was no waters available to sample prior to the end of the 2017. A summary of the analytical results is provided in Table 2.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. Copies of the analytical reports are provided in Attachment B.

2.3 Well Testing and Maintenance Activities

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2017:

- High-pressure shutdown, Mechanical Integrity Testing (MIT), and Bradenhead Testing.
- Fracture stimulation of the Entrada Formation

All activities were conducted following NMOCD approval and the respective documentation is provided in Attachment C. The following is a brief summary of the well testing and well maintenance activities conducted in 2017.

2.3.1 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and MIT conducted on two separate occasions in 2017. Prior to the initial start-up of WDW-2, testing was conducted on March 8th, 2017. An additional round of testing was conducted on June 8th, 2017 following the formation stimulation activities. All mechanical integrity testing was witnessed by Monica Kuehling of NMOCD-Aztec. No issues were observed during all mechanical testing activities and therefore the well resumed operation after each testing event. Copies of the respective Sundry Notifications are provided in Attachment C.

2.3.2 Entrada Formation Stimulation

Following start-up of well operations, the rate of which treated wastewaters were able to be pumped into WDW-2 was restricted by the permitted injection pressure limit of 1,465 psi. Therefore on April 7, 2017 Western submitted a Sundry Notification requesting NMOCD approval to stimulate the Entrada Formation in order to enhance the operational efficiency of the well. Formation stimulation activities were conducted between May 8th, 2017 and June 7, 2017. The well returned to normal operations on June 8th, 2017 following the completion of the integrity testing observed by NMOCD. A copy of the respective Sundry Notice for the formation stimulation activities is provided in Attachment C.

3.0 WELL EVALUATION

3.1 Area of Review (AOR)

The Area of Review data was updated in the 2017 Fall-Off Test and Bottom-Hole Pressure Survey Report dated December 12, 2017. The area of review data shows all wells known to have been drilled within a one-mile radius of WDW-1. There are 59 wells in the one-mile radius of investigation. One well, Ashacroft SWD #1, penetrates the Entrada injection zone. This well is 0.64 miles from WDW-2 and is an active water disposal well. No wells are currently producing from the Entrada injection zone within the AOR. A copy of the AOR and list of wells identified within the one mile radius is provided as Attachment D.

3.2 Pressure Fall-Off Test

A pressure Fall-Off Test (FOT) was conducted in 2017. The well test was conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Falloff Test Guidelines dated December 3, 2007. The FOT was conducted with tandem bottom hole pressure memory gauges. The test results indicate a transient linear flow early in the fall-off test, with a transient radial flow later in the testing period. The analysis of the two transient flow regimes provide a good understanding of the reservoir properties. A copy of the revised 2017 Fall-Off Test is provided as Attachment E.

3.3 Bottom-Hole Pressure Survey

A bottom-hole pressure survey was conducted following the completion of the FOT activities. The bottom-hole pressures gauges used for the FOT were pulled from the well making gradient stops every 1,000 feet. The results of the pressure survey are provided in the 2017 Fall-Off Test Report. A copy of the Test Report is provided in Attachment E.

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TABLES

TABLE 1

WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD TERMINAL P.O. BOX 159

BLOOMFIELD, NEW MEXICO 87413

QUARTERLY INJECTION WELL REPORT DISCHARGE PERMIT UICI-011 (WDW #2) U.L: H, SEC 27, T29N, R11W API #: 30-045-35747

	AMOUNT	AMOUNT	TOTALIZER									ON-LINE	
	OF WATER	FROM WWTP	AMOUNT	-NWOD	N	INJECTION PRESSURE		A	ANNULAR PRESSURE		-	FLOW RATES	
PERIOD	FROM RIVER		INJECTED	TIME	MAX	MIN	AVG	MAX	NIM	AVG	MAX	MIN	AVG
2015	(GALLONS)	(GALLONS)	(GALLONS)	(HRS)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(GPM)	(GPM)	(GPM)
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MAY	59.178	000,688	18,858	720	1,393	782	959	44	8	23	51	2	13
NOr	3,528		784,560	263	1,337	555	1,067	1.06	ហ្	7	52	S	5
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SEP	1,199		258,468	400	1,440	906	1,154	51	(1)	20	49	00	14
oct	1,457	875,000	325,710	312	1,288	838	1,084	55	(2)	16	23	2	13
NON	229	894,000	258,552	366	1,327	856	1,108	40	(1)	13	18	2	12
DEC	1	961,000	85,722	701	1,385	753	863	90	(5)	53	66	3	37
The total amount	The total amount injected in 2015 is:		3,126,913	gallons									
TELECATION: AL	Killer	man	1	NATE: 1 /4	12018								
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Note: Well officially brought on-line full time March 8, 2017.

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TABLE こ Injection Well 2017 Quarterly Analytical Summary

Toxicity WQCC Characteristics (40 CFR261.24) (20.6.2.3103 NMAC) 1st Quarter 2nd Quarter 3rd Quarter Volatile Organic Compounds (ug/L) 3/31/2017 6/22/2017 9/13/2017 D029 1,1-Dichloroethene 700 5 < 5.0 < 5.0 <0.70 < 5.0 1,2-Dichloroethane (EDC) < 5.0 <0,5 D028 500 10 < 5.0 < 5.0 <7.5 1.4-Dichlorobenzene 7.500 D027 < 50 200 200,000 60 D035 2-Butanone (MEK) < 5.0 <0.50 10 < 5.0 500 D018 Benzene 500 < 5.0 < 5.0 <0.50 Carbon Tetrachloride 10 D019 100000 < 5.0 < 5.0 <100 Chlorobenzene D021 100 < 5.0 < 5.0 <6.0 6000 Chloroform D022 < 5.0 < 5.0 <0.50 D033 Hexachlorobutadiene 500 20 < 5.0 < 5.0 <0.70 Tetrachloroethene (PCE) 700 D039 100 < 5.0 < 5.0 <0.50 D040 Trichloroethene (TCE) 500 200 < 5.0 < 5.0 < 0.20 D043 Vinyl chloride 1 Semi-Volatile Organic Compounds (ug/L) D027 1,4-Dichlorobenzene 7,500 <10 <10 <7500 D041 2,4,5-Trichlorophenol 400,000 < 10 < 10 <400,000 2,4,6-Trichlorophenol 2,000 < 10 < 10 <2000 D042 130 < 10 < 10 <130 D030 2,4-Dinitrotoluene 2-Methylphenol (o-Cresol) 200,000 <10 < 10 <200,000 D023 3+4-Methylphenol (m, p-Cresol) 200,000 < 10 < 10 <200,000 D024, D025 Hexachlorobenzene 130 < 10 <10 <130 D032 D033 Hexachlorobutadiene 500 < 10 < 10 <500 <3000 Hexachloroethane 3,000 <10 <10 D034 <2000 D036 Nitrobenzene 2.000 < 10<10 <100.000 D037 Pentachlorophenol 100,000 < 20 < 20 <10 D038 Pyridine 5,000 <10 <5,000 mistry (mg/L unless otherwise stated) General Che 2200 2400 3100 Specific Conductance (umhos/cm) Bromide 1.7 2 2.3 250 * 470 600 410 Chloride < 0.050 <0.050 Fluoride 5.9 <2.5 < 0.050 <1.0 Nitrate + Nitrite as N <2.5 < 2.5 Phosphorus, Orthophosphate (As P) < 2.5 600 * 59 69 80 Sulfate 1540 10,000 1920 1470 Total Dissolved Solids 7.5 7.32 7.34 pH (pH Units) 499 Bicarbonate (As CaCO3) 504.7 415 <2.0 Carbonate (As CaCO3) <2.0 <2.0 504.7 499 Total Alkalinity (as CaCO3) 415 184 -155.7 Oxidation-Reduction Potential (mV) 0.9991 1.0010 1.0020 Specific Gravity Total Metals (mg/L) 0.035 < 0.020 < 0.020 5.0 D004 Arsenic 0.35 0.34 0.17 100 D005 Barium < 0,0020 < 0.0020 < 0.0020 D006 Cadmium 1.0 < 0.0060 < 0.0060 < 0.0060 D007 Chromium 5.0 < 0.0050 0.0063 < 0.0050 5.0 D008 Lead 33 43 26 Magnesium 8.4 10 14 Potassium D010 1.0 < 0.050 < 0.050 < 0.050 Selenium < 0.0050 < 0.0050 < 0.0050 Silver 5.0 D011 340 430 530 Sodium 0.002 < 0.00020 0.2 < 0.00020 0.00024 D009 Mercury Dissolved Metals (mg/L) 0.01 100 84 53 Calcium 26 32 43 Magnesium Potassium 8.1 9.9 14 Sodium 330 370 530 Ignitability, Corrosivity, and Reactivity <0.00500 <0.0500 < 0.00500 D003 Reactive Cyanide (mg/L) Reactive Sulfide (mg/L) <20 0.099 0.125 D003 <140° F >170 >170 >170 Ignitability ("F) D001 7.09 D002 Corrosivity (ph Units) < 2 or > 12.5 6-9 7.32 7.5 Pesticides (ug/L) <0.030 < 5.0 30 Chlordane na **Field Parameters** Oxidation-Reduction Potential (mV) 67.3 -155.7 -75.6 1,838 3,187 Specific Conductance (umhos/cm) 2,161 7.02 8.26 7.62 pH 315 34 8 Temperature (°C) 21.7

Notes:

* = Screening level is to apply to dissolved phase result; therefore comparison is bias high.

1,1-Dichloroethene result was revised from "<7.0" to "<0.70" as reflected in the analytical report.

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FIGURES

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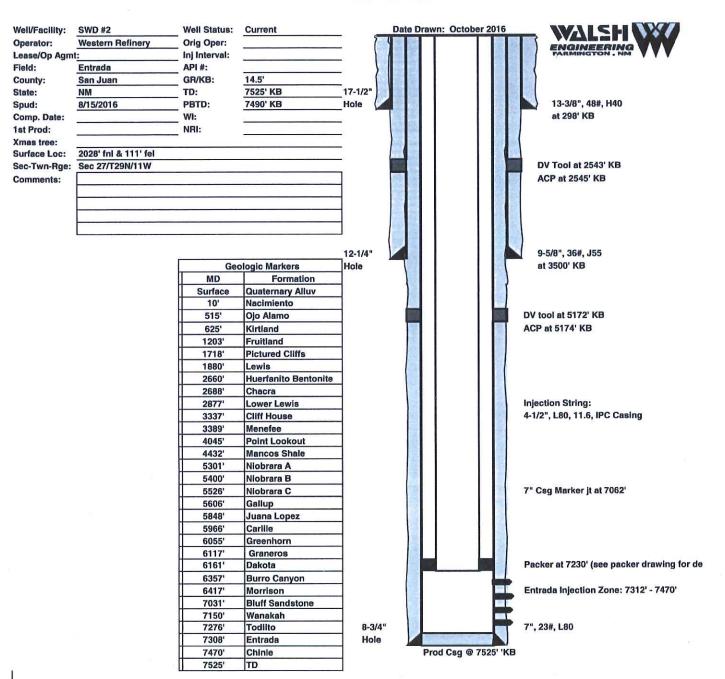


FIGURE 1

ATTACHMENT A

Monthly C-115 Reports

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<u>District II</u> 811 S. First St., Artesia, NM 88210 <u>District III</u>

1000 Rio Brazos, Aztec, NM 84710

OIL CONSERVATION DIVISION Energy, Minerals & Natural Resources Department State of New Mexico

1220 South Saint Francis Drive Santa Fe, NM 87505 OPERATOR'S MONTHLY REPORT

Form C-115 First Page Revised January 22, 2004 Instruction on Reverse Side (

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6 Page 2 of 4

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2 Operator

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OCDOnline@state.nm.us Monday, May 15, 2017 8:24 AM Robinson, Kelly; Robinson, Kelly OCD C115 Accepted

This email was sent by an external sender. Please use caution when opening attachments, clicking web links, or replying until you have verified this email sender.

1

The following C-115 has been ACCEPTED by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 03/2017 Date Submitted: 5/12/2017 Operator: 267595 Permit ID: 236211 Highest Production Month: 03/2017 added Monday, May 15, 2017

1625 North French, Hobbs, NM 88241 District I

811 S. First St., Artesia, NM 88210 District III District II

1000 Rio Brazos, Aztec, NM 84710

POOL NO. AND NAME

Property No. and Name Well No. & U-L-S-T-R

API No.

316242 Waste Disposal Well U-H-27-29N-11R

30-045-35747

96436 - Entrada

(Instruction on Reverse Side Amended Report Form C-115 First Page Revised January 22, 2004 end of month Oil on hand at 23 ОД ШA U 6 Page 1 of 4 Transporter Ogrid 4 04/2017 DISPOSITION OF OIL, GAS, AND WATER 21 ۲ ۲ (Bbls/mcf) Volume 20 Oil on hand beginning of month 19 at 18 Gas BTU or Oil API Gravity 3 OGRID: 267595 Disposition Point of 17 OIL CONSERVATION DIVISION OPERATOR'S MONTHLY REPORT Energy, Minerals & Natural Resources Department 1220 South Saint Francis Drive 0 ۵ щ 0 Produced 15 Days State of New Mexico Santa Fe, NM 87505 Produced 14 MCF Gas PRODUCTION Barrels of produced water 13 Oil/conden-Barrels of produced sate 12 1011 W ша 0 Ω Pressure INJECTION 10 1819 Volume 5 Address: PO Box 159 Bloomfield, NM 87413 Ø 1 000ш-2 Western Refining Southwest, Inc.

205-632-4166 Phone Number 6 Page 2 of 4 2/10/12 Date 1. Robinar Curr. Cours 4 Month/Year hereby confight that the information contained in this report is true and complete to the best of my knowledge. E-Mail Address Kell Kelly. Robinson Eur. Supervisor Printed Name & Title 3 OGRID Signature 2 Operator J X 24

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From: Sent: To: Subject:

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OCDOnline@state.nm.us Tuesday, May 16, 2017 12:37 PM Robinson, Kelly; Robinson, Kelly OCD C115 Accepted

This email was sent by an external sender. Please use caution when opening attachments, clicking web links, or replying until you have verified this email sender.

1

The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 04/2017 Date Submitted: 5/16/2017 Operator: 267595 Permit ID: 236338 Highest Production Month: 04/2017 added Tuesday, May 16, 2017

1625 North French, Hobbs, NM 88241 District I

811 S. First St., Artesia, NM 88210 District II District III

Aztec. NM 84710 1000 Rio Bra

Energy, Minerals & Natural Resources Layon OIL CONSERVATION DIVISION 1220 South Saint Francis Drive 7/5/17

State of New Mexico

Instruction on Reverse Side Form C-115 First Page Revised January 22, 2004

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JU11-261-202 Phone Number 7/5/17 6 Page 2 of 4 Date Kelly. Robinser Ew. Syservison Kelly. Robinson Candeavon Con Printed Name & Title E-Mail Address D 4 Month/Year 3 OGRID Kelled w NUL Signature 2 Operator

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OCDOnline@state.nm.us Thursday, July 06, 2017 8:00 AM Robinson, Kelly; Robinson, Kelly OCD C115 Accepted

This email was sent by an external sender. Please use caution when opening attachments, clicking web links, or replying until you have verified this email sender.

The following C-115 has been ACCEPTED by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 05/2017 Date Submitted: 7/5/2017 Operator: 267595 Permit ID: 238521 Highest Production Month: 05/2017 added Thursday, July 06, 2017

Instruction on Reverse Side Form C-115 First Page Revised January 22, 2004 Amended Report , []

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OIL CONSERVATION DIVISION

1220 South Saint Francis Drive

Energy, Minerals & Natural Resources Department

1625 North French, Hobbs, NM 88241

District I

<u>District II</u> 811 S. First St., Artesia, NM 88210

1000 Rio Brazos, Aztec, NM 84710

District III

State of New Mexico

Santa Fe, NM 87505 OPERATOR'S MONTHLY REPORT

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estern Refining Southwest, Inc. Idress: PO Box 159 Bloomfield, N Property No. and Name Well No. & U-L-S-T-R API No. API No. 42 Waste Disposal Well 27-29N-11R 45-35747			IM 8			-																
이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이		Western Refining Southwest, Inc.	Address: PO Box 159 Bloomfield, N		Z POOL NO. AND NAME Property No. and Name Weil No. & U-L-S-T-R API No.	86436 - Entrada 316242 Waste Disposal Well J-H-27-29N-11R 30-045-35747																

I hereby certify that the information contained in this report is true and complete to the best of my knowledge.

SDT. 632-4166 Phone Number 4 6 Page 2 of 4 Kelly. Robinos Caudeavor. Wur 97, E-Mail Address Date 4 Month/Year Robiwon Env. Euperviser Printed Name & Title 3 OGRID Kelly Jerre 24 M 2 Operator

C

From: Sent: To: Subject:

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OCDOnline@state.nm.us Thursday, July 06, 2017 8:00 AM Robinson, Kelly; Robinson, Kelly OCD C115 Accepted

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The following C-115 has been ACCEPTED by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 06/2017 Date Submitted: 7/5/2017 Operator: 267595 Permit ID: 238522 Highest Production Month: 06/2017 added Thursday, July 06, 2017

1625 North French Hoths NM 88241				Enor	Enomy Minerals & Natural Decourses Decontract	and Imittel	of acount	nombron			3		Dovised Januar 22 2004	action	10 00 .
1923 NOTAT FIERDAR, FROMS, NNA 9924 (District II 8115. First St., Artesia, NM 88210			0	OIL	CONSERVATION DIVISION 1220 South Saint Francis Drive	VATIC VATIC h Saint Fr	DN DJ ancis Di	LVIS ive	õ	a	E1/41/2 1		revised January 22, 2004 Instruction on Reverse Side	a January 22, 2004 1 on Reverse Side Amended Report	erse S erse S ed Rep
UDBUICLIII 1000 Rio Brazos, Aztec, NM 84710				OPE	SAMAFS, NW 8/5U5 OPERATOR'S MONTHLY REPORT	Samare, NIN 8/505 OR'S MONTHLY	SUC'S	EPOR		Coutin	Coutinutre #		241832	2	
2 Western Refining Southwest, Inc.							. Qî	<u> </u>	3 OGRID: 267595	267595			4 07/ 2017	17	
Address: PO Box 159 Bloomfield, NM 87413	87413												6 Page 1 of 4	1 of 4	
	N.	INJECTION			PRODUCTION	TION				LISOASIC	DISPOSITION OF OIL, GAS, AND WATER	IL, GAS, A	AND WAT!	ER	
Z POOL NO. AND NAME				12 Barrels of	13	4	Ŕ	ب ة م	4	é	19 Oil on hand	d20	21	22 C	23 Oil on
Property No. and Name 0	9 Volume	10 Breesure	0 Oil/cc	Oil/conden-	Barrels of water	MCF	Days	0 0	Point of Disposition	Gas BTU		Volume	Transporter		hand at
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<u>96436 - Entrada</u> 316242 Waste Disposal Well 30-045-35747 30-045-35747		1335	3			-									
that the information con	tained in this rej	is report is	ort is true and האיר S	nd complete to t	te to the b	best of my	knowle	dge.		もうして	4		-222-41 POIS	-260)	לור
rent	5		Nomo 8		32	L	NA. I A.	diam'r				2		I'A	2

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OCDOnline@state.nm.us
Thursday, September 14, 2017 11:28 AM
kelly.robinson@wnr.com; kelly.robinson@wnr.com
OCD C115 Accepted

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The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 07/2017 Date Submitted: 9/14/2017 Operator: 267595 Permit ID: 241832 Highest Production Month: 07/2017 added Thursday, September 14, 2017

Fom C-115 First Page vised January 22, 2004 Lotion on Reverse Side Amended Report Counfinues たら、エンレリ もろろ				Ç	<u> </u>	و
Form C-115 First Page vised January 22, 2004 uction on Reverse Side Amended Report				22 23 C Oil on O hand at E month	5. 	505- 632-4166 Phone Number
	4 08/ 2017	6 Page 1 of 4	DISPOSITION OF OIL, GAS, AND WATER	21 Transporter Ogrid		Phone Number
<u> </u>			, GAS, A	20 Volume (Bbls/mcf)		
Subwitted FIL4/18			ON OF OI	19 Oil on hand at beginning of month		g/iy/17 Date
nder S	267595		DISPOSITI	18 Gas BTU or Oil API Gravity		ete to the best of my knowledge. Erru. Syperviter 9/14/13 Erru. Kubiuton Caudeavor. Cour
Bent SION	3 OGRID: 267595		_	17 Point of Disposition		se and
Drive			_	15 16 Days 0 Prod- D uced E 33		Addres
Mexico esource ON 1 -rancis M 8750						Ny knov
State of New Mexico erals & Natural Resources! SERVATION D South Saint Francis I Santa Fe, NM 87505 OR'S MONTHLY			LION	14 MCF Gas Produced		estofn Zvpce
State of New Mexico Energy, Minerals& Natural Resources Department OIL CONSERVATION DIVISION 1220 South Saint Francis Drive Santia Fe, NM 87505 OPERATOR'S MONTHLY REPORT			PRODUCTION	13 Barrels of water produced		Env. S
OIL (12 Barrels of Oil/conden- sate produced		this report is true and comp Kelly Robiuser Primed Name & Title
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17		-	INJECTION	10 Pressure		is repo
r) <u>bj</u>		7413	IN	9 Volume	10093	ed in th
		NM 8	*	∞ U O O U T		L main
<u>District I</u> 1625 North Franch, Hobbs, NM 88241 <u>District II</u> 811 S. First St., Artesia, NM 882 10 <u>District III</u> 1000 Rio Brazos, Aztec, NM 847 10	2 Western Refining Southwest, Inc.	5 Address: PO Box 159 Bloomfield, NM 87413		<u>T</u> Property No. and Name Well No. & U-L-S-T-R API No.	96436 - Entrada 316242 Waste Disposal Well U-H-27-29N-11R 30-045-35747	I hereby certify that the information contained in this report is true and complete to the best of my knowledge. ²⁴ Kelly Koluny Kelly Robiuser Erv. Speurioser Signature Kelly Robiuser Ritte Kelly Robiuser
			-			

From:	OCDOnline@state.nm.us
Sent:	Thursday, September 14, 2017 11:28 AM
То:	kelly.robinson@wnr.com; kelly.robinson@wnr.com
Subject:	OCD C115 Accepted

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The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 08/2017 Date Submitted: 9/14/2017 Operator: 267595 Permit ID: 241833 Highest Production Month: 08/2017 added Thursday, September 14, 2017

1625 North French, Hobbs, NM 88241 811S. First St., Artesia, NM 88210 District III District II **District**

OIL CONSERVATION DIVISION 1220 South Saint Francis Drive Santa Fe, NM 87505

Energy, Minerals & Natural Resources Department State of New Mexico

Instruction on Reverse Side Form C-115 First Page Revised January 22, 2004

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6 Page 2 of 4 Kelly. Kabiwarilandeavar. con 4 Month/Year 3 OGRID 5 2 Operator

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From:	OCDOnline@state.nm.us
Sent:	Thursday, November 09, 2017 7:15 AM
То:	kelly.robinson@wnr.com; kelly.robinson@wnr.com
Subject:	OCD C115 Accepted

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The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 09/2017 Date Submitted: 11/8/2017 Operator: 267595 Permit ID: 244366 Highest Production Month: 09/2017 added Thursday, November 09, 2017

1625 North French, Hobbs, NM 88241 811S. First St., Artesia, NM 88210 District II District I

District III

1000 Rio Brazos, Aztec, NM84710

OIL CONSERVATION DIVISION 1220 South Saint Francis Drive Santa Fe, NM 87505 Energy, Minerals & Natural Resources Department

State of New Mexico

Instruction on Reverse Side Form C-115 First Page Revised January 22, 2004

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	REPORT
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Caller	OPERATOR'S

2 Western Refining Southwest, Inc.									~,	3 OGRID: 267595	67595			4 10/2017		
5 Address: PO Box 159 Bloomfield, NM 87413	M 8741:													6 Page 1 of 4	_	
		INJECTIO	TION			PRODUCTION	TION				ISPOSITI	DISPOSITION OF OIL, GAS, AND WATER	, GAS, AN			
Z O. AND NAME y No. and Name & B. L-S-T-R API No.	s сс о Volume Е		10 Pressure	× ≡ 000 2	12 Barrels of Oil/conden- sate produced	13 Barrels of water produced	14 MCF Gas Produced	15 Days Prod- uced	а пооъ 	17 Point of Disposition	18 Gas BTU or Oil API Gravity	19 Oil on hand at beginning of month	20 Volume (Bbls/mcf)	21 Transporter Ogrid	22 4 ED 0 4	23 Oil on hand at end of month
96436 - Erritada 316242 Waste Disposal Well U-H-27-29N-11R 30-045-35747 30-045-35747	۲ –	7755	1084 V	>												
I hereby certify that the information contained in this report is true and complete to the best of my knowledge. ²⁴ $AQL ALM V Kelly Robinson EW System Signature Signature Finded Name & Title E.Mail Addression and the State E.Mail Addression Signature Signature$	ltained i	n this r	eport is true and (Robiture Printed Name & 1	o true	eport is true and comp Robiture A	slete to the L EUV. S	best of my knowledge. ()22.000 E-Mail Address	knowled	iress		11/8/2017 Date	2014 Date	Ø S ∎	<u>507 - 1652 - 141 (66</u> Phone Number	<u>,</u>	
2 Operator				Ť	3 ogrid			4 Month/Year	ith/Ye	ar		6 Page 2	of 4			
		Kelly	v	S	oilus Dr	Rebinson Candeavor. ron	audr. (5								

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From:	OCDOnline@state.nm.us
Sent:	Thursday, November 09, 2017 7:15 AM
То:	kelly.robinson@wnr.com; kelly.robinson@wnr.com
Subject:	OCD C115 Accepted

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The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 10/2017 Date Submitted: 11/8/2017 Operator: 267595 Permit ID: 244367 Highest Production Month: 10/2017 added Thursday, November 09, 2017

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C-115 First Page January 22, 2004 I on Reverse Side Amended Report		T	00	23 Oil on hand at end of month		 	 	 	רטן ד			23	3		
5 Fir ary 2 even nded				х со <u>п</u> т 4			 	 	 ź	· .		22			
Form Revised truction	4 11/2017	6 Page 1 of 4	GAS, AND WATER	21 Transporter Ogrid					- באטריש	Phone Number		ID WATER			
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pro la			DISPOSITION OF OIL,	19 Oil on hand at beginning of month				 	1/12/2019	Date	6 Page 2	DISPOSITION OF OIL, GAS, AND WATER	5		
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NO	3 OGRID: 267595			17 Point of Disposition			 		 e.		ear				
o Department DTVLST Drive S REPORT		ļ		фоорш »		 	 	 	 ledge	lress	ith/Y	4	2		
K RI K RI K RI				15 Days Prod- uced					know	E-Mail Address	4 Month/Year				
State of New Mexico Energy, Minerals & Natural Resources Department L CONSERVATION DIVISION 1220 South Saint Francis Drive Santa Fe, NM 87505 OPERATOR'S MONTHLY REPORT			TION	14 MCF Gas Produced		 	 	 	 complete to the best of my knowledge.			CTION			
State ergy, Minerals (CONSEF 1220 Sout Sand ERATOR 1			PRODUCTION	13 Barrels of water produced		 	 		 npiete to th √ ^ (∖			PRODUCTION			
OIL OIL OF				12 Barrels of Oil/conden- sate produced				 	report is true and con	ENV, Sperume	3 OGRID	;	12		
				2000 7	Ň	 	 	 	 tist						
			INJECTION	10 Pressure	1108 W	 	 	 	 this repor			INJECTION			
		413	N	9 Volume	6156				ned in this √						
		1M 87		∾ U O D Ш 〒			 	 	 ontair			°	»		
8241 0 utthwest, Inc	uthwest, Inc. 9 Bloomfield, I		utnwest, Inc. 9 Bloomfield, N	PO Box 159 Bloomfield, NM 87413		D NAME 1 Name S-T-R	l Well				1 hereby certify that the information contained in this report is true and	Thursday of			
<u>District </u> 1625 North French, Hobbs, NM 88241 <u>District II</u> 811 S. First St., Artesia, NM 88210 <u>District III</u> 1000 Rio Brazos, Aztec, NM 84710	2 Western Refining Southwest, Inc.			7 POOL NO, AND NAME Property No. and Name Well No. & U-L-S-T-R API No.	<u>96436 - Entrada</u> 316242 Waste Disposal Well U-H-27-29N-11R 30-045-35747				certify that th						
District] 1625 North Fr District II 811 S. First S District III 1000 Rio Bra	2 Wester	5 Address:		ц. 	<u>96436 - Entrada</u> 316242 Waste D U-H-27-29N-11R 30-045-35747	 	 	 	 1 hereby	Signature	2 Operator				

From: Sent: To: Subject: OCDOnline@state.nm.us Friday, January 12, 2018 10:51 AM kelly.robinson@wnr.com; kelly.robinson@wnr.com OCD C115 Accepted thy. Well

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The following C-115 has been **ACCEPTED** by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 11/2017 Date Submitted: 1/12/2018 Operator: 267595 Permit ID: 247042 Highest Production Month: 11/2017 added Friday, January 12, 2018

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C-115 First Page January 22, 2004 on Reverse Side Amended Report				23 Oil on hand at end of month		41 P				23
5 Fin lary 2 tever nded				4 ШОС <mark>2</mark> 2		2				22
Form Revised Inuction	4 12/2017	6 Page 1 of 4	D WATER	21 Transporter Ogrid		 202-632-41106	Phone Number		ID WATER	
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Suburited Vrz/ zer 8			DISPOSITION OF OIL, GAS, AND WATER	19 Oil on hand at beginning of month		1/12/2018	Date	6 Page 2	DISPOSITION OF OIL, GAS, AND WATER	19
x .\			DISPOSIT	18 Gas BTU or Oil API Gravity					DISPOSIT	
ant S I ON R T	3 OGRID: 267595			17 Point of Disposition		 to the best of my knowledge. Kelly, Robinson Eauchedror.com		ear		
) Department Drive REPORT				°ч п о с а		 ledge Co.u.	dress	thN	L	9
exico burces De N DI ncis Di 17505 HLY RI				15 Days Prod- uced		 y knowl	E-Mail Address	4 Month/Year		
State of New Mexico gy, Minerals & Natural Resources Departu CONSERVATION DIVI 1220 South Saint Francis Drive Santa Fe, NM 87505 iRATOR'S MONTHLY REPO			TION	14 MCF Gas Produced		 e best of m , Co biy	ц Ц		CTION	
State of New Mexico Energy, Minerals & Natural Resources Department L CONSERVATION DIVISION 1220 South Saint Francis Drive Santa Fe, NM 87505 OPERATOR'S MONTHLY REPORT			PRODUCTION	13 Barrels of water produced		and complete to the best of my knowledge. Kelly, Ro biwow ecture			PRODUCTION	
DIL OIL				12 Barrels of Oil/conden- sate produced		ue and com A	ne & Title	3 OGRID		12
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		5	INJECTION	10 Pressure	863 W	his report 2 ob w	Printed Name 8		INJECTION	
		7413	IN.	9 Volume	2041	ned in t	T°,		Ž	
		NIM 8		∞оопш ←		 ontaí	$ \omega $		Γ	80
<u>District 1</u> 1625 North French, Hobbs, NM 88241 <u>District II</u> 811 S. First St., Artesia, NM 88210 <u>District III</u> 1000 Rio Brazos, Aztec, NM 84710	2 Western Refining Southwest, Inc.	5 Address: PO Box 159 Bloomfield, NM 87413		POOL NO. AND NAME Property No. and Name Well No. & U-L-S-T-R API No.	96436 - Entrada 316242 Waste Disposal Well U-H-27-29N-11R 30-045-35747	I hereby certify that the information contained in this report is true 24 UD , KOULUM Kelly Cob MJ84	Signature	Operator		7
						0		2	1	1

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Robinson, Kelly

From: Sent: To: Subject: OCDOnline@state.nm.us Friday, January 12, 2018 10:51 AM kelly.robinson@wnr.com; kelly.robinson@wnr.com OCD C115 Accepted Ing. Well

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The following C-115 has been ACCEPTED by OCD:

Description: WESTERN REFINING SOUTHWEST, INC. [267595] 12/2017 Date Submitted: 1/12/2018 Operator: 267595 Permit ID: 247044 Highest Production Month: 12/2017 added Friday, January 12, 2018

ATTACHMENT B

Analytical Laboratory Reports



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

April 17, 2017

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX

RE: WDW 2 3-31-17

OrderNo.: 1704017

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 4/1/2017 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 <u>www.hallenvironmental.com</u> 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,

andig

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Hall Environmental Analy	all Environmental Analysis Laboratory, Inc.						
CLIENT: Western Refining Southwest	, Inc.		C	lient Sample I	D: Inj	ection Well	
Project: WDW 2 3-31-17				Collection Dat	te: 3/3	1/2017 7:30:00 AM	
Lab ID: 1704017-001	Matrix:	AQUEOUS		Received Dat	te: 4/1	/2017 11:30:00 AM	
Analyses	Result	PQL (Qual	Units	DF	Date Analyzed	Batch
SPECIFIC GRAVITY						Analyst	: LGT
Specific Gravity	0.9991	0			1	4/5/2017 4:15:00 PM	R41912
EPA METHOD 300.0: ANIONS						Analyst	MRA
Fluoride	ND	0.50		mg/L	5	4/5/2017 3:48:31 AM	R41868
Chloride	410	25	*	mg/L	50	4/7/2017 3:26:42 AM	A41955
Bromide	1.7	0.50		mg/L	5	4/5/2017 3:48:31 AM	R41868
Phosphorus, Orthophosphate (As P)	ND	2.5	Н	mg/L	5	4/5/2017 3:48:31 AM	R41868
Sulfate	59	2.5		mg/L	5	4/5/2017 3:48:31 AM	R41868
Nitrate+Nitrite as N	ND	1.0		mg/L	5	4/5/2017 4:25:46 AM	R41868
SM2510B: SPECIFIC CONDUCTANC	E					Analyst	: MRA
Conductivity	2200	1.0		µmhos/cm	1	4/11/2017 2:24:41 PM	R42064
SM2320B: ALKALINITY						Analyst	: MRA
Bicarbonate (As CaCO3)	415.0	20.00		mg/L CaCO3	1	4/11/2017 2:24:41 PM	R42064
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	4/11/2017 2:24:41 PM	R42064
Total Alkalinity (as CaCO3)	415.0	20.00		mg/L CaCO3	1	4/11/2017 2:24:41 PM	R42064
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analysi	t: KS
Total Dissolved Solids	1470	100	*D	mg/L	1	4/8/2017 1:38:00 PM	31115
EPA METHOD 7470: MERCURY						Analysi	t: MED
Mercury	ND	0.00020		mg/L	1	4/5/2017 10:17:21 AM	31063
EPA METHOD 6010B: DISSOLVED N	IETALS					Analys	t: MED
Calcium	100	5.0		mg/L	5	4/5/2017 11:02:31 AM	A41903
Magnesium	26	1.0		mg/L	1	4/5/2017 10:57:43 AM	A41903
Potassium	8.1	1.0		mg/L	1	4/5/2017 10:57:43 AM	A41903
Sodium	330	5.0		mg/L	5	4/5/2017 11:02:31 AM	A41903
EPA 6010B: TOTAL RECOVERABLE	METALS					Analys	t: MED
Arsenic	ND	0.020		mg/L	1	4/5/2017 10:34:53 AM	31057
Barium	0.34	0.020		mg/L	1	4/5/2017 10:34:53 AM	31057
Cadmium	ND	0.0020		mg/L	1	4/5/2017 10:34:53 AM	31057
Calcium	100	5.0		mg/L	5	4/5/2017 11:11:34 AM	31057
Chromium	ND	0.0060		mg/L	1	4/5/2017 10:34:53 AM	31057
Lead	ND	0.0050		mg/L	1	4/5/2017 10:34:53 AM	31057
Magnesium	26	1.0		mg/L	1	4/5/2017 10:34:53 AM	31057
Potassium	8.4	1.0		mg/L	1	4/5/2017 10:34:53 AM	31057
Selenium	ND	0.050		mg/L	1	4/5/2017 10:34:53 AM	31057
Silver	ND	0.0050		mg/L	1	4/5/2017 10:34:53 AM	31057
Sodium	340	5.0		mg/L	5	4/5/2017 11:11:34 AM	31057

Hall Environmental Analysis Laboratory, Inc.

Lab Order 1704017

Analytical Report

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	в	Analyte detected in the associated Method Blank
-	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 19
	ND	Not Detected at the Reporting Limit	Р	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	W	Sample container temperature is out of limit as specified

Hall Environmental Analys			Lab Order 1704017 Date Reported: 4/17/201	17				
CLIENT: Western Refining Southwest, Project: WDW 2 3-31-17 Lab ID: 1704017-001		AQUEOUS	Collection	Date: 3/3	Injection Well 3/31/2017 7:30:00 AM 4/1/2017 11:30:00 AM			
Analyses	Result	PQL Qual	Units	DF	Date Analyzed	Batch		
EPA METHOD 8270C: SEMIVOLATILE	s				Analyst	DAM		
Acenaphthene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Acenaphthylene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059		
Aniline	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Anthracene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Azobenzene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benz(a)anthracene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benzo(a)pyrene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benzo(b)fluoranthene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benzo(g,h,i)perviene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benzo(k)fluoranthene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059		
Benzoic acid	ND	20	μg/L	1	4/14/2017 5:19:57 PM	31059		
Benzyl alcohol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Bis(2-chloroethyl)ether	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
4-Bromophenyl phenyl ether	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Butyl benzyl phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Carbazole	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
4-Chloro-3-methylphenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
4-Chloroaniline	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
2-Chloronaphthalene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
2-Chlorophenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Chrysene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Di-n-butyl phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Di-n-octyl phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Dibenz(a,h)anthracene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Dibenzofuran	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059		
1,2-Dichlorobenzene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
1,3-Dichlorobenzene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
1,4-Dichlorobenzene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
3,3'-Dichlorobenzidine	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Diethyl phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
Dimethyl phthalate	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
2,4-Dichlorophenol	ND	20	μg/L	1	4/14/2017 5:19:57 PM	31059		
2,4-Dimethylphenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059		
4.6-Dinitro-2-methylphenol	ND	20	µg/L	1	4/14/2017 5:19:57 PM	31059		
2,4-Dinitrophenol	ND	20	µg/L	1	4/14/2017 5:19:57 PM	31059		

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

- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
 - Analyte detected below quantitation limits Page 2 of 19 J

Analytical Report

- р Sample pH Not In Range
- Reporting Detection Limit RL

Sample container temperature is out of limit as specified W

Hall Environmental Analy	sis Labora	tory, Inc.			Lab Order 1704017 Date Reported: 4/17/20	17			
CLIENT: Western Refining Southwes Project: WDW 2 3-31-17 Lab ID: 1704017-001	t, Inc.	AQUEOUS		Date: 3/3	njection Well /31/2017 7:30:00 AM /1/2017 11:30:00 AM				
Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch			
EPA METHOD 8270C: SEMIVOLATI	ES				Analyst	DAM			
2,4-Dinitrotoluene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
2,6-Dinitrotoluene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
Fluoranthene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Fluorene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
Hexachlorobenzene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Hexachlorobutadiene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Hexachlorocyclopentadiene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Hexachloroethane	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Indeno(1,2,3-cd)pyrene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Isophorone	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
1-Methylnaphthalene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
2-Methylnaphthalene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
2-Methylphenol				1	4/14/2017 5:19:57 PM	31059			
3+4-Methylphenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
N-Nitrosodimethylamine	ND	10	μg/L		4/14/2017 5:19:57 PM	31059			
N-Nitrosodiphenylamine	ND	10	μg/L	1		31058			
Naphthalene	ND	10	µg/L	1	4/14/2017 5:19:57 PM				
2-Nitroaniline	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
3-Nitroaniline	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
4-Nitroaniline	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
Nitrobenzene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
2-Nitrophenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
4-Nitrophenol	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Pentachlorophenol	ND	20	μg/L	1	4/14/2017 5:19:57 PM	31059			
Phenanthrene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Phenol	NÐ	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Pyrene	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
Pyridine	ND	10	μg/L	1	4/14/2017 5:19:57 PM	31059			
1,2,4-Trichlorobenzene	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
2,4,5-Trichlorophenol	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
2,4,6-Trichlorophenol	ND	10	µg/L	1	4/14/2017 5:19:57 PM	31059			
Surr: 2-Fluorophenol	29.5	15-98.1	%Rec	1	4/14/2017 5:19:57 PM	31059			
Surr: Phenol-d5	24.3	15-80.7	%Rec	1	4/14/2017 5:19:57 PM	31059			
Surr: 2,4,6-Tribromophenol	39.6	15-112	%Rec	1	4/14/2017 5:19:57 PM	3105			
Surr: Nitrobenzene-d5	62.8	27.2-90.7	%Rec	1	4/14/2017 5:19:57 PM	31059			
Surr: 2-Fluorobiphenyl	47.4	23.3-85.6	%Rec	1	4/14/2017 5:19:57 PM	31059			
Surr: 4-Terphenyl-d14	36.6	27.6-107	%Rec	1	4/14/2017 5:19:57 PM	31059			

EPA METHOD 8260B: VOLATILES

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

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 Page 3 of 19

Analyst: rde

Analytical Report

- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Lab Order 1704017

Date Reported: 4/17/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

WDW 2 3-31-17

1704017-001

Project:

Lab ID:

Client Sample ID: Injection Well Collection Date: 3/31/2017 7:30:00 AM Received Date: 4/1/2017 11:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analys	t: rde
Benzene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Toluene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Ethylbenzene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Methyl tert-butyl ether (MTBE)	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
1,2,4-Trimethylbenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R4185
1,3,5-Trimethylbenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R4185
1,2-Dichloroethane (EDC)	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
1,2-Dibromoethane (EDB)	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Naphthalene	ND	10	D	µg/L	· 10	4/3/2017 11:35:00 PM	R4185
1-Methyinaphthalene	ND	20) D	µg/L	10	4/3/2017 11:35:00 PM	R4185
2-Methylnaphthalene	ND	20	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Acetone	860	50	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Bromobenzene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Bromodichloromethane	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Bromoform	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Bromomethane	ND	15	i D	μg/L	10	4/3/2017 11:35:00 PM	R4185
2-Butanone	60	50) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Carbon disulfide	ND	50) D	µg/L	10	4/3/2017 11:35:00 PM	R4188
Carbon Tetrachloride	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4188
Chlorobenzene	ND	5.0) D	µg/L	10	4/3/2017 11:35:00 PM	R4185
Chloroethane	ND	10) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Chloroform	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4188
Chloromethane	ND	18	5 D	μg/L	10	4/3/2017 11:35:00 PM	R4185
2-Chlorotoluene	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
4-Chlorotoluene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
cis-1,2-DCE	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
cis-1,3-Dichloropropene	ND	5.0) D	μg/L.	10	4/3/2017 11:35:00 PM	R4185
1,2-Dibromo-3-chloropropane	ND	20) D	μg/L	10	4/3/2017 11:35:00 PM	R418
Dibromochloromethane	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4188
Dibromomethane	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R4185
1,2-Dichlorobenzene	ND	5.() D	μg/L	10	4/3/2017 11:35:00 PM	R418
1,3-Dichlorobenzene	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R418
1.4-Dichlorobenzene	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R418
Dichlorodifluoromethane	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R418
1,1-Dichloroethane	ND	5.0) D	μg/L	10	4/3/2017 11:35:00 PM	R418
1,1-Dichloroethene	ND	5.0		μg/L	10	4/3/2017 11:35:00 PM	R418
1,2-Dichloropropane	ND	5.0		μg/L	10		R418
1,3-Dichloropropane	ND	5.0		μg/L	10	4/3/2017 11:35:00 PM	R418
2,2-Dichloropropane	ND	1(μg/L	10		R418

Matrix: AQUEOUS

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

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 Page 4 of 19
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analys	sis Laborat	ory, Inc				Date Reported: 4/17/20	17
CLIENT: Western Refining Southwest, Project: WDW 2 3-31-17 Lab ID: 1704017-001		AQUEOUS	C		Date: 3/3	ection Well 1/2017 7:30:00 AM /2017 11:30:00 AM	
Analyses	Result	PQL (Jual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	: rde
1,1-Dichloropropene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
Hexachlorobutadiene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
2-Hexanone	ND	50	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
Isopropylbenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
4-[sopropy toluene	190	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
4-Methyl-2-pentanone	ND	50	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
Methylene Chioride	ND	15	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
n-Butylbenzene	ND	15	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
n-Propylbenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
sec-Butylbenzene	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
Styrene	ND	5,0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
tert-Butylbenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
1,1,1,2-Tetrachloroethane	ND	5.0	D	µg/L.	10	4/3/2017 11:35:00 PM	R41854
1,1,2,2-Tetrachloroethane	ND	10	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
Tetrachloroethene (PCE)	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
trans-1,2-DCE	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
trans-1,3-Dichloropropene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
1,2,3-Trichlorobenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
1,2,4-Trichlorobenzene	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
1,1,1-Trichloroethane	ND	5.0	D	µg/L	10	4/3/2017 11:35:00 PM	R41854
1,1,2-Trichloroethane	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
Trichloroethene (TCE)	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
Trichlorofluoromethane	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R41854
1,2,3-Trichloropropane	ND	10	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Viny! chloride	ND	5.0	D	μg/L	10	4/3/2017 11:35:00 PM	R4185
Xylenes, Total	16	7.5	D	µg/L	10	4/3/2017 11:35:00 PM	R4185
Surr: 1,2-Dichloroethane-d4	86.3	70-130	D	%Rec	10	4/3/2017 11:35:00 PM	R4185
Surr: 4-Bromofluorobenzene	105	70-130	D	%Rec	10	4/3/2017 11:35:00 PM	R4185
Surr: Dibromofluoromethane	103	70-130	D	%Rec	10	4/3/2017 11:35:00 PM	R4185
Surr: Toluene-d8	97.8	70-130	D	%Rec	10	4/3/2017 11:35:00 PM	R41854

Analytical Report Lab Order 1704017

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

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0 110	v	Males and Maging Contaminant Loyal	р	Analyte detected in the associated Method Blank
Qualifiers:	Ŧ	Value exceeds Maximum Contaminant Level.	Б	-
	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 5 of 19
	ND	Not Detected at the Reporting Limit	Р	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	W	Sample container temperature is out of limit as specified



LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:Hall EnvironmentalProject:Not IndicatedLab ID:B17040170-001Client Sample ID:1704017-001F,G Injection Well

 Report Date:
 04/14/17

 Collection Date:
 03/31/17 07:30

 DateReceived:
 04/04/17

 Matrix:
 Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES Oxidation-Reduction Potential	184	mV	Н			A2580 B	04/12/17 14:52 / dah
IGNITABILITY Flash Point (Ignitability)	>200	۴F		30		SW1010A	04/14/17 08:44 / dah
CORROSIVITY pH	7.32	s.u.		0.10		SW9040C	04/10/17 13:14 / dah
REACTIVITY Cyanide, Reactive Sulfide, Reactive	ND ND	mg/kg mg/kg		0.05 20	250 500	SW846 Ch 7 SW846 Ch 7	04/13/17 12:25 / mas 04/11/17 09:00 / dah

Report Definitions: RL - Analyte reporting limit. QCL - Quality control limit. MCL - Maximum contaminant level.

H - Analysis performed past recommended holding time.



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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Project:	Hall Environmental Not Indicated		Report Date: 04/14 Work Order: B170									
Analyte		Count	Result	Units	RL %REC	Low Limit	High Limit	RPD	RPDLimit	Qual		
Method:	A2580 B								Batch	: R277927		
Lab ID:	B17040170-001ADU	P Sa	mple Duplic	ale		Run: ORIC	N 720A HZW_	170412A	04/12	/17 14:52		
Oxidation	-Reduction Potential		187	mV				1.5	20			
Lab ID:	LCS2	Lat	ooratory Cor	trol Sample		Run: ORIC	N 720A HZW_	170412A	04/12	/17 14:52		
Oxidation	-Reduction Potential		300	mV	100	97	103					



QA/QC Summary Report

Prepared by Billings, MT Branch

Client:	Hall Environmental							Repo	ort Date:	: 04/14/17	
Project:	Not Indicated							Wor	k Order:	B170401	70
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLImit	Qual
Method:	SW1010A									Batch:	R278069
Lab ID:	B17040539-008ADUI int (Ignitability)	P Sai	mple Duplic 77	ale °F	30		Run: PENS	KY MARTEN (CLOSED 5.3	04/14 10	/17 08:44
FIASH FO	an (ignicariny)		~ ~	1					010		



QA/QC Summary Report

Prepared by Billings, MT Branch

Client:	Hall Environmental							Repo	rt Date:	04/14/17	
Project:	Not Indicated							Work	Order:	B170401	70
Analyte		Count Res	ult U	Inits	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	SW846 Ch 7									Batc	h: 107762
Lab ID:	MB-107762	Method Bl	lank				Run: FIA20	2-8_170413A		04/13	/17 12:24
Cyanide,	Reactive	t	ND m	ig/kg	0.05						
Lab ID:	B17040591-001DMS	Sample M	latrix Spi	ke			Run: FIA20	2-B_170413A		04/13	/17 12:30
Cyanide,	Reactive	•	•	g/kg	0.050	87	80	120			
Lab ID:	B17040591-001DMSI	D Sample M	latrix Spi	ike Duplicate			Run: FIA20	2-B_170413A		04/13	/17 12:31
Cyanide,	Reactive	0.	.87 m	ng/kg	0.050	87	80	120	0.0	10	
Method:	SW846 Ch 7		<u>.</u>							Bato	:h: 107762
Lab ID:	MB-107762	Method B	lank				Run: REAC	TIVE SULFIDE	/CYANIC	03/24	/17 09:40
Sulfide, R	leactive	I	ND n1	g/kg	10						
Lab ID:	LCS-107762	Laborator	y Contro	I Sample			Run: REAC	TIVE SULFIDE	/CYANIC	03/24	/17 09:40
Sulfide, R	eactive		12 m	ıg/kg	20	107	70	130			
Lab ID:	B17031461-001BDUF	Sample D	uplicate				Run: REAC	TIVE SULFIDE	CYANIE	03/24	/17 09:40
Sulfide, R	leactive	1	ND m	ng/kg	20					10	
Method:	SW846 Ch 7									Bato	:h: 107762
Lab ID:	MB-107762	Method B	lank				Run: REAC	TIVE SULFIDE	/CYANIE	04/11	/17 09:00
Sulfide, R	leactive	ł	ND m	ıg/kg	10						



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Project:	Hall Environmental Not Indicated							•		: 04/14/17 : B1704017	70
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	SW9040C							Analytical Ru	n: ORION	1 720A HZW	170410B
Lab ID:	ICV	Init	ial Calibratio	on Verificati	on Standard					04/10/	17 13:14
pН			7.99	s.u.	0.10	100	98	102			
Method:	SW9040C									Batch:	R277761
Lab ID:	B17040170-001ADU	P Sa	mple Duplic	ate			Run: ORIO	N 720A HZW_	170410B	04/10/	/17 13:14
pН			7.38	\$.U,	0.10			-	0.8	3	

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project:

WDW 2 3-31-17

Sample ID MB	SampT	ype: mb	lk	Tes	tCode: EF	PA Method	300.0: Anions			
Client ID: PBW	Batch	1D: R4	1868	F	tunNo: 4	1868				
Prep Date:	Analysis D	ate: 4/4	4/2017	S	SeqNo: 1	315703	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Bromide	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								
Sample ID LCS	SampT	ype: Ics	;	Tes	tCode: El	PA Method	300.0: Anions	;		
Client ID: LCSW	Batch	n ID: R4	1868	F	RunNo: 4	1868				
Prep Date:	Analysis D	ate: 4/	4/2017	ę	SeqNo: 1	315704	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			
Bromide	2.4	0.10	2,500	0	95,4	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	99.6	90	110			
Sulfate	9.6	0.50	10.00	0	96.2	90	110			
Nitrate+Nitrite as N	3.4	0.20	3,500	0	97.4	90	110			
Sample ID MB	Samp1	ype: ml	olk	Tes	tCode: E	PA Method	300.0: Anions	6		
Client ID: PBW	Batc	h ID: A4	1955	F	RunNo: 4	1955				
Prep Date:	Analysis E	Date: 4/	6/2017	\$	SeqNo: 1	317699	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sample ID LCS	Samp	Type: Ics	3	Tes	stCode: E	PA Method	300.0: Anion:	3		
Client ID: LCSW	Batc	h ID: A4	1955	I	RunNo: 4	1955				
Prep Date:	Analysis I	Date: 4	6/2017	:	SeqNo: 1	317700	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Vai	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.9	0.50	5.000	0	98.9	90	110			

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
- W Sample container temperature is out of limit as specified

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WO#: 1704017

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

WDW 2 3-31-17

Project:

Sample ID 100ng ics	SampTy	/pe: LC	S	Tes	tCode: El	PA Method	8260B: VOLA	ATILES		
Client ID: LCSW	Batch	ID: R4	1854	F	RunNo: 4	1854				
Prep Date:	Analysis Da	ate: 4/	3/2017	5	SeqNo: 1	313978	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	109	70	130			
Toluene	21	1.0	20.00	0	104	70	130			
Chlorobenzene	22	1.0	20.00	0	108	70	130			
1,1-Dichloroethene	23	1.0	20.00	0	116	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	8.5		10.00		85.1	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	9.7		10.00		97.3	70	130			
Sample ID vsb deli	SampTy	ype: ME	3LK	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R4	1854	F	RunNo: 4	1854				
Prep Date:	Analysis Da	ate: 4/	3/2017	8	SeqNo: 1	313980	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								
Giloromoniano		0.0								

Qualifiers:

2-Chlorotoluene

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded

ND

1.0

- 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
- W Sample container temperature is out of limit as specified

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WO#: 1704017

Western Refining Southwest, Inc. Client:

WDW 2 3-31-17

Project:

Sample ID vsb deli	SampT	уре: М	зlk	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	1D: R4	1854	F	RunNo: 4	1854				
Prep Date:	Analysis D	ate: 4	3/2017	e	SeqNo: 1	313980	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. *

Sample Diluted Due to Matrix D

- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix \mathbf{S}
- Analyte detected in the associated Method Blank В

Value above quantitation range Е

- Analyte detected below quantitation limits J
- Sample pH Not In Range Р
- RL Reporting Detection Limit
- Sample container temperature is out of limit as specified W

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WO#: 1704017

Client: Western Refining Southwest, Inc.

WDW 2 3-31-17

Project:

Sample ID vsb deli	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL/	ATILES		
Client ID: PBW	Batch	n ID: R4	1854	R	RunNo: 4	1854				
Prep Date:	Analysis D	ate: 4/	3/2017	S	GeqNo: 1	313980	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	8.4		10.00		84.5	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	10		10.00		100	70	130			
Surr: Toluene-d8	9.8		10.00		98.1	70	130			

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
- W Sample container temperature is out of limit as specified

WO#: 1704017

17-Apr-17

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Client: Western Refining Southwest, Inc.

Project: WDW 2 3-31-17

Sample ID 1704017-001bms	SampT	ype: MS	;	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: Injection Well	Batch	n ID: 310	059	F	RunNo: 4	2041				
Prep Date: 4/4/2017	Analysis D	ate: 4/	6/2017	S	SeqNo: 1	320412	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	51	10	100.0	0	50.9	18.1	108			
4-Chloro-3-methylphenol	120	10	200.0	0	59.9	15	111			
2-Chlorophenol	120	10	200.0	0	61.4	15	113			
1,4-Dichlorobenzene	34	10	100.0	0	33.5	21	81.3			
2,4-Dinitrotoluene	49	10	100.0	0	49.0	27.4	101			
N-Nitrosodi-n-propylamine	64	10	100.0	13.82	49.8	24.9	107			
4-Nitrophenol	67	10	200.0	0	33.4	15	62.2			
Pentachlorophenol	87	20	200.0	0	43.6	15	96.9			
Phenol	81	10	200.0	3.520	38.6	15	64.7			
Pyrene	51	10	100.0	0	51.4	29.2	111			
1,2,4-Trichlorobenzene	38	10	100.0	0	37.6	22.9	94,8			
Surr: 2-Fluorophenol	90		200.0		45.2	15	98.1			
Surr: Phenol-d5	65		200.0		32.7	15	80.7			
Surr: 2,4,6-Tribromophenol	100		200.0		51.5	15	112			
Surr: Nitrobenzene-d5	59		100.0		59.3	27.2	90.7			
Surr: 2-Fluorobiphenyl	50		100.0		50.3	23,3	85.6			
Surr: 4-Terphenyl-d14	43		100.0		42.9	27.6	107			

Sample ID 1704017-001bmsc	l SampTyp	e: MS	D	Test	Code: El	PA Method	8270C: Semi	volatiles		
Client ID: Injection Well	Batch II	D: 310)59	R	unNo: 4	2041				
Prep Date: 4/4/2017	Analysis Dat	ie: 4/	6/2017	S	eqNo: 1	320413	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	40	10	100.0	0	40.2	18.1	108	23.6	30.5	
4-Chloro-3-methylphenol	98	10	200.0	0	49.0	15	111	19.9	50	
2-Chlorophenol	93	10	200.0	0	46.4	15	113	27.9	36.3	
1,4-Dichlorobenzene	25	10	100.0	0	24.6	21	81.3	30.7	42.1	
2,4-Dinitrotoluene	41	10	100.0	0	40.8	27.4	101	18.2	28.5	
N-Nitrosodi-n-propylamine	52	10	100.0	13.82	38.5	24.9	107	19.4	25.4	
4-Nitrophenol	50	10	200.0	0	25.2	15	62.2	28.1	50	
Pentachlorophenol	72	20	200.0	0	36.1	15	96.9	18.8	50	
Phenol	58	10	200.0	3.520	27.1	15	64.7	33.4	46.1	
Pyrene	45	10	100.0	0	44.7	29.2	111	14.0	34.3	
1,2,4-Trichlorobenzene	29	10	100.0	0	28.9	22.9	94.8	26.0	43.6	
Surr: 2-Fluorophenol	63		200.0		31.7	15	98.1	0	0	
Surr: Phenol-d5	49		200.0		24.4	15	80.7	0	0	
Surr: 2,4,6-Tribromophenol	89		200.0		44.7	15	112	0	0	
Surr: Nitrobenzene-d5	46		100.0		45.7	27.2	90.7	0	0	
Surr: 2-Fluorobiphenyl	42		100.0		41.9	23.3	85.6	0	0	

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- D Sample Diluted Due to Matrix
- Η 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
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Page 10 of 19

- Р Sample pH Not In Range Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

17-Apr-17

WO#: 1704017

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: WDW 2 3-31-17

=

Sample ID 1704017-001bms	d SampT	ype: MS	SD	Test	Code: E	PA Method	8270C: Semiv	/olatiles		
Client ID: Injection Well	Batch	ID: 31	059	R	unNo: 4	2041				
Prep Date: 4/4/2017	Analysis D	ate: 4/	6/2017	S	eqNo: 1	320413	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	35		100.0		35.2	27.6	107	0	0	
Sample ID Ics-31059	SampT	ype: LC	S	Test	Code: E	PA Method	8270C: Semi	volatiles		
Client ID: LCSW	Batch	ID: 31	059	R	lunNo: 4	2041				
Prep Date: 4/4/2017	Analysis D	ate: 4/	6/2017	S	eqNo: 1	320415	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cenaphthene	65	10	100.0	0	64.6	42.9	100			
-Chloro-3-methylphenol	160	10	200.0	0	78.9	36.2	110			
2-Chlorophenol	150	10	200.0	0	74.7	33.4	97.8			
,4-Dichlorobenzene	58	10	100.0	0	57.6	32.8	79.3			
2,4-Dinitrotoluene	63	10	100.0	0	63.0	34.9	107			
-Nitrosodi-n-propylamine	83	10	100.0	0	82.8	30.7	111			
-Nitrophenol	95	10	200.0	0	47.4	15	91.9			
Pentachlorophenol	120	20	200.0	0	58.6	33.3	93.5			
Phenol	110	10	200.0	0	56.0	20.9	86.4			
^p yrene '	73	10	100.0	0	73.3	45.6	111			
,2,4-Trichlorobenzene	60	10	100.0	0	59.9	38.7	88.2			
Surr: 2-Fluorophenol	130	.5	200.0	-	63.8	15	98.1			
Surr: Phenol-d5	110		200.0		56.2	15	80.7			
Surr: 2,4,6-Tribromophenol	150		200.0		74.8	15	112			
Surr: Nitrobenzene-d5	73		100.0		73.1	27.2	90.7			
Surr: 2-Fluorobiphenyl	69		100.0		68.7	23.3	85.6			
	69 64		100.0		63.6	23.5	107			
Surr: 4-Terphenyl-d14	04		0.001							
Sample ID mb-31059		ype: MI					8270C: Semi	volatiles		
Client ID: PBW	Batch	n ID: 31	059	F	RunNo: 4	2041				
Prep Date: 4/4/2017	Analysis D	ate: 4	/6/2017	5	SeqNo: 1	320416	Units: µg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
		10								

Qualifiers:

Value exceeds Maximum Contaminant Level. *

D Sample Diluted Due to Matrix

- Н Holding times for preparation or analysis exceeded
- \mathbf{ND} Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Page 11 of 19

Sample pH Not In Range Reporting Detection Limit RL

P

Sample container temperature is out of limit as specified W

WO#: 1704017

Western Refining Southwest, Inc. Client:

Project:

WDW 2 3-31-17

Sample ID mb-31059	SampTy	be: MBLK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch I	D: 31059	F	RunNo: 4	2041				
Prep Date: 4/4/2017	Analysis Da	te: 4/6/2017	5	SeqNo: 1	320416	Units: µg/ì.			
Analyte	Result	PQL SPK va	lue SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzoic acid	ND	20							
Benzyl alcohol	ND	10							
Bis(2-chloroethoxy)methane	ND	10							
Bis(2-chioroethyl)ether	ND	10							
Bis(2-chloroisopropyl)ether	ND	10							
Bis(2-ethylhexyl)phthalate	ND	10							
4-Bromophenyl phenyl ether	ND	10							
Butyl benzyl phthalate	ND	10							
Carbazole	ND	10							
4-Chloro-3-methylphenol	ND	10							
4-Chloroaniline	ND	10							
2-Chioronaphthalene	ND	10							
2-Chlorophenol	ND	10							
4-Chlorophenyl phenyl ether	ND	10							
Chrysene	ND	10							
Di-n-butyl phthalate	ND	10							
Di-n-octyl phthalate	ND	10							
Dibenz(a,h)anthracene	ND	10							
Dibenzofuran	ND	10							
1,2-Dichlorobenzene	ND	10							
1,3-Dichlorobenzene	ND	10							
1,4-Dichlorobenzene	ND	10							
3,3'-Dichlorobenzidine	ND	10							
Diethyl phthalate	ND	10							
Dimethyl phthalate	ND	10							
2,4-Dichlorophenol	ND	20							
2,4-Dimethylphenol	ND	10							
4,6-Dinitro-2-methylphenol	ND	20							
2,4-Dinitrophenol	ND	20							
2,4-Dinitrotoluene	ND	10							
2,6-Dinitrotoluene	ND	10							
Fluoranthene	ND	10							
Fluorene	ND	10							
Hexachlorobenzene	ND	10							
Hexachlorobutadiene	ND	10							
Hexachlorocyclopentadiene	ND	10							
Hexachloroethane	ND	10							
Indeno(1,2,3-cd)pyrene	ND	10							
Indeno(1,2,0°02)pyrono	ND	10							

Qualifiers:

Isophorone

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Н

ND

10

- Not Detected at the Reporting Limit ND
- R RPD outside accepted recovery limits
- \mathbf{S} % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank В
- Е Value above quantitation range
- Analyte detected below quantitation limits J
 - Sample pH Not In Range
- Reporting Detection Limit RL

Р

Sample container temperature is out of limit as specified W

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WO#: 17-Apr-17

1704017

Western Refining Southwest, Inc. Client:

WDW 2 3-31-17

Project:

Sample ID mb-31059	SampT	ype: ME	ILK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	n ID: 310)59	F	RunNo: 4	2041				
Prep Date: 4/4/2017	Analysis D	ate: 4/0	6/2017	5	SeqNo: 1	320416	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2-Fluorophenol	130		200.0		64.7	15	98.1			
Surr: Phenol-d5	92		200.0		45.9	15	80.7			
Sur: 2,4,6-Tribromophenol	160		200.0		80.0	15	112			
Surr. Nitrobenzene-d5	86		100.0		86.4	27.2	90.7			
Surr: 2-Fluorobiphenyl	74		100.0		73.9	23.3	85.6			
Surr: 4-Terphenyl-d14	68		100.0		67.7	27.6	107			

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank В
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- Sample pH Not In Range Р
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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WO#: 1704017

QC SUMMARY REPORT

WO#:

1704017 17-Apr-17

Client: Western Refining Southwest, Inc.

WDW 2 3-31-17

Project:

Sample ID	MB-31063	SampT	ype: N	IBLK	Test	Code: E	PA Method	7470: Mercury	l		
Client ID:	PBW	Batch	h ID: 3	1063	R	unNo: 4	1900				
Prep Date:	4/4/2017	Analysis D	Date: 4	4/5/2017	S	ieqNo: 1	316028	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Мегсигу		ND (0.00020)							
Sample ID	LCS-31063	SampT	Гуре: L	CS	Test	Code: E	PA Method	7470: Mercury	/		
Client ID:	LCSW	Batch	h ID: 3	1063	R	tunNo: 4	1900				
Prep Date:	4/4/2017	Analysis D	Date:	4/5/2017	s	eqNo: 1	316029	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0049 (0.00020	0.005000	0	97.2	80	120			
Sample ID	1704017-001EMS	SampT	ype: N	15	Test	tCode: E	PA Method	7470: Mercury	,		
Client ID:	Injection Well	Batch	h ID: 3	1063	R	unNo: 4	1900				
	ingoonon mon										
Prep Date:	•	Analysis D	Date:	4/5/2017	S	eqNo: 1	316034	Units: mg/L			
Prep Date: Analyte	•		ہ :)ate		S SPK Ref Val		316034 LowLimit	Units: mg/L HighLimit	%RPD	RPDLimit	Qual
Analyte	•	Analysis D Result		SPK value				-	%RPD	RPDLimit	Qual
Analyte Mercury	•	Analysis D Result 0,0051 (PQL 0.00020	SPK value 0 0.005000	SPK Ref Val .00007989	%REC 101	LowLimit 75	HighLimit		RPDLimit	Qual
Analyte Mercury	4/4/2017	Analysis D Result 0.0051 (SampT	PQL 0.00020	SPK value 0.005000	SPK Ref Val .00007989 Test	%REC 101	LowLimit 75 PA Method	HighLimit 125		RPDLimit	Qual
Analyte Mercury Sample ID	4/4/2017 1704017-001EMSI Injection Well	Analysis D Result 0.0051 (SampT	PQL 0.00020 Гуре: N h ID: 3	SPK value 0 0.005000 ISD 1063	SPK Ref Val .00007989 Test	%REC 101 tCode: E	LowLimit 75 PA Method 1900	HighLimit 125		RPDLimit	Qual
Analyte Mercury Sample ID Client ID:	4/4/2017 1704017-001EMSI Injection Well	Analysis D Result 0,0051 (O SampT Batch	PQL 0.00020 Гуре: N h ID: 3	SPK value 0 0.005000 ISD 1063 4/5/2017	SPK Ref Val .00007989 Test	%REC 101 tCode: E tunNo: 4 SeqNo: 1	LowLimit 75 PA Method 1900	HighLimit 125 7470: Mercury		RPDLimit	Qual

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
 - Sample pH Not In Range
- RL Reporting Detection Limit

P

W Sample container temperature is out of limit as specified

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WO#: 1704017

17-Apr-17

Client: Project:	Western F WDW 2	Refining Sc 3-31-17	outhwes	st, Inc.									
Sample ID	MB-A	SampTy	/pe: ME	3LK	Test	Code: El	PA Method	6010B: Dissol	ved Meta	ls			
Client ID:	PBW	Batch	iD: A4	1903	RunNo: 41903								
Prep Date:		Analysis Da	ate: 4/	5/2017	S	eqNo: 1	316139	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Calcium		ND	1.0										
Magnesium		ND	1.0										
Potassium		ND	1.0										
Sodium		ND	1.0										
Sample ID	LCS-A	SampTy	/pe: LC	S	Tes	tCode: E	PA Method	6010B: Dissol	ved Meta	als			
Client ID:	LCSW	Batch	ID: A4	1903	F	RunNo: 4	1903						
Prep Date:		Analysis Da	ate: 4 /	5/2017	5	SeqNo: 1	316140	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Calcium		51	1.0	50.00	0	103	80	120					
Magnesium		51	1.0	50.00	0	101	80	120					
Potassium		49	1.0	50.00	0	98.6	80	120					
Sodium		50	1.0	50.00	0	99.3	80	120					
Sample ID	1704017-001DMS	SampT	vpe: MS	5	TestCode: EPA Method 6010B: Dissolved Metals								
Junpio iD						RunNo: 41903							
Client ID:	Injection Well	• •	ID: A4										
	Injection Well	• •	ID: A4	1903	F		1903	Units: mg/L					
Client ID:	Injection Well	Batch Analysis D Result	ID: A4 ate: 4, PQL	1903 5/2017 SPK value	F S SPK Ref Val	RunNo: 4 SeqNo: 1 %REC	1903 316151 LowLimit	Units: mg/L HighLimit	%RPD	RPDLimit	Qual		
Client ID: Prep Date: Analyte	Injection Well	Batch Analysis D	ID: A4 ate: 4/	-1903 /5/2017	F SPK Ref Val 25.63	RunNo: 4 SeqNo: 1 %REC 99.6	1903 316151 LowLimit 75	Units: mg/L HighLimit 125	%RPD	RPDLimit	Qual		
Client ID: Prep Date: Analyte Magnesium	Injection Well	Batch Analysis D Result	ID: A4 ate: 4, PQL	1903 5/2017 SPK value	F S SPK Ref Val	RunNo: 4 SeqNo: 1 %REC	1903 316151 LowLimit	Units: mg/L HighLimit	%RPD	RPDLimit	Qual		
Client ID: Prep Date: Analyte Magnesium Polassium	Injection Well	Batch Analysis D Result 75 57	ID: A4 ate: 4 <u>PQL</u> 1.0	1903 5/2017 SPK value 50.00 50.00	F SPK Ref Val 25.63 8.072	RunNo: 4 SeqNo: 1 %REC 99.6 97.1	1903 316151 LowLimit 75 75	Units: mg/L HighLimit 125			Qual		
Client ID: Prep Date: Analyte Magnesium Polassium	Injection Well	Batch Analysis D Result 75 57 D SampT	ID: A4 ate: 4 PQL 1.0 1.0	1903 5/2017 SPK value 50.00 50.00	F SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 %REC 99.6 97.1	1903 316151 LowLimit 75 75 75	Units: mg/L HighLimit 125 125			Qual		
Client ID: Prep Date: Analyte Magnesium Polassium Sample ID	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT	ID: A4 ate: 4/ PQL 1.0 1.0 1.0 ype: Ms	1903 5/2017 SPK value 50.00 50.00 SD	F SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 %REC 99,6 97,1 1Code: E	1903 316151 LowLimit 75 75 PA Method	Units: mg/L HighLimit 125 125			Qual		
Client ID: Prep Date: Analyte Magnesium Potassium Sample ID Client ID:	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT Batch	ID: A4 ate: 4/ PQL 1.0 1.0 1.0 ype: Ms	1903 5/2017 SPK value 50.00 50.00 SD 1903 25/2017	F SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 %REC 99.6 97.1 	1903 316151 LowLimit 75 75 PA Method	Units: mg/L HighLimit 125 125 6010B: Disso	lved Met	als RPDLimit	Qual		
Client ID: Prep Date: Analyte Magnesium Potassium Sample ID Client ID: Prep Date:	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D	ID: A4 ate: 4/ PQL 1.0 1.0 1.0 ype: M3 ID: A4 ate: 4	1903 5/2017 SPK value 50.00 50.00 SD 1903 25/2017	F SPK Ref Val 25.63 8.072 Tes F	RunNo: 4 SeqNo: 1 %REC 99.6 97.1 ttCode: E RunNo: 4 SeqNo: 1	1903 316151 LowLimit 75 75 PA Method 1903 1316152	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L	lved Met	als RPDLimit 20			
Client ID: Prep Date: Analyte Magnesium Potassium Sample ID Client ID: Prep Date: Analyte Magnesium	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D Result	ID: A4 ate: 4/ PQL 1.0 1.0 ype: Ms iD: A4 ate: 4 PQL	1903 5/2017 SPK value 50.00 50.00 SD 1903 /5/2017 SPK value	F SPK Ref Val 25.63 8.072 Tes F SPK Ref Val	RunNo: 4 SeqNo: 1 %REC 99.6 97.1 1Code: E RunNo: 4 SeqNo: 1 %REC	1903 316151 LowLimit 75 75 PA Method 1903 316152 LowLimit	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L HighLimit	lved Met	als RPDLimit			
Client ID: Prep Date: Magnesium Potassium Sample ID Client ID: Prep Date: Analyte Magnesium Potassium	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D Result 76 57	ID: A4 ate: 4, PQL 1.0 1.0 ype: M ID: A4 ate: 4, PQL 1.0	1903 5/2017 SPK value 50.00 50.00 SD 1903 /5/2017 SPK value 50.00 50.00	F SPK Ref Val 25.63 8.072 Tes F SPK Ref Val 25.63 8.072	RunNo: 4 SeqNo: 1 99.6 97.1 1Code: E RunNo: 4 SeqNo: 1 %REC 101 98.2	1903 316151 LowLimit 75 75 PA Method 1903 316152 LowLimit 75 75	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L HighLimit 125	ved Met %RPD 1.17 0.937	als RPDLimit 20 20			
Client ID: Prep Date: Magnesium Potassium Sample ID Client ID: Prep Date: Analyte Magnesium Potassium	Injection Well 1704017-001DMSI Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D Result 76 57 SampT	ID: A4 ate: 4/ PQL 1.0 1.0 ype: M3 1D: A4 ate: 4 PQL 1.0 1.0	1903 5/2017 SPK value 50.00 50.00 SD 1903 1903 15/2017 SPK value 50.00 50.00 SS	F SPK Ref Val 25.63 8.072 Tes 5 SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 99.6 97.1 1Code: E RunNo: 4 SeqNo: 1 %REC 101 98.2	1903 316151 LowLimit 75 75 PA Method 1903 316152 LowLimit 75 75	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L HighLimit 125 125	ved Met %RPD 1.17 0.937	als RPDLimit 20 20			
Client ID: Prep Date: Magnesium Potassium Sample ID Client ID: Prep Date: Analyte Magnesium Potassium Sample ID	Injection Well 1704017-001DMSI Injection Well 1704017-001DMS Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D Result 76 57 SampT	ID: A4 ate: 4/ PQL 1.0 1.0 ype: M3 1D: A4 ate: 4 PQL 1.0 1.0 1.0 1.0 xype: M3 1.0 1.0	1903 5/2017 SPK value 50.00 50.00 SD 1903 /5/2017 SPK value 50.00 50.00 S	F SPK Ref Val 25.63 8.072 Tes SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 99.6 97.1 tCode: E RunNo: 4 SeqNo: 1 %REC 101 98.2 stCode: E	1903 316151 LowLimit 75 75 PA Method 1903 316152 LowLimit 75 75 75	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L HighLimit 125 125	ved Met %RPD 1.17 0.937	als RPDLimit 20 20			
Client ID: Prep Date: Analyte Magnesium Potassium Sample ID Client ID: Prep Date: Analyte Magnesium Potassium Sample ID Client ID:	Injection Well 1704017-001DMSI Injection Well 1704017-001DMS Injection Well	Batch Analysis D Result 75 57 D SampT Batch Analysis D Result 76 57 SampT Batch	ID: A4 ate: 4/ PQL 1.0 1.0 ype: M3 1D: A4 ate: 4 PQL 1.0 1.0 1.0 1.0 xype: M3 1.0 1.0	1903 5/2017 SPK value 50.00 50.00 SD 1903 5/2017 SPK value 50.00 50.00 S 1903 5/2017	F SPK Ref Val 25.63 8.072 Tes SPK Ref Val 25.63 8.072 Tes	RunNo: 4 SeqNo: 1 99.6 97.1 1Code: E RunNo: 4 5eqNo: 1 %REC 101 98.2 stCode: E RunNo: 4	1903 316151 LowLimit 75 75 PA Method 1903 316152 LowLimit 75 75 75	Units: mg/L HighLimit 125 125 6010B: Disso Units: mg/L HighLimit 125 125 6010B: Disso	ved Met %RPD 1.17 0.937	als RPDLimit 20 20			

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
- W Sample container temperature is out of limit as specified

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Client:Western Refining Southwest, Inc.Project:WDW 2 3-31-17

Sample ID	1704017-001DMSD	SampTy	/pe: MS	SD .	TestCode: EPA Method 6010B: Dissolved Metals								
Client ID:	Injection Well	Batch	ID: A4	1903	R	tunNo: 4	1903						
Prep Date:		Analysis Da	ate: 4 /	5/2017	S	eqNo: 1	316155	Units: mg/L					
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Calcium		360	5.0	250.0	102.6	102	75	125	0.0602	20			

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
- W Sample container temperature is out of limit as specified

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WO#: 1704017 17-Apr-17

Client: Western Refining Southwest, Inc.

WDW 2 3-31-17

Project:

Sample ID	MB-31057	Samp	Type: ME	BLK	TestCode: EPA 6010B: Total Recoverable Metals							
Client ID: F	PBW	Batc	h ID: 310	057	R	tunNo: 4	1903					
Prep Date:	4/4/2017	Analysis i	Date: 4/	5/2017	S	eqNo: 1	316127	Units: mg/L				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Arsenic		ND	0.020									
Barium		ND	0.020									
Cadmium		ND	0.0020									
Calcium		ND	1.0									
Chromium		ND	0.0060									
Lead		ND	0.0050									
Magnesium		ND	1.0									
Potassium		ND	1.0									
Selenium		ND	0.050									
Silver		ND	0.0050									
Sodium		ND	1.0									
Sample ID L	LCS-31057	Samp	Type: LC	S	Tes	tCode: El	PA 6010B: `	Total Recover	able Meta	als		
-	LCS-31057 LCSW		Type: LC h ID: 31 0			tCode: El RunNo: 4		Total Recover	able Meta	als		
Client ID: L			h ID: 31	057	F		1903	Total Recover Units: mg/L	able Meta	als		
Client ID: L	LCSW	Bato	h ID: 31	057 5/2017	F	RunNo: 4	1903		able Meta %RPD	als RPDLimit	Qual	
Client ID: L Prep Date: Analyte	LCSW	Bato Analysis I	h ID: 31 Date: 4 /	057 5/2017	F	RunNo: 4 SeqNo: 1	1903 316168	Units: mg/L HighLimit 120			Qual	
Client ID: L Prep Date: Analyte	LCSW	Bato Analysis I Result	h ID: 31 Date: 4 / PQL	057 5/2017 SPK value	F S SPK Ref Val	RunNo: 4 SeqNo: 1 %REC	1903 316168 LowLimit	Units: mg/L HighLimit 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic	LCSW	Bate Analysis I Result 1.0	h ID: 31 Date: 4 / PQL 0.040	057 5/2017 SPK value 1.000	F SPK Ref Val 0	RunNo: 4 SeqNo: 1 <u>%REC</u> 102	1903 316168 LowLimit 80	Units: mg/L HighLimit 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium	LCSW	Bato Analysis I Result 1.0 0.98	h ID: 31 Date: 4 <u>PQL</u> 0.040 0.040	057 5/2017 SPK value 1.000 1.000	F S SPK Ref Val 0 0	RunNo: 4 SeqNo: 1 <u>%REC</u> 102 98.2	1903 316168 LowLimit 80 80	Units: mg/L HighLimit 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium	LCSW	Bate Analysis I Result 1.0 0.98 0.98	h ID: 31 0 Date: 4 / PQL 0.040 0.040 0.0040	057 5/2017 SPK value 1.000 1.000 1.000	F S SPK Ref Val 0 0 0	RunNo: 4 SeqNo: 1 <u>%REC</u> 102 98.2 98.1	1903 316168 LowLimit 80 80 80 80 80 80	Units: mg/L HighLimit 120 120 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium Calcium Chromium	LCSW	Bato Analysis I Result 1.0 0.98 0.98 100	h ID: 310 Date: 4/ PQL 0.040 0.040 0.0040 2.0	057 5/2017 SPK value 1.000 1.000 1.000 100.0	F SPK Ref Val 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 102 98.2 98.1 103	1903 316168 LowLimit 80 80 80 80	Units: mg/L HighLimit 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium Calcium Chromium Lead	LCSW	Bate Analysis I Result 1.0 0.98 0.98 100 0.98	h ID: 310 Date: 4/ PQL 0.040 0.040 0.0040 2.0 0.012	057 5/2017 5/2017 1.000 1.000 1.000 100.0 1.000	F SPK Ref Val 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 102 98.2 98.1 103 98.2	1903 316168 LowLimit 80 80 80 80 80 80	Units: mg/L HighLimit 120 120 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium Calcium	LCSW	Bate Analysis I Result 1.0 0.98 0.98 100 0.98 0.99	h ID: 31 Date: 4 PQL 0.040 0.040 0.0040 2.0 0.012 0.010	057 5/2017 5/2017 1.000 1.000 1.000 1.000 1.000 1.000	F SPK Ref Val 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 102 98.2 98.1 103 98.2 98.9	1903 316168 LowLimit 80 80 80 80 80 80 80	Units: mg/L HighLimit 120 120 120 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium Cadmium Calcium Chromium Lead Magnesium	LCSW	Bate Analysis I Result 1.0 0.98 0.98 100 0.98 0.99 100	h ID: 31 Date: 4 PQL 0.040 0.040 0.0040 2.0 0.012 0.010 2.0	057 5/2017 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	F SPK Ref Val 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 102 98.2 98.1 103 98.2 98.9 101	1903 316168 LowLimit 80 80 80 80 80 80 80 80	Units: mg/L HighLimit 120 120 120 120 120 120 120 120			Qual	
Client ID: L Prep Date: Analyte Arsenic Barium Cadmium Calcium Chromium Lead Magnesium Potassium	LCSW	Batc Analysis I Result 1.0 0.98 0.98 100 0.98 0.99 100 98	h ID: 31 Date: 4 <u>PQL</u> 0.040 0.040 0.0040 2.0 0.012 0.010 2.0 2.0 2.0	5/2017 5/2017 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 102 98.2 98.1 103 98.2 98.9 101 97.6	1903 316168 LowLimit 80 80 80 80 80 80 80 80 80	Units: mg/L HighLimit 120 120 120 120 120 120 120 120 120			Qual	

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
- W Sample container temperature is out of limit as specified

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WO#: **1704017** *17-Apr-17*

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: WI	OW 2 3-31-17											
Sample ID mb-1	SampTy	oe: mbl	lk	Test	Code: SI	12320B: Al	kalinity					
Client ID: PBW	Batch I	D: R42	2064	R	unNo: 4 2	2064						
Prep Date:	Analysis Dat	te: 4/1	1/2017	S	eqNo: 1:	321188	Units: mg/L	CaCO3				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Total Alkalinity (as CaCO3)	ND	20.00										
Sample ID Ics-1 DOC-1 alk MR SampType: Ics TestCode: SM2320B: Alkalinity												
Client ID: LCSW Batch ID: R42064 RunNo: 42064												
Prep Date:	Analysis Da	te: 4/1	1/2017	S	SeqNo: 1	321189	Units: mg/L	. CaCO3				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Total Alkalinity (as CaCO3)	80.08	20.00	80.00	0	100	90	110					
Sample ID DOC-2 alk	MRA SampTy	pe: Ics		Tes	tCode: SI	M2320B: AI	kalinity					
Client ID: LCSW	Batch I	ID: R4 2	2064	F	RunNo: 4	2064						
Prep Date:	Analysis Da	te: 4/1	1/2017	S	SeqNo: 1	321190	Units: mg/L	CaCO3				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Total Alkalinity (as CaCO3)	80.76	20.00	80.00	0	101	90	110					
Sample ID DOC-3 alk	MRA SampTy	pe: lcs		Tes	tCode: SI	M2320B: AI	kalinity					
Client ID: LCSW	Batch	ID: R42	2064	F	RunNo: 4	2064						
Prep Date:	Analysis Da	te: 4/1	1/2017	9	SeqNo: 1	321191	Units: mg/l	, CaCO3				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Total Alkalinity (as CaCO3)	80.60	20.00	80.00	0	101	90	110					
Sample ID DOC-4 alk	MRA SampTy	pe: Ics		Tes	tCode: SI	M2320B: AI	lkalinity					
Client ID: LCSW	Batch	ID: R4;	2064	F	RunNo: 4	2064						
1	Analysis Da	ite: 4/*	11/2017	5	SeqNo: 1	321192	Units: mg/l	CaCO3				
Prep Date:	741019313 Du											
Prep Date: Analyte	Result			SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		

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
- W Sample container temperature is out of limit as specified

1704017

WO#:

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Client: Western Refining Southwest, Inc.

Project:

WDW 2 3-31-17

Sample ID MB-31115	SampType: MBLK	TestCode: SM2540C MC	DD: Total Diss	olved So	lids	
Client ID: PBW	Batch ID: 31115	RunNo: 41978				
Prep Date: 4/6/2017	Analysis Date: 4/8/2017	SeqNo: 1318207	Units: mg/L			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
otal Dissolved Solids	ND 20.0					
Total Dissolved Solids Sample ID LCS-31115	ND 20.0 SampType: LCS	TestCode: SM2540C MC	DD: Total Diss	olved So	lids	
		TestCode: SM2540C MC RunNo: 41978	DD: Total Diss	olved So	lids	
Sample ID LCS-31115 Client ID: LCSW	SampType: LCS		DD: Total Diss	olved So	lids	
Client ID: LCSW	SampType: LCS Batch ID: 31115 Analysis Date: 4/8/2017	RunNo: 41978		olved So %RPD	lids RPDLimit	Qual

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
- W Sample container temperature is out of limit as specified

WO#: 1704017 17-Apr-17

tion range

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HALL ENVIRONMENTAL ANALYSIS LABORATORY	Hall Environmental Albu Albu TEL: 505-345-3975 Website: www.hai	4901 Hawk querque, NM FAX: 505-34	ins NE 87109 5-4107	Sam	ple Log-In Cl	neck List
Client Name: Western Refining Southw	Work Order Number:	1704017			RcptNo:	1
Received By: Lindsay MangIn	4/1/2017 11:30:00 AM		Fridy	Hliqo		
Completed By: Anne Thorne	4/3/2017 12:10:08 PM		Den.	A.		
Reviewed By:	4/3/17		0,014	<i>,,,,,,,,,,,,,</i>		
Chain of Custody						
1. Custody seals intact on sample bottles?		Yes 🗌	No		Not Present 🗹	
2. Is Chain of Custody complete?		Yes 🗹	Na		Not Present	
3. How was the sample delivered?		<u>Courier</u>				
Log In					_	
4. Was an attempt made to cool the sampl	es?	Yes 🗹	No	b	NA 🗔	
5. Were all samples received at a temperat	ure of >0° C to 6.0°C	Yes 🗹	No		NA 🗆	
6. Sample(s) in proper container(s)?		Yes 🗹	N	. 🗆		
7. Sufficient sample volume for indicated te	st(s)?	Yes 🗹	No			
Are samples (except VOA and ONG) pro	perly preserved?	Yes 🗹			_	
9. Was preservative added to bottles?		Yes 🗌	No			
10.VOA vials have zero headspace?		Yes	No	,E°	<i>屮10311</i> No VOA Vials □	
11. Were any sample containers received b	oken?	Yes	N	• 🗸	# of preserved	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)		Yes 🗹	No	□	bottles checked for pH:	r 20nless noted)
13. Are matrices correctly identified on Chair		Yes 🗹	No		Adjusted?	
14. Is it clear what analyses were requested		Yes 🗹	No	D د		Α
15. Were all holding times able to be met? (If no, notify customer for authorization.)		Yes 🗹	No	, 🗆	Checked by:	AOHOSIN
Special Handling (if applicable)						
16. Was client notified of all discrepancies w	ith this order?	Yes 🗌	No	, 🗆	NA 🗹	
		0.00]
Person Notified: By Whom:	Date J Via:	eMail	Phone] Fax	In Person	
Regarding:						
Client Instructions:					<u></u>	
17. Additional remarks:	201 20 10 WW Top Force 1					
18. <u>Cooler Information</u> Cooler No Temp °C Condition	Seal Intact Seal No	Seal Date	Signed	By	1	

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Page 1 of 1

	ANALYSIS LABORATORY		4901 Hawkins NE - Albuquerque, NM 87109	Tel, 505-345-3975 Fax 505-345-4107	Analysis	(*c	PO4,50 (2MIS) (2MIS)	(1) DF (1) 2 (1) 2 (·//O/ i/////////////////////////////////	TM + XJT8 B2108 HqT TPH (Method B108 (Method B208 (Method B208 (No S17 Pestic S208 (Vo S208 (Vo S200 (See attached Vrs A									see attached list	If necessary samples submitted to Hall Environmental may be subcontracted to other accepted laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	K Standard 🗆 Rush		LI-12-2 C#MAM	Project #:	ro# 12619031-2		Kelly Robinson	Sampler: Math Krakiw	emeratives and the second second	Container Preservative Type and # Type Type	3. Sum Ry Cold -ool	1-Scont Perly Zn Acetel -001	3 UDAS HCL -001	3-1/trAnd Celd -001	1-500MLPH & HITC -001	1-05 piy HND2 -001	1-25 poly H250, -00 1			Received by: Murtulue 1 3/1/17 1200 Received by: Received by: CHOUNT 1130	ntracted to other acchedited laboratories. This serves as notice of this possi
Chain-of-Custody Record	client Western Reflining	7	Mailing Address: 50 CR4990	Bloomfield, NM B7413	Г , ^с		QA/QC Package: K Standard Level 4 (Full Validation)	Accreditation	EDD (Type)	Date Time Matrix Sample Request ID	3-3177 7:30 H20 Injection Well									Date: Time: Relinquished by: 30) 17 PLOG TATAT Fuller Date: Time: Relinquished by: 3/31/0 [800 Must Uack	If necessary (samples submitted to Hall Environmental may be subco

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WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

immediately or within a specified time period, or assess a civil penalty, or both (see Section 74-6-10 NMSA 1978). The compliance order may also include a suspension or termination of this Discharge Permit. OCD may also commence a civil action in district court for appropriate relief, including injunctive relief (see Section 74-6-10(A)(2) NMSA 1978). The Permittee may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in a renewal application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a Discharge Permit issued pursuant to a state or federal law or regulation (see Section 74-6-10.2 NMSA 1978).

2. GENERAL FACILITY OPERATIONS:

2.A. QUARTERLY MONITORING REQUIREMENTS FOR CLASS I NON-

HAZARDOUS WASTE INJECTION WELL: The Permittee shall properly conduct waste management injection operations at its facility by injecting only non-hazardous (RCRA exempt and RCRA non-hazardous, non-exempt) oil field waste fluids. Injected waste fluids shall not exhibit the RCRA characteristics, i.e., ignitability, reactivity, corrosivity, or toxicity under 40 CFR 261 Subpart "C" 261.21 – 261.24 (July 1, 1992), at the point of injection into WDW-2, based upon environmental analytical laboratory testing. Fursuant to 20.6.2.5207B, the Permittee shall provide analyses of the injected fluids at least quarterly to yield data representative of their toxicity characteristic.

The Permittee shall also analyze the injected fluids quarterly for the following characteristics:

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- pH (Method 9040); 4040C
- YOUL Billing
- Eh;
 - Specific conductance;
- Specific gravity;
- Temperature;
- Major dissolved cations and anions, including: fluoride, calcium, potassium, magnesium, sodium bicatbonate, carbonate, chloride, sulfate, bromide, total dissolved solids, and cation/anion balance using the methods specified in 40 CFR 136.3); and,
- EPA RCRA Characteristics for Ignitability (ASTM Methods); Corrosivity (SW-846) and Reactivity (determined through Permittee's application of knowledge or generating process).

The Permittee shall analyze the injected fluids quarterly for the constituents identified in the Quarterly Monitoring List (below) to demonstrate that the injected fluids do not exhibit the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure, EPA SW-846 Test Method 1311 (see Table 1, 40 CFR 261.24(b)).

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WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

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UICI-011 (WDW-2) July 20, 2016

EPA HW No.	Contaminant	SW-846 Methods	Regulatory Level (mg/L)
D004	Arsenic	1311	5.0
D005	Barium	1311	100.0
D018	Benzene	8021B	0.5
D006	Cadmium	1311	1.0
D019 ·	Carbon tetrachloride	8021B	0.5
		8260B	
D020	Chlordane	8081A	0.03
D021	Chlorobenzene	8021B	100.0
		8260B	
D022	Chloroform	8021B	6.0
·· ·		8260B	
D007	Chromium	1311	5.0
D023	o-Cresol	8270D	200.0
D024	m-Cresol	8270D	200.0
D025	p-Cresol	8270D	200.0
D026	Cresol	8270D	200.0
D027	1,4-Dichlorobenzene	8021B	7.5
2021		8121	
		8260B	
	·	8270D	
D028	1,2-Dichloroethane	8021B	0.5
		8260B	
D029	1,1-Dichloroethylene	8021B	0.7
		8260B	
D030	2,4-Dimitrotoluene	8091	0.13
		8270D	
D032	Hexachlorobenzene	8121	0.13
D033	Hexachlorobutadiene	8021B	0.5
		8121	
		8260B	
D034	Hexachlorgethane	* 8121	3.0
D008	Lead	1311	5.0
D009	Mercury	7470A.	0.2
		7471B	
D035	Methyl ethyl ketone	8015B	200.0
· · · · · · · · · · · · · · · · · · ·		8260B	
D036	Nitrobenzene	8091	2.0
+		8270D	
D037	Pentrachlorophenol	8041	100.0
D038	Pyridine	8260B	5.0
		8270D	

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WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

D010	Selenium	1311	1.0
D011	Silver	1311	5.0
D039	Tetrachloroethylene	8260B	0.7
D040	Trichloroethylene	8021B	0.5
	-	8260B	
D041	2,4,5-Trichlorophenol	8270D	400.0
D042	2,4,6-Trichlorophenol	8041A	2.0
		8270D	
D043	Vinyl chloride	8021B	0.2
	Ť	8260B	1

If o-, m-, and p-cresol concentrations cannot be differentiated, then the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

If the quantitation limit is greater than the regulatory level, then the quantitation limit becomes the regulatory level. If metals (dissolved), the EPA 1311 TCLP Laboratory Method is required with the exception of Mercury (total).

1. Monitor and Piezometer Wells: Groundwater with a total dissolved solids concentration of less than 10,000 mg/L occurs at an estimated depth of approximately 10 - 30 ft. below ground surface at the WDW-2 well (hereafter, "uppermost water-bearing unit"). Groundwater monitoring well (MW) with GW sampling capability shall be installed proximal to and hydrogeologically downgradient from WDW-2 in order to monitor the uppermost waterbearing unit. The MW shall be screened (15 ft. screen with top of screen positioned 5 ft. above water table) into the uppermost water-bearing unit. The Permittee shall propose a monitoring frequency with chemical monitoring parameters in order to detect potential groundwater contamination either associated with or not associated with WDW-2.

2.B. CONTINGENCY PLANS: The Permittee shall implement its proposed contingency plan(s) included in its application to cope with failure of a system(s) in the Discharge Permit.

2.C. CLOSURE: Prior to closure of the facility, the Permittee shall submit for OCD's approval, a closure plan including a completed form C-103 for plugging and abandonment of the waste injection well. The Permittee shall plug and abandon its well pursuant to 20.6.2.5209 NMAC and as specified in Permit Condition 2.D.

- Pre-Closure Notification: Pursuant to 20.6.2.5005A NMAC, the Permittee shall submit a pre-closure notification to OCD's Environmental Bureau at least 30 days prior to the date that it proposes to close or to discontinue operation of WDW-2. Pursuant to 20.6.2.5005B NMAC, OCD's Environmental Bureau must approve all proposed well closure activities before the Permittee may implement its proposed closure plan.
- 2. **Required Information:** The Permittee shall provide OCD's Environmental Bureau with the following information in the pre-closure notification specified in Permit Condition 2.C.1:
 - Name of facility;
 - Address of facility;
 - Name of Permittee (and owner or operator, if appropriate);

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

July 28, 2017

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX

RE: Injection Well 6-22-17

OrderNo.: 1706D18

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 2 sample(s) on 6/23/2017 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 <u>www.hallenvironmental.com</u> 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 qualifiers 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,

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Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

CLIENT:Western Refining Southwest, IProject:Injection Well 6-22-17Lab ID:1706D18-001		AQUEOUS			t e: 6/2	ection Well 2/2017 9:00:00 AM 23/2017 7:25:00 AM	
Analyses	Result	PQL (Qual	Units	DF	Date Analyzed	Batch
SPECIFIC GRAVITY						Analyst	: JRR
Specific Gravity	1.001	0			1	6/28/2017 1:27:00 PM	R43862
EPA METHOD 300.0: ANIONS						Analyst	MRA
Fluoride	ND	0.50		mg/L	5	6/23/2017 9:59:34 PM	R43753
Chloride	470	25	*	mg/L	50	7/9/2017 1:44:56 PM	R44088
Nitrogen, Nitrite (As N)	ND	0.50		mg/L	5	6/23/2017 9:59:34 PM	R43753
Bromide	2.0	0.50		mg/L	5	6/23/2017 9:59:34 PM	R43753
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	6/23/2017 9:59:34 PM	R43753
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	6/23/2017 9:59:34 PM	R43753
Sulfate	69	2.5		mg/L	5	6/23/2017 9:59:34 PM	R43753
SM2510B: SPECIFIC CONDUCTANCE						Analyst	JRR
Conductivity	2400	5.0		µmhos/cm	1	6/28/2017 5:27:10 PM	R43890
SM2320B: ALKALINITY						Analyst	: JRR
Bicarbonate (As CaCO3)	504.7	20.00		mg/L CaCO3	1	6/28/2017 5:27:10 PM	R43890
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	6/28/2017 5:27:10 PM	R43890
Total Alkalinity (as CaCO3)	504.7	20.00		mg/L CaCO3	1	6/28/2017 5:27:10 PM	R43890
SM2540C MOD: TOTAL DISSOLVED S	OLIDS					Analyst	t KS
Total Dissolved Solids	1540	40.0	*D	mg/L	1	6/27/2017 7:56:00 PM	32502
EPA METHOD 7470: MERCURY						Analyst	t: MED
Mercury	0.00024	0.00020		mg/L	1	7/12/2017 2:13:50 PM	32756
EPA METHOD 6010B: DISSOLVED ME	TALS					Analyst	t: MED
Calcium	84	1.0		mg/L	1	7/6/2017 1:15:37 PM	A44027
Magnesium	32	1.0		mg/L	1	7/6/2017 1:15:37 PM	A44027
Potassium	9.9	1.0		mg/L	1	7/6/2017 1:15:37 PM	A44027
Sodium	370	5.0		mg/L	5	7/6/2017 1:17:03 PM	A44027
EPA 6010B: TOTAL RECOVERABLE N	IETALS					Analys	t: pmf
Arsenic	ND	0.020		mg/L	1	7/10/2017 4:47:53 PM	32492
Barium	0,35	0.020		mg/L	1	7/10/2017 4:47:53 PM	32492
Cadmium	ND	0.0020		mg/L	1	7/10/2017 4:47:53 PM	32492
Calcium	110	5.0		mg/L	5	7/10/2017 4:54:20 PM	32492
Chromium	ND	0.0060		mg/L	1	7/10/2017 4:47:53 PM	32492
Lead	0.0063	0.0050		mg/L	1	7/10/2017 4:47:53 PM	32492
Magnesium	33	1.0		mg/L	1	7/10/2017 4:47:53 PM	32492
Potassium	10	1.0		mg/L	1	7/10/2017 4:47:53 PM	32492
Selenium	ND	0.050		mg/L	1	7/10/2017 6:31:07 PM	32492

Hall Environmental Analysis Laboratory, Inc.

Silver

Sodium

Qualifiers:

Lab Order 1706D18 Date Reported: 7/28/2017

Analytical Report

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

0.0050

10

ND

430

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded H

Not Detected at the Reporting Limit ND

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix S

Analyte detected in the associated Method Blank В

Value above quantitation range Е

1

10

Analyte detected below quantitation limits Page 1 of 27 J

7/10/2017 4:47:53 PM

7/10/2017 6:36:45 PM

32492

32492

Sample pH Not In Range Ρ

mg/L

mg/L

Reporting Detection Limit RL

Sample container temperature is out of limit as specified W

CLIENT: Western Refining Southwest, Inc. Client					le ID: Inj	ection Well	
Project: Injection Well 6-22-17	Collection Date: 6/22/2017 9:00:00 AM						
0 5							
Lab ID: 1706D18-001	Matrix: AQUEOUS Received D				Jate: 0/23/2017 7.23.00 Alvi		
nalyses	Result	PQL Q	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8081: PESTICIDES						Analys	t: MAB
4,4′-DDD	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
4,4'-DDE	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
4,4'-DDT	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Aldrin	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
aipha-BHC	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
beta-BHC	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Chlordane	ND	5.0		µg/L	1	7/1/2017 2:37:16 PM	32507
delta-BHC	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
Dieldrin	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
Endosulfan I	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
Endosulfan II	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Endosulfan sulfate	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
Endrin	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Endrin aldehyde	ND	0.25		µg/L	1	7/1/2017 2:37:16 PM	32507
gamma-BHC	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Heptachlor	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Heptachlor epoxide	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Methoxychlor	ND	0.25		μg/L	1	7/1/2017 2:37:16 PM	32507
Toxaphene	ND	5.0		μg/L	1	7/1/2017 2:37:16 PM	32507
Surr: Decachlorobiphenyl	66.6	36.8-113		%Rec	1	7/1/2017 2:37:16 PM	32507
Surr: Tetrachloro-m-xylene	67.3	34.7-105		%Rec	1	7/1/2017 2:37:16 PM	32507
EPA METHOD 8270C: SEMIVOLATILES						Analys	t: JDC
Acenaphthene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	32582
Acenaphthylene	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	32582
Aniline	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	32582
Anthracene	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	32582
Azobenzene	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	32582
Benz(a)anthracene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	32582
Benzo(a)pyrene	ND	10	Н	μg/L.	1	7/8/2017 8:16:53 AM	32582
Benzo(b)fluoranthene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	32582
Benzo(g,h,i)perylene	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258
Benzo(k)fluoranthene	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258
Benzoic acid	40	20	Н	µg/L	1	7/8/2017 8:16:53 AM	3258
Benzyl alcohol	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258
Bis(2-chloroethoxy)methane	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258
Bis(2-chloroethyl)ether	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258
Bis(2-chloroisopropyl)ether	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258
Bis(2-ethylhexyl)phthalate	47	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258
4-Bromophenyl phenyl ether	47 ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258

Lab Order 1706D18

Analytical Report

Qualifiers:

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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

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix S

B Analyte detected in the associated Method Blank

Е Value above quantitation range

Analyte detected below quantitation limits Page 2 of 27 J

Р Sample pH Not In Range

Reporting Detection Limit RL

Ŵ Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc. Date Reported: 7/28/20								
CLIENT: Western Refining Southwes Project: Injection Well 6-22-17		~		Collection	Date: 6/2	ection Well 22/2017 9:00:00 AM		
Lab ID: 1706D18-001	Matrix: A	AQUEOUS		Received	Date: 6/2	23/2017 7:25:00 AM		
Analyses	Result	PQL Q)ual	Units	DF	Date Analyzed	Batcl	
EPA METHOD 8270C: SEMIVOLATIL	ES					Analys	t: JDC	
Butyl benzyl phthalate	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Carbazole	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
4-Chloro-3-methylphenol	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
4-Chloroaniline	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
2-Chloronaphthalene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
2-Chlorophenol	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258	
4-Chlorophenyl phenyl ether	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Chrysene	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Di-n-butyl phthalate	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Di-n-octyl phthalate	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Dibenz(a,h)anthracene	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Dibenzofuran	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
1,2-Dichlorobenzene	ND	10	н	µg/L	1	7/8/2017 8:16:53 AM	3258	
1,3-Dichlorobenzene	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
•	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
1,4-Dichlorobenzene	ND	10	H	μg/L	1	7/8/2017 8:16:53 AM	3258	
3,3'-Dichlorobenzidine	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Diethyl phthalate	ND	10	н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Dimethyl phthalate					1	7/8/2017 8:16:53 AM	3258	
2,4-Dichlorophenol	ND	20	Н	μg/L	1	7/8/2017 8:16:53 AM	3258	
2,4-Dimethylphenol	ND	10	Н	µg/L		7/8/2017 8:16:53 AM	3258	
4,6-Dinitro-2-methylphenol	ND	20	H	µg/L	1	7/8/2017 8:16:53 AM	3258	
2,4-Dinitrophenoi	ND	20	Н	µg/L	1		3258	
2,4-Dinitrotoluene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3250	
2,6-Dinitrotoluene	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Fluoranthene	ND	10	Н	µg/L. 	1	7/8/2017 8:16:53 AM		
Fluorene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Hexachlorobenzene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Hexachlorobutadiene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Hexachlorocyclopentadiene	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Hexachloroethane	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	3258	
Indeno(1,2,3-cd)pyrene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
Isophorone	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	325	
1-Methylnaphthalene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	325	
2-Methylnaphthalene	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	325	
2-Methylphenol	ND	10	Н	μg/L	1	7/8/2017 8:16:53 AM	325	
3+4-Methylphenol	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
N-Nitrosodi-n-propylamine	ND	10	H	µg/L	1	7/8/2017 8:16:53 AM	325	
N-Nitrosodimethylamine	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	
N-Nitrosodiphenylamine	ND	10	Н	µg/L	1	7/8/2017 8:16:53 AM	3258	

Analytical Report

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

			 	_
Qualifiers:	*	Value exceeds Maximum Contaminant Level.	в	
	D	Sample Diluted Due to Matrix	Е	
	Н	Holding times for preparation or analysis exceeded	J	

- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank
- Value above quantitation range
- Analyte detected below quantitation limits Page 3 of 27
- Sample pH Not In Range Р
- RL Reporting Detection Limit

Sample container temperature is out of limit as specified W

Analytical Report Lab Order 1706D18 Date Reported: 7/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well Collection Date: 6/22/2017 9:00:00 AM Injection Well 6-22-17 **Project:** Matrix: AQUEOUS Received Date: 6/23/2017 7:25:00 AM 1706D18-001 Lab ID: PQL Qual Units **DF** Date Analyzed Batch Result Analyses Analyst: JDC EPA METHOD 8270C: SEMIVOLATILES 7/8/2017 8:16:53 AM 32582 10 Н 1 ND µg/L Naphthalene 7/8/2017 8:16:53 AM 32582 NÐ 10 Н µg/L 1 2-Nitroaniline 32582 7/8/2017 8:16:53 AM ND 10 Н µg/L 1 3-Nitroaniline 32582 7/8/2017 8:16:53 AM 1 Н μg/L 4-Nitroaniline ND 10 32582 7/8/2017 8:16:53 AM ND 10 Н μg/L 1 Nitrobenzene 7/8/2017 8:16:53 AM 32582 ND 10 н µg/L 1 2-Nitrophenol 32582 1 7/8/2017 8:16:53 AM 4-Nitrophenol ND 10 Н µg/L 32582 1 7/8/2017 8:16:53 AM ND 20 н µg/L Pentachlorophenol 32582 1 7/8/2017 8:16:53 AM ND 10 н µg/L Phenanthrene 32582 ND 10 Н µg/L 1 7/8/2017 8:16:53 AM Phenol ND 10 Н μg/L 1 7/8/2017 8:16:53 AM 32582 Pyrene 7/8/2017 8:16:53 AM 32582 10 Н 1 ND μg/L Pyridine 32582 10 µg/L 1 7/8/2017 8:16:53 AM ND Н 1,2,4-Trichlorobenzene 32582 μg/L 1 7/8/2017 8:16:53 AM ND 10 Н 2,4,5-Trichlorophenol 32582 7/8/2017 8:16:53 AM ND 10 н μg/L 1 2.4.6-Trichlorophenol 32582 29.9 15-98.1 Н %Rec 1 7/8/2017 8:16:53 AM Surr: 2-Fluorophenol %Rec 1 7/8/2017 8:16:53 AM 32582 25.4 15-80.7 Н Surr: Phenol-d5 32582 1 7/8/2017 8:16:53 AM 43.8 15-112 Н %Rec Surr: 2,4,6-Tribromophenol 7/8/2017 8:16:53 AM 32582 27.2-90.7 Н %Rec 1 47.0 Surr: Nitrobenzene-d5 7/8/2017 8:16:53 AM 32582 29.6 23.3-85.6 Н %Rec 1 Surr: 2-Fluorobiphenyl 32582 25.7 27.6-107 HS %Rec 1 7/8/2017 8:16:53 AM Surr: 4-Terphenyl-d14 Analyst: RAA EPA METHOD 8260B: VOLATILES 6/26/2017 4:15:00 PM R43806 5.0 D µg/L 5 Benzene ND 6/26/2017 4:15:00 PM R43806 5.0 D µg/L 5 Toluene ND R43806 5 6/26/2017 4:15:00 PM Ethylbenzene ND 5.0D μg/L 5 6/26/2017 4:15:00 PM R43806 ND 5.0 D μg/L Methyl tert-butyl ether (MTBE) 5 6/26/2017 4:15:00 PM R43806 ND 5,0 D μg/L 1,2,4-Trimethylbenzene R43806 1,3,5-Trimethylbenzene ND 5.0 D µg/L 5 6/26/2017 4:15:00 PM ND 5.0 D μg/L 5 6/26/2017 4:15:00 PM R43806 1,2-Dichloroethane (EDC) D 5 6/26/2017 4:15:00 PM R43806 5.0 ND μg/L 1.2-Dibromoethane (EDB) 6/26/2017 4:15:00 PM R43806 10 D µg/L 5 ND Naphthalene 6/26/2017 4:15:00 PM R43806 20 D μg/L 5 ND 1-Methylnaphthalene R43806 5 6/26/2017 4:15:00 PM D 2-Methylnaphthalene ND 20 µg/L D 5 6/26/2017 4:15:00 PM R43806 ND 50 µg/L Acetone 5 6/26/2017 4:15:00 PM R43806 ND 5.0 D µg/L Bromobenzene 6/26/2017 4:15:00 PM 5 R43806 ND 5.0 D µg/L Bromodichloromethane 5 6/26/2017 4:15:00 PM R43806 ND 5.0 D µg/L Bromoform 6/26/2017 4:15:00 PM R43806 5 ND 15 D μg/L Bromomethane R43806 6/26/2017 4:15:00 PM ND 50 D µg/L 5 2-Butanone

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

Qualifiers:

*

- Value exceeds Maximum Contaminant Level. D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
 - Analyte detected below quantitation limits Page 4 of 27 J
 - Sample pH Not In Range Р
 - Reporting Detection Limit RĹ.
 - Sample container temperature is out of limit as specified W

Hall Environmental Analys		Date Reported: 7/28/2017						
CLIENT: Western Refining Southwest, Project: Injection Well 6-22-17 Lab ID: 1706D18-001		Client Sample ID: Injection Well Collection Date: 6/22/2017 9:00:00 AM rix: AQUEOUS Received Date: 6/23/2017 7:25:00 AM						
Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch	
EPA METHOD 8260B: VOLATILES						Analyst	: RAA	
Carbon disulfide	ND	50	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
Carbon Tetrachloride	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
Chlorobenzene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
Chloroethane	ND	10	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
Chloroform	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
Chloromethane	ND	15	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
2-Chlorotoluene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
4-Chlorotoluene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
cis-1,2-DCE	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
cis-1,3-Dichloropropene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R4380	
1,2-Dibromo-3-chloropropane	ND	10	D	µg/∟ µg/L	5	6/26/2017 4:15:00 PM	R43806	
Dibromochloromethane	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R4380	
Dibromomethane	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43800	
	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43800	
1,2-Dichlorobenzene					5	6/26/2017 4:15:00 PM	R43806	
1,3-Dichlorobenzene	ND	5.0	D	µg/L	5			
1,4-Dichlorobenzene	ND	5.0	D	µg/L		6/26/2017 4:15:00 PM	R4380	
Dichlorodifluoromethane	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43800	
1,1-Dichloroethane	ND	5.0	D	µg/L "	5	6/26/2017 4:15:00 PM	R4380	
1,1-Dichloroethene	ND	5.0	D	µg/L "	5	6/26/2017 4:15:00 PM	R43806	
1,2-Dichloropropane	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
1,3-Dichloropropane	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
2,2-Dichloropropane	ND	10	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
1,1-Dichloropropene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
Hexachlorobutadiene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
2-Hexanone	ND	50	D	µg/L	5	6/26/2017 4:15:00 PM	R4380(
Isopropylbenzene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
4-Isopropyltoluene	14	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43800	
4-Methyl-2-pentanone	ND	50	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
Methylene Chloride	ND	15	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
n-Butylbenzene	ND	15	D	µg/L	5	6/26/2017 4:15:00 PM	R43806	
n-Propylbenzene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
sec-Butylbenzene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
Styrene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
tert-Butylbenzene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
1,1,1,2-Tetrachloroethane	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
1,1,2,2-Tetrachloroethane	ND	10	D	µg/L	5	6/26/2017 4:15:00 PM	R4380	
Tetrachloroethene (PCE)	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R4380	
trans-1,2-DCE	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	
trans-1,3-Dichloropropene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806	

Analytical Report

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

Qualifiers: * Value exceeds Maximum Contaminant Level. В Sample Diluted Due to Matrix Ë D H Holding times for preparation or analysis exceeded J

- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Value above quantitation range
- Analyte detected below quantitation limits Page 5 of 27
- Р Sample pH Not In Range
- Reporting Detection Limit RL

Sample container temperature is out of limit as specified W

Date Reported: 7/28/2017

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Project: Injection Well 6-22-17 Lab ID: 1706D18-001		c. Client Sample ID: Injection Well Collection Date: 6/22/2017 9:00:00 AM Received Date: 6/23/2017 7:25:00 AM							
Analyses	Result	PQL ()ual	Units	DF	Date Analyzed	Batch		
EPA METHOD 8260B: VOLATILES						Analyst	RAA		
1,2,3-Trichlorobenzene	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
1.2.4-Trichlorobenzene	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806		
1,1,1-Trichloroethane	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
1,1,2-Trichloroethane	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806		
Trichloroethene (TCE)	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
Trichlorofluoromethane	ND	5.0	D	μg/L	5	6/26/2017 4:15:00 PM	R43806		
1,2,3-Trichloropropane	ND	10	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
Vinyl chloride	ND	5.0	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
Xylenes, Total	9.6	7.5	D	µg/L	5	6/26/2017 4:15:00 PM	R43806		
Surr: 1,2-Dichloroethane-d4	93.3	70-130	D	%Rec	5	6/26/2017 4:15:00 PM	R43806		
Surr: 4-Bromofluorobenzene	97.5	70-130	D	%Rec	5	6/26/2017 4:15:00 PM	R43806		
Surr: Dibromofluoromethane	105	70-130	D	%Rec	5	6/26/2017 4:15:00 PM	R43806		
Surr: Toluene-d8	90.7	70-130	D	%Rec	5	6/26/2017 4:15:00 PM	R43806		

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	в	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 6 of 27
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analy		Lab Order 1706D18 Date Reported: 7/28/20	17			
CLIENT: Western Refining SouthwestProject:Injection Well 6-22-17Lab ID:1706D18-002		AQUEOUS	Client Samp Collection Received	Date:	p Blank 3/2017 7:25:00 AM	,
Analyses	Result	PQL Qua	l Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: RAA
Benzene	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806
Toluene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Ethylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Naphthalene	ND	2.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1-Methylnaphthalene	ND	4.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
2-Methylnaphthalene	ND	4.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Acetone	ND	10	μg/L	1	6/26/2017 5:28:00 PM	R43806
Bromobenzene	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806
Bromodichloromethane	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806
Bromoform	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Bromomethane	ND	3.0	µg/L	1	6/26/2017 5:28:00 PM	R43806
2-Butanone	ND	10	μg/L	1	6/26/2017 5:28:00 PM	R43806
Carbon disulfide	ND	10	µg/L	1	6/26/2017 5:28:00 PM	R43806
Carbon Tetrachloride	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806
Chlorobenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Chloroethane	ND	2.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Chloroform	ND	3.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
Chloromethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
2-Chiorotoluene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
4-Chlorotoluene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
cis-1,2-DCE	ND	1.0	µg/∟ µg/L	1	6/26/2017 5:28:00 PM	R43806
cis-1,3-Dichloropropene	ND	2.0	μg/L μg/L	1	6/26/2017 5:28:00 PM	R43806
1,2-Dibromo-3-chloropropane				1	6/26/2017 5:28:00 PM	R43806
Dibromochloromethane	ND	1.0 1.0	μg/L μg/L	1	6/26/2017 5:28:00 PM	R43806
Dibromomethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
1,2-Dichlorobenzene	ND			1	6/26/2017 5:28:00 PM	R43806
1,3-Dichlorobenzene	ND	1.0 1.0	μg/L ug/l	1	6/26/2017 5:28:00 PM	R43806
1,4-Dichlorobenzene	ND		μg/L μg/l	1	6/26/2017 5:28:00 PM	R43806
Dichlorodifluoromethane	ND	1.0	μg/L ug/l	1	6/26/2017 5:28:00 PM	R43806
1,1-Dichloroethane	ND	1.0	µg/L ug/l		6/26/2017 5:28:00 PM	R43806
1,1-Dichloroethene	ND	1.0	μg/L	1		R43806
1,2-Dichloropropane	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	
1,3-Dichloropropane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806
2,2-Dichloropropane	ND	2.0	µg/L	1	6/26/2017 5:28:00 PM	R43806

Analytical Report

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

*	Value exceeds Maximum Contaminant Leve	el.
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Sample Diluted Due to Matrix D

Qualifiers:

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits Page 7 of 27 J
- Ρ Sample pH Not In Range
- Reporting Detection Limit RL

Sample container temperature is out of limit as specified W

Hall Environmental Analy	Date Reported: 7/28/2017									
CLIENT: Western Refining Southwest Project: Injection Well 6-22-17 Lab ID: 1706D18-002		Client Sample ID: Trip Blank Collection Date: Matrix: AQUEOUS Received Date: 6/23/2017 7:25:00 AM								
Analyses	Result	PQL Qual	Units	DF	Date Analyzed	Batch				
EPA METHOD 8260B: VOLATILES					Analyst	RAA				
1,1-Dichloropropene	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806				
Hexachlorobutadiene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
2-Hexanone	ND	10	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Isopropylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
4-Isopropyltoluene	ND	1.0	µg/L	1	6/26/2017 5:28:00 PM	R43806				
4-Methyl-2-pentanone	ND	10	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Methylene Chloride	ND	3.0	µg/L	1	6/26/2017 5:28:00 PM	R43806				
n-Butylbenzene	ND	3.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
n-Propylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
sec-Butylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Styrene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
tert-Butylbenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
trans-1,2-DCE	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,1,1-Trichloroethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,1,2-Trichloroethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Trichloroethene (TCE)	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Trichlorofluoromethane	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
1,2,3-Trichloropropane	ND	2.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Vinyl chloride	ND	1.0	μg/L	1	6/26/2017 5:28:00 PM	R43806				
Xylenes, Total	ND	1.5	µg/L	1	6/26/2017 5:28:00 PM	R43806				
Surr: 1,2-Dichloroethane-d4	96.5	70-130	⊬9/∺ %Rec	1	6/26/2017 5:28:00 PM	R43806				
Surr: 4-Bromofluorobenzene	100	70-130	%Rec	1	6/26/2017 5:28:00 PM	R43806				
Sur: Dibromofluoromethane	108	70-130	%Rec	1	6/26/2017 5:28:00 PM	R43806				
Surr: Dibromonuorometriane Surr: Toluene-d8	89.7	70-130	%Rec	1	6/26/2017 5:28:00 PM	R43806				

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	в	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 8 of 27
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	PQL	Practical Quanitative Limit	RL	Reporting Detection Limit

% Recovery outside of range due to dilution or matrix S

Analytical Report Lab Order 1706D18

W Sample container temperature is out of limit as specified

1706D18-001G INJECTION WELL Collected defe/time: 06/22/17 09:00

SAMPLE RESULTS - 01

Wet Chemistry by Method 4500 CN E-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / time		
Reactive Cyanide	ND		0.00500	1	06/29/2017 19:47	WG994469	
Wet Chemistry by	Method 9034-	9030B					
	Result	Qualifier	RDL.	Dilution	Analysis	Batch	
Anaiyte	mg/l		mg/l		date / time	······································	
Reactive Sulfide	0.0990		0.0500	1	06/28/2017 00:00	WG993615	
Wet Chemistry by	Method 90400	2					
Analuto	Result	Qualifier	Dilution	Analysis data / time	Batch		
Analyte Corrosivity by pH	SU		Dilution	Analysis date / time 06/27/2017 15:5			
Analyte Corrosivity by pH Sample Narrative: L918788-01 WG992223: 7.	su 7.50	<u>Qualifier</u> <u>T8</u>	Dilution 1	date / time			
Corrosivity by pH Sample Narrative: L918788-01 WG992223: 7.	su 7.50 50 at 10.5c	<u>18</u>	Dilution 1	date / time			
Corrosivity by pH Sample Narrative: L918788-01 WG992223: 7.	su 7.50 50 at 10.5c	<u>18</u>	Dilution	date / time			
Corrosivity by pH Sample Narrative:	su 7.50 50 at 10.5c Method D93/10	<u>18</u> 010A	1	date / time 06/27/2017 15:5	5 <u>WG992223</u>		

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QUALITY CONTROL SUMMARY

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	Blank (MB)
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	Method
	Σ

	06/29/17 19:22
ואוברו וכח חומו וע וואוח	IMB) R3730010-1 06/79/17 19-72

	MB RDL	l/gm	0,00500
	MB Result MB Qualifier MB MDL	Arraiyte mg/l mg/l	0.0018
0123111372	MB Result	mg/l	Π
77 EL 11/27/00 I-MINDEZEN (CINI)		Analyte	Reactive Cyanide

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

			Ard Jacobi Manager and Angel and Ang
	RPD Limits	8 2	20
	LCSD Qualifier RPD	9 ⁵	active Cyanide 0.100 0.107 0.105 107 105 85-115 2 20
	LCS Qualifier		annan an ann an Anna an Anna an Anna an Anna A
	Rec. Limits	₽6	85-115
	LCSD Rec.	%	105
24	LCS Rec.	ж	107
3 06/29/17 19:24	LCSD Result	l/Gm	0.105
SD) R3230010-	spike Amount LCS Result	Ngm	0.107
6/29/17 19:23 • (LC	Spike Amoun	пд/1	0.100
(LCS) R3230010-2 06/29/17 19:23 • (LCSD) R3230010-3		Analyte	Reactive Cyanide

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ACCOUNT: Hall Environmental Analysis Laboratory

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SDG: L918788

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PROJECT:

Date/TIME: 07/05/17 13:54

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	WGJJJOIJ Wet Chemistry by Method 9034-9030B	030B		ğ	JALITY	QUALITY CONTROL SUMMARY	oL SUN ≌	IMARY			ONE LAB. NATIONWIDE.
Method Blank (MB)	(B)										
(MB) R3229272-1 06/27/17 23:58 MB Rec	(27/17 23:58 MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL							
Analyte	l/gm		l∕gm	П<u>9</u>П						:	-
Reactive Sulfide L Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)	troi Sample (LCS) • Labo	0.0065 vratory Cor	0.0500 atrol Sample	ole Duplicate	(LCSD)					
(LCS) R3229272-2 06/27/17 23:59 + (LCSD) R3229272-3 06/27/17 23:59	5/27/17 23:59 • (L(CSD) R3229272	-3 06/27/17 2	3:59		والمراجعة المراجعة والمراجعة و					ar e real a chuir an tha an
	Spike Amour	Spike Amount LCS Result LCSD Result LCS Rec.	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier RPD	RPD	RPD Limits	
Analyte	l/gm	l/gm	Шgл	₩	ж	9 ₆			88	5 ²	
Reactive Sulfide	0.500	0.512	0.507	102	a	85-115			-	20	

PROJECT:

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DATE/TIME: 07/05/17 13:54

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ACCOUNT: Hall Environmental Analysis Laboratory

Original Sample (OS) - Duplicate (DUP) • U02777 IESS - (DUP) Weese22233 062777 IESS 000004 Network Indiane United Indiane Unite	WG99223	WG992223 Wet Chemistry by Method 9040C		QUALITY	QUALITY CONTROL SUMMARY	- SUMM.	ARY		ONE LAB. NATIONWIDE.	VIDE
A DeCITY Fiss- OWERNAL FORM DUP Guiling DUP RPD LINE 0 gain Nearu DP Result Duils 1 1 1 134 133 1 0.03 1 1 1 1 2 3 1 0.03 1 1 1 1 1 2 3 3 23 1 0.03 1	0-04 OI	riginal Sample (OS) • D	Juplicate (DUP)							
a Control Sample (LCS) + Laboratory Control Sample Duplicate (LCSD) 31 06/2017 155(LCSD) Weeex223-2 06/2017) 1555 32 06/2017 1555(LCSD) Weeex223-2 06/2017) 1555 33 06/2017 1555(LCSD) Weeex223-2 06/2016) 1555 34 06/2017 1555(LCSD) Weeex223-2 06/2016) 1555 35 06/2017 1555(LCSD) Weeex223-2 06/2016) 1555 31 06/2017 1555(LCSD) Weeex223-2 06/2016) 1555 31 06/2017 1555(LCSD) Weeex223-2 06/2016) 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555 31 06/2017 1555	000-04 00 by pH	3/27/17 15:55 - (DUP) WG9922. Original Result DUP Res. su 7.34 7.35	23-3 06/27/17 15:55 Itt Dilution DUP RPD % 1 0.136	· ·	JP RPD Limits					-
Control Sample (LCS) - Laboratory Control Sample Dupitcate (LCSD) 33 062777 1555 - (LCS) Wear2222 062717 1555 - (LCS) Wear2222 062717 1555 - (LCS) Wear2222 062717 1555 - (LCS) Wear222 062717 1555 - (LCS) Wear222 062717 1555 - (LCS) Wear222 062717 1556 - (LCS) Wear222 062717 1556 - (LCS) Wear222 06271 1556 - (LCS) Wear222 062717 1556 - (LCS) Wear222 06271 1556 - (LCS) Wear222 056 - (LCS) Wear22 056 - (trative: Lat 12.1c 85 at 12.2c									
Ster. LCSD Rec. Rec. Limits LCSO Qualifier LCSD Qualifier RPD R1 2 99.2 98.4-102 0.0000 1 9.0000 1 PROJECT: S.G.E. S.G.E. S.G.E. S.G.E. S.G.E.	tory Cor	rtrol Sample (LCS) • La	iboratory Control Sc	ample Duplicat	e (LCSD)					
Define the second secon	99223-1	06/27/17 15:55 - (LCSD) WG99 Spike Amount LCS Resu	2223-2 06/27/17 15:55 It LCSD Result LCS Re					RPD Limits		
Line Accounting Accoun	by pH			99.2	<u>8</u> 98 4-102		0.000	1		
atili Environmental Analvsis Laboratory L1918788	Sample Narrative: LCS: 6.33 at 21.0c LCSD: 6.33 at 21.1c									
ACCOUNT: SDG: SDG: Lait Environmental Analysis Laboratory L918788										
	Hall Envi	ACCOUNT: ACCOUNT: ronmental Analvais Laboratory		PROJECT:		SDG: L918788		DATE/TIME: 07/05/17/13:54	•	

993569	hemistry by Method D93/1010A
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QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

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													RPD Limits	%	0
													LCSD Qualifier RPD	ж	1.00
													LCS Qualifier		
		dup RPD Limits	*	10			dup RPD Limits		10		te (LCSD)		Rec. Limits	96 96	96.0-104
		DUP Qualifier D					DUP Qualifier D	<u>8</u> <	1412. 1		Iple Duplicat		LCSD Rec.	9 ₅	0.86
Ð,	12	UP RPD	-0	0.000	<u>í</u>	12	UP RPD	.9	0.000		introl Sam	532	LCSD Result LCS Rec.	8	0.79
licate (DU	06/28/17 15:	Dilution	-	-	licate (DU	06/28/17 15:5	Dilution		1		rratory Co	-2 06/28/17	LCSD Resul	deg F	80.7
dna • (so)) R3229525-3	Original Result DUP Result Dilution DUP RPD	deg F	DNF at 170 DNF at 170	dnd • (SO)) R3229525-4	Original Result DUP Result Dilution DUP RPD	deg F	DNF at 170		LCS) • Labo	SD) R3229525	Spike Amount LCS Result	deg F	79.7
ginal Sample	28/17 15:32 • (DUP	Original Resu	deg F	DNF at 170	jinel Sample	28/17 15:32 • (DUF	Original Resu	deg F	DNF at 170		trol Sample (V28/17 15:32 • (LC	Spike Amoun	deg F	82.0
L918834-03 Original Sample (OS) • Duplicate (DUP)	(OS) L918834-03 06/28/17 15:32 • (DUP) R3229525-3 06/28/17 15:32		Analyte	Flashpoint	L918834-07 Original Sample (OS) • Duplicate (DUP)	(OS) L918834-07 06/28/17 15:32 • (DUP) R3229525-4 06/28/17 15:32		Analyte	Flashpoint		Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)	(LCS) R3229525-1 06/28/17 15:32 • (LCSD) R3229525-2 06/28/17 15:32		Analyte	Flashpoint

Hall Environmental Analysis Laboratory ACCOUNT:

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. SDG: L918788

PROJECT:

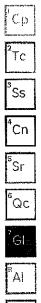
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GLOSSARY OF TERMS

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Rec.	Recovery.

Qualifier	Description
Т8	Sample(s) received past/too close to holding time expiration.



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Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

Sample ID MB	SampT	'ype: mb	lk	Tes	tCode: El	PA Method	300.0: Anions			
Client ID: PBW	Batch	a ID: R4	3753	R	tunNo: 4	3753				
Prep Date:	Analysis D)ate: 6 /2	23/2017	S	SeqNo: 1	379275	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50	- 10 110							
Sample ID LCS	SampT	ype: Ics	;	Tes	tCode: E	PA Method	300.0: Anions	1		
Client ID: LCSW	Batch	h ID: R4	3753	F	RunNo: 4	3753				
Prep Date:	Analysis D	Date: 6/	23/2017	S	SeqNo: 1	379276	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai
Fluoride	0.54	0.10	0.5000	0	109	90	110			
Nitrogen, Nitrite (As N)	0.98	0.10	1.000	0	97.5	90	110			
Bromide	2.5	0.10	2.500	0	99.1	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	102	90	110			
Phosphorus, Orthophosphate (As P	5.0	0.50	5.000	0	99.1	90	110			
Sulfate	9.8	0.50	10.00	0	98.2	90	110			
Sample ID MB	Samp	Fype: mi	olk	TestCode: EPA Method 300.0: Anions						
Client ID: PBW	Batc	h ID: R4	4088	RunNo: 44088						
Prep Date:	Analysis [Date: 7/	9/2017	S	391240	Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sample ID LCS	Samp	Type: I c s	3	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: LCSW	Batc	h ID: R4	4088	F	RunNo: 4	4088				
Prep Date:	Analysis [Date: 7	9/2017	5	SeqNo: 1	391241	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94,9	90	110			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1706D18

WO#:

Page 9 of 27

Client: Western Refining Southwest, Inc.

Injection Well 6-22-17 **Project:**

Sample ID LCS-32507	SampT	ype: LC	S	Test	Code: El	PA Method	8081: PESTI	CIDES		
Client ID: LCSW	Batch	1 ID: 32	507	R	unNo: 4	3950				
Prep Date: 6/27/2017	Analysis D	ate: 7/	1/2017	S	eqNo: 1	385335	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai
1,4'-DDD	0.41	0.050	0.5000	0	81.2	45.7	118			
1,4'-DDE	0.40	0.050	0.5000	0	79.2	44.2	117			
I,4'-DDT	0.46	0.050	0.5000	0	92.6	44.5	115			
Idrin	0.35	0.050	0.5000	0	69.2	27	124			
lpha-BHC	0.48	0.050	0.5000	0	96.8	19.7	132			
beta-BHC	0.43	0.050	0.5000	0	85.6	20.9	146			
leita-BHC	0.44	0.050	0.5000	0	87.0	27.4	132			
Dieldrin	0.46	0.050	0.5000	0	91.6	44	118			
Endosulfan I	0.40	0.050	0.5000	0	80.8	34.4	116			
Endosulfan II	0.42	0.050	0.5000	0	83.8	38.4	114			
Endosulfan sulfate	0.44	0.050	0.5000	0	87.0	29.3	127			
Endrin	0.46	0.050	0.5000	0	93.0	40.5	120			
Endrin aldehyde	0.45	0.050	0.5000	0	90.0	22.9	129			
jamma-BHC	0,48	0.050	0.5000	0	95.4	24.4	132			
Heptachlor	0.39	0.050	0.5000	0	78.8	31.7	125			
leptachlor epoxide	0,45	0.050	0.5000	0	89.2	36.6	121			
Methoxychlor	0.49	0.050	0.5000	0	97.6	42.3	129			
Surr: Decachlorobiphenyl	2.4		2,500		95.1	36.8	113			
Surr: Tetrachloro-m-xylene	·····+····/·				82.2	34.7	105			
Sample ID LCSD-32507	Samp	Type: LC	SD	TestCode: EPA Method 8081: PESTICIDES						
Client ID: LCSS02	Batc	h ID: 32	507	RunNo: 43950						
Prep Date: 6/27/2017	Analysis I	Date: 7/	1/2017	. 8	SeqNo: 1	385336	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4'-DDD	0.35	0.050	0.5000	0	69.4	45.7	118	15.7	29.2	
1,4'-DDE	0.36	0.050	0.5000	0	72.2	44.2	117	9.25	29.2	
4,4'-DDT	0.38	0.050	0.5000	0	75.6	44.5	115	20.2	32.9	
Aldrin	0.32	0.050	0.5000	0	63.6	27	124	8.43	31.2	
alpha-BHC	0.41	0.050	0.5000	0	82.6	19.7	132	15.8	36	
beta-BHC	0.33	0.050	0.5000	0	66.8	20.9	146	24.7	27.7	
delta-BHC	0.36	0.050	0.5000	0	71.0	27.4	132	20.3	34.3	
Dieldrin	0.37	0.050	0.5000	0	74.6	44	118	20.5	30.5	
Tude sulfers I	0.34	0.050	0.5000	0	68.8	34.4	116	16.0	29.5	
Endosunan i	0.35	0.050	0.5000	0	70.8	38.4	114	16.8	29.8	
			0 5000	0	69.0	29.3	127	23.1	31.2	
Endosulfan II	0.34	0.050	0.5000	0						
Endosulfan I Endosulfan II Endosulfan sulfate Endrin		0.050 0.050	0.5000	0	78,6	40.5	120	16.8	30.6	
Endosulfan II Endosulfan sulfate	0.34						120 129	16.8 23.3	30.6 28.6 33.9	

Qualifiers:

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank в
- Е Value above quantitation range
- Analyte detected below quantitation limits J

Sample pH Not In Range Reporting Detection Limit RĹ

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Sample container temperature is out of limit as specified W

1706D18

WO#:

28-Jul-17

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

Sample ID LCSD-32507	SampT	ype: LC	SD	Tes	tCode: El	PA Method	8081: PESTI	CIDES		
Client ID: LCSS02	Batch	n ID: 32	507	F	RunNo: 4	3950				
Prep Date: 6/27/2017	Analysis D)ate: 7/	1/2017	5	SeqNo: 1	385336	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Heptachlor	0.35	0.050	0.5000	0	70.4	31.7	125	11.3	32.7	
Heptachlor epoxide	0.38	0.050	0.5000	0	75.8	36.6	121	16,2	30.5	
Methoxychlor	0.38	0.050	0.5000	0	75.8	42.3	129	25.1	28.9	
Surr: Decachlorobiphenyl	2.0		2.500		78.3	36.8	113	0	20	
Surr: Tetrachloro-m-xylene	1.8		2.500		71.3	34.7	105	0	20	
Sample ID MB-32507	SampT	ype: ME	BLK	Tes	tCode: E	PA Method	8081: PESTI	CIDES		
Client ID: PBW	Batcl	h ID: 32	507	F	RunNo: 4	3950				
Prep Date: 6/27/2017	Analysis D	Date: 7/	1/2017	8	SeqNo: 1	385337	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4,4'-DDD	ND	0.050								
4,4'-DDE	ND	0.050								
4,4′-DDT	ND	0.050								
Aldrin	ND	0.050								
alpha-BHC	ND	0.050								
beta-BHC	ND	0.050								
Chlordane	ND	1.0								
delta-BHC	ND	0.050								
Dieldrin	ND	0.050								
Endosulfan I	ND	0.050								
Endosulfan II	ND	0.050								
Endosulfan sulfate	ND	0.050								
Endrin	ND	0.050								
Endrin aldehyde	ND	0.050								
gamma-BHC	ND	0.050								
Heptachlor	ND	0.050								
Heptachlor epoxide	ND	0.050								
Methoxychlor	ND	0.050								
Toxaphene	ND	1.0								
Surr: Decachlorobiphenyl	2.0		2.500		81.8	36.8	113			
Surr: Tetrachloro-m-xylene	2.0		2.500		78.0	34.7	105			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1706D18

WO#:

Page 11 of 27

Client:

Western Refining Southwest, Inc.

Injection Well 6-22-17 **Project:**

Sample ID 100ng Ics	SampT	ype: LC	S4	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: BatchQC	Batch	n ID: R4	3806	F	RunNo: 4	3806				
Prep Date:	Analysis D)ate: 6/	26/2017	5	SeqNo: 1	380054	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	109	70	130			
Toluene	20	1.0	20.00	0	101	70	130			
Ethylbenzene	20	1.0	20.00	0	102	70	130			
Methyl tert-butyl ether (MTBE)	41	1.0	40.00	0	104	70	130			
1,2,4-Trimethylbenzene	18	1.0	20.00	0	90.7	70	130			
1,3,5-Trimethylbenzene	18	1.0	20.00	0	88.7	70	130			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	103	62.2	143			
1,2-Dibromoethane (EDB)	19	1.0	20.00	0	97.5	70	130			
Naphthalene	16	2.0	20.00	0	80.6	70	130			
1-Methylnaphthalene	16	4.0	20.00	0	82.5	60	140			
2-Methylnaphthalene	12	4.0	20.00	0	62.2	60	140			
Acetone	42	10	40.00	0	105	60	140			
Bromobenzene	18	1.0	20.00	0	92.2	70	130			
Bromodichloromethane	22	1.0	20.00	0	111	70	130			
Bromoform	20	1.0	20.00	0	100	70	130			
Bromomethane	22	3.0	20.00	0	110	60	140			
2-Butanone	49	10	40.00	0	123	60	140			
Carbon disulfide	41	10	40.00	0	103	60	140			
Carbon Tetrachloride	22	1.0	20.00	0	110	70	130			
Chlorobenzene	21	1.0	20.00	0	104	70	130			
Chloroethane	21	2.0	20.00	0	106	60	140			
Chloroform	22	1.0	20.00	0	111	70	130			
Chloromethane	18	3.0	20.00	0	91.8	60	140			
2-Chlorotoluene	18	1.0	20.00	0	89.2	70	130			
4-Chlorotoluene	18	1.0	20.00	0	89.1	70	130			
cis-1,2-DCE	23	1.0	20.00	0	113	70	130			
cis-1,3-Dichloropropene	20	1.0	20.00	0	98.2	70	130			
1,2-Dibromo-3-chloropropane	17	2.0	20.00	0	87.1	70	130			
Dibromochloromethane	19	1.0	20.00	0	94.8	70	130			
Dibromomethane	22	1.0	20.00	0	109	70	130			
1.2-Dichlorobenzene	18	1.0	20.00	0	89.2	70	130			
1,3-Dichlorobenzene	18	1.0	20.00	0	91.3	70	130			
1,4-Dichlorobenzene	18	1.0	20.00	0	91.2	67.2	141			
Dichlorodifluoromethane	19	1.0	20.00	0	96.2	60	140			
1,1-Dichloroethane	21	1.0	20.00	0	105	52.6	157			
1,1-Dichloroethene	21	1.0	20.00	0	106	70	130			
1,2-Dichloropropane	21	1.0	20.00	0	105	63.7	138			
, , ,	19	1.0	20.00	0	96.4	70	130			
1,3-Dichloropropane										
2,2-Dichloropropane	22	2.0	20.00	0	109	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

- Holding times for preparation or analysis exceeded H
- Not Detected at the Reporting Limit ND

PQL Practical Quanitative Limit

- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В

Е Value above quantitation range

J Analyte detected below quantitation limits

Р Sample pH Not In Range

RL Reporting Detection Limit

Sample container temperature is out of limit as specified W

1706D18

WO#:

28-Jul-17

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Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

Sample ID 100ng Ics	SampT	ype: LC	S4	Tes	tCode: El	PA Method	8260B: VOLA	TILES		
Client ID: BatchQC	Batch	ID: R4	3806	R	tunNo: 4	3806				
Prep Date:	Analysis D	ate: 6/	26/2017	5	SeqNo: 1	380054	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	21	1.0	20.00	0	107	70	130			
Hexachlorobutadiene	16	1.0	20.00	0	78.2	70	130			
2-Hexanone	37	10	40.00	0	91.6	60	140			
lsopropylbenzene	20	1.0	20.00	0	101	70	130			
4-isopropyltoluene	18	1.0	20.00	0	91.3	70	130			
4-Methyl-2-pentanone	40	10	40.00	0	100	60	140			
Methylene Chloride	22	3.0	20.00	0	108	70	130			
n-Butylbenzene	17	3.0	20.00	0	84.0	70	130			
n-Propylbenzene	18	1.0	20.00	0	88.3	70	130			
sec-Butylbenzene	17	1.0	20.00	0	86.6	70	130			
Styrene	20	1.0	20.00	0	101	70	130			
tert-Butylbenzene	18	1.0	20.00	0	89.2	70	130			
1,1,1,2-Tetrachloroethane	20	1.0	20.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	18	2.0	20.00	0	91.4	65.9	133			
Tetrachloroethene (PCE)	21	1.0	20.00	0	106	70	130			
trans-1,2-DCE	22	1.0	20.00	0	108	70	130			
trans-1,3-Dichloropropene	18	1.0	20.00	0	88.4	70	130			
1,2,3-Trichlorobenzene	16	1.0	20.00	0	82.3	70	130			
1,2,4-Trichlorobenzene	16	1.0	20.00	0	80.9	70	130			
1,1,1-Trichloroethane	22	1.0	20.00	0	109	70	130			
1,1,2-Trichloroethane	19	1.0	20.00	0	96,8	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	106	70	130			
Trichlorofluoromethane	21	1.0	20.00	0	107	70	130			
1,2,3-Trichloropropane	18	2.0	20.00	0	92.1	69.7	129			
Vinyl chloride	20	1.0	20.00	0	100	70	130			
Xylenes, Total	60	1.5	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	8.6		10.00		85.5	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	10		10.00		103	70	130			
Surr: Toluene-d8	9.6		10.00		96.0	70	130			
Sample ID RB	Samp	ype: M	BLK	Tes	stCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batc	h ID: R4	43806	I	RunNo: 4	13806				
Prep Date:	Analysis [Date: 6	/26/2017	:	SeqNo: 1	1380057	Units: µg/L			
Anaiyte	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								

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

PQL Practical Quanitative Limit

- 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
- W Sample container temperature is out of limit as specified

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WO#: 1706D18 28-Jul-17

Western Refining Southwest, Inc. **Client:**

Project: Injection Well 6-22-17

Sample ID RB	SampT	ype: MBLK	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	n ID: R43806	귀	RunNo: 4	3806				
Prep Date:	Analysis D	ate: 6/26/2017	S	SeqNo: 1	380057	Units: µg/L			
Analyte	Result	PQL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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							
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							
. , .	ND	2.0							
2,2-Dichloropropane	ND	1.0							
1,1-Dichloropropene	ND	1.0							
Hexachlorobutadiene	ND	1.0							

Qualifiers:

2-Hexanone

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

Holding times for preparation or analysis exceeded Η

10

ND

- ND Not Detected at the Reporting Limit
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- B Analyte detected in the associated Method Blank
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Р Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

Sample ID RB	SampType: MBLK TestCode: EPA Method 8260B: VOLATILES									
Client ID: PBW	Batch	1D: R4	3806	F	unNo: 4	3806				
Prep Date:	Analysis D			ç	eqNo: 1	380057	Units: µg/L			
Fieb Date.	Analysis L									
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sopropylbenzene	ND	1.0								
4-lsopropyltoluene	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	9.2		10.00		92.3	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	11		10.00		107	70	130			
Surr: Toluene-d8	9.2		10.00		92.0	70	130			

Sample ID 1706d18-001ams	s SampT	уре: М	3	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: Injection Well	Batci	n ID: R4	3806	F	RunNo: 4	3806				
Prep Date:	Analysis D	Date: 6/	26/2017	9	SeqNo: 1	380063	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	120	5.0	100.0	0	120	70	130			
Toluene	100	5.0	100.0	0.4700	102	70	130			
Chlorobenzene	110	5.0	100.0	0	106	70	130			
1,1-Dichloroethene	130	5.0	100.0	0	127	70	130			
Trichloroethene (TCE)	120	5.0	100.0	0	118	70	130			
Surr: 1,2-Dichloroethane-d4	47		50.00		95.0	70	130			

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

PQL Practical Quanitative Limit

- 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
- W Sample container temperature is out of limit as specified

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WO#: 1706D18 28-Jul-17

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

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Sample ID 1706d18-001ams	SampTy	pe: MS	3	Test	Code: El	PA Method	8260B: VOL	ATILES		
Client ID: Injection Well	Batch	ID: R4	3806	R	tunNo: 4	3806				
Prep Date:	Analysis Da	ate: 6/	26/2017	S	eqNo: 1	380063	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	50		50.00		99.0	70	130			
Surr: Dibromofluoromethane	53		50.00		105	70	130			
Surr: Toluene-d8	46		50.00		91.6	70	130			
Sample ID 1706d18-001amsc	I SampTy	/pe: M \$	SD	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: Injection Well	Batch	ID: R4	3806	F	RunNo: 4	3806				
Dana Data										
Prep Date:	Analysis Da	ate: 6/	26/2017		SeqNo: 1	380064	Units: µg/L			
Analyte	Analysis Da Result	ate: 6/ PQL		SPK Ref Val	SeqNo: 1 %REC	380064 LowLimit	Units: µg/L HighLimit	%RPD	RPDLimit	Qual
Analyte					•			%RPD 0.759	RPDLimit 20	Qual
Analyte Benzene	Result	PQL	SPK value	SPK Ref Val	· %REC	LowLimit	HighLimit			Qual
Analyte Benzene Toluene	Result 120	PQL 5.0	SPK value 100.0	SPK Ref Val 0	%REC 119	LowLimit 70	HighLimit 130	0.759	20	Qual
Analyte Benzene Toluene Chlorobenzene	Result 120 100	PQL 5.0 5.0	SPK value 100.0 100.0	SPK Ref Val 0 0.4700	- %REC 119 100	LowLimit 70 70	HighLimit 130 130	0.759 2.30	20 20	Qual
Analyte Benzene Toluene Chlorobenzene 1,1-Dichloroethene	Result 120 100 100	PQL 5.0 5.0 5.0	SPK value 100.0 100.0 100.0 100.0	SPK Ref Val 0 0.4700 0	%REC 119 100 103	LowLimit 70 70 70	HighLimit 130 130 130	0.759 2.30 2.73	20 20 20	Qual
Analyte Benzene Toluene Chlorobenzene 1,1-Dichloroethene Trichloroethene (TCE)	Result 120 100 100 120	PQL 5.0 5.0 5.0 5.0	SPK value 100.0 100.0 100.0 100.0	SPK Ref Val 0 0.4700 0 0	%REC 119 100 103 124	LowLimit 70 70 70 70	HighLimit 130 130 130 130	0.759 2.30 2.73 2.49	20 20 20 20	Qual
Analyte Benzene Toluene Chlorobenzene 1,1-Dichloroethene Trichloroethene (TCE) Surr: 1,2-Dichloroethane-d4	Result 120 100 100 120 120	PQL 5.0 5.0 5.0 5.0	SPK value 100.0 100.0 100.0 100.0 100.0	SPK Ref Val 0 0.4700 0 0	%REC 119 100 103 124 117	LowLimit 70 70 70 70 70 70	HighLimit 130 130 130 130 130	0.759 2.30 2.73 2.49 1.02	20 20 20 20 20	Qual
Analyte Benzene Toluene Chlorobenzene 1,1-Dichloroethene Trichloroethene (TCE)	Result 120 100 100 120 120 48	PQL 5.0 5.0 5.0 5.0	SPK value 100.0 100.0 100.0 100.0 100.0 50.00	SPK Ref Val 0 0.4700 0 0	%REC 119 100 103 124 117 95.1	LowLimit 70 70 70 70 70 70 70	HighLimit 130 130 130 130 130 130	0.759 2.30 2.73 2.49 1.02 0	20 20 20 20 20 20 0	Qual

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

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WO#: 1706D18

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Injection Well 6-22-17 **Project:**

Sample ID mb-32582	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8270C: Semiv	/olatiles		
Client ID: PBW	Batch	ID: 32	582	F	lunNo: 4	4069				
Prep Date: 6/30/2017	Analysis D	ate: 7/	7/2017	5	GeqNo: 1	390263	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	• ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								

Qualifiers:

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Р Sample pH Not In Range
- Reporting Detection Limit RL
- W Sample container temperature is out of limit as specified

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28-Jul-17

WO#: 1706D18

Western Refining Southwest, Inc. **Client:**

Injection Well 6-22-17 **Project:**

Project: Injectio	on Well 6-22-	± 1								
Sample ID mb-32582	SampTy	pe: MBL	.к				8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 325	32	F	tunNo: 44	4069				
Prep Date: 6/30/2017	Analysis Da	ate: 7/7	2017	S	eqNo: 1	390263	Units: µg/L			
Analyte	Result		SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachiorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2-Fluorophenol	110	10	200.0)	53.8	15	98.1			
	88		200.0		43.9	15				
Surr: Phenol-d5	140		200.0		67.6	15				
Surr: 2,4,6-Tribromophenol	80		100.0		80.0	27.2				
Surr: Nitrobenzene-d5	67		100.0		67.3	23.3				
Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14	67 67		100.0		67.3	27.6				

Qualifiers:

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

- Holding times for preparation or analysis exceeded H
- Not Detected at the Reporting Limit ND
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Р Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

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Sample ID Ics-32582	SampType: LCS TestCode: EPA Method 8270C: Semivolatiles									
Client ID: LCSW	Batch	1D: 32	582	F	tunNo: 4	4069				
Prep Date: 6/30/2017	Analysis D	ate: 7/	7/2017	5	SeqNo: 1	390265	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	60	10	100.0	0	60.4	41.2	98.9			
4-Chloro-3-methylphenol	140	10	200.0	0	68.3	29.1	111			
2-Chlorophenol	120	10	200.0	0	57.7	23.3	108			
1,4-Dichlorobenzene	38	10	100.0	0	38.3	29.4	84.5			
2,4-Dinitrotoluene	57	10	100.0	0	57.4	36.6	88.7			
N-Nitrosodi-n-propylamine	70	10	100.0	0	69.5	46.9	106			
4-Nitrophenol	86	10	200.0	0	43.1	15	74.7			
Pentachlorophenol	120	20	200.0	0	62.0	28.1	85.4			
Phenol	77	10	200.0	0	38.7	15	78.2			
Pyrene	85	10	100.0	0	84.8	44.4	96.8			
1,2,4-Trichlorobenzene	48	10	100.0	0	48.1	34.3	89			
Surr: 2-Fluorophenol	92		200.0		45.9	15	98.1			
Surr: Phenol-d5	81		200.0		40.5	15	80.7			
Surr: 2,4,6-Tribromophenol	140		200.0		71.5	15	112			
Surr: Nitrobenzene-d5	72		100.0		71.8	27.2	90.7			
Surr: 2-Fluorobiphenyl	65		100.0		64.7	23.3	85.6			
Surr: 4-Terphenyl-d14	67		100.0		67.1	27.6	107			

Sample ID Icsd-32582	SampT	ype: LC	SD	Tes	tCode: E	PA Method	8270C: Semiv	olatiles		
Client ID: LCSS02	Batch	n ID: 32	582	F	RunNo: 4	4069				
Prep Date: 6/30/2017	Analysis D	ate: 7/	7/2017	8	SeqNo: 1	390267	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	64	10	100.0	0	64.3	41.2	98.9	6.16	37.4	
4-Chloro-3-methyiphenol	130	10	200.0	0	66.8	29.1	111	2.18	26.8	
2-Chlorophenol	130	10	200.0	0	64.8	23.3	108	11.6	30.3	
1,4-Dichlorobenzene	42	10	100.0	0	42.1	29.4	84.5	9,46	32	
2.4-Dinitrotoluene	59	10	100.0	0	58.9	36.6	88.7	2,61	36.7	
N-Nitrosodi-n-propylamine	76	10	100.0	0	75.7	46.9	106	8.51	29.9	
4-Nitrophenol	88	10	200.0	0	43.8	15	74.7	1.59	28,8	
Pentachlorophenol	130	20	200.0	0	64.5	28.1	85.4	3.97	38.2	
Phenol	85	10	200.0	0	42.3	15	78.2	8.79	39.8	
Pyrene	89	10	100.0	0	88.7	44.4	96.8	4.47	28.3	
1,2,4-Trichlorobenzene	52	10	100.0	0	51.8	34.3	89	7.44	39.8	
Surr: 2-Fluorophenol	100		200.0		51.6	15	98.1	0	0	
Surr: Phenol-d5	88		200.0		44.1	15	80.7	0	0	
Surr: 2,4,6-Tribromophenol	150		200.0		76.0	15	112	0	0	
Surr. Nitrobenzene-d5	77		100.0		77.5	27.2	90.7	0	0	
Surr: 2-Fluorobiphenyl	69		100.0		69.3	23.3	85.6	0	0	

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
- PQL Practical Quanitative Limit
- 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
 - Sample pH Not In Range
- RL Reporting Detection Limit

Р

W Sample container temperature is out of limit as specified

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WO#: **1706D18** 28-Jul-17

Client: Western Refining Southwest, Inc.

Project: Injection Well 6-22-17

Sample ID Icsd-32582	SampT	ype: LC	SD	Tes	Code: El	PA Method	8270C: Semi	volatiles		
Client ID: LCSS02	Batcl	וD: 32	582	ਜ	tunNo: 4	4069				
Prep Date: 6/30/2017	Analysis D	ate: 7	/7/2017	5	eqNo: 1	390267	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	68		100.0		68.0	27.6	107	0	0	

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1706D18 28-Jul-17

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WO#:

Client: Western Refining Southwest, Inc.

Project:

Injection Well 6-22-17

Sample ID MB-32756	SampType: MBLK	TestCode: EPA Method	17470: Mercury	1		
Client ID: PBW	Batch ID: 32756	RunNo: 44172				
Prep Date: 7/12/2017	Analysis Date: 7/12/2017	SeqNo: 1394132	Units: mg/L			
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND 0.00020					
Mercury Sample ID LCS-32756	ND 0.00020 SampType: LCS	TestCode: EPA Method	1 7470: Mercur			
•		TestCode: EPA Method RunNo: 44172	l 7470: Mercur			
Sample ID LCS-32756	SampType: LCS		1 7470: Mercur Units: mg/L	/		
Sample ID LCS-32756 Client ID: LCSW	SampType: LCS Batch ID: 32756 Analysis Date: 7/12/2017	RunNo: 44172	Units: mg/L	% RPD	RPDLimit	Qual

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
- PQL Practical Quanitative Limit
- 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
 - Sample pH Not In Range
- RL Reporting Detection Limit

Ρ

W Sample container temperature is out of limit as specified

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WO#: 1706D18 28-Jul-17

Hall Environmental Analysis Laboratory, Inc.

Client: Project:		Western Refining S Injection Well 6-2		st, Inc.							
Sample ID	LCS-A	Samp	Type: LC	s	Tes	tCode: El	PA Method	6010B: Disso	lved Meta	als	
Client ID:	LCSW	Bato	h ID: A4	4027	F	lunNo: 4	4027				
Prep Date:		Analysis	Date: 7/	6/2017	S	SeqNo: 1	388397	Units: mg/L			
Analyte		Resuit	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		49	1.0	50.00	0	99.0	80	120			
Chromium		0.49	0.0060	0.5000	0	97.1	80	120			
Magnesium		49	1.0	50.00	0	98.1	80	120			
Potassium		48	1.0	50.00	0	95.5	80	120			
Sodium		48	1.0	50.00	0	96.2	80	120			
Sample ID	MB-A	Samp	Туре: М	BLK	Tes	tCode: E	PA Method	6010B: Disso	lved Met	als	
Client ID:	PBW	Bate	ch ID: A4	4027	F	RunNo: 4	4027				
Prep Date:		Analysis	Date: 7/	6/2017	8	SeqNo: 1	388401	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		ND	1.0								
Chromium		ND	0.0060								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Sodium		ND	1.0								

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- D Sample Diluted Due to Matrix
- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- В Analyte detected in the associated Method Blank
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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Western Refining Southwest, Inc. **Client:**

Injection Well 6-22-17 **Project:**

Sample ID M	B-32492	Samp	Гуре: МВ	LK	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID: P	BW	Batc	h ID: 324	192	R	unNo: 4	4102				
Prep Date:	6/26/2017	Analysis [Date: 7/	10/2017	S	eqNo: 1	391517	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		ND	0.020								
Barium		ND	0.020								
Cadmium		ND	0.0020								
Calcium		ND	1.0								
Chromium		ND	0.0060								
Lead		ND	0.0050								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Silver		ND	0.0050								
Sodium		ND	1.0								
Sample ID L	CS-32492	Samp	Type: LC	s	Tes	tCode: El	PA 6010B:	Total Recover	rable Meta	als	
Client ID: L	CSW	Bato	Batch ID: 32492 RunNo: 44								
Prep Date:	6/26/2017	Analysis I	Date: 7/	10/2017	5	SeqNo: 1	391518	Units: mg/L			
Analyte		Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.51	0.020	0.5000	0	103	80	120			
Barium		0.49	0,020	0.5000	0	98.7	80	120			
Cadmium		0.49	0.0020	0.5000	0	99.0	80	120			
Calcium		51	1.0	50.00	0	102	80	120			
Chromium		0.50	0.0060	0.5000	0	99.0	80	120			
Lead		0.50	0.0050	0.5000	0	100	80	120			
Magnesium		52	1.0	50.00	0	103	80	120			
Potassium		50	1.0	50.00	0	100	80	120			
Silver		0.10	0.0050	0.1000	0	102	80	120			
Sodium		51	1.0	50.00	0	101	80	120	· · · · ·		
Sample ID 1	706D18-001FMS	Samp	Туре: М	3	Tes	tCode: E	PA 6010B:	Total Recove	rable Met	als	
Client ID: In	njection Well	Bate	h ID: 32	492	F	RunNo: 4	4102				
Prep Date:	6/26/2017	Analysis	Date: 7/	10/2017	8	SeqNo: 1	391522	Units: mg/L			
Analyte		Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.52	0.020	0.5000	0	104	75	125			
Barium		0.83	0.020	0.5000	0.3505	96.4	75	125			
Cadmium		0.50	0.0020	0.5000	0	99.2	75	125			
Chromium		0.50	0.0060	0.5000	0	99.4	75	125			
Lead		0.49	0.0050	0.5000	0.006270	97.5	75	125			
Magnesium		85	1.0	50.00	33.32	103	75	125			
Potassium		61	1.0	50.00	10.28	102	75	125			
		0.10	0.0050	0.1000	0	105	75	125			

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

Holding times for preparation or analysis exceeded Н

Not Detected at the Reporting Limit ND

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix S

Analyte detected in the associated Method Blank В

Value above quantitation range Е

Analyte detected below quantitation limits J

Sample pH Not In Range

RL Reporting Detection Limit

Ρ

Sample container temperature is out of limit as specified W

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Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Injection Well 6-22-17 **Project:**

Sample ID	1706D18-001FMS) SampT	ype: MS	D	TestCode: EPA 6010B: Total Recoverable Metals						
Client ID:	Injection Well	Batcl	h ID: 324	192	RunNo: 44102						
Prep Date:	-	Analysis E	Date: 7/	10/2017	S	eqNo: 13	391523	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.51	0.020	0.5000	0	102	75	125	1.61	20	
Barium		0.83	0.020	0.5000	0.3505	95.9	75	125	0.308	20	
Cadmium		0.49	0.0020	0.5000	0	98.8	75	125	0.374	20	
Chromium		0.50	0.0060	0.5000	0	99.2	75	125	0.203	20	
Lead		0.49	0.0050	0.5000	0.006270	96.1	75	125	1.39	20	
Magnesium		85	1.0	50.00	33.32	103	75	125	0.0518	20	
Potassium		61	1.0	50.00	10.28	102	75	125	0.154	20	
Silver		0.11	0.0050	0.1000	0	105	75	125	0.695	20	
Sample ID	1706D18-001FMS	Samp	Гуре: МЗ	3	Tes	tCode: El	PA 6010B: "	Total Recover	able Meta	als	
Client ID:	Injection Well	Batc	h ID: 32	492	F	RunNo: 44	4102				
Prep Date:	6/26/2017	Analysis [Date: 7 /	10/2017	S	SeqNo: 1	391526	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		160	5.0	50.00	106.0	103	75	125			
Sample ID	1706D18-001FMS	D Samp	Type: MS	SD	Tes	tCode: El	PA 6010B:	Total Recover	rable Meta	als	
Client ID:	Injection Well	Batc	h ID: 32	492	F	RunNo: 4	4102				
	6/26/2017	Analysis [S	SegNo: 1	391530	Units: mg/L			
•	0/20/2011	•						•			
A. 1. A. 1. A. 4.						W REC	Lowlimit	Hight imit	%RPD	RPDI imit	Qual
Analyte		Result 170	PQL 5.0		SPK Ref Val 106.0	%REC 120	LowLimit 75	HighLimit 125	%RPD 5.22	RPDLimit 20	Qual
Calcium		170	5.0	50.00	106.0	120	75	125	5.22	· 20	Qual
Calcium	MB-32492	170		50.00	106.0	120	75		5.22	· 20	Qual
Calcium	MB-32492 PBW	170 Samp	5.0	50.00 BLK	106.0 Tes	120	75 P A 6010B : 1	125	5.22	· 20	Qual
Calcium Sample ID Client ID:		170 Samp	5.0 Type: MI :h ID: 32	50.00 BLK 492	106.0 Tes	120 tCode: El	75 PA 6010B: 1 4102	125	5.22	· 20	Qual
Calcium Sample ID Client ID:	PBW	170 Samp Batc	5.0 Type: MI :h ID: 32	50.00 BLK 492 /10/2017	106.0 Tes	120 stCode: El RunNo: 4 SeqNo: 1	75 PA 6010B: 1 4102 391846	125 Total Recover	5.22	· 20	Qual
Calcium Sample ID Client ID: Prep Date: Analyte	PBW	170 Samp Batc Analysis I	5.0 Type: MI h ID: 32 Date: 7/	50.00 BLK 492 /10/2017	106.0 Tes F	120 stCode: El RunNo: 4 SeqNo: 1	75 PA 6010B: 1 4102 391846	125 Total Recover Units: mg/L	5.22 rable Met	20 als	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium	PBW	170 Samp Bato Analysis I Result	5.0 Type: MI h ID: 32 Date: 7/ PQL	50.00 BLK 492 /10/2017	106.0 Tes F	120 stCode: El RunNo: 4 SeqNo: 1	75 PA 6010B: 1 4102 391846	125 Total Recover Units: mg/L	5.22 rable Met	20 als	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium	PBW	170 Samp Batc Analysis I Result ND	5.0 Type: MI h ID: 32 Date: 7 PQL 0.0060	50.00 BLK 492 /10/2017	106.0 Tes F	120 stCode: El RunNo: 4 SeqNo: 1	75 PA 6010B: 1 4102 391846	125 Total Recover Units: mg/L	5.22 rable Met	20 als	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium	PBW	170 Samp Batc Analysis I Result ND ND ND	5.0 Type: MI th ID: 32 Date: 7 PQL 0.0060 0.050	50.00 3LK 492 (10/2017 SPK value	106.0 Tes F SPK Ref Val	120 atCode: El RunNo: 4 SeqNo: 1 %REC	75 PA 6010B: ` 4102 391846 LowLimit	125 Total Recover Units: mg/L	5.22 rable Met	20 als RPDLimit	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium	PBW 6/26/2017 LCS-32492	170 Samp Batc Analysis I Result ND ND ND Samp	5.0 Type: MI h ID: 32 Date: 7/ PQL 0.0060 0.050 1.0	50.00 3LK 492 /10/2017 SPK value	106.0 Tes SPK Ref Val	120 atCode: El RunNo: 4 SeqNo: 1 %REC	75 PA 6010B: 4102 391846 LowLimit PA 6010B:	125 Total Recover Units: mg/L HighLimit	5.22 rable Met	20 als RPDLimit	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium Sample ID Client ID:	PBW 6/26/2017 LCS-32492	170 Samp Batc Analysis I Result ND ND ND Samp	5.0 Type: MF ch ID: 32 Date: 7/ PQL 0.0060 0.050 1.0 Type: LC Type: LC	50.00 3LK 492 110/2017 SPK value SS 492	106.0 Tes SPK Ref Val	120 atCode: El RunNo: 4 SeqNo: 1 %REC atCode: E	75 PA 6010B: ' 4102 391846 LowLimit PA 6010B: 4102	125 Total Recover Units: mg/L HighLimit	5.22 rable Met %RPD rable Met	20 als RPDLimit	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium Sample ID Client ID:	PBW 6/26/2017 LCS-32492 LCSW	170 Samp Bato Analysis I Result ND ND ND Samp Bato	5.0 Type: MF ch ID: 32 Date: 7/ PQL 0.0060 0.050 1.0 Type: LC Type: LC	50.00 3LK 492 /10/2017 SPK value SS (492 /10/2017	106.0 Tes SPK Ref Val	120 atCode: El RunNo: 4 SeqNo: 1 %REC stCode: E stCode: E RunNo: 4	75 PA 6010B: ' 4102 391846 LowLimit PA 6010B: 4102	125 Total Recover Units: mg/L HighLimit	5.22 rable Met %RPD rable Met	20 als RPDLimit	
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium Sample ID Client ID: Prep Date: Analyte	PBW 6/26/2017 LCS-32492 LCSW	170 Samp Batc Analysis I Result ND ND ND Samp Batc Analysis I	5.0 Type: MI h ID: 32 Date: 7/ PQL 0.0060 0.050 1.0 Type: LC sh ID: 32 Date: 7/	50.00 3LK 492 /10/2017 SPK value SS (492 /10/2017	106.0 Tes SPK Ref Val	120 atCode: El RunNo: 4 SeqNo: 1 %REC atCode: E RunNo: 4 SeqNo: 1	75 PA 6010B: ' 4102 391846 LowLimit PA 6010B: 4102 391847	125 Total Recover Units: mg/L HighLimit Total Recove Units: mg/L	5.22 rable Met %RPD	20 als RPDLimit als	Qual
Calcium Sample ID Client ID: Prep Date: Analyte Chromium Selenium Sodium Sample ID Client ID: Prep Date:	PBW 6/26/2017 LCS-32492 LCSW	170 Samp Bato Analysis I Result ND ND ND Samp Bato Analysis I Result	5.0 Type: MI ch ID: 32 Date: 7/ PQL 0.0060 0.050 1.0 Type: LC ch ID: 32 Date: 7/ PQL	50.00 3LK 492 /10/2017 SPK value 25 /492 /10/2017 SPK value	106.0 Tes SPK Ref Val Tes SPK Ref Val O	120 atCode: El RunNo: 4 SeqNo: 1 %REC atCode: E RunNo: 4 SeqNo: 1 %REC	75 PA 6010B: ' 4102 391846 LowLimit PA 6010B: 4102 391847 LowLimit	125 Total Recover Units: mg/L HighLimit Total Recove Units: mg/L HighLimit	5.22 rable Met %RPD	20 als RPDLimit als	Qual

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Ħ
- Not Detected at the Reporting Limit ND
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S

Analyte detected in the associated Method Blank В

- Value above quantitation range Е
- Analyte detected below quantitation limits J
 - Sample pH Not In Range

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Reporting Detection Limit \mathbf{RL}

Р

Sample container temperature is out of limit as specified W

WO#: 28-Jul-17

Hall Environmental Analysis Laboratory, Inc.

Client:	Western Refining Southwest, Inc.
Droigate	Injection Well 6-22-17

Project:	Injection	well 6-22	-1/								
Sample ID	1706D18-001FMS	SampT	ype: MS	3	Tes	tCode: EF	PA 6010B: "	Total Recover	able Meta	als	
Client ID:	Injection Well	Batch	1D: 324	492	F	RunNo: 44	4102				
Prep Date:	6/26/2017	Analysis D	ate: 7/	10/2017	5	SegNo: 1	391851	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium		0.44	0.050	0.5000	0	87.0	75	125			
Sample ID	1706D18-001FMSI	D SampT	ype: M \$	3D	Tes	tCode: El	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	Injection Well	Batch	1 ID: 32	492	F	RunNo: 4	4102				
Prep Date:	6/26/2017	Analysis D	ate: 7/	10/2017	ę	SeqNo: 1	391852	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium		0.45	0.050	0.5000	0	90.8	75	125	4.31	20	

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1706D18 28-Jul-17

WO#:

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Hall Environmental Analysis Laboratory, Inc.

Client: Project:	Western Refining Southwest, Inc. Injection Well 6-22-17
Sample ID mb-1	SampType: mblk TestCode: SM2320B: Alkalinity
Client ID: PBW	Batch ID: R43890 RunNo: 43890
Prep Date:	Analysis Date: 6/28/2017 SeqNo: 1383548 Units: mg/L CaCO3
Analyte	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaCC	3) ND 20.00
Sample ID Ics-1	SampType: Ics TestCode: SM2320B: Alkalinity
Client ID: LCSW	Batch ID: R43890 RunNo: 43890
Prep Date:	Analysis Date: 6/28/2017 SeqNo: 1383549 Units: mg/L CaCO3
Analyte	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaCC	3) 77.64 20.00 80.00 0 97.0 90 110
Sample ID mb-2	SampType: mblk TestCode: SM2320B: Alkalinity
Client ID: PBW	Batch ID: R43890 RunNo: 43890
Prep Date:	Analysis Date: 6/28/2017 SeqNo: 1383572 Units: mg/L CaCO3
Analyte	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaCC	3) ND 20.00
Sample ID Ics-2	SampType: Ics TestCode: SM2320B: Alkalinity
Client ID: LCSW	Batch ID: R43890 RunNo: 43890
Prep Date:	Analysis Date: 6/28/2017 SeqNo: 1383573 Units: mg/L CaCO3
Analyte	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaCC	03) 78.84 20.00 80.00 0 98.5 90 110

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- D Sample Diluted Due to Matrix
- Holding times for preparation or analysis exceeded \mathbf{H}
- Not Detected at the Reporting Limit ND
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- в Analyte detected in the associated Method Blank
- Value above quantitation range Έ
- Analyte detected below quantitation limits J
- Sample pH Not In Range Ρ
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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WO#: 28-Jul-17

Hall Environmental Analysis Laboratory, Inc.

Client: Project:		ern Refining So tion Well 6-22-		st, Inc.							
Sample ID	MB-32502	SampTy	pe: ME	BLK	Tes	tCode: S	M2540C MC	D: Total Diss	olved So	lids	
Client ID:	PBW	Batch	ID: 32	502	F	RunNo: 4	43839				
Prep Date:	6/26/2017	Analysis Da	ate: 6 /:	27/2017	9	SeqNo:	1381448	Units: mg/L			
Analyte Total Dissolved	Solids	Result ND	PQL 20.0	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID	LCS-32502	SampT	ype: LC	s	Tes	tCode: S	M2540C MC	D: Total Diss	olved So	lids	
Client ID:	LCSW	Batch	ID: 32	502	F	RunNo: 4	43839				
Prep Date:	6/26/2017	Analysis Da	ate: 6/.	27/2017	S	SeqNo:	1381449	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved	Solids	985	20.0	1000	0	98.5	80	120			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

WO#: 1706D18

28-Jul-17

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HALL ENVIRONMENTAL ANALYSIS LABORATORY	Hall Environmental Albı TEL: 505-345-3975 Website: www.ha	4901 Hawki uquerque, NM FAX: 505-345	ns NE 87109 Sam -4107	ple Log-In C	heck List
Client Name: Western Refining Southw	Work Order Number	: 1706D18		RcptNo:	1
Received By: Anne Thorne Completed By: Anne Thorne Reviewed By:	6/23/2017 7:25:00 AM 6/23/2017 1:45:52 PM [v[23][]	•	Aone Him Aone Him		
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?		<u>Courier</u>			
Log In			-		
4. Was an attempt made to cool the sample	es?	Yes 🔽	No 🗌	NA 🗔	
5. Were all samples received at a temperat	ure of >0° C to 6.0°C	Yes 🗹	No 🗌		
6. Sample(s) in proper container(s)?		Yes 🔽	No 🗌		
7, Sufficient sample volume for indicated te	st(s)?	Yes 🗹	No 🗌		
8. Are samples (except VOA and ONG) pro	perly 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 b	oken?	Yes 🗌	No 🗹	# of preserved	_
12. Does paperwork match bottle labels?		Yes 🗹	No 🗀	bottles checked for pH:	3,2 rF12) unless noted)
(Note discrepancies on chain of custody) 13. Are matrices correctly identified on Chair		Yes 🗹	No 🗆	Adjusted?	N ()
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 🗌	Checked by:	VA I
					-
Special Handling (if applicable)	ista statu muut-20	Yes 🗍	. ["""]		
16. Was client notified of all discrepancies w	STATESTATING REALING STATES	Yes 🗌	No 🗌		1
Person Notified:	Date				
By Whom: Regarding:	Via: [eMail	Phone 🔲 Fax	In Person	
Regarding: Client Instructions:			nana dinantana kata meninan		
17. Additional remarks:					J
18. Cooler Information					
Cooler No Temp C Condition	Seal Intact Seal No S	Seal Date	Signed By		
1	Yes		-		

.

			4901 Hawki	10	Analysis	() (02 (02)) Hat	+ = 503 8103 8103 810 810 810 810 810 810 810 810 810 810	BE 0 0 0 0 0 0 0 0 0 0 0 0 0	 M + X∃TB TM + X∃TB TM + X∃TB TPH 8015B Heth Heth Heth Heth R83 198 HA9 R83 84 R84 84 R84	-col Sde Attlached								Bo Bo	1/7 Dec Attached	if necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	🗹 Standard 🛛 Rush	Project Name:	Injection Well-6-27-17	Project #:	PO# 12619031-2	Project Manager:	Kelly Robinson	Sampler: Mett Krakow		Sample Relaperature: ///	Container Preservative HEAL No Type and # Type	3.500mL Amber	3- VOA, HCL	- Zn Acetel	1-500 ML HNO3 -7	1-130 ML HaSOH	Y			Repeated by: MANAT Ward 42/17 19	Received by. Date Tim Color 23/ Color 23/	ontracted to other accredited laboratories. This serves as not
Chain-of-Custody Record	Client: Western Refining		Mailing Address: 50 CR4990	\sim	1632 - 4169	email or Fax#:	QA/QC Package:			🗆 EDD (Type)	Date Time Matrix Sample Request ID	-71 9:00 Hao I Injection Well					Trip Rlack	ANT-OFFICIAL		Date: Time: Relinquished by: 22)17 1430 777241164/00	Ultring 1911 Multiplet by	1

WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

immediately or within a specified time period, or assess a civil penalty, or both (see Section 74-6-10 NMSA 1978). The compliance order may also include a suspension or termination of this Discharge Permit. OCD may also commence a civil action in district court for appropriate relief, including injunctive relief (see Section 74-6-10(A)(2) NMSA 1978). The Permittee may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in a renewal application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a Discharge Permit issued pursuant to a state or federal law or regulation (see Section 74-6-10.2 NMSA 1978).

2. GENERAL FACILITY OPERATIONS:

2A OUARTERIZYMONIFORING REQUIREMENTS FOR CLASSENON-

HAZARDOUS WASTEINJECTION WELL: (The Permittee shall properly conduct waste) management injection operations at its facility by injecting only non-hazardous (RCRA exempt) and RCRA from hazardous, non-exempt) oil field waste fluids. Injected waste fluids shall not exhibit the RCRA characteristics, i.e., ignitability, reactivity, corrosivity, or toxicity under 40) (CFR 261-Subpart "C" 261.21 = 261.24 (July 1, 1992), at the point of injection into WDW-2.) based upon environmental analytical laboratory testing. Pursuant to 20.6:2:5207B, the Permittee (shall provide analyses of the injected fluids at least quarterly to yield data representative of their toxicity characteristic.)

The Permittee shall also analyze the injected fluids quarterly for the following characteristics:

- (pEl (Method 9040);)
- (e) (EB)
- Specific conductance;)
- Specific gravity;
- () (Temperature;)
- Major dissolved cations and anions, including: fluoride, calcium; potassium;) inagnesium; sodium bicarbonate, carbonate, chloride, sulfate, bromide, total dissolved) solids; and cation/anion balance using the methods specified in 40 CFR 136,3); and;
- EPA RGRA Characteristics for Ignitability (ASTM Methods); Corrosivity (SW-846) and Reactivity (determined through Permittee's application of knowledge or generating process).

(The Permittee shall analyze the injected fluids quarterly for the constituents identified in the Quarterly Monitoring List (below) to demonstrate that the injected fluids do not exhibit the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure, EPA SW-846) (Test Method 1311 (see Table 1, 40 CFR 261.24(6)).)

Page 5

AVENTIANS CONTRACTOR OF THE STREET OF THE ST

(1164-01016440422)) (119-202-016

OIL NOR BARRANCE MILLORING COMPANY							
	Contaminant		Regulators/ (Regulators/				
	Ansahic		60)				
	(Proces)		05				
	(Environmentationale)						
	(CHGT460E)						
	(ChiqioBenzene)		(190a)				
(D.) [22)	Chloicionii		60)				
	(Chicasan)		600				
			(2000)				
(TY45)			2000				
	(57550)		2000				
	fizz Dichiorobenzene)						
(1028)	122-Dichloroethane	SOLADB) SEZANDB	03				
(<u>bio29</u>)	11 Dichloroethylenc)	(102/19) (22/002)					
(2030)	2,4-Dimitrololuene		018				
	(Hexachlorobenzene)		013				
(E.113)	(HExachionobuladiene)	(2021)B) (2120) (82646)	035				
(DIJES)	(flexachtoroethane)		310				
(DEMB)	(CCAT)		530				
(2009)	(Merciny)		02				
(2035)	Methyliethyl kelone	SOLAB SELIND	20010				
(1010356)	Nitrolienzene		20				
(ERESTA	Rentrachlorophenol		(10010)				
(2038)	Evidine	8726DB 88270D	510				

Page 6

WESTERN REFINING/SOUTHWEST, INC.) WASTE/DISPOSAL/WEBENO. 2

(UICE011 (WDW/2)) (JUX 20.(2016)

D010	(Selenium)	(18)11)	(10)
(DOM)	Silver	(13:11)	(5:0) (0:7)
(D039)	Teuachloroethylene	(8260B)	(07)
(D040)	Trichloroethylene	(80211B)	(05)
		(8260B)	
D941)	(A) (2,4,5-Trichlorophenol)	(8270D)	(400.0)
D042)	2,4,6 Trichlorophenol)	(8041)A	2.0
		(<u>8270</u> D)	
D043)	(Minylechloride)	(8021)B)	(0)2)
		(8260B)	
for mr. and pr	cresol concentrations cannol be differentiate	d, then the total cresol (D026) co	centration is used
Reveaulatory.	evel of total cresolus 200 mg/L	· · · · ·	

(If the quantitation limit is greater than the regulatory level, then the quantitation limit becomes the regulatory level. (If metals (dissolved), the EPA 1511 TCLP Laboratory Method is required with the exception of Mercury (total).

1. Monitor and Piezometer Wells: Groundwater with a total dissolved solids concentration of less than 10,000 mg/L occurs at an estimated depth of approximately 10 - 30 ft. below ground surface at the WDW-2 well (hereafter, "uppermost water-bearing unit"). Groundwater monitoring well (MW) with GW sampling capability shall be installed proximal to and hydrogeologically downgradient from WDW-2 in order to monitor the uppermost waterbearing unit. The MW shall be screened (15 ft. screen with top of screen positioned 5 ft. above water table) into the uppermost water-bearing unit. The Permittee shall propose a monitoring frequency with chemical monitoring parameters in order to detect potential groundwater contamination either associated with or not associated with WDW-2.

2.B. CONTINGENCY PLANS: The Permittee shall implement its proposed contingency plan(s) included in its application to cope with failure of a system(s) in the Discharge Permit.

2.C. CLOSURE: Prior to closure of the facility, the Permittee shall submit for OCD's approval, a closure plan including a completed form C-103 for plugging and abandonment of the waste injection well. The Permittee shall plug and abandon its well pursuant to 20.6.2.5209 NMAC and as specified in Permit Condition 2.D.

- 1. Pre-Closure Notification: Pursuant to 20.6.2.5005A NMAC, the Permittee shall submit a pre-closure notification to OCD's Environmental Bureau at least 30 days prior to the date that it proposes to close or to discontinue operation of WDW-2. Pursuant to 20.6.2.5005B NMAC, OCD's Environmental Bureau must approve all proposed well closure activities before the Permittee may implement its proposed closure plan.
- 2. Required Information: The Permittee shall provide OCD's Environmental Bureau with the following information in the pre-closure notification specified in Permit Condition 2.C.1:
 - Name of facility;
 - Address of facility;
 - Name of Permittee (and owner or operator, if appropriate);

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

October 18, 2017

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: BPT Injection Well 9 13 17

OrderNo.: 1709746

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 9/14/2017 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 <u>www.hallenvironmental.com</u> 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 qualifiers 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

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Hall Envi	ronmental Analysis	Labora	itory, Inc.			Lab Order 1709746 Date Reported: 10/18/20	017
Project: BI	estern Refining Southwest, Inc PT Injection Well 9 13 17 09746-001		AQUEOUS		Date: 9 /1	ection Well 3/2017 11:20:00 AM 4/2017 7:05:00 AM	
Analyses		Result	PQL Qua	l Units	DF	Date Analyzed	Batch
EPA METHO	D 8081: PESTICIDES TCLP					Analyst	MAB
Chlordane		ND	0.030	mg/L	1	9/27/2017 1:41:44 PM	33957
Endrin		ND	0.020	mg/L	1	9/27/2017 1:41:44 PM	33957
gamma-BHC	(Lindane)	ND	0.40	mg/L	1	9/27/2017 1:41:44 PM	33957
Heptachlor	()	ND	0.0080	mg/L	1	9/27/2017 1:41:44 PM	33957
Heptachior e	poxide	ND	0.0080	mg/L	1	9/27/2017 1:41:44 PM	33957
Methoxychlo		ND	10	mg/L	1	9/27/2017 1:41:44 PM	33957
Toxaphene		ND	0.50	mg/L	1	9/27/2017 1:41:44 PM	33957
	achlorobiphenyl	85.8	57.8-124	%Rec	1	9/27/2017 1:41:44 PM	33957
	achloro-m-xylene	81.5	43-114	%Rec	1	9/27/2017 1:41:44 PM	33957
EPA METHO	D 8270C TCLP					Analyst	DAM
2-Methylphe	nol	ND	200	mg/L	1	9/27/2017 4:13:14 PM	33908
3+4-Methylp		ND	200	mg/L	1	9/27/2017 4:13:14 PM	33908
Phenol		ND	200	mg/L	1	9/27/2017 4:13:14 PM	33908
2,4-Dinitroto	luene	ND	0.13	mg/L	1	9/27/2017 4:13:14 PM	33908
Hexachlorob		ND	0.13	mg/L	1	9/27/2017 4:13:14 PM	33908
Hexachlorob		ND	0.50	mg/L	1	9/27/2017 4:13:14 PM	33908
Hexachloroe		ND	3.0	mg/L	1	9/27/2017 4:13:14 PM	33908
Nitrobenzen		ND	2.0	mg/L	1	9/27/2017 4:13:14 PM	33908
Pentachloro		ND	100	mg/L	1	9/27/2017 4:13:14 PM	33908
Pyridine		ND	5.0	mg/L	1	9/27/2017 4:13:14 PM	33908
2,4,5-Trichlo	rophenol	ND	400	mg/L	1	9/27/2017 4:13:14 PM	33908
2,4,6-Trichlo		ND	2.0	mg/L	1	9/27/2017 4:13:14 PM	33908
Cresols, Tot	•	ND	200	mg/L	1	9/27/2017 4:13:14 PM	33908
	uorophenol	44.6	15-124	%Rec	1	9/27/2017 4:13:14 PM	33908
Surr: Phe	•	38.8	15-118	%Rec	1	9/27/2017 4:13:14 PM	33908
Surr: 2,4,6	6-Tribromophenol	65.9	15-148	%Rec	1	9/27/2017 4:13:14 PM	33908
	benzene-d5	82.7	40.6-124	%Rec	1	9/27/2017 4:13:14 PM	33908
	uorobiphenyl	61.8	35.7-128	%Rec	1	9/27/2017 4:13:14 PM	33908
	erphenyl-d14	57.0	18.8-115	%Rec	1	9/27/2017 4:13:14 PM	33908
SPECIFIC G	RAVITY					Analys	t: JRR
Specific Gra	vity	1.002	0		1	9/15/2017 2:17:00 PM	R4565
EPA METHO	D 300.0: ANIONS					Analys	t: MRA
Fluoride		5.9	0.50 *	mg/L	5	9/14/2017 3:12:54 PM	R4564
Chloride		600	25 *	mg/L	50	9/27/2017 4:01:08 PM	R4594
Nitrogen, Nit	trite (As N)	ND	0.50	mg/L	5	9/14/2017 3:12:54 PM	R4564
Bromide		2.3	0.50	mg/L	5	9/14/2017 3:12:54 PM	R4564
Nitrogen, Ni	trate (As N)	ND	0.50	mg/L	5	9/14/2017 3:12:54 PM	R4564
-	, Orthophosphate (As P)	ND	2.5	mg/L	5	9/14/2017 3:12:54 PM	R4564

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

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

PQL Practical Quanitative Limit

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 Page 1 of 13

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1709746

Hall Environmental Analysis	s Labora	atory, In	ic.			Lab Order 1709746 Date Reported: 10/18/20)17
CLIENT: Western Refining Southwest, Ir Project: BPT Injection Well 9 13 17 Lab ID: 1709746-001		AQUEOU			te: 9/13	ection Well 3/2017 11:20:00 AM 4/2017 7:05:00 AM	
Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst	MRA
Sulfate	80	2.5		mg/L	5	9/14/2017 3:12:54 PM	R45644
SM2510B: SPECIFIC CONDUCTANCE						Analyst	JRR
Conductivity	3100	5.0		µmhos/cm	1	9/19/2017 2:03:47 PM	R45747
SM2320B: ALKALINITY						Analyst	JRR
Bicarbonate (As CaCO3)	499.0	20.00		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
Carbonate (As CaCO3)	439.0 ND	2,000		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
Total Alkalinity (as CaCO3)	499.0	20.00		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
SM2540C MOD: TOTAL DISSOLVED SC	2011			-		Analyst	KS
Total Dissolved Solids	1920	100	*D	mg/L	1	9/22/2017 10:23:00 AM	
	1520	100		ngre	•		
SM4500-H+B: PH						Analyst	
рН	7.34		Н	pH units	1	9/19/2017 2:03:47 PM	R45747
EPA METHOD 7470: MERCURY						Analyst	: MED
Mercury	ND	0.00020		mg/L	1	9/27/2017 9:25:56 AM	34071
EPA METHOD 6010B: DISSOLVED MET	ALS					Analyst	TES
Calcium	53	5.0		mg/L	5	9/19/2017 1:02:14 PM	A45714
Magnesium	43	5.0		mg/L	5	9/19/2017 1:02:14 PM	A45714
Potassium	14	5.0		mg/L	. 5	9/19/2017 1:02:14 PM	A45714
Sodium	530	10	I	mg/L	10	9/28/2017 1:04:41 PM	A45960
EPA 6010B: TOTAL RECOVERABLE M	ETALS					Analyst	: TES
Arsenic	0.035	0.020	I	mg/L	1	9/19/2017 11:57:19 AM	33882
Barium	0.17	0.020	l	mg/L	1	9/19/2017 11:57:19 AM	33882
Cadmium	ND	0.0020	I	mg/L	1	9/19/2017 11:57:19 AM	
Chromium	ND	0.0060		mg/L	1	9/19/2017 11:57:19 AM	
Lead	ND	0.0050		mg/L	1	9/19/2017 11:57:19 AM	
Selenium	ND	0.050		mg/L	1	9/19/2017 11:57:19 AM	
Silver	ND	0.0050	1	mg/L	1	9/19/2017 11:57:19 AM	
TCLP VOLATILES BY 8260B						Analyst	
Benzene	ND	0.50		mg/L) 9/15/2017 1:25:00 AM	T45638
1,2-Dichloroethane (EDC)	ND	0.50		mg/L) 9/15/2017 1:25:00 AM	T45638
2-Butanone	ND	200		mg/L) 9/15/2017 1:25:00 AM	T45638 T45638
Carbon Tetrachloride	ND	0.50		mg/L mg/l) 9/15/2017 1:25:00 AM) 9/15/2017 1:25:00 AM	T45638
Chloroform	ND ND	6.0 7.5		mg/L mg/L) 9/15/2017 1:25:00 AM	T45638
1,4-Dichlorobenzene 1,1-Dichloroethene	ND	0.70		mg/L) 9/15/2017 1:25:00 AM	T45638
Hexachlorobutadiene	ND	0.50		mg/L) 9/15/2017 1:25:00 AM	T45638
HEXACINOTODULAUICHE		0.00	•	mg/L	200	,	, ,0000

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

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
- PQL Practical Quanitative Limit
- 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 Page 2 of 13

Analytical Report

- P Sample pH Not In Range
- RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Hall Environmental Analy	sis Labora	tory, Inc.		Date Reported: 10/18/2	2017
CLIENT: Western Refining Southwes Project: BPT Injection Well 9 13 17 Lab ID: 1709746-001		AQUEOUS	Collection]	le ID: Injection Well Date: 9/13/2017 11:20:00 AM Date: 9/14/2017 7:05:00 AM	
Analyses	Result	PQL Qual	Units	DF Date Analyzed	Batch
TCLP VOLATILES BY 8260B				Analys	t: RAA
Tetrachloroethene (PCE)	ND	0.70	mg/L	200 9/15/2017 1:25:00 AM	T45638
Trichloroethene (TCE)	ND	0.50	mg/L	200 9/15/2017 1:25:00 AM	T45638
Vinyl chloride	ND	0.20	mg/L	200 9/15/2017 1:25:00 AM	T45638
Chlorobenzene	ND	100	mg/L	200 9/15/2017 1:25:00 AM	T45638
Surr: 1,2-Dichloroethane-d4	97.4	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: 4-Bromofluorobenzene	95.6	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: Dibromofluoromethane	100	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: Toluene-d8	91.2	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638

Refe	r to th	e QC Summary report and sample login checklis	t for flagg	ged QC data and preservation information.
Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
-	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 3 of 13
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
		% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory Inc.

Analytical Report Lab Order 1709746

Data Danastad: 10/18/2017

1709746-001G INJECTION WELL Collected date/time: 09/13/17 11:20

SAMPLE RESULTS - 01

Wet Chemistry by Method 4500 CN E-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / time		5
Reactive Cyanide	ND		0.00500	1	09/21/2017 18:03	WG1023142	
Wet Chemistry by	Method 9034-9	9030B					
	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / time		4
Reactive Sulfide	0,125		0.0500	1	09/18/2017 17:47	WG1021084	L
Wet Chemistry by	Method 9040C						
	Result	Qualifier	Dilution	Analysis	Batch		-
Analyte	SÜ			date / time			
Corrosivity by pH	7,09	<u>18</u>	1	09/18/2017 10:3	2 <u>WG1021485</u>		L. 17
Sample Narrative:							ľ
L936656-01 WG1021485: 7	.09 at 15.2c						L. r
Wet Chemistry by	Method D93/10	IOA					L. P
	Result	Qualifier	Dilution	Analysis	Batch		
Analyte	deg F			date / time			Ł
Flashpoint	DNF at 170			09/22/2017 15:1	1 WG1023539		

	E-2011
	и С
	14500
V	Method
オニウ	β
りていて	lemistry
۸A	Wet Ch

QUALITY CONTROL SUMMARY

Method Blank (MB)

MB Result MB Qualifier MB MDL mayte mg/l mg/l mg/l reactive Gyanide U 0.0018 0.0018 abboratory Control Sample (LCS) + Laboratory 0.0018 cS) R3251293-2 09/21/17 77:55 + (LCS) R32551293-3 09/21/17 71 cS) R3251293-2 09/21/17 mg/l mg/l mg/l mg/l analyte mg/l mg/l mg/l mg/l mg/l mg/l eactive Cyanide 0.100 0.104 0.104 0.104 0.104	MB MDL MB RDL mg/l mg/l 0.0018 0.00500 atory Control Sample 29/21/17 17:56 LCSD Result LCS Rec. mg/l % 0.104 104	e Duplicate (LCSD) LCSD Rec. Rec. Limit % % %	e (LCSD) Rec. Limits 85-115	L C S D) Rec. Limits LCS Qualifier 85-115	LCSD Qualifier %	RPD Limits 20		
Matyte mg/l mg/l Reactive Cyanide U 0.0018 Reactive Cyanide U 0.0018 Laboratory Control Sample (LCS) • Laboratory C LCS) R3251293-2 09/2/17/17 LCS) R3251293-3 09/2/17/17 LCS) R3251293-3 09/2/17/17 Analyte mg/l mg/l Reactive Cyanide 0.100 0.104	mg/l 0.00500 0.00500 0.00500 0.00500 	e Duplicate LCSD Rec. %	e (LCSD) Rec. Limits % 85-(15	LCS Qualifier				
Reactive Cyanide U 0.0018 0.00500 Laboratory Control Sample (LCS) • Laboratory Control Sample Laboratory Control Sample Example (LCS) R3251293-2 09/21/17 17:55 • (LCSD) R3251293-3 09/21/17 17:56 Sample (LCS) R3251293-2 09/21/17 17:55 • (LCSD) R3251293-3 09/21/17 17:56 Sample Analyte mg/l mg/l % Analyte mg/l mg/l mg/l % Reactive Cyanide 0.100 0.104 104 104	0.00500 ontrol Sample rse ut LCS Rec.	e Duplicate Lcsp Rec. 8	e (LCSD) Rec. Limits 85-115	LCS Qualifier				
-aboratory Control Sample (LCS) - Laboratory C LCS) R3251293-2 09/21/17 77-55 - (LCS) R3251293-3 09/21/17 17 Spike Amount LCS Result LCS Result LCS Result analyte mg/l mg/l mg/l mg/l mg/l rective Cyanide 0.100 0.104 0.104	ontrol Sampik 1:56 ult LCS Rec. 104	e Duplicate LCSD Rec. %	(LCSD) Rec. Limits % 85-115	LCS Qualifier				
LCS) R3251293-2 09/2/17 17:55 • (LCSC) R3251293-3 09/2/17 17 Spike Amount LCS Result LCSD Result LCSD Result Analyte mg/l mg/l mg/l keactive Cyanide 0.100 0.104 0.104	?:56 ult LCS Rec. % 104	LCSD Rec. % 104	1	LCS Qualifier				
Spike Amount LCS Result mg/i mg/i 0.100 0.104	uit LCS Rec. % 104	LCSD Rec. % 104		LCS Qualifier				
mg/l mg/l 0.100 0.104	% 104	% 104	% 85-115					
0.100 0.104	104	104	85-115		0	20		
L936656-01 Original Sample (OS) • Matrix Spike (MS) • Matrix	(MS) • Matrix	Spille Dup	Spike Duplicate (MSD)	6		2		
(OS) L936656-01 09/21/17 18:03 • (MS) R3251293-4 09/21/17 18:06 • (MSD) R3251293-5 09/21/17 18:07	5 - (MSD) R325129:	3-5 09/21/17 18	\$:07					
Spike Amount Original Result MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution Rec. Limits	:. Limits MS Qualifier	MSD Qualifier	RPD RPD Limits	
Anakyte mg/l mg/l mg/l	ц/бш	96	96	8				
Reactive Cyanide 0.100 ND 0.0901	0.0861	86	82	1 75-	75-125		5 20	

Hall Environmental Analysis Laboratory ACCOUNT:

PROJECT:

Wet Chemistry by Method 9034-90303 W61021084

QUALITY CONTROL SUMMARY

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MB RDL mg/l 0.0500	<u>a</u>	MB RDL mg/l 0.0500 UP RPD DUP 0	MB RDL mg/l 0.0500 UP RPD DUP Quainfier Unit ur RPD DUP Quainfier Unit a	MB RDL mg/l 0.0500 UP RPD UP Cualifier UNP RPD UP RPD UP Cualifier (LCSD) 3 LCS Rec. LCSD Rec. Limits LCS Oualifier RPD LCS Rec. LCSD Rec. Limits LCS Oualifier RPD	MB RDL mg/l 0.05000 UP RPD DUP Cualifier Limits % 20 Nirrol Sample Duplicate (LCSD) strict Rec. IcSD Rec. Rec. Limits 100 102 85-115 101 102 85-115	ő –	Wet Chemistry by Method 9034-90308				L936656-01	ş			
	MB RDL mg/l 0.0500 0.0500 UP RPD DUP Qualifier	MB.RDL mg/l 0.0500 UP.RPD UP.RPD DUP o DUP o	MB RDL mg/l 0.0500 0.0500 UP RPD <u>DUP Qualifier</u> DUP % and rtrcl Sample Dup(tcate 33	MB RDL mg/l 0.0500 UP RPD DUP RPD UP RPD DUP RPD % % 20 20 20 20 20 20 20 20 20 20 20 20 20	MB RDL mg/l 0.0500 UP RPD UP Cualifier UP RPD UP RPD UP Cualifier Unters % 20 Nitrol Sample Dupficate (LCSD) 13 LCS Rec Lonits (LCSD) % % % 7 10 102 85-115 2										
	MB RDL mg/l 0.0500 0.0500 UP RPD DUP Qualifier	MB RDL mg/l 0.0500 UP RPD DUP d ntrol Sample	MB RPL mg/l 0.0500 UP RPD <u>DUP Qualifier</u> DUP % nircl Sample Duplicate 3	MB RDL mg/ 0.0500 UP RPD DUP Qualifier Limits 20 20 20 20 20 20 20 20 20 20 20 20 20	MB RDL mg/l 0.0500 UP RPD DUP Cualifier UUP RPD % 20 101 RPD DUP Cualifier Limits 20 101 102 85-115 2 101 102 85-115 2 20 20 20 20 20 20 20 20 20 20 20 20 20										
mg/l 0.0500	mg/l 0.0500 JP) UP RPD <u>DUP Qualifier</u>	mg/l 0.0500 UP RPD	mg/l 0.0500 UP RPD <u>DUP Qualifier</u> Dup 4 * * * * * * *	mg/l 0.0500 UP RPD UP RPD UP RPD UP RPD % 20 20 20 20 20 20 20 20 20 20 20 20 20	mgl 0.0500 UP RPD UP RPD UP RPD UP RPD Lonatifier Limits 20 3 LCS Rec. Ket % % 10 102 101	MB Qualifier MB MDL	MB MI	ž	MB RDL						
0.0500	0.0500 JP) UP RPD DUP Qualifier	0.0500 uP RPD DUP of ntrol Sample	0.0500 UP RPD <u>DUP Qualifier</u> Dup % antrol Sample Duplicate 3	0.0500 UP RPD DUP Qualifier Units Limits 20 20 20 20 20 20 20 20 20 20	00500 UP RPD DUP CouldIffer Um RPD % 20 ntrol Sample Dup Itcate (LCSD) atc5 Rec. Limits 20 10 102 85-115 2	l/gm	l/6ui		щдЛ						
	JP) UP RPD DUP Qualifier	ue Reb <u>Due</u> o nirci Sample	up RPD <u>Dur Qualifier</u> Dur se control Sample Duplicate	JP) UP RPD <u>DUP Qualifier</u> DUP RPD % 20 20 20 20 20 20 20 20 20 20 20 20 20	IP) DUP countine DUP RPD IP RPD Limits % % % % 20 10 102 8 % 10 102 85-115	0.0065	0.0065		0.0500						
	DUP Qualifier	~	kep <u>Due quaitifier</u> Utimi % 20 arcel Sample Dupticate	RPD <u>DUP Qualifier</u> DUP RPD % 20 arcl Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier RPD	RPD DUP Qualifier DUP RPD % % 20 20 100 100 100 100 100	(OS) L934254-02 09/18/17 17:43 • (DUP) R3250199-4 09/18/17 17:44	1 7N8N91	45							
44			20 20 urcl Sample Dupticate	20 20 arci Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier RPD	20 Ircl Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Limits LCS Qualifier LCSD Qualifier RPD % % % % % % % % % % % % % % % % % % %	Original Result DUP Result Dilution	Dilution	ING		Qualifier	JP RPD nits				
UP RPD DUP Qualifier			20 arci Sample Duplicate	20 irol Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier RPD	20 Ircl Sample Duplicate (LCSD) LCS Rec. LCSD Rec. & % % % 10 102 85-115	l/6m		88		9 ₆					
UP RPD DUP Qualifier			irol Sample Duplicate	ircel Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier LCSD Qualifier RPD	Ircl Sample Duplicate (LCSD) LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier RPD % % % % % % % % % % % % % % % % % % %	1.05 2	2	0		20	_				
UP RPD DUP Que Que timits % 20 ntrol Sample Duplicate (LCSD) 3 LCS Rec LCSD Rec. Rec. Limits LCS Qualifier RPD % %	LCS Rec. LCSD Rec. Rec. Limits LCS Qualifier LCSD Qualifier RPD % % % %	LCS Rec. LCSD Rec. Limits <u>LCS Qualifier</u> LCS <u>D Qualifier</u> RPD % % % %	86 88			0.503 0.511	0.511		ЮĮ	102	85-115		2	20	

Hall Environmental Analysis Laboratory ACCOUNT:

PROJECT:

WGIUZ1485 Wet Chemistry by Method 9040C

QUALITY CONTROL SUMMARY

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L936656-01 Original Sample (OS) • Duplicate (DUP)

710:32	ilution DUP RPD DUP RPD Limits	9 6	0.000	
51021485-3 09/18/17 10:32	Δ	7	7.09 1	
UP) WG	Original Result DUP Result	ns ns	7.09	
(OS) L936656-01 09/18/17 10:32 • (DUP) WG1021485-3	o			

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

DUP: 7.09 at 15.2c

S S SS SS TC

(LCS) WG1021485-1 09/18/17 10:32 - (L	LCS) WG1021485-1 09/18/17 10:32 • (LCSD) WG1021485-2 09/18/17 10:32	D) WG102148!	CSD) WGI021485-2 09/18/17 10:32						
	Spike Amount	LCS Result	Spike Amount LCS Result LCSD Result	LCS Rec.	LCSD Rec.	Rec, Limits	LCS Qualifier	LCSD Qualifier RPD	RPD Limits
Analyte	SU	115	Su	9e	26	96		9 ₆	
Carrosivity by pH	10.0	9-95	9.96	99.5	9 9.6	98.4-102		0.100	
Sample Narrative:									

LCS: 9.95 at 20.1c

LCSD: 9.96 at 20.0c

PROJECT:

; ;

1023539	hemistry by Method D93/1010A
WGIUZ.	Wet Chemist

QUALITY CONTROL SUMMARY

L936656-01 Original Sample (OS) • Duplicate (DUP)

		DUP RPD Limits			
			۶	6	
		DUP Qualifier			
	15:11	OUP RPD	26	0.000	
-	09/22/17 1	Dilution		1	
	/G1023539-1	DUP Result	deg F	DNF at 170	
	22/17 15:11 • (DUP) W	Original Result DUP Result Dilution DUP RPD	deg F	DNF at 170	
	(OS) L936656-01 09/22/17 15:11 - (DUP) WG1023539-1 09/22/17 15:11		Analyte	Flashpoint	

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						RPD Limits	æ	10				
						LCSD Qualifier RPD	ж	0.000				
						LCS Qualifier L						
DUP RPD Limits	ж	10		ite (LCSD)		Rec. Limits	96	96.0-104				
DUP Qualifier		-		nple Duplice		LCSD Rec.	96	98.0				
OUP RPD	8	0.000		ontrol San	1	t LCS Rec.	} 2	98.0				
Dilution		1		ratory Co	09/22/17 15:	LCSD Resul	deg F	80.6				
Original Result DUP Result Dilution DUP RPD	deg F	DNF at 170		CS) • Labo) R3251560-2	Spike Amount LCS Result LCSD Result LCS Rec.	deg F	80.3				
Original Result	deg F	DNF at 170		rol Sample (L	22/17 15:11 - (LCSD	Spike Amount	deg F	82.0				
	Analyte	Flashpoint		Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)	(LCS) R3251560-1 09/22/17 15:11 - (LCSD) R3251560-2 09/22/17 15:11		Analyte	Flastipoint				

Hall Environmental Analysis Laboratory ACCOUNT:

PROJECT:

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 2580

	Result	Qualifier	Dilution	Analysis	Batch	• • •	
Analyte	πV			date / time		5	-
ORP	71.0		1	09/21/2017 16:57	<u>WG1023075</u>	TC	
						L	_



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DATE/TIME: 09/26/17 09:22

<i>ر</i> ا	r Method 2580
10230	hemistry by
פׂ. א	Wet C)

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

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s S C

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L937490-01 Original Sample (OS) • Duplicate (DUP)

	DUP RPD Limits	ж	20
	DUP Qualifier		
7 16:57	Dilution DUP RPD	ж	1.42
09/21/17 1	Dilution		٢
(G1023075-3	DUP Result	٨	70.07
1/17 16:57 • (DUP) M	Original Result DUP Result	М	71.0
(OS) L937490-01 09/21/17 16:57 + (DUP) WG1023075-3 09/21/17 16:57		Analyte	ORP

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WGI023075-1 09/21/17 16:57 • (LCSD) WGI023075-2 09/21/17 16:57	1/17 16:57 • (LCS	SD) WG1023075-2 09/	3075-2 09/21/17 16	:57					
	Spike Amount	Spike Amount LCS Result LCSD Result LCS	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier RPD	RPD Limits
Analyte	шV	шV	٨	₽9	*	96		9 ⁶	*
ORP	228	228	229	100	100	90.0-110		0,438	20

GLOSSARY OF TERMS

Тc

Ss

Cn

Sr

Qc

G

AI

S¢

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions MDL Method Detection (imit. ND Not detected at the Reporting Limit (or MDL where applicable). RDL Reported Detection Limit. Rec. Recovery. RPD Relative Percent Difference. SDG Sample Delivery Group. u Not detected at the Reporting Limit (or MDL where applicable). The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes Analyte reported. If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the Dilution highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or Limits duplicated within these ranges. The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. **Original Sample** This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. Qualifier The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the results column may state "ND" (Not Detected) or "BDL (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL Result (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. Case Narrative (Cn) This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not Quality Control Summary (Qc) being performed on your samples typically, but on laboratory generated material This is the document created in the field when your samples were initially collected. This is used to verify the time and Sample Chain of date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This Custody (Sc) chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. Sample Results (Sr) This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and Sample Summary (Ss) times of preparation and/or analysis. Qualifier Description Τ8 Sample(s) received past/too close to holding time expiration.

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

Sample ID MB	SampT	ype: mb	olk	Tes	tCode: El	PA Method	300.0: Anions			
Client ID: PBW	Batch	n ID: R4	5644	F	tunNo: 4	5644				
Prep Date:	Analysis D	Date: 9/	14/2017	5	SeqNo: 1	448506	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Bromide	ND	0.100								
Nitrogen, Nitrate (As N)	ND	0.100								
Phosphorus, Orthophosphate (As P	ND	0.500								
Sulfate	ND	0.500								
Sample ID LCS	Samp1	l'ype: Ics	1	Tes	tCode: El	PA Method	300.0: Anions	1		
Client ID: LCSW	Batcl	h ID: R4	5644	F	RunNo: 4	5644				
Prep Date:	Analysis [Date: 9/	14/2017	ę	SeqNo: 1	448507	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.541	0.100	0.5000	0	108	90	110			
Nitrogen, Nitrite (As N)	0.953	0.100	1.000	0	95.3	90	110			
Bromide	2.45	0.100	2.500	0	97,9	90	110			
Nitrogen, Nitrate (As N)	2.53	0.100	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	4.76	0.500	5.000	0	95.1	90	110			
Sulfate	9.84	0.500	10.00	0	98.4	90	110			
Sample ID MB	Samp	Type: ml	olk	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: PBW	Batc	h ID: R4	5948	F	RunNo: 4	5948				
Prep Date:	Analysis [Date: 9/	27/2017	:	SeqNo: 1	460425	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sample ID LCS	Samp	Type: Ics	3	Tes	tCode: E	PA Method	300.0: Anion:	3		
Client ID: LCSW	Batc	h ID: R4	5948	I	RunNo: 4	5948				
Prep Date:	Analysis [Date: 9/	/27/2017	:	SeqNo: 1	460426	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5,000	0	93.5	90	110			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1709746

WO#:

Page 4 of 13

18-Oct-17

QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

BPT Injection Well 9 13 17 **Project:**

Sample ID 100ng lcs	SampT	ype: LC	S	Test	tCode: T	CLP Volatil	es by 8260B			
Client ID: LCSW	Batch	n ID: T4	5638	R	tunNo: 4	15638				
Prep Date:	Analysis D)ate: 9 /	14/2017	S	eqNo: 1	448337	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.021	0.010	0.02000	0	105	70	130			
1,1-Dichloroethene	0.022	0.010	0.02000	0	110	70	130			
Trichloroethene (TCE)	0.020	0.010	0.02000	0	102	70	130			
Chlorobenzene	0.020	0.010	0.02000	0	99.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.0094		0.01000		94.3	70	130			
Surr: 4-Bromofluorobenzene	0.0097		0.01000		96.6	70	130			
Surr: Dibromofluoromethane	0.0097		0.01000		97.0	70	130			
Surr: Toluene-d8	0.0092		0.01000		91.6	70	130			
Sample ID rb	Sampl	Type: ME	3LK	Tes	tCode: T	CLP Volatii	es by 8260B			
Client ID: PBW	Batcl	h ID: T4	5638	F	RunNo: 4	45638				
Prep Date:	Analysis [Date: 9/	14/2017	5	SeqNo: 1	1448338	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,1-Dichloroethene	ND	0,70								
Hexachlorobutadiene	ND	0,50								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Chlorobenzene	ND	100								
Surr: 1,2-Dichloroethane-d4	0.0096		0.01000		95.9		130			
Surr: 4-Bromofluorobenzene	0.0096		0.01000		96.2	70	130			
Surr: Dibromofluoromethane	0.0096		0.01000		96.0	70 70	130			
							130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- В Analyte detected in the associated Method Blank
- Value above quantitation range E
- Analyte detected below quantitation limits J
- Sample pH Not In Range Р
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

Page 5 of 13

WO#: 1709746 18-Oct-17

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

BPT Injection Well 9 13 17 **Project:**

Sample ID 1709746-001cms	Samp	Type: MS	i	Test	Code: EF	PA Method	8270C TCLP			
Client ID: Injection Well	Bato	h ID: 339	908	R	unNo: 4 8	5933				
Prep Date: 9/18/2017	Analysis I	Date: 9/2	27/2017	S	eqNo: 14	160039	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
-Methylphenol	0.069	0,0010	0.1000	0	69.0	23.9	129			
3+4-Methylphenol	0.13	0.0010	0.2000	0	64.6	15	167			
2,4-Dinitrotoluene	0.063	0.0010	0.1000	0	63.3	15	147			
texachlorobenzene	0.073	0,0010	0.1000	0	72.5	41.4	136			
lexachlorobutadiene	0.069	0.0010	0.1000	0	68.5	16.2	134			
lexachloroethane	0.056	0.0010	0.1000	0	56.5	20.6	124			
Nitrobenzene	0.081	0.0010	0.1000	0	80.8	39.5	134			
Pentachlorophenol	0.028	0.0010	0.1000	0	28.3	15	137			
Pyridine	0.011	0.0010	0.1000	0	11.0	15	129			S
2,4,5-Trichlorophenol	0.080	0.0010	0.1000	0	79.8	15	158			
2,4,6-Trichlorophenol	0.073	0.0010	0.1000	0	72.9	15	153			
Cresols, Total	0.20	0.0010	0.3000	0	66.1	10.6	179			
Surr: 2-Fluorophenol	0.095		0.2000		47.3	15	124			
Surr: Phenol-d5	0.078		0.2000		38.9	15	118			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		66.7	15	148			
Surr: Nitrobenzene-d5	0.085		0.1000		84.7	40.6	124			
Surr: 2-Fluorobiphenyl	0.070		0,1000		69.6	35.7	128			
Surr: 4-Terphenyl-d14	0.059		0.1000		58.7	18.8	115			
O	d Some	Type: MS	20	Tee	fCode: Fl	PA Method	8270C TCLP			
Sample ID 1709746-001cms		ch ID: 33			RunNo: 4		OLIVO TOLI			
Client ID: Injection Well							[]offer ment]			
Prep Date: 9/18/2017	Analysis	Date: 9/	27/2017	2	SeqNo: 1	460040	Units: mg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.062	0.0010	0.1000	0	62.5	23.9	129	9.98	20	
3+4-Methylphenol	0.12	0.0010	0.2000	0	61.3	15	167	5.28	20	
	0.056	0.0010	0.1000	0	56.3	15	147	11.7	23.2	
2,4-Dinitrotoluene								0.10		
,	0.071	0.0010	0.1000	0	70.8	41.4	136	2.46	20	
Hexachlorobenzene	0.065	0.0010	0.1000	0	64.5	16.2	134	5.98	20	
Hexachlorobenzene Hexachlorobutadiene	0.065 0.051	0.0010 0.0010	0.1000 0.1000	0 0	64.5 51.5	16.2 20.6	134 124	5.98 9.27	20 31.3	
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane	0.065	0.0010 0.0010 0.0010	0.1000 0.1000 0.1000	0 0 0	64.5 51.5 80.9	16.2 20.6 39.5	134 124 134	5.98 9.27 0.124	20 31.3 26.6	_
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene	0.065 0.051	0.0010 0.0010	0.1000 0.1000 0.1000 0.1000	0 0 0 0	64.5 51.5 80.9 40.5	16.2 20.6 39.5 15	134 124 134 137	5.98 9.27 0.124 35.5	20 31.3 26.6 27.9	R
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol	0.065 0.051 0.081	0.0010 0.0010 0.0010	0.1000 0.1000 0.1000	0 0 0 0	64.5 51.5 80.9 40.5 8.96	16.2 20.6 39.5 15 15	134 124 134 137 129	5.98 9.27 0.124 35.5 20.8	20 31.3 26.6 27.9 47.4	R S
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine	0.065 0.051 0.081 0.040	0.0010 0.0010 0.0010 0.0010	0.1000 0.1000 0.1000 0.1000	0 0 0 0 0	64.5 51.5 80.9 40.5 8.96 71.6	16.2 20.6 39.5 15 15 15	134 124 134 137 129 158	5.98 9.27 0.124 35.5 20.8 10.9	20 31.3 26.6 27.9 47.4 36.9	
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol	0.065 0.051 0.081 0.040 0.0090	0.0010 0.0010 0.0010 0.0010 0.0010	0.1000 0.1000 0.1000 0.1000 0.1000	0 0 0 0 0 0	64.5 51.5 80.9 40.5 8.96 71.6 77.0	16.2 20.6 39.5 15 15 15 15	134 124 134 137 129 158 153	5.98 9.27 0.124 35.5 20.8 10.9 5.42	20 31.3 26.6 27.9 47.4 36.9 37.2	
2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Cresols, Total	0.065 0.051 0.081 0.040 0.0090 0.072	0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	0 0 0 0 0	64.5 51.5 80.9 40.5 8.96 71.6	16.2 20.6 39.5 15 15 15 15 10.6	134 124 134 137 129 158 153 179	5.98 9.27 0.124 35.5 20.8 10.9 5.42 6.89	20 31.3 26.6 27.9 47.4 36.9 37.2 27.4	
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	0.065 0.051 0.081 0.040 0.0090 0.072 0.077	0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	0 0 0 0 0 0	64.5 51.5 80.9 40.5 8.96 71.6 77.0	16.2 20.6 39.5 15 15 15 15	134 124 137 129 158 153 179 124	5.98 9.27 0.124 35.5 20.8 10.9 5.42 6.89 0	20 31.3 26.6 27.9 47.4 36.9 37.2 27.4 0	
Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Cresols, Total	0.065 0.051 0.081 0.040 0.0090 0.072 0.077 0.18	0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.3000	0 0 0 0 0 0	64.5 51.5 80.9 40.5 8.96 71.6 77.0 61.7	16.2 20.6 39.5 15 15 15 15 10.6	134 124 134 137 129 158 153 179	5.98 9.27 0.124 35.5 20.8 10.9 5.42 6.89	20 31.3 26.6 27.9 47.4 36.9 37.2 27.4	

Value exceeds Maximum Contaminant Level. *

Sample Diluted Due to Matrix D

Holding times for preparation or analysis exceeded Η

Not Detected at the Reporting Limit ND

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix S

Analyte detected in the associated Method Blank В

Е Value above quantitation range

Analyte detected below quantitation limits J

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RL Reporting Detection Limit

Sample container temperature is out of limit as specified W

18-Oct-17

1709746 WO#:

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

Sample ID 1709746-001cms	d SampT	ype: MS	SD	Tes	Code: El	PA Method	8270C TCLP			
Client ID: Injection Well	Batch	ID: 33	908	R	tunNo: 4	5933				
Prep Date: 9/18/2017	Analysis D	ate: 9/	/27/2017	S	eqNo: 1	460040	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.7	40.6	124	0	0	
Surr: 2-Fluorobiphenyl	0.070		0.1000		69.8	35.7	128	0	0	
Sur: 4-Terphenyl-d14	0.051		0,1000		51.1	18.8	115	0	0	

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

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WO#: 1709746

18-Oct-17

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project:	BPT Injec	ction Wel	19131	7							
Sample ID	MB-34071	Samp	Гуре: М	BLK	Tes	Code: E	PA Method	7470: Mercur	/		
Client ID:	PBW	Batc	h ID: 34	4071	F	tunNo: 4	5912				
Prep Date:	9/26/2017	Analysis I	Date: 9)/27/2017	8	eqNo: 1	459048	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.00020)							
Sample ID	LCS-34071	Samp	Type: L	cs	Tes	tCode: E	PA Method	7470: Mercur	y		
Client ID:	LCSW	Batc	h ID: 3	4071	F	RunNo: 4	5912				
Prep Date:	9/26/2017	Analysis [Date: 9)/27/2017	5	eqNo: 1	459049	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	•	0.0049	0.00020	0.005000	0	97.0	80	120			
Sample ID	1709746-001DMS	Samp	Туре: N	IS	Tes	tCode: E	PA Method	7470: Mercur	y		
Client ID:	Injection Well	Batc	h ID: 3	4071	F	RunNo: 4	5912				
Prep Date:	9/26/2017	Analysis I	Date: 🤮	9/27/2017	8	SeqNo: 1	459053	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0050	0.00020	0.005000	.00004788	98.8	75	125			
Sample ID	1709746-001DMSI) Samp	Type: N	ISD	Tes	tCode: E	PA Method	7470: Mercur	у		
Client ID:	Injection Well	Bato	h ID: 3	4071	F	RunNo: 4	5912				
Prep Date:	9/26/2017	Analysis I	Date: 9	9/27/2017	5	SeqNo: 1	459054	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0,0049	0.00020	0.005000	.00004788	97.9	75	125	0.906	20	

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Н
- Not Detected at the Reporting Limit ND
- POL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- в Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- Ρ Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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18-Oct-17

Hall Environmental Analysis Laboratory, Inc.

Client: Project:		Western Re BPT Injection	-									
Sample ID	MB-A		SampTy	vpe: ME	LK	Test	Code: E	PA Method	6010B: Disso	lved Meta	als	
Client ID:	PBW		Batch	ID: A4	5714	ਸ	unNo: 4	5714				
Prep Date:		A	nalysis Da	ate: 9 /	19/2017	s	eqNo: 1	452976	Units: mg/L			
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium			ND	1.0								
Magnesium			ND	1.0								
Potassium			ND	1.0								
Sample ID	LCS-A		SampTy	/pe: LC	S	Tes	tCode: E	PA Method	6010B: Disso	lved Meta	als	
Client iD:	LCSW		Batch	ID: A4	5714	F	RunNo: 4	5714				
Prep Date:		А	nalysis Da	ate: 9/	19/2017	S	SeqNo: 1	452977	Units: mg/L			
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium			52	1.0	50.00	0	104	80	120			
Magnesium			54	1.0	50.00	0	108	80	120			
Potassium			53	1.0	50.00	0	106	80	120			
Sample ID	MB-A		SampTy	/pe: MB	BLK	Tes	tCode: E	PA Method	6010B: Disso	lved Met	als	
Client ID:	PBW		Batch	ID: A4	5960	F	RunNo: 4	5960				
Prep Date:		A	nalysis Da	ate: 9/	28/2017	ę	SeqNo: 1	461012	Units: mg/L			
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium			ND	1.0								
Sample ID	LCS-A		SampT	vpe: LC	s	Tes	tCode: E	PA Method	6010B: Disso	lved Met	als	
Client ID:	LCSW		• •	ID: A4		F	RunNo: 4	15960				
Prep Date:		Α	alysis D	ate: 9 /	28/2017	5	SeqNo: 1	1461013	Units: mg/L			
Analyte			Result	PQL	SPK value	SPK Ref Vai	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium			51	1.0	50.00	0	102	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Sample pH Not In Range P
- RLReporting Detection Limit
- Sample container temperature is out of limit as specified W

18-Oct-17

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Hall Environmental Analysis Laboratory, Inc.

Client:		rn Refining S									
Project:	BPT II	njection Well	9 13 17	1							
Sample ID	MB-33882	SampT	Type: ME	BLK	Tes	tCode: E	PA 6010B: 1	fotal Recover	able Meta	als	
Client ID:	PBW	Batcl	h ID: 33	882	F	RunNo: 4	5714				
Prep Date:	9/15/2017	Analysis [Date: 9/	19/2017	S	SeqNo: 1	451478	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		ND	0.020								
Barium		ND	0.020								
Cadmium		ND	0.0020								
Chromium		ND	0.0060								
Lead		ND	0.0050								
Silver		ND	0.0050								
Sample ID	LCS-33882	Samp	Гуре: LC	s	Tes	tCode: E	PA 6010B: "	Total Recover	able Meta	als	
Client ID:	LCSW	Batc	h ID: 33	882	F	RunNo: 4	5714				
Prep Date:	9/15/2017	Analysis [Date: 9/	19/2017	5	SeqNo: 1	451479	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.52	0.020	0.5000	0	103	80	120			
Barium		0.49	0.020	0.5000	0	98.6	80	120			
Cadmium		0.49	0.0020	0.5000	0	98.8	80	120			
Chromium		0.49	0.0060	0.5000	0	98.1	80	120			
Lead		0.48	0.0050	0.5000	0	95.7	80	120			
Silver		0.10	0.0050	0.1000	0	103	80	120			
Sample ID	MB-33882	Samp	Туре: МІ	BLK	Tes	tCode: E	PA 6010B:	Total Recover	able Met	als	
Client ID:	PBW	Bato	h ID: 33	882	ł	RunNo: 4	15714				
Prep Date:	9/15/2017	Analysis I	Date: 9 ,	19/2017	5	SeqNo: 1	451496	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium		ND	0.050								
Sample ID	LCS-33882	Samp	Type: LC	s	Tes	stCode: E	PA 6010B:	Total Recover	able Met	als	
Client ID:	LCSW	Bato	h ID: 33	882	I	RunNo: 4	15714				
Prep Date:	9/15/2017	Analysis I	Date: 9	/19/2017	:	SeqNo: 1	1451497	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val		LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium		0.49	0.050	0.5000	0	98.4	80	120			

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- P Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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Hall Environmental Analysis Laboratory, Inc.

Client:	Western Refining Southwest, Inc.		
Project:	BPT Injection Well 9 13 17		
	SampType: MBLK	TestCode: SM2320B: Alk	alinity
Sample ID mb-1		RunNo: 45747	
Client ID: PBW	Batch ID: R45747		
Prep Date:	Analysis Date: 9/19/2017	SeqNo: 1452652	Units: mg/L CaCO3
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaC	03) ND 20.00		
Sample ID Ics-1	SampType: L CS	TestCode: SM2320B: Alk	calinity
Client ID: LCSW	Batch ID: R45747	RunNo: 45747	
Prep Date:	Analysis Date: 9/19/2017	SeqNo: 1452653	Units: mg/L CaCO3
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaC		0 101 90	110
	SampType: MBLK	TestCode: SM2320B: All	calinity
Sample ID mb-2	Batch ID: R45747	RunNo: 45747	
Client ID: PBW		SegNo: 1452675	Units: mg/L CaCO3
Prep Date:	Analysis Date: 9/19/2017	·	-
Analyte		SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaC	03) ND 20.00		
Sample ID Ics-2	SampType: LCS	TestCode: SM2320B: All	kalinity
Client ID: LCSW	Batch ID: R45747	RunNo: 45747	
Prep Date:	Analysis Date: 9/19/2017	SeqNo: 1452676	Units: mg/L CaCO3
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Total Alkalinity (as CaC		0 101 90	110
Sample ID mb-3	SampType: MBLK	TestCode: SM2320B: All	kalinity
Client ID: PBW	Batch ID: R45747	RunNo: 45747	-
Prep Date:	Analysis Date: 9/19/2017	SeqNo: 1452699	Units: mg/L CaCO3
	-	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Analyte Total Alkalinity (as CaC		STRIKE VAL ANCES LONEANIA	
Sample ID Ics-3	SampType: LCS	TestCode: SM2320B: Al	kalinity
Client ID: LCSV		RunNo: 45747	-
Prep Date:	Analysis Date: 9/19/2017	SeqNo: 1452700	Units: mg/L CaCO3
			HighLimit %RPD RPDLimit Qual
Analyte		SPK Ref Val %REC LowLimit 0 101 90	
Total Alkalinity (as CaC	03) 00.04 20.00 80.00	0 101 00	

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix \mathbf{D}
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- Practical Quanitative Limit PQL
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range E
- Analyte detected below quantitation limits J
- Sample pH Not In Range Р
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

Client:Western Refining Southwest, Inc.Project:BPT Injection Well 9 13 17

Sample ID 1709746-001EDUP	SampTyp	e: DUP	TestCode:	Specific Gra	vity			
Client ID: Injection Well	Batch II	D: R45658	RunNo:	45658				
Prep Date:	Analysis Dat	e: 9/15/2017	SeqNo:	1449109	Units:			
Analyte	Result	PQL SPK value	SPK Ref Val %RE	C LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.001	0				0.110	20	

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

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WO#: 1709746 18-Oct-17

QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

	ern Refining Southwest, Inc. Injection Well 9 13 17					
Sample ID MB-33959 Client ID: PBW Prep Date: 9/20/2017 Analyte	SampType: MBLK Batch ID: 33959 Analysis Date: 9/22/2017 Result PQL SPK value	TestCode: SM2540C N RunNo: 45804 SeqNo: 1455608 SPK Ref Val %REC LowLimi	Units: mg/L	%RPD	lids RPDLimit	Qual
Total Dissolved Solids	ND 20.0					
Sample ID LCS-33959 Client ID: LCSW	SampType: LCS Batch ID: 33959	TestCode: SM2540C N RunNo: 45804		olved So	lids	
Prep Date: 9/20/2017 Analyte		SeqNo: 1455609 SPK Ref Val %REC LowLim		%RPD	RPDLimit	Qual
Total Dissolved Solids	1020 20.0 1000	0 102 8) 120			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

WO#: 1709746 18-Oct-17

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ANALY	ONMENTAL (SIS RATORY	Hall Environmental Albu Albu TEL: 505-345-3975 Website: www.hal	4901 Hawkins querque, NM 87 FAX: 505-345-4	109 Samp	Sample Log-In Check List			
Client Name:	Western Refining Southw	Work Order Number:	1709746		RcptNo:	1		
Received By:	Isaiah Ortiz	9/14/2017 7:05:00 AM		IGht				
Completed By:	Ashley Gallegos	9/14/2017 9:01:05 AM		AJ				
Reviewed By:	ENM	9/14/17		•				
hain of Cus	tody							
1. Custody sea	als intact on sample bottles?		Yes 🗌	No 🗌	Not Present 🗹			
2. Is Chain of (Custody complete?		Yes 🗹	No 🗆	Not Present 🗌			
3. How was the	e sample delivered?		<u>Courier</u>					
Log In				_	_			
4. Was an atte	empt made to cool the sample	es?	Yes 🗹	No 🗌	na 🗆			
5. Were all sar	mples received at a temperat	ure of >0° C to 6.0°C	Yes 🗹	No 🗌	NA 🗆			
6. Sample(s) i	n proper container(s)?		Yes 🗹	No 🗌				
7. Sufficient sa	imple volume for indicated te	st(s)?	Yes 🗹	No 🗀				
8. Are samples	s (except VOA and ONG) pro	perly preserved?	Yes 🗹	No	_			
9. Was preser	vative added to bottles?		Yes 🗋	No 🗹	NA 🗌			
10.VOA viais h	ave zero headspace?		Yes 🔽	No 🗆	No VOA Vials 🗌			
11, Were any s	ample containers received bi	oken?	Yes 🗆	No 🗹	# of preserved bottles checked	1 1		
	work match bottle labels? epancies on chain of custody)	I	Yes 🗹	No 🗖		2, 2 Duniess note		
13. Are matrice	s correctly identified on Chair	n of Custody?	Yes 🗹	No 🗌	Adjusted?			
14, Is it clear wi	hat analyses were requested	?	Yes 🗹	No 🔲 🗄		(Le		
	lding times able to be met? customer for authorization.)		Yes 🗹	No 🛄	Checked by:			
Special Hand	dling (if applicable)							
	notified of all discrepancies w	ith this order?	Yes 🗌	No 🗌	NA 🗹	1		
Perso	n Notified:	Date 🚺						
By W	hom:	Via:	🗌 eMail 🗌	Phone 🗌 Fax	In Person			
Rega	rding:	<u>, , , , , , , , , , , , , , , , , , , </u>						
Client	Instructions:	n an						
17. Additional	remarks:							
18. <u>Cooler Inf</u>	1 1	۰	0	01				
Cooler N	Io Temp °C Condition 1.0 Good	Seal Intact Seal No	Seal Date	Signed By				

1 [.] .	. I i	 	 	
		 	 	···· = ··· ··
Page 1 o	of 1			

			4901 Hawki	Tel. 505-345-3975	Analysis	0 ⁴) 80)	5/4/03 (SMIS) 0 2850	19082 100 ² 110 110 100 100 100 100 100 100 100 10	287 294 294 294 294 294 294 294 294 294 294	88: (6) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	A rM + X3T8 rM + X3T8 rM + X3T8 r8t08 H9T r9t08 (Methin r1960 (Methin r1		1 Ste shall 1/40 475+								D See anolyte 13t		If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	🔏 Standard 🗆 Rush	Project Name:	BPT-Injection Well-9-13-1		Po# 19691358	Project Manager;	Kelly Robinson	: Wat Kr	On Ice: DYtes DND	Sample Temperature: (D	Container Preservative Type and # Type Type indocted	3-11 Amber -001	hold <	1 20ML HNOS	1-22041 HUDZ	2-SOOML POLY	1.2.2	1-500. 1 2" 400440 1-			Received by Date Time ADA LOU 9/0/17/16/0 Received by Date Time	som apply mas	ontracted to other accredited laboratories. This serves as notice of
Chain-of-Custody Record	client: Western Refining	7	Mailing Address: \$ 50 CE 4990	Riomorticeld, NUN R7413	- 633-	email or Fax#;	OA/OC Package: KT Standard D Level 4 (Full Validation)	uo		D EDD (Type)	Date Time Matrix Sample Request ID	13.17 11.30 AD Injection Well									Cate: Time: Retincuis at by 9/13/17 10.00 7 88 7 191 101 Date: Time: Retincuistrot by	e	If necessary, samples submitted to Hall Environmental may be subt

WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

UICI-011 (WDW-2) July 20, 2016

immediately or within a specified time period, or assess a civil penalty, or both (see Section 74-6-10 NMSA 1978). The compliance order may also include a suspension or termination of this Discharge Permit. OCD may also commence a civil action in district court for appropriate relief, including injunctive relief (see Section 74-6-10(A)(2) NMSA 1978). The Permittee may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in a renewal application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a Discharge Permit issued pursuant to a state or federal law or regulation (see Section 74-6-10.2 NMSA 1978).

2. GENERAL FACILITY OPERATIONS:

2.A. QUARTERLY MONITORING REQUIREMENTS FOR CLASS I NON-

HAZARDOUS WASTE INJECTION WELL: The Permittee shall properly conduct waste management injection operations at its facility by injecting only non-hazardous (RCRA exempt and RCRA non-hazardous, non-exempt) oil field waste fluids. Injected waste fluids shall not exhibit the RCRA characteristics, i.e., ignitability, reactivity, corrosivity, or toxicity under 40 CFR 261 Subpart "C" 261.21 – 261.24 (July 1, 1992), at the point of injection into WDW-2, based upon environmental analytical laboratory testing. Pursuant to 20.6.2.5207B, the Permittee shall provide analyses of the injected fluids at least quarterly to yield data representative of their toxicity characteristic.

The Permittee shall also analyze the injected fluids quarterly for the following characteristics:

- pH (Method 9040);
- Eh;
- Specific conductance;
- Specific gravity;
- Temperature;
- Major dissolved cations and anions, including: fluoride, calcium, potassium, magnesium, sodium bicarbonate, carbonate, chloride, sulfate, bromide, total dissolved solids, and cation/anion balance using the methods specified in 40 CFR 136.3); and,
- EPA RCRA Characteristics for Ignitability (ASTM Methods); Corrosivity (SW-846) and Reactivity (determined through Permittee's application of knowledge or generating process).

The Permittee shall analyze the injected fluids quarterly for the constituents identified in the Quarterly Monitoring List (below) to demonstrate that the injected fluids do not exhibit the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure, BPA SW-846 Test Method 1311 (see Table 1, 40 CFR 261.24(b)).

UICI-011 (WDW-2) July 20, 2016

MUST D DIDI	USAL ALEBINO, 2				
D010	Selenium	1311	1.0		
D011	Silver	1311	5.0		
D039	Tetrachloroethylene	8260B	0.7		
D040	Trichloroethylene	8021B	0.5		
		8260B			
D041	2,4,5-Trichlorophenol	8270D	400.0		
D042	2,4,6-Trichlorophenol	8041A	2.0		
		8270D			
D043	Vinyl chloride	8021B	0.2		
All and a second second		8260B			

If a-, m-, and p-cresol concentrations cannot be differentiated, then the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

If the quantitation limit is greater than the regulatory level, then the quantitation limit becomes the regulatory level. If metals (dissolved), the EPA 1311 TCLP Laboratory Method is required with the exception of Mercury (total).

1. Monitor and Piezometer Wells: Groundwater with a total dissolved solids concentration of less than 10,000 mg/L occurs at an estimated depth of approximately 10 - 30 ft. below ground surface at the WDW-2 well (hereafter, "uppermost water-bearing unit"). Groundwater monitoring well (MW) with GW sampling capability shall be installed proximal to and hydrogeologically downgradient from WDW-2 in order to monitor the uppermost waterbearing unit. The MW shall be screened (15 ft. screen with top of screen positioned 5 ft. above water table) into the uppermost water-bearing unit. The Permittee shall propose a monitoring frequency with chemical monitoring parameters in order to detect potential groundwater contamination either associated with or not associated with WDW-2.

2.B. CONTINGENCY PLANS: The Permittee shall implement its proposed contingency plan(s) included in its application to cope with failure of a system(s) in the Discharge Permit.

2.C. CLOSURE: Prior to closure of the facility, the Permittee shall submit for OCD's approval, a closure plan including a completed form C-103 for plugging and abandonment of the waste injection well. The Permittee shall plug and abandon its well pursuant to 20.6.2.5209 NMAC and as specified in Permit Condition 2.D.

- Pre-Closure Notification: Pursuant to 20.6.2.5005A NMAC, the Permittee shall submit a pre-closure notification to OCD's Environmental Bureau at least 30 days prior to the date that it proposes to close or to discontinue operation of WDW-2. Pursuant to 20.6.2.5005B NMAC, OCD's Environmental Bureau must approve all proposed well closure activities before the Permittee may implement its proposed closure plan.
- Required Information: The Permittee shall provide OCD's Environmental Bureau with the following information in the pre-closure notification specified in Permit Condition 2.C.1:
 - Name of facility;

WESTERN REFINING SOUTHWEST, INC.

WASTE DISPOSAL WELL NO. 2

- Address of facility;
- Name of Permittee (and owner or operator, if appropriate);

ATTACHMENT C

Sundry Notification Reports

Submit 1 Copy To Appropriate District	State of New Mex	kico	Form C-103
Office District I – (575) 393-6161	Energy, Minerals and Natur	al Resources	Revised July 18, 2013
1625 N. French Dr., Hobbs, NM 88240			WELL API NO. 30-045-35747
District II - (575) 748-1283 811 S. First St., Artesia, NM 88210	OIL CONSERVATION		5. Indicate Type of Lease
District III - (505) 334-6178	1220 South St. Fran		STATE FEE X
1000 Rio Brazos Rd., Aztec, NM 87410 District IV - (505) 476-3460	Santa Fe, NM 87	505	6. State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM			
87505 SUNDRY NOT	ICES AND REPORTS ON WELLS		7. Lease Name or Unit Agreement Name
(DO NOT USE THIS FORM FOR PROPO	SALS TO DRILL OR TO DEEPEN OR PLU	IG BACK TO A	
DIFFERENT RESERVOIR. USE "APPL	ICATION FOR PERMIT" (FORM C-101) FO	R SUCH	
PROPOSALS.) 1. Type of Well: Oil Well	Gas Well 🔲 Other Waste Water	Disposal Well	8. Well Number WDW #2
2. Name of Operator		ONS. DIV DIST.	9. OGRID Number 267595
Western Refining, Southwest, Inc.		UNA. DIV DIST.	3
3. Address of Operator		ADA 0 2047	10. Pool name or Wildcat SWD; Entrada
#50 County Road 4990 (PO Box 1	59), Bloomfield, NM 87413	AR 0 2 2017	SwD, Emrada
4. Well Location			Notice and the Res
Unit Letter H			'_feet from the <u>East</u> line
Section 27	Township 29N	Range 11W	NMPM San Juan County
	11. Elevation (Show whether DR,	RKB, RT, GR, etc.,	
	5535' GL		
		-turn of Mating	Poport or Other Data
12. Check	Appropriate Box to Indicate N	ature of Notice,	Report of Onler Data
NOTICE OF I	NTENTION TO:	SUB	SEQUENT REPORT OF:
PERFORM REMEDIAL WORK		REMEDIAL WOR	
TEMPORARILY ABANDON		COMMENCE DR	
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMEN	т јов
DOWNHOLE COMMINGLE	1		
CLOSED-LOOP SYSTEM		OTUED.	
OTHER: X	MIT, Kill Switch test & BH tests	OTHER:	d give pertinent dates, including estimated date
13. Describe proposed or com	pleted operations. (Clearly state and work) SEE PILLE 10 15 7 14 NMA(For Multiple Co	impletions: Attach wellbore diagram of
proposed completion or re	completion.	or ror munipre es	
proposed completion of re			
	· · · · · · · · · · · · · · · · · · ·	Intestion public of the	Il as a mechanical integrity test (MIT) on the 7"x4-
Western Refining Southwest, Inc. into	ads to perform a "kill switch" test on the	ad tests will also be r	Il as a mechanical integrity test (MIT) on the 7"x4- performed at the same time. The test(s) have been
scheduled with Monica Kueling to tak	e place on March 7, 2017.		
Solicities and the second s			
		Notify NMOCD prior to begin	24 hrs
		operation	ning s
8/15/2	2016	9/9/	2016
Spud Date: 6/15/2	2016 Rig Release Da	ate:	
Fully service and the service of the		C 1	and halief
I hereby certify that the information	on above-is true and complete to the b	best of my knowled	ge and bener.
SIGNATURE	TITLE E	ngineer/Agent	DATE <u>3/1/2017</u>
SIGNATORE		I BILLOUIT BOIL	
Type or print name John Th	ompson E-mail address:jo	hn@walsheng.net	PHONE: <u>505-320-1748</u>
For State Use Only	Ten		
- Ollow	1. Kulling	Deputy Oil 8	& Gas Inspervare 3-2-17
APPROVED BY:	4 Julhung TITLE		trict #3
Conditions of Approval (if any):	\sim	010	
			2 ² · · · · · · · · · · · · · · · · · · ·
			10 M
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NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM 87410 (505) 334-6178 FAX: (505) 334-6170 http://emnrd.state.nm.us/ocd/District N/3d/stric.htm

BRADENHEAD TEST REPORT

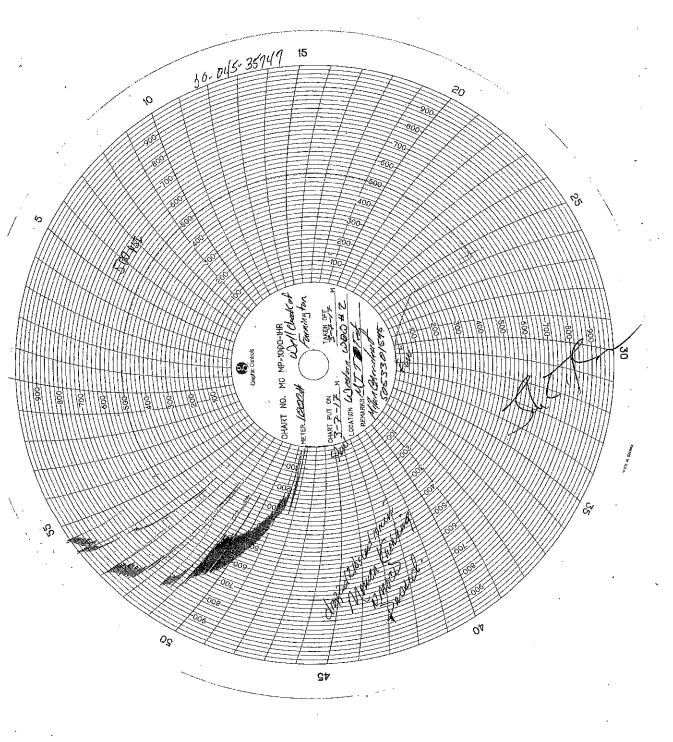
(submit 1 copy id above address)	
Date of Test	147
Property Name Waste D: 57 Surven No. 2 Location: Unit / Section 27 Township 2	
Well Status (Shut-In or Producing) Initial PSI: Tubing 30 SIntermediate 0 Casing 0 Brader	

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

			PRESSU	RE		FLOW CHARACTERISTICS		
Testing		Bradenl	nead	INTEI		BRADENHEAD INTERMEDIATE		
_	BH	Int	Csg	Int	Csg			
TIME 5 min	D	0	Û	0	0	Steady Flow		
10 min_	Ð	0	D	D	D	Surges		
15 min_	0	0	0	0	0	Down to Nothing		
20 min_						Nothing		
25 min_		ļ				Gas		
30 min_						Gas & Water		
						Water		
<u>If brade</u>	enhead	flowed v	vater, che	ck all of th	e descrip	otions that apply below:		
	CLEA	R	FRESH	[SALTY_	SULFURBLACK		
5 MINU	JTE SH	UT-IN I	PRESSUI	RE	BRADEN	IHEAD D INTERMEDIATE		
REMAR		BU. 1	tolli:	11 6 11	hem	opened - Nothing When popul		
all	15	NM	Duy on	it in	T.u.	t - 110 thing ut here a Renec (-		
A	flim	yW	itte je	Served	afte	1 5min shut in -		
By Cheffer Witness Monie Culling								
		1	s					
	(Posit	ion)						
E-mail a	ıddress							

NEW MEXICO ENE	RGY, MINERALS and
	URCES DEPARTMENT
Noncommut.	
MECHANICAL INTEG	
(TA OR)	Pl · surther its zenit
Date of Test_ <u>3-8-17</u> Operator Western Property Name UB ful ,'s Posa / Well Well #	Achung Ob API# 30-0 45 55 74 1
, 1	ч. Г
Land Type: State	Weil Type: Water Injection
Federal Private	Salt Water Disposal Gas Injection
Indian	Producing Oil/Gas Pressure obervation
F)	
Temporarily Abandoned Well (Y/N)/	TA Expires:
Casing Pres. 0 Tbg. SI Pres. Bradenhead Pres. 0 Tbg. Inj. Pres	
Tubing Pres. 30ϕ Int. Casing Pres. 0	
Pressured annulus up to	mins. Test passed/failed
REMARKS:	
PUCKEL pet 7230	1812
	Maria La
<u> </u>	Munutes.
By <u>646</u> Witness, (Operator Representative)	(NMOCD)
(Chermon refreseries)	
(Position)	Revised 02-11-02

Oil Conservation Division * 1000 Rio Brazos Road * Aztec, New Mexico 87410 Phone: (505) 334-6178 * Fax (505) 334-6170 * <u>http://www.emprd.state.nm.us</u>



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Submit 1 Copy To Appropriate District	State of New Mexico	Form C-103				
Office	Energy, Minerals and Natural Resource	Revised July 18, 2013				
<u>District 1</u> – (575) 393-6161 1625 N. French Dr., Hobbs, NM 88240	Ellergy, Millerals and Matalan Resource	WELL API NO.				
District II - (575) 748-1283	OIL CONSERVATION DIVISIO	NI 30-045-35747				
811 S. First St., Artesia, NM 88210		5. Indicate Type of Lease				
<u>District III</u> – (505) 334-6178 1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Francis Dr.	STATE FEE X				
District IV - (505) 476-3460	Santa Fe, NM 87505	6. State Oil & Gas Lease No.				
1220 S. St. Francis Dr., Santa Fe, NM						
87505 SUNDRY NO	FICES AND REPORTS ON WELLS	7. Lease Name or Unit Agreement Name				
(DO NOT USE THIS FORM FOR PROP	OSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A	A				
	ICATION FOR PERMIT" (FORM C-101) FOR SUCH					
PROPOSALS.) 1. Type of Well: Oil Well	Gas Well 🔲 Other Waste Water Disposal We	8. Well Number WDW #2				
2. Name of Operator		9. OGRID Number 267595				
Western Refining, Southwest, Inc.	h.					
3. Address of Operator		10. Pool name or Wildcat				
#50 County Road 4990 (PO Box	159), Bloomfield, NM 87413	SWD; Entrada				
4. Well Location						
Unit Letter H	: 2028 feet from the North line and	111' feet from the <u>East</u> line				
Section 27	Township 29N Range 11					
	11. Elevation (Show whether DR, RKB, RT, G					
	5535' GL					
12 Check	Appropriate Box to Indicate Nature of No.	otice. Report or Other Data				
12. Check	Appropriate Box to indicate relative of re-					
NOTICE OF I	NTENTION TO:	SUBSEQUENT REPORT OF:				
PERFORM REMEDIAL WORK] PLUG AND ABANDON 🗌 🛛 REMEDIAL	- WORK ALTERING CASING				
TEMPORARILY ABANDON	CHANGE PLANS COMMENC	CE DRILLING OPNS 🔲 P AND A				
PULL OR ALTER CASING	MULTIPLE COMPL CASING/C	EMENT JOB				
CLOSED-LOOP SYSTEM						
OTHER:	OTHER:	X MIT, Kill Switch test & BH tests				
13. Describe proposed or con	pleted operations. (Clearly state all pertinent deta	ails, and give pertinent dates, including estimated date				
of starting any proposed v	vork). SEE RULE 19.15.7.14 NMAC. For Multi	ple Completions: Attach wellbore diagram of				
proposed completion or re						
On 2/7/2017 Western Patining South	est, Inc. performed bradenhead tests on the bradenhead	and intermediate casing strings. Also performed a				
mechanical integrity test (MIT) on the	7"x4-1/2" annulus and packer to 500 psi – held for 30	min (with a 2 psi drop off after 30 mins). Also, performed a				
"kill switch" test on the injection pum	which was set at 1200 psi $-$ tested good. All tests pas	sed and were witness by Monica Kueling with the NMOCD				
Aztec office. Ms. Kueling kept all cha	rts and paperwork related to the tests. Ms. Kueling also	o authorized for water injection to begin on 3/7/2017.				
		OIL CONS. DIV DIST. 3				
		MAR 1 3 2017				
Snud Data: 8/15/2	016	9/9/2016				
Spud Date: 6/13/2	Rig Release Date:	7772010				
P						
I hereby certify that the informatio	n above is true and complete to the best of my kno	owledge and belief.				
		DATE 2/2/2012				
SIGNATURE	TITLE Engineer/Agen	tDATE <u>3/7/2017</u>				
Type or print name John The	ompson E-mail address: john@walsheng	g.net PHONE: 505-320-1748				
For State Use Only						
Demitte Oild (see						
APPROVED BY: / OMCG (uchlegoTITLE Inspector DATE 3-22-1)						
Conditions of Approval (if any):	~ / P	/				

2			T (102	
Submit 1 Copy To Appropriate District Office	State of New Mexico		Form C-103 Revised July 18, 2013	
District I - (575) 393-6161	Energy, Minerals and Natural Resources		WELL API NO.	
1625 N. French Dr., Hobbs, NM 88240 District II – (575) 748-1283	OIL CONSERVATION	NOISIMU	30-045-35747	
811 S. First St., Artesia, NM 88210 District III - (505) 334-6178	5. First St., Artesia, NM 88210 OIL CONSERVATION DIVISION		5. Indicate Type of Lease	
1000 Rio Brazos Rd., Aztec, NM 87410	Santa Fe, NM 87		STATE FEE X 6. State Oil & Gas Lease No.	
<u>District IV</u> – (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM	Sunta 10, 1010	505	0. State off & Gas Lease 110.	
87505	OPS AND REPORTS ON WELLS		7. Lease Name or Unit Agreement Name	
SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A			7. Lease Ivanie of Onicitigreement runne	
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH				
PROPOSALS.) 1. Type of Well: Oil Well Gas Well Other: <u>Wastewater Disposal Well</u>			8. Well Number WDW #2	
2. Name of Operator			9. OGRID Number 267595	
Western Refining Southwest, Inc.			10. Pool name or Wildcat	
3. Address of Operator #50 County Pood 4000 (PO Box 15	(9) Bloomfield NM 87413		SWD; Entrada	
#50 County Road 4990 (PO Box 159), Bloomfield, NM 87413 4. Well Location				
	2028 feet from the Nort	h line and 11	' feet from the <u>East</u> line	
Section 27	Township 29N	Range 11W	NMPM San Juan County	
Beetion 27	11. Elevation (Show whether DR			
	5535' GL			
12. Check A	Appropriate Box to Indicate N	ature of Notice,	Report or Other Data	
NOTICE OF IN	TENTION TO	SUB	SEQUENT REPORT OF:	
PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WOR		
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DR		
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMEN	т јов 🗌	
CLOSED-LOOP SYSTEM		OTHER: X : MIT.	Bradenhead, and High Pressure Shutdown Tests	
13. Describe proposed or comp	leted operations. (Clearly state all	pertinent details, an	d give pertinent dates, including estimated date	
of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of				
proposed completion or rec	ompletion.			
		. 1.1	to the second	
On June 8th, 2017, Western Refining Southwest, Inc. ("Western") conducted the following tests were performed on WDW #2:				
• Braden Head Test: The Bradenhead Test was performed on the bradenhead and intermediate casing strings.				
• Mechanical Integrity Test (MIT): The MIT was performed on the 7"x4-1/2" annulus and packer to 500 psi. The pressure was				
held for 30 minutes.				
• High-Pressure Shutdown: The high-pressure shutdown setting was tested on the injection pump.				
All were witness by Monica Kueling with the NMOCD Aztec office. All tests passed. A copy of the test reports are attached for reference. At the end of testing, Ms. Kueling witnessed the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and provided Dip COM Sor Defended in the start-up of the injection well pump and pump and pump and pump and pump a				
operation. Normal full-time operation of the WDW#2 resumed by approximately 2:20pm on June 8 th , 2017.				
operation. Tromai fun time operation	in of the William Presenter of app-		JUN 12 2017	
			301112 2011	
Spud Date:	Rig Release Da	te:		
Spud Date.				
×				
I hereby certify that the information above is true and complete to the best of my knowledge and belief.				
SIGNATURE Kolly Kolle TITLE Environmental Supervisor DATE 6/9/2017				
Type or print name <u>Kelly Rob</u>	inson E-mail address. Kelly	Robinson@wnr.com	n PHONE:505-632-4166	
For State Use Only	<u>inson</u> D-man address. <u>Keny</u> ,			
<u></u>	7,1		2/2/2	
APPROVED BY: Drol 6-4	TITLE Der	District	s Inspector, DATE 7/3/17	
Conditions of Approval (if any):		DISTLICT		

Submit 1 Copy To Appropriate District	State of New Me		Form C-103	
<u>District I</u> – (575) 393-6161 1625 N. French Dr., Hobbs, NM 88240	Energy, Minerals and Natural Resources		Revised July 18, 2013 WELL API NO.	
<u>District II</u> – (575) 748-1283 811 S. First St., Artesia, NM 88210	OIL CONSERVATION		30-045-35747 5. Indicate Type of Lease	
District III (505) 334-6178 1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Fran		STATE FEE X	
<u>District IV</u> – (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM 87505	Santa Fe, NM 87	505	6. State Oil & Gas Lease No.	
SUNDRY NO	FICES AND REPORTS ON WELLS OSALS TO DRILL OR TO DEEPEN OR PLU JCATION FOR PERMIT" (FORM C-101) FO	IG BACK TO A R SUCH	7. Lease Name or Unit Agreement Name	
PROPOSALS.) 1. Type of Well: Oil Well	Gas Well 🔲 Other: Wastewater Disposal Well		8. Well Number WDW #2	
2. Name of Operator	Dr		9. OGRID Number 267595	
Western Refining Southwest, Inc. 3. Address of Operator		10. Pool name or Wildcat		
#50 County Road 4990 (PO Box	159), Bloomfield, NM 87413		SWD; Entrada	
4. Well Location			1. Cost Coss the Test line	
Unit Letter H Section 27		Range 11W	<u>L'feet from the East</u> line NMPM San Juan County	
Section 27	11. Elevation (Show whether DR,			
	5535' GL			
12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data				
PERFORM REMEDIAL WORK TEMPORARILY ABANDON PULL OR ALTER CASING DOWNHOLE COMMINGLE CLOSED-LOOP SYSTEM OTHER	CHANGE PLANS	REMEDIAL WOR COMMENCE DR CASING/CEMEN OTHER: X : MIT, I	ILLING OPNS P AND A	
 Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion. 				
On June 8th, 2017, Western Refining Southwest, Inc. ("Western") conducted the following tests were performed on WDW #2:				
• Braden Head Test: The Bradenhead Test was performed on the bradenhead and intermediate casing strings.				
 Mechanical Integrity Test (MIT): The MIT was performed on the 7"x4-1/2" annulus and packer to 500 psi. The pressure was held for 30 minutes. 				
• If the high-pressure shutdown: The high-pressure shutdown setting was tested on the injection pump.				
All were witness by Monica Kueling with the NMOCD Aztec office. All tests passed. A copy of the test reports are attached for reference. At the end of testing, Ms. Kueling witnessed the start-up of the injection well pump and provided approval for return to full operation. Normal full-time operation of the WDW#2 resumed by approximately 2:20pm on June 8 th , 2017.				
Spud Date:	Rig Release Dat	e:		
I hereby certify that the information above is true and complete to the best of my knowledge and belief.				
SIGNATURE Killy Koulder TITLE Environmental Supervisor DATE 6/9/2017				
Type or print name Kelly Robinson E-mail address: Kelly.Robinson@wnr.com PHONE: 505-632-4166 For State Use Only				
APPROVED BY: Cond , Wing TITLE Environment of Engineer DATE 6/9/2017 Conditions of Approval (if any)				

The second time way have

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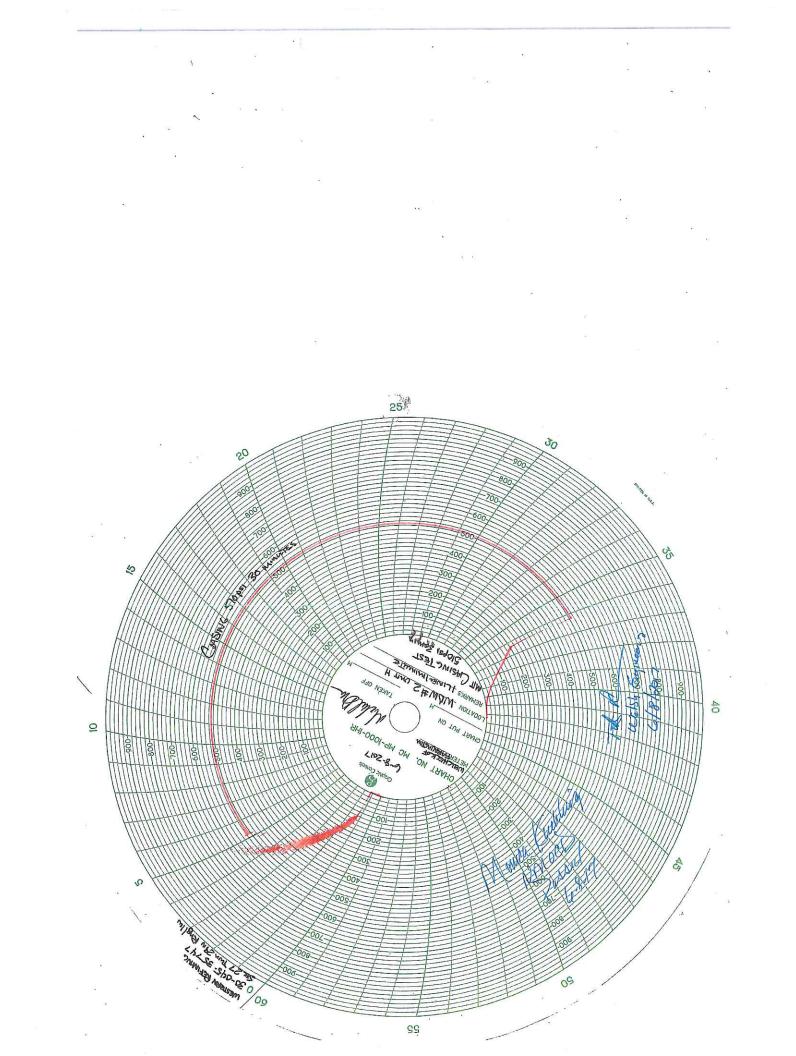


NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA	A OR UIC)
Date of Test $6 - 8 - 17$ Operator We	tern Ref. Sw Jm Spi # 30-0 45- 35747
Property Name Vaste Disp. Well Well	# $\frac{1}{2}$ Location: Unit $\frac{1}{4}$ Sec $\frac{27}{7}$ Wm $\frac{29}{8}$ Rge $\frac{11}{2}$
Land Type: State Federal Private Indian	Well Type: Water Injection Salt Water Disposal Gas Injection Producing Oil/Gas Pressure obervation
Temporarily Abandoned Well (Y/N):	TA Expires:
	I Pres Max. Inj. Pres j. Pres
Int. Casing Pres Pressured annulus up topsi. for	30 mins. Test passed/failed
REMARKS:	
Pucker Set 723	
-top	Dub 1312-1470
dropped to sos held las	t 15 min.
By(Operator Representative)	Turess Monula Kuelleng (NMOCD)
(Position)	Revised 02-11-02

Oil Conservation Division * 1000 Rio Brazos Road * Aztec, New Mexico 87410 Phone: (505) 334-6178 * Fax (505) 334-6170 * <u>http://www.emnrd.state.nm.us</u>



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	IEW MEXICO 2 NATURAL]) ENERGY, M RESOURCES 1	NERALS DEPARTMENT	http://er	OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM 87410 (505) 334-6178 FAX: (505) 334-6170 mnrd.state.nm.us/ocd/District III/3distric.htm
	a X	BRADENHE (submit 1 co	AD TEST REPO	DRT	. ,
Date of Test	6-8-17	Operator	1		0-0-45-35747
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E-mail address _					

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Submit 1 Copy To Appropriate District	State of New Me	xico	Form C-103
Office <u>District 1</u> – (575) 393-6161	Energy, Minerals and Natu	ral Resources	Revised July 18, 2013 WELL API NO.
1625 N. French Dr., Hobbs, NM 88240 District II – (575) 748-1283	OIL CONSERVATION	DIVISION	30-045-35747
811 S. First St., Artesia, NM 88210 District III – (505) 334-6178	1220 South St. Frat		5. Indicate Type of Lease STATE FEE X
1000 Rio Brazos Rd., Aztec, NM 87410 District IV – (505) 476-3460	Santa Fe, NM 87		STATE FEE X 6, State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM			
(DO NOT USE THIS FORM FOR PROP	FICES AND REPORTS ON WELLS OSALS TO DRILL OR TO DEEPEN OR PLI LICATION FOR PERMIT" (FORM C-101) FO	UG BACK TO A	7. Lease Name or Unit Agreement Name
PROPOSALS.) 1. Type of Well: Oil Well	Gas Well 🔲 Other: Wastewater		8. Well Number WDW #2
2. Name of Operator		<u></u>	9. OGRID Number 267595
Western Refining Southwest, Inc 3. Address of Operator			10. Pool name or Wildcat
#50 County Road 4990 (PO Box	159), Bloomfield, NM 87413		SWD; Entrada
4. Well Location			
Unit Letter H			'feet from the line
Section 27	Township 29N 11. Elevation (Show whether DR	Range 11W RKB RT GR etc.)	NMPM San Juan County
	5535' GL		
10 01 1	4	the of Notion	Peret of Other Date
12. Check	Appropriate Box to Indicate N		
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PULL OR ALTER CASING		CASING/CEMENT	ГЈОВ 🗋
DOWNHOLE COMMINGLE			
OTHER:		OTHER: X : MIT, E	and High Pressure Shuldown Tests
 Describe proposed or com of starting any proposed v proposed completion or re 	work). SEE RULE 19.15.7.14 NMAG	perfment defails, and C. For Multiple Cor	l give pertinent dates, including estimated date npletions: Attach wellbore diagram of
On June 8th, 2017, Western Refinir	ng Southwest, Inc. ("Western") condu	acted the following t	tests were performed on WDW #2:
	Bradenhead Test was performed on t		
			nulus and packer to 500 psi. The pressure was
	n: The high-pressure shutdown settin	ng was tested on the	injection pump.
reference. At the end of testing, M	ng with the NMOCD Aztec office. A s. Kueling witnessed the start-up of t tion of the WDW#2 resumed by appr	he injection well pu	opy of the test reports are attached for mp and provided approval for return to full on June 8 th , 2017.
	······		
Spud Date:	Rig Release Da	te:	
I hereby certify that the information	n above is true and complete to the b	est of my knowledge	e and belief.
	JUUDU TITLE EN		
Type or print name Kelly Ro	binson E-mail address: <u>Kelly.</u>	<u>Robinson@wnr.com</u>	PHONE; <u>505-632-4166</u>
		· +1 =	DATE 6/9/2017
Conditions of Approval (if any).	TILLS CAY	ILOW WOWLAN S	Engineer DATE 6/9/2017

and the set and

Submit I Copy To Appropriate District Office	State of New Me		Form C-103 Revised July 18, 2013
District 1 - (575) 393-6161 1625 N. French Dr., Hobbs, NM 88240	Energy, Minerals and Natu	iral Resources	WELL API NO.
District II (575) 748-1283	OIL CONSERVATION	DIVISION	30-045-35747
811 S. First St., Artesia, NM 88210 District III (\$0\$) 334-6178	1220 South St. Fran		5. Indicate Type of Lease STATE FEE X
1000 Rio Brazos Rd., Aztec, NM 87410 District IV - (505) 476-3460	Santa Fe, NM 8	7505	6. State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM			Constraint Constraint Straint Straint Constraint Constraint Constraint Straint Straint Straint
87505 SUNDRY NOT	TICES AND REPORTS ON WELLS		7. Lease Name or Unit Agreement Name
(DO NOT USE THIS FORM FOR PROP DIFFERENT RESERVOIR. USE "APPL	DSALS TO DRILL OR TO DEEPEN OR PLI ICATION FOR PERMIT" (FORM C-101) FO	UG BACK TO A	
PROPOSALS.) 1. Type of Well: Oil Well	Gas Well 🔲 Other Waste Water	Disposal Well	8. Well Number WDW #2
2. Name of Operator			9. OGRID Number 267595
Western Refining, Southwest, Inc 3. Address of Operator	2		10. Pool name or Wildcat
#50 County Road 4990 (PO Box	159), Bloomfield, NM 87413		SWD; Entrada
4. Well Location			
Unit LetterH		a see	1 st feet from the <u>East</u> line
Section 27	Township 29N	Range 11W	NMPM San Juan County
	11. Elevation (Show whether DR 5535' GL	, RKB, RT, GR, etc	
12. Check	Appropriate Box to Indicate N	lature of Notice,	, Report or Other Data
NOTICE OF	NTENTION TO:	I SHE	SEQUENT REPORT OF:
PERFORM REMEDIAL WORK		REMEDIAL WOR	
TEMPORARILY ABANDON		COMMENCE DR	
PULL OR ALTER CASING		CASING/CEMEN	ІТ ЈОВ 🔲
DOWNHOLE COMMINGLE		а.	
CLOSED-LOOP SYSTEM		OTHER: X	Fracture Stimulate Entrada
13. Describe proposed or com	pleted operations. (Clearly state all	pertinent details, an	nd give pertinent dates, including estimated date
		C. For Multiple Co	mpletions: Attach wellbore diagram of
proposed completion or re	completion,		
			(1. (2210) 2420)
Western Refining Southwest, Inc. inter white sand in a 23 lb cross linked gel s	ids to fracture slimulate the Entrada throus ystem at rates of ~ 50 bpm. Please see at	ugh the existing period	prations (7312' - 7470') w/ 246,000 lbs of premium
and and in a so is often intered Bar a			
	11 8 2		
Saud Data: 8/15/2	016	0/0/	2016
Spud Date: 6/13/2	Rig Release Da	ite:	2010
I hereby certify that the information	n above is true and complete to the b	est of my knowled	ge and belief.
AC			
SIGNATURE Loll C		igincer/Agent	DATE 4/7/2017
Type or print name John The	mpson E-mail address: jol	m@walsheng.net	PHONE: <u>505-320-1748</u>
For State Use Only	-		
APPROVED BY: Carl 1.	Chines TITLE S.	ironmental i	Engineer DATE 4/24/2017
Conditions of Approval (if any):			

Western Refining Southwest, Inc. (UICI-011) UIC Class I (Non-hazardous) Injection Well WDW-2 (API #: 30-045-35747)

C-103 "Fracture Stimulate Entrada" OCD Santa Fe and Aztec District Conditions of Approval (4/26/2017)

1) The operator shall submit a "Net Pressure Plot" from fracture stimulation within 30-days of well work completion. The plot shall verify that any or all fracturing occurred within the Entrada Formation.

2) The Oil and Gas Act applies to all UIC Class II operations on all lands within the state of New Mexico including federal lands. OCD Rule 19.15.16 NMAC was amended pursuant to the Oil and Gas Act and hydraulic fracturing fluid disclosure form requirements became effective February 12, 2012. 19.15.16.19(A) NMAC requires that "within 20 days after the completion of a well drilled under oil or gas laws, or the recompletion of a well into a different common source of supply, the operator shall file a completion report with the division . ..[disclosing] whether the well has been hydraulically fractured." Rule 19.15.16.19(B) NMAC requires that "for a hydraulically fractured well, the operator shall also complete and file the OCD's hydraulic fracturing disclosure form within 45 days after completion of the well." Disclosure on FracFocus is not a substitute for the Rule 19.15.16.19 NMAC disclosure requirements. Operators who have not complied with Rule 19.15.16 NMAC disclosure requirements and do not submit the OCD's hydraulic fracturing disclosure form will be considered in violation of 19.15.16 NMAC and the Oil and Gas Act.

3) The operator shall comply with the applicable provisions of the OCD approved Discharge Permit, i.e., MITs after well workovers.

Please be advised that OCD approval does not relieve Western Refining Southwest, Inc. from responsibility should its operations pose a threat or impact to groundwater, human health or the environment. In such event, OCD may order the operator to plug and abandon its well pursuant to the Water Quality Control Commission Regulations. In addition, OCD approval does not relieve Western Refining Southwest, Inc. of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Western Refining, Southwest - WDW #2

2028' fnl & 111' fse SECTION 27, T29N, R11W SAN JUAN COUNTY, NEW MEXICO API #: 30-045-35747

ENTRADA STIMULATION POCEDURE

See WBD for wellbore information

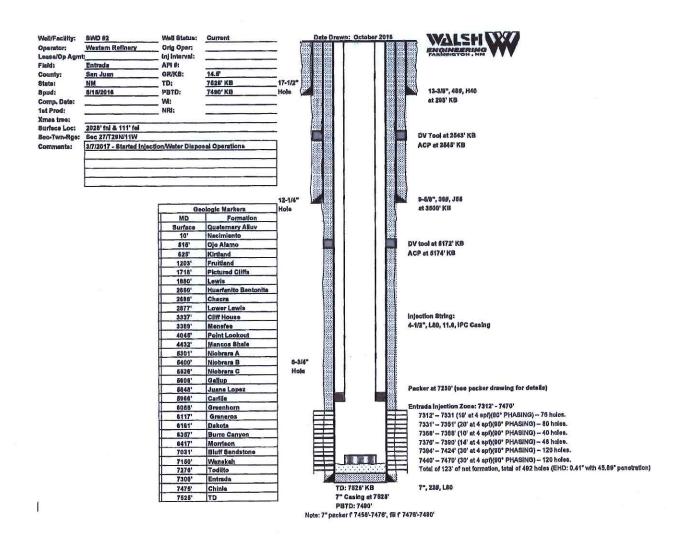
- 1. All personal must check in at Western office prior to entering location.
- 2. Spot 8 ea. 400 bbl frac tanks and fill with 2% KCI water (may use water from refinery if chemical tests show that water is compatible with Halliburton Delta 200 system).
- 3. RU slick line company and RIH w/ 2.81" blanking plug and set in XN Profile Nipple in Weatherford packer that is set at 7230' KB.
- 4. MOL & RU service rig. ND WH & NU BOPE. Set pipe racks for laying down/picking up casing.
- TOH, laying down 4-1/2" IPC casing string and seal assembly.
- 6. Install seal assembly with 3-1/2" change over. PU and RIH w/ 3-1/2" casing
- 7. Space out & land in WH with tubing hanger. NU WH & 10K frac valve.
- 8. RD rig & related equipment & MOL. Have slick line pull blanking plug from packer. SD operations until frac crew is available.
- 9. RU Halliburton Frac crew. PT pumps & lines to 9000 psi. Note: Max STP for job is 8100 psi
- 10. Note: Refer to Halliburton Procedure for Frac Details. Frac Entrada with 246,000# 20/40 Premium White sand In 107,900 gal of 23# X-linked gel water@ 50 BPM. Bottom hole pressure to be monitored by computer van. All sand to be tagged w/ 0.40 mci/1000# Ir-192 tracer. Anticipated surface pressure= 2350 psi. Max pressure = 3500 psi. Frac using the following schedule:

STAGE	Clean Volume (GALS.)	Sand (lbs)
Pad	20,000	
1.0 ppg	19,500	19,500
2,0 ppg	18,500	37,000
3.0 ppg	17,500	52,500
4.0 ppg	25,000	100,000
5.0 ppg	7400	37,000
Flush	<u>3121</u>	all brain an an bh
Totals	111,021	246,000#

- 11. Make all sand is displaced below packer. RD & Release frac crew. Consolidate frac water and release frac tanks. RU slick line & RIH w/ 2.81" blanking plug and set in XN profile nipple in packer.
- 12. MOL & RU. Remove frac valve & NU WH & BOPE. Set pipe racks for laying down/picking up casing.

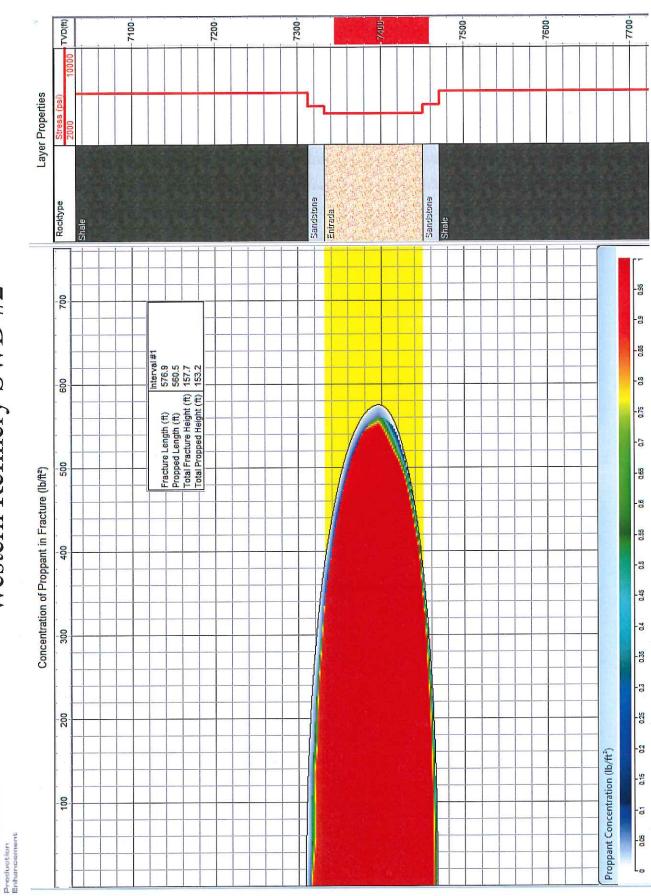
- 13. Lay down 3-1/2" frac string & haul back to Cave Tubulars.
- 14. RIH w/ seal assembly and 4-1/2" IPC casing. Circulate "packer fluid" and land in packer/wellhead as before. Pressure up one 4-1/2" & 7" annulus to 500 psi and make sure it holds and will pass MIT test.
- 15. RU slickline & RIH. Retrieve blanking plug from profile nipple in packer.
- 16. Monitor well for pressure, which will determine if flowback will be necessary or clean operations can begin.
- 17. After flowback, PU 2-3/8" work string w/ 1-1/4" tail pipe to clean through and below 7" packer.
- 18. Reverse out down to PBTD (7476'). Once, sand inflows have diminished TOH, laying down 2-3/8" work string and tailpipe.
- 19. Set blanking plug in packer w/ slick line (if necessary). ND BOP & related equipment. NU WH and manifold flowlines back in place.
- 20. Remove blanking plug from packer. Return well to injection status. Schedule MIT w/ NMOCD.

John Thompson Engineer Walsh Engineering & Production Corp.



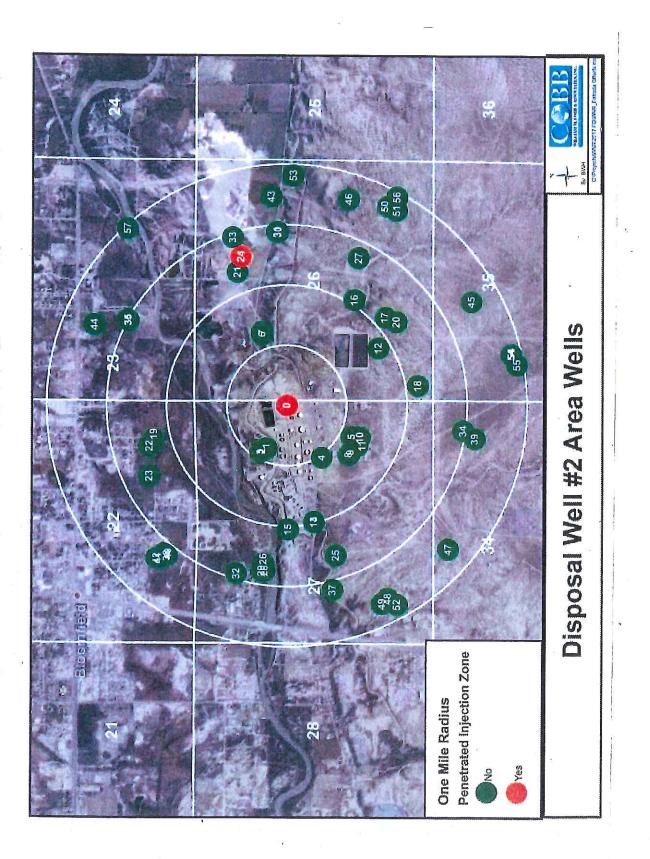
HALLIBURTON

Western Refinery SWD #2



ATTACHMENT D

Area of Review



Wells
Area
and
Vell #2
Disposal V

FRE-UNGARD VYELE V 30-049-07.000 DISDASAI - 30.045 20003

Disposal Well #2 and Area Wells

Pne Inj	Zone	No	No	No No	°N No	o Z	No	No	No	No	å	No	°Z	οN	°N	No	8	No	°Z	No No	No No	οN	°N N	No	No	No	No	0Z	0N N	
	Status	INACTIVE	Р&А	P&A	ACTIVE	ACTIVE	INACTIVE	ACTIVE	ACTIVE	ACTIVE	ACTIVE	Ρ&Α	ACTIVE	ACTIVE	ACTIVE	Р&А	ACTIVE	ACTIVE	ACTIVE	Ρ&Α	ACTIVE	INACTIVE	ACTIVE	ACTIVE	Р&А	Р&А	ACTIVE	INACTIVE	INACTIVE	
	Reservoir	CHACRA	DAKOTA	DAKOTA	FRUITLAND COAL	CHACRA	CHACRA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	FRUITLAND SAND	FRUITLAND SAND	GALLUP	CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	GALLUP	DAKOTA	PICTURED CLIFFS	FRUITLAND COAL	GALLUP	CHACRA	DAKOTA	PICTURED CLIFFS	FARMINGTON	DAKOTA	MANCOS	CHACRA	
	Operator	HOLCOMB OIL& GAS	BP AMERICA	BURLINGTON	HOLCOMB OIL& GAS	MANANA GAS INC	HILCORP ENERGY	MANANA GAS INC	MANANA GAS INC	MANANA GAS INC	HOLCOMB OIL& GAS	PRE-ONGARD WELL	HILCORP ENERGY	SOUTHLAND ROYALTY	SOUTHLAND ROYALTY	PRE-ONGARD WELL	SOUTHLAND ROYALTY	HILCORP ENERGY	HILCORP ENERGY	BURLINGTON	HOLCOMB OIL& GAS	HOLCOMB OIL& GAS	HILCORP ENERGY	HILCORP ENERGY	CHAPARRAL ENERGY	GENERAL MINERALS	XTO ENERGY, INC.	XTO ENERGY, INC.	XTO ENERGY, INC.	
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Perf Perf Botto Total	E	2761	6182 6182 P	2 6214 6214 P&A	1661 6214		2857 2857	1608 1608	6226 6226	1410 1410	1478 1478	1468 1468 P&A	5943 5943	2856 2856	5970 5970	1747 1747 P&A		5530 5530	6363 6363	1678 1678 P&A	1706 5622	5622 5622	2906 6328	6328 6328	1790 1790 P&A	945 945 P&A				ated for area
	# API No	1 30-045-23550 2746	1 30-045-07985 6154	1 30-045-07835 6102	1 30-045-07835 1388	1 30-045-26731 2622	9 30-045-24574 2747	1 30-045-34312 1440	1 30-045-07940 6052 (2 30-045-13089 1390		1 30-045-08009 1443	15 30-045-25675 5369 5	10 30-045-21457 2852 20	15 30-045-25707 5326 59	1 30-045-07903 1664 17		2 30-045-25195 5346 54	1E 30-045-24772 6209 6	30-045-21732 1648	1535	2 30-045-25621 5264 5	4E 30-045-24837 2784 2		1 30-045-20752 1776 1					* Estimated

ATTACHEMNT E

2017 Fall-Off Test and Down-Hole Pressure Survey Report



March 20, 2018

Mr. Carl Chavez New Mexico Oil Conservation Division, Environmental Bureau 1220 South St. Frances Drive Santa Fe, New Mexico 87505

FedEx Tracking #: 7718 0112 0174

RE: Western Refining Southwest, Inc. – Bloomfield Terminal 2017 Fall-Off Test Response to Comments dated February 21, 2018 Permit #: UIC-CL-011

Mr. Chavez,

Western Refining Southwest, Inc. ("Western") received comments from the New Mexico Oil Conservation Division ("NMOCD") on February 21, 2018 via e-mail regarding the 2017 Class 1 Non-Hazardous Injection Well Fall-Off Test conducted at the Bloomfield Terminal. This letter and enclosed updated Fall-Off Test Report address NMOCD's comments and provide the additional clarification requested:

- The updated reservoir analysis better addresses the flow regimes which are:
 - o Transient linear flow early in the falloff test,
 - o Transient radial flow late in the falloff test,
 - o Radial flow was not observed on the test, and
 - o Radial flow is not expected with any test of a reasonable time period.
- Analysis of the two transient flow regimes gives a good understanding of the reservoir properties.
- All testing was successful and meets both the OCD and EPA requirements.

If you have any questions or additional requests for information, please feel free to contact me at your convenience at (505) 632-4166.

Sincerely,

Kelly R. Robinson Environmental Supervisor Western Refining Southwest, Inc.

- cc: B. Powell NMOCD (Aztec District Office) via e-mail
 J. Griswold NMOCD (Santa Fe Office) via e-mail
 B. Davis Western Refining (Albuquerque)
 T. Roberts Western Refining (Bloomfield)
 - A. Hains Western Refining (El Paso)

50 Road 4990, Bloomfield, New Mexico 87413 • 505 632-8013 • www.wnr.com

WILLIAM M. COBB & ASSOCIATES, INC.

Worldwide Petroleum Consultants

12770 Coit Road, Suite 907 Dallas, Texas 75251 (972) 385-0354 Fax: (972) 788-5165 E-Mail: office@wmcobb.com

March 19, 2018

Mr. Bruce Davis Western Refining Southwest, Inc. Bloomfield Terminal P.O. Box 159 Bloomfield, New Mexico 87413

Re: Waste Disposal Well #2 October 2017 Falloff Test OGRID No. 267595 Update to December 12, 2017 report

Dear Mr. Davis:

Western Refining retained William M Cobb & Associates, Inc to perform the annual bottomhole pressure survey and pressure falloff test analysis on Waste Disposal Well #2. A pressure fall-off test (FOT) and bottomhole pressure survey were conducted on the well at the Western Refining Bloomfield Terminal facility near Bloomfield, New Mexico. The well tests were conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Falloff Test Guidelines, dated December 3, 2007. The 2017 pressure falloff test procedure was conducted in accordance with the USEPA's Region 6 "Pressure Falloff Testing Guidelines, Third Revision", dated August 8, 2002, and required by the State of New Mexico as of December 3, 2007. The pressure falloff test and bottomhole pressure survey performed on Waste Disposal Well No. 2 also met the New Mexico Oil Conservation Division's (NMOCD's) requirements for such testing. Note: There are references made in this report to the permit document on file with the OCD for Western Refining in Bloomfield, New Mexico.

FACILITY INFORMATION

Name:	Western Refining Southwest, Inc.
Location:	50 County Road 4990 (PO Box 159)
	Bloomfield, New Mexico 874 13

WELL INFORMATION

Well Name & No.	OCD UIC or Discharge Plan Permit Number	Well Classification	API Number	Legal Location
WDW #2	UICI-011	Class I Non-hazardous	30-045-35747	2028 FNL, 111 FEL, H Sec 27 T29S R11E

All depths in this report are referenced to ground level (GL) from the drilling rig rotary kelly bushing (RKB), unless the depth is specified as RKB or GL within this document. Appendix A contains the well schematic for Western's Waste Disposal Well No. 2 (WDW-2) and a section of the log covering the perforated interval. Appendix B is a summary of the injection intervals for the well.

The fluid used for the injection test is the terminal treated waste water (effluent). A current waste water (effluent) analysis collected on September 13, 2017 is included in Appendix C. A summary of the formation water is also in Appendix C. The formation water analyses taken on January 25, 2017 is included.

Appendix D contains three well logs for WDW #2 ran by Schlumberger on September 5, 2016. They are: 1) Array Induction log, 2) Neutron Litho density long, and 3) Triple Combo log.

REPORT OF EVENTS

October 2, 2017 8:00 AM – The pre-test injection flow test begins.

October 3, 2017 9:02 AM – Tefteller, Inc. runs tandem bottomhole pressure gauges in the well to monitor the falloff portion of the test.

October 3, 2017 9:36 AM - pre-flow period begins.

- October 5, 2017 11:08 AM well is flowing at 13.84 GPM with an average rate of 14.1 GPM for the 75 hour period. Well is shut-in for falloff test.
- October 13, 2017 8:39 AM falloff test ends after 189.5 hours. A pressure gradient survey is conducted as pressure gauges are retrieved from well.

GENERAL TEST OPERATIONAL CONSIDERATIONS

The falloff testing for WDW-2 was conducted with tandem bottomhole pressure memory gauges with a pre-flow period beginning at 8:00 AM on October 2, 2017 and ending at 8:39 AM on October 13, 2017. The average flow rate for the 75 hour period prior to the beginning of the falloff test was 14.1 GPM with a final flowing rate of 13.84 GPM. On the morning of October 3, 2017, tandem bottom hole pressure memory gauges were lowered into the well and allowed to stabilize. Lowering the gauges in the well had no impact on rates and a minimal impact on surface injection pressures. The well was shut-in for 189.5 hours ending at 8:39 AM on October 13, 2017. Field data are included in Appendix E.

At the end of the falloff test, the bottomhole pressure gauges were pulled from the well making gradient stops every 1,000 feet. Key test data are summarized as follows:

Event	Flow Rate – GPM	Surface PSIG	Bottomhole PSIG	Date/Time
Start of flow	0.0	1040.3	N.A.	10/2/2017 8:00 AM
Final flow rate	13.84	1226.8	4396.7	10/5/2017 11:08 AM
Final falloff pressure	0.0	861	4012.6	10/13/2017 8:39 AM

Final surface pressure	0.0	861	N.A.	

The memory gauges used are SP-2000 hybrid-quartz gauges provided by Tefteller, Inc. that have a resolution of 0.01 psi and an accuracy of ± 0.05 percent of full scale. The pressure range of the gauges were from 0 - 5,000 psi minimum. The gauges were lowered to the top of the injection interval at 7,312 feet. The recording period was set to record pressures at a minimum of every five minutes and more frequently during the early part of the falloff test period. Calibration certificates are included in Appendix F.

GEOLOGY

The injection zone is the Entrada sandstone formation. The formations occur in Waste Disposal Well No. 2 at the depths shown in the table below. The injection zone is shown in Waste Disposal Well No.2 logs in Appendix D.

Injection Zone Formation	Waste Disposal Well #2 (KB elev = 5,550 ft)					
	MD below KB (ft)	SS Depth (ft)				
Bluff Sandstone	Not completed	7031				
Entrada Sandstone	7312 to 7470	7308				

The Jurassic aged Entrada Sandstone is thought to be one of the best water disposal rock units in the San Juan Basin. The Entrada is the basal formation of the San Rafael Group which also includes the Todilto and Wanakah Formations The Entrada Sandstone is present throughout the basin's subsurface and crops out along the it's margin as step cliffs. The Entrada unconformably overlies the Chinle Formation. The overlying Todilto Formation made up of limestone and anhydrite in dense and thought to an impermeable barrier or seal.

The Entrada Sandstone consists of mottled reddish-brown very fine to medium grained wellsorted, silica cemented quartz sandstone interbedded with thinner reddish-brown siltstones. The sandstone units are assembled in high-angle, large-scale crossbeds indicating eolian environment deposition and with the siltstones representing interdue and sabkha deposition. The cross-stratified sandstone is competent, laterally persistent and with homogenous reservoir properties. Entrada Sandstone gross thickness ranges 60 feet to 330 feet across the basin.

At the Water Disposal Well #2 location the Entrada is 158 feet thick. Based upon the nearby XTO Energy Ashcroft SWD #1 water disposal well density porosities are up to 18 percent with the most porous interval found in the upper 90 feet of the formation where the majority of the density porosities are more than 10 percent. Water Disposal Well #2 has a density porosity of 12.1 percent. The two intervals with the highest porosity are 20 feet from 7,333 feet to 7,353 feet with 14.1 percent porosity and 26 feet from 7,442 feet to 7,468 feet with 14.3 percent porosity.

Permeability for the well as measured by this falloff test is 3.29 md or less.

PREVIOUS FALLOFF TESTS

This is a new disposal well. There are no previous falloff tests.

ANNULUS PRESSURE TESTING

On June 8, 2017, an Annulus Pressure Test (APT) was conducted. The annulus was pressured up to 510 psig and held for 15 minutes. The test was witnessed by the NMOCD and by the operator. The test report and chart recording of the pressure in included in Appendix G and has been reported to the NMOCD using form C-103.

EVALUATION OF THE TEST RESULTS

The raw test data from the test are included in Appendix E with an injection history in Appendix J. This includes details of the build-up portion of the October 2017 test. These falloff data are presented in Figure 1 showing pressure and temperature during the falloff test. The falloff data show no unexpected pressure changes. The pressure drops quickly during the first few minutes and then continues to decline as the pressure in the reservoir adjusts to the no-flow period.

A log-log plot, Figure 2, with a derivative diagnostic plot is used to identify flow regimes as described by Dr. John Lee in chapter 6 of "Estimating Ultimate Recovery of Developed Wells in Low-Permeability Reservoirs" or Monograph 4 published by the Society of Petroleum Evaluation Engineers in 2016. Figure 6.5 of that chapter notes that a slope of $\frac{1}{2}$ is characteristic of transient linear flow. This plot shows a slope of near to 0.50 through 0.17 hours and then drops to a slope of 0.20 at the end of the test. The early time data exhibits transient linear flow as described in SPEE Monograph 4. The later time data is more reasonably represented with a bilinear flow model. Figure 6.6 of the SPEE monograph describes a bilinear flow regime which has a slope of $\frac{1}{4}$ of 0.25. The bilinear flow regime is (page 122) "caused by both linear flow in a fracture (with significant pressure drop from fracture tip to wellbore) and by linear flow in the reservoir toward the fracture". The bilinear flow pattern is very near to the flow pattern observed with the drawdown data for Disposal Well #2. As will be discussed later, the flow pattern, while very near to a bilinear flow pattern.

The early portion of the test is shown in detail in Figure 3 with pressures from 0 to 36 hours which range from 4396.7 psig to 4110.1 psig. The pressure decline is a smooth decline and is flattening over time as expected.

Figure 4 shows the linear characteristics of the falloff test in some detail. It is a plot of falloff pressure versus $\sqrt{t + \Delta t} - \sqrt{\Delta t}$ where t is flow time in hours and Δt is falloff time in hours. Flow time is derived from the total fluid injected and the final flow rate as follows:

Cumulative injection:	2,391,224 gallons
Final flowing rate:	13.84 GPM
Equivalent flowing time (hours):	Gallons/(GPM X 60) = 2,391,224/(13.84*60)
Equivalent flowing time (hours):	3,079 hours

The pressure data, Figure 4, are linear beginning at 9.5 on the x axis. Projection of the data to estimated reservoir pressure is shown in Figure 5. This trend extrapolates to 3,406 psig which is the apparent reservoir pressure. The data shows no indication of ending of a linear flow straight line or of reservoir boundaries when the falloff test ends after 189 hours.

A traditional Horner plot, Figure 6, shows an increasing slope throughout the falloff test. When a straight line is obtained on a Horner plot, the slope of the line can be used to determine the permeability as described in "Pressure Buildup and Flow Test in Wells" published by the Society of Petroleum Engineers in 1967. Chapter 3 (pages 18 to 34) describes the process. Because of the increasing slope at the end of the test, permeability cannot be directly measured from the test data. As the slope increases, calculated permeability decreases. The final trend extrapolated to 3,819 psig is the apparent maximum reservoir pressure because of the increasing slope at the end of the falloff on Figure 6 is a minimum slope possible straight line segment. Because the slope is increasing at the end of the falloff test, it is expected to increase to higher levels had the falloff test been continued for a longer period of time. At the end of the test, the measured slope becomes the minimum possible Horner slope. This minimum slope yields a maximum permeability with the actual permeability not directly measurable from this test. Figure 7 shows increased detail of the Horner plot data at the end of the FOT.

To better understand flow regimes a type curve analysis was prepared using the SPE Monograph 5 "Advances In Well Test Analysis" type curves Figures C.18 and C.19 prepared by Gingarten, Ramey and Raghavan. These type curves provide dimensionless pressure for vertically fractured wells in the center of a closed square with no well bore storage. Figure C.18 addresses infinite-conductivity fractures and Figure 3.19 addresses uniform flux fractures. Both address boundary dominated flow with x_e/x_f ratios from 1 to 10 and the uniform flux solution shows boundary ratios to 20. For convenience, the figures are included in this report as Figures 7A and 7B. Figure 7C is a composite of the trendlines on from Figures 7A and 7B showing how the uniform flux fracture and the infinite conductivity fracture compare.

Figures 7A and 7B or both used to better understand the flow regime. During the early segment of the drawdown test the data indicated fracture flow with a uniform flux fracture or a fracture with pressure drops in the fracture. During the late portion of the test, the flow is best matched with the infinite conductivity fracture. No signs of reservoir boundaries are seen in drawdown data. The drawdown data show that the fracture has damage near the wellbore and has little or no damage away from the wellbore as is shown in Figure 7C.

In Figure 7C, the delta PSI curve from Figure 2 is imposed on the type curves 7A and 7B which provides a positive match of the data. The falloff test data match the type curve when the horizontal $t_{dxf} = 1.00$ and t = 1.2 hours and when the vertical $P_d = 1.0$ and Delta P = 100.

This match shows that the falloff test is in transient linear flow for about 10 minutes after which the flow regime begins a transition to a transient radial flow regime. At the end of the drawdown's 189.5 hours, the flow regime is a transient radial flow regime and no reservoir boundaries have been encountered. The absence of observed boundary effects show that the X_e/X_f ratio for the flow system is 20 or greater. The type curve analysis with the fit noted gives a calculated permeability of 2.56 md and a fracture half-length of 51 feet. The distance to the boundary is known to be more than a factor of 20 times the half-length or more than 1020 feet.

Absent the presence of reservoir boundaries, the Horner analysis for radial flow does not provide a reliable reservoir permeability. The linear flow analysis likewise provides only indications of reservoir properties. For this reason, the type curve permeability of 2.56 md is considered a more reliable measurement than the 4.24 md determined with radial and linear flow analysis.

It is our opinion that during the falloff test, the data transitioned from transient linear flow to transient radial flow and no boundary effects were observed during the 189.5 hour pressure falloff test.

LONG-TERM PERFORMANCE

Figure 8 is a history of pressures and injection rates. Wellhead injection pressures have been at 1465psig or less and are typically less than 1400 psig. The maximum injection rate is 77 GPM with rates in near 13 GPM being the most common rate.

Figure 9 shows the stabilized flow period of 75 hours prior to beginning the FOT test. The final flowing rate is 13.84 GPM with a final flowing wellhead pressure of 1226.8 psig. The injection rates for the pre falloff flow test range maximum rate of 23 GPM to a final rate of 13.84 GPM with an average rate of 14.1 GPM.

Calculations:

Calculations for permeability with an assumed Horner plot straight line, for time for a pressure transient to reach the edge of the injected water, traditional skin factor and for fracture half length are included.

1. Permeability:

 $\frac{kh}{k} = \frac{162.6qB}{k}$ where: μ m q = final flowing rate B = formation volume factor m = slope from Horner plot of pressure vs log((t+dt)/dt)k = permeability - mdh = net pay - feet perforated $\mu = \text{viscosity} - \text{cp}$ q = 13.84 GPMq = 475 BWPDB = 1.0m = 69.61 or more (stabilized slope not observed on test) $\frac{kh}{\mu} = \frac{162.6qB}{m} = (162.6)(14.1)(24)(60/42)(1.0)/69.61 = 1,108 \text{ md-ft/cp or less}$ kh = (1,108*0.47) = 521 md-ft or lessk = 521/123 = 4.24 md or less

2. Radius to edge of injected fluid:

$$r_{waste} = \sqrt{\frac{0.13368V}{\pi\phi h}}$$

V = total volume injected, gallons
 ϕ = porosity of injection zone
h = net pay of injection zone in feet

 $\mu = \text{viscosity in cp}$ V = 2,556,452 gallons $\phi = 0.149 \text{ (average of perforated interval)}$ H = 123 feet (perforated interval) $\mu = 0.47 \text{ cp}$ $c_t = s_w c_{ws} + c_f = (0.149)(0.0000230) + 0.00000410) = 0.00000444$ $r_{waste} = ((0.13368)(2,556,452)/(\pi (0.149)(123))^{\circ}(0.5) = 77 \text{ feet}$

3. Time to reach edge of injected fluid:

$$t_{waste} = \frac{948 c_{I} \mu r_{waste}^{2}}{k}$$

twaste = (948)(0.00000444)(0.47)(75²)/4.24 = 2.8 hours or more

4. Skin factor (with radial flow)

$$S = 1.151 \left[\frac{p_{wf} - p_{1hr}}{m} - \log\left(\frac{k}{\phi\mu c_t r_w^2}\right) + 3.23 \right]$$

pwf = final flowing pressure, psi
p1hr = projected pressure at 1 hour using radial flow straight line, psi
rw = wellbore radius - feet
pwf = 4376.7 psig
p1hr = 4370 psig
rw=0.3281 feet
S = 1.151[(4376.7-4370)/69.6 - log(4.24/((0.149)(0.47)(0.00000444)(0.3281)^2)+3.23]
S = -5.17

5. Fracture half length

$$X_f \sqrt{k} = \frac{4.064qB}{m_L h} \sqrt{\left(\frac{\mu}{\phi c_f}\right)}$$

$$\begin{split} m_{\rm L} &= {\rm slope \ from \ linear \ flow \ chart \ of \ pressure \ vs \ \sqrt{t + \Delta t} - \sqrt{\Delta t} \\ m_{\rm L} &= 70.628 \\ X_{\rm fk}^{0.5} &= (4.064)(475)(1.0)/((70.628)(123)(0.47/((0.149)(0.00000444))))^{0.5} = = 187 \ {\rm ft} \sqrt{md} \\ X_{\rm f} &= 187/4.24^{0.5} = 91 \ {\rm cumulative \ feet \ or \ more} \end{split}$$

6. Type Curve Analysis

$$\begin{split} t_{dxf} &= 0.0002637 kt/(\Phi\mu c_t X_f^2) \\ \Delta P &= 141.2 QB\mu P_d/(KH) \\ KH &= 141.2 QB\mu P_d/(\Delta P) \\ X_f^2 &= 0.0002637 kt/(t_{dxf} \Phi\mu c_t) \\ Type \ Curve \ Match \ Point \ ON \ Figure \ 7C: \\ \Delta P &= 100 \ psi \ at \ P_d &= 1.0 \\ T &= 1.2 \ hours \ at \ t_{dxf} \ = 1.0 \\ Match \ points \ show: 1) \ early \ time \ transient \ linear \ flow, 2) \ late \ time \ transient \ radial \ flow, \\ 3) no \ reservoir \ or \ drainage \ boundary, \end{split}$$

$$\begin{split} & \text{KH} = 141.2(475)(1.0)(0.47)^*(1.0)/(100) = 314.91 \text{ md-ft} \\ & \text{K} = 2.56 \text{ md} \\ & \text{X}_{f}^2 = 0.0002637(2.56)(1.2)/((1.0)(0.149)(0.47)(0.00000444) = 2,601 \text{ ft}^2 \\ & \text{X}_{f} = 51 \text{ feet} \end{split}$$

AREA OF REVIEW (AOR) UPDATE

The area of review data is attached as Appendix H which shows all wells known to have been drilled within a one mile radius of Water Disposal Well #2. There are 57 wells in the one mile radius of investigation. One of these fifty-nine wells, Ashcroft SWD #1, penetrates the Entrada injection zone. This well is 0.64 miles from the disposal well and is an active water disposal well.

No wells are currently producing form the Entrada injection zone within the AOR.

CONCLUSIONS

All testing was successful and meets both the OCD and EPA requirements. Western Refining fulfills all analysis and reporting requirement of the USEPA's "Pressure Falloff Testing Guideline, Third Revision", issued by Region 6, and dated August 8, 2002, with the submittal of this report. Pressure falloff and bottomhole pressure testing were conducted according to these guidelines.

OTHER

In evaluating available information concerning this appraisal, we have excluded from our consideration all matters as to which legal or accounting interpretation, rather than engineering, may be controlling. As in all aspects of oil and gas evaluation, there are uncertainties inherent in the interpretation of engineering data and conclusions necessarily represent only informed professional judgments.

William M. Cobb & Associates, Inc. is an independent consulting firm. Our compensation is not contingent on the results obtained or reported. This report was prepared by an engineer with more than 30 years of experience in the estimation, assessment, and evaluation of oil and gas production rates and related reservoir properties.

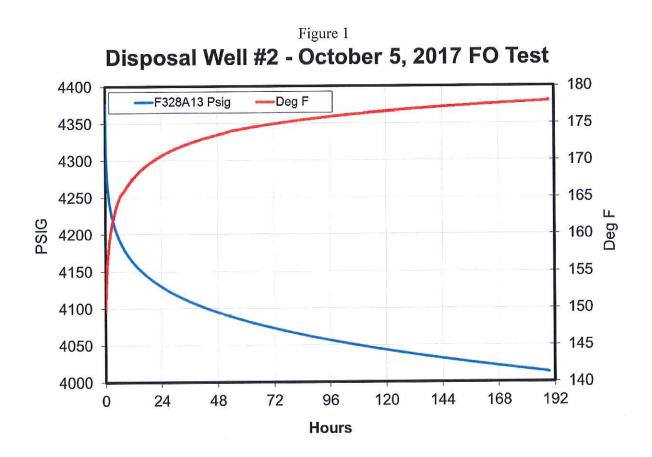
We appreciate the opportunity to be of service to you. If you have questions regarding this report, please contact us.

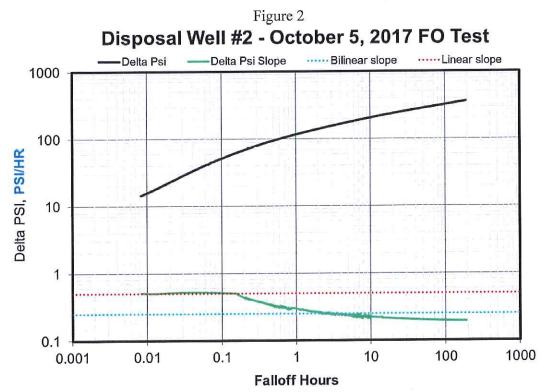
Sincerely,

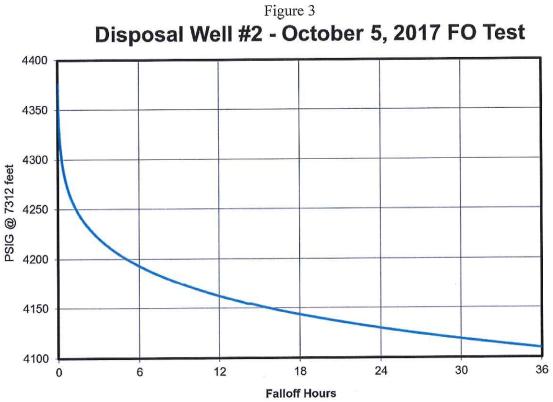
WILLIAM M. COBB & ASSOCIATES, INC.

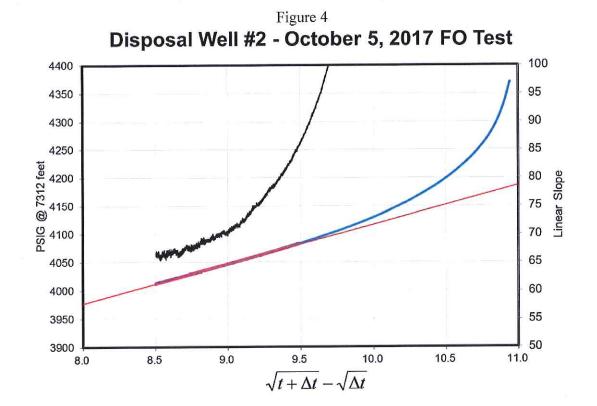
Brent Nr. Hale

Brent W. Hale Vice President

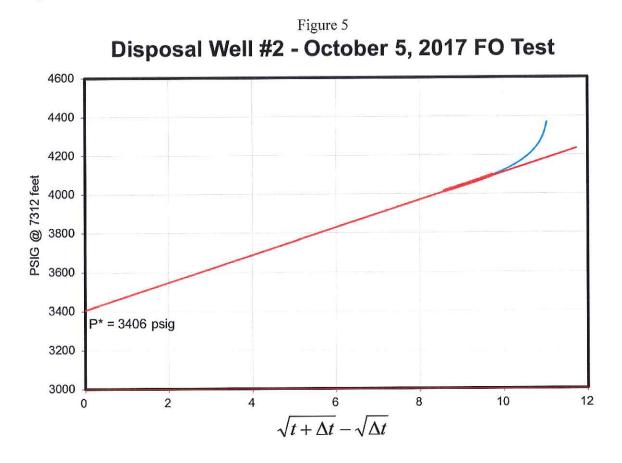


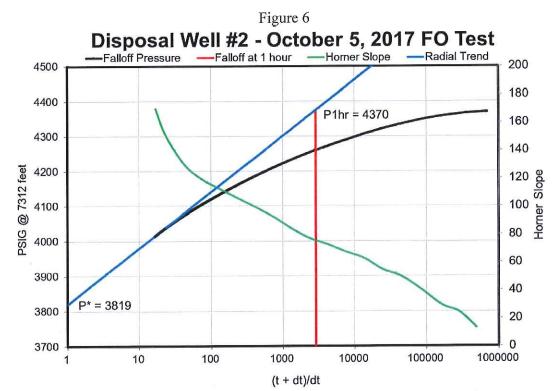






Mr. Bruce Davis March 21, 2018 update to 12 December 2017 report Page 11





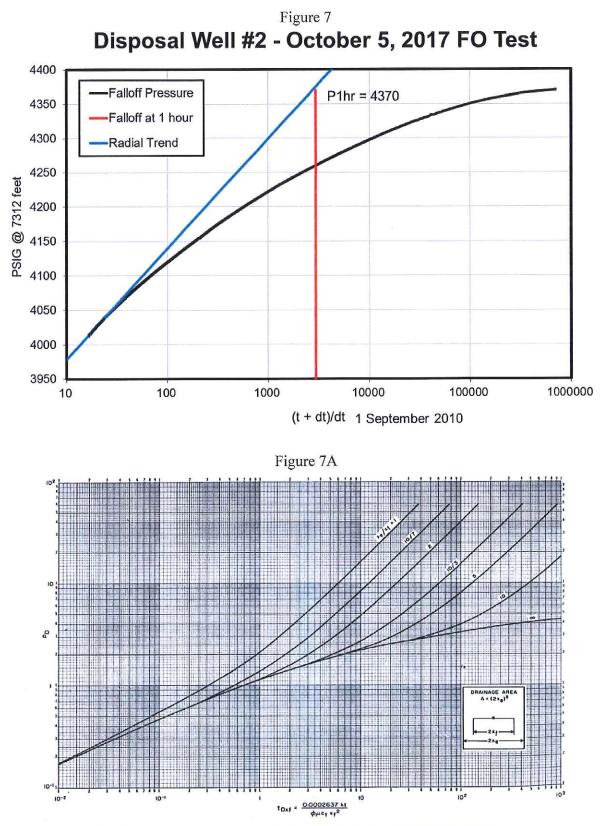


Fig. C.18 Dimensionless pressure for vertically fractured well in the center of a closed square, no wellbore storage, infinite-conductivity

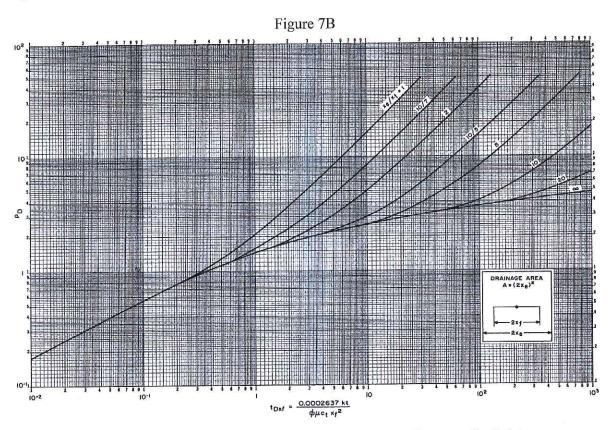
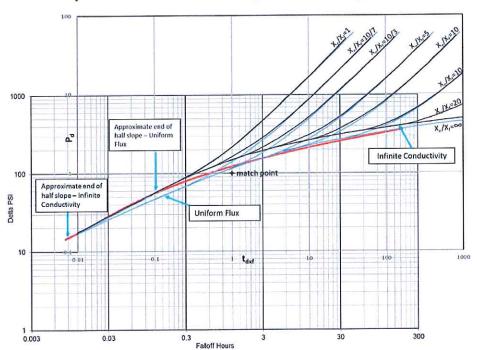


Fig. C.19 Dimensionless pressure for vertically fractured well in the center of a closed square, no wellbore storage, uniform-flux fracture. After Gringarten, Ramey and Raghavan.^{8,7}

Figure 7C



Di+sposal Well #2 – October 5, 2017 Test – Type Curve Match

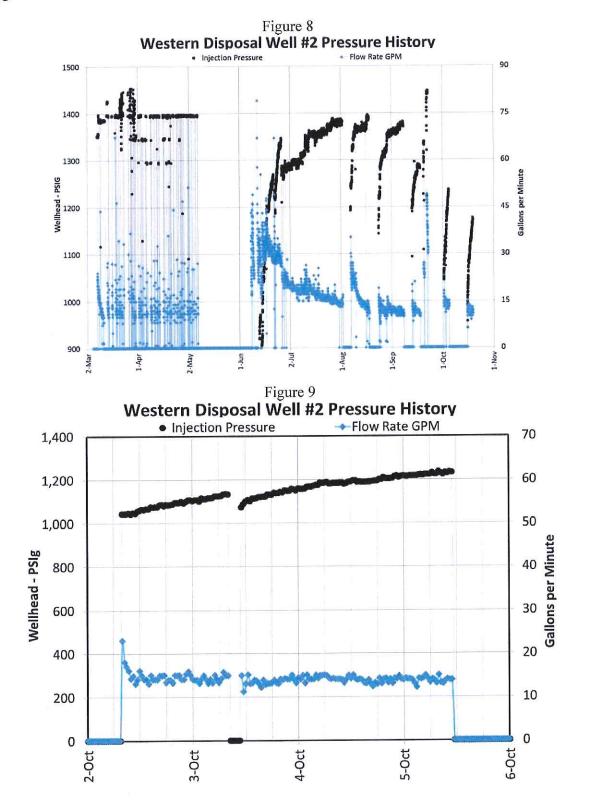
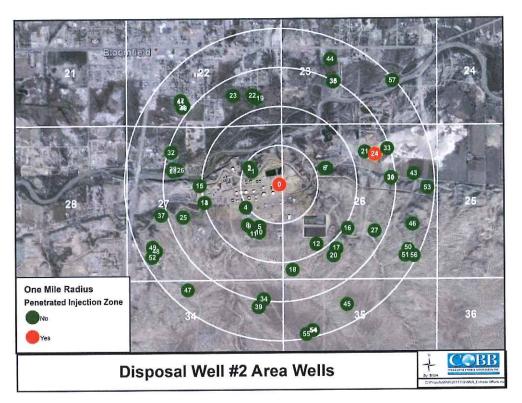


Figure 10



Mr. Bruce Davis December 12, 2017 Page 13

List of Appendices

Appendix A: Well bore schematic for Disposal Well #1
Appendix B: Summary of injection intervals
Appendix C: Injection and formation fluid analysis
Appendix D: Well Logs
Appendix E: October 5, 2017 Falloff test data
Appendix F: Test gauge calibration certificates
Appendix G: Mechanical Integrity Test Report (MIT)

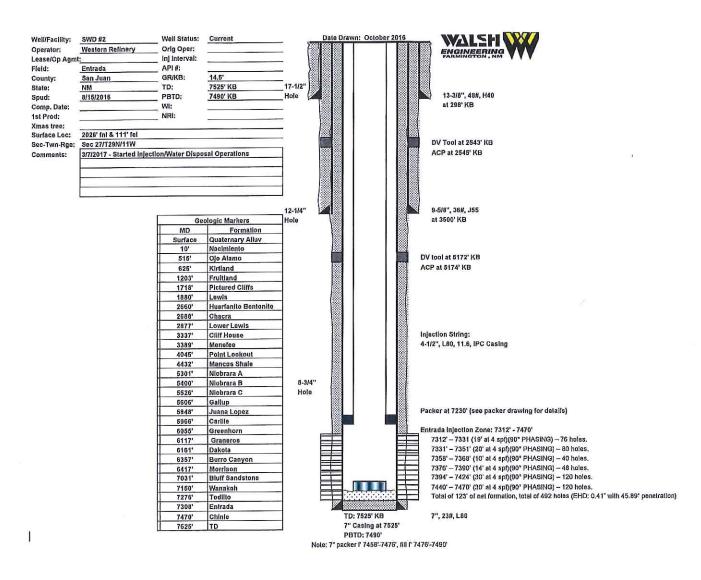
Appendix H: Table of wells in a one mile radius

Appendix I: Injection History

Appendix A

Well bore schematic for Disposal Well #1

Table 2: A wellbore diagram showing the current configuration of the wellbore.



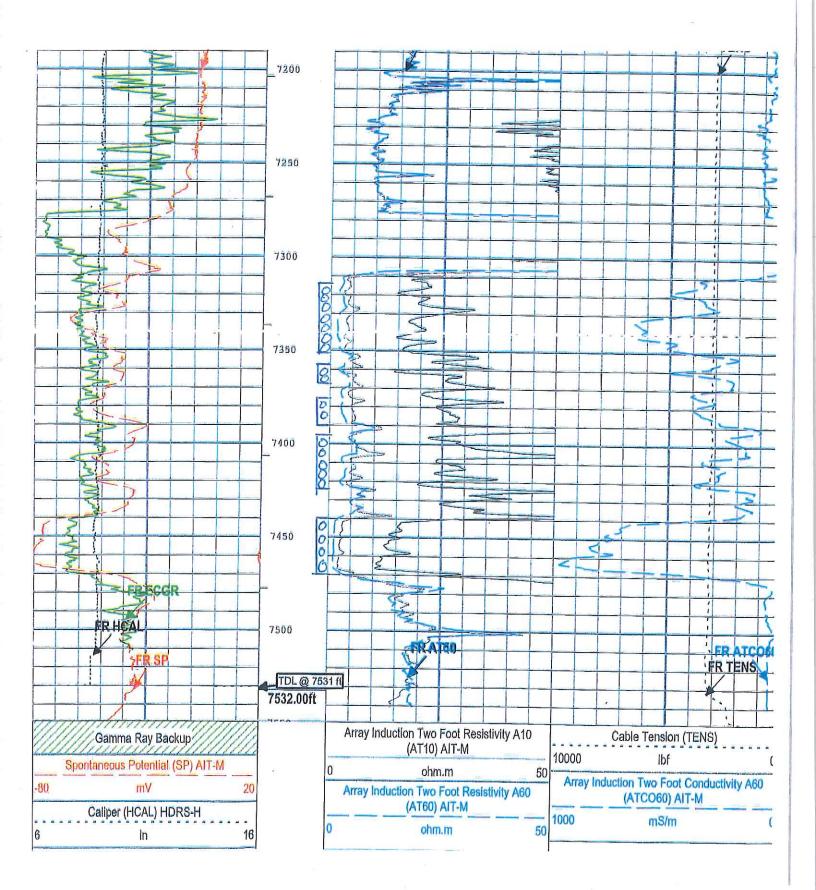


Table 1: A copy of the well log showing the Entrada interval to be tested.

Appendix B

Summary of injection intervals

Appendix B

Western Refining Southwest, Inc.

Waste Disposal Well #2

Injection Intervals

FormationTopBaseEntrada7312'7470'

Appendix C

Injection and formation fluid analysis

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

October 18, 2017

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: BPT Injection Well 9 13 17

OrderNo.: 1709746

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 9/14/2017 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 <u>www.hallenvironmental.com</u> 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 qualifiers 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

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Hall Environmental Analysis	Labora	ntory, Inc.		Lab Order 1709746 Date Reported: 10/18/2017
CLIENT: Western Refining Southwest, Inc			lient Samp	le ID: Injection Well
Project: BPT Injection Well 9 13 17			Collection	Date: 9/13/2017 11:20:00 AM
Lab ID: 1709746-001	Matrix:	AQUEOUS	Received	Date: 9/14/2017 7:05:00 AM
Analyses	Result	PQL Qual	Units	DF Date Analyzed Batch
EPA METHOD 8081: PESTICIDES TCLP				Analyst: MAB
Chlordane	ND	0.030	mg/L	1 9/27/2017 1:41:44 PM 33957
Endrin	ND	0.020	mg/L	1 9/27/2017 1:41:44 PM 33957
gamma-BHC (Lindane)	ND	0.40	mg/L	1 9/27/2017 1:41:44 PM 33957
Heptachlor	ND	0.0080	mg/L	1 9/27/2017 1:41:44 PM 33957
Heptachlor epoxide	ND	0.0080	mg/L	1 9/27/2017 1:41:44 PM 33957
Methoxychlor	ND	10	mg/L	1 9/27/2017 1:41:44 PM 33957
Toxaphene	ND	0.50	mg/L	1 9/27/2017 1:41:44 PM 33957
Surr: Decachlorobiphenyl	85.8	57.8-124	%Rec	1 9/27/2017 1:41:44 PM 33957
Surr: Tetrachloro-m-xylene	81.5	43-114	%Rec	1 9/27/2017 1:41:44 PM 33957
EPA METHOD 8270C TCLP				Analyst: DAM
2-Methylphenol	ND	200	mg/L	1 9/27/2017 4:13:14 PM 33908
3+4-Methylphenol	ND	200	mg/L	1 9/27/2017 4:13:14 PM 33908
Phenol	ND	200	mg/L	1 9/27/2017 4:13:14 PM 33908
2,4-Dinitrotoluene	ND	0.13	mg/L	1 9/27/2017 4:13:14 PM 33908
Hexachlorobenzene	ND	0.13	mg/L	1 9/27/2017 4:13:14 PM 33908
Hexachlorobutadiene	ND	0.50	mg/L	1 9/27/2017 4:13:14 PM 33908
Hexachloroethane	ND	3.0	mg/L	1 9/27/2017 4:13:14 PM 33908
Nitrobenzene	ND	2,0	mg/L	1 9/27/2017 4:13:14 PM 33908
Pentachlorophenol	ND	100	mg/L	1 9/27/2017 4:13:14 PM 3390
Pyridine	ND	5,0	mg/L	1 9/27/2017 4:13:14 PM 3390
2,4,5-Trichlorophenol	ND	400	mg/L	1 9/27/2017 4:13:14 PM 3390
2,4,6-Trichlorophenol	ND	2.0	mg/L	1 9/27/2017 4:13:14 PM 3390
Cresols, Total	ND	200	mg/L	1 9/27/2017 4:13:14 PM 3390
Surr: 2-Fluorophenol	44.6	15-124	%Rec	1 9/27/2017 4:13:14 PM 3390
Surr: Phenol-d5	38.8	15-118	%Rec	1 9/27/2017 4:13:14 PM 3390
Surr: 2,4,6-Tribromophenol	65.9	15-148	%Rec	1 9/27/2017 4:13:14 PM 3390
Surr: Nitrobenzene-d5	82.7	40.6-124	%Rec	1 9/27/2017 4:13:14 PM 3390
Surr: 2-Fluorobiphenyl	61.8	35.7-128	%Rec	1 9/27/2017 4:13:14 PM 3390
Surr: 4-Terphenyl-d14	57.0	18.8-115	%Rec	1 9/27/2017 4:13:14 PM 3390
SPECIFIC GRAVITY				Analyst: JRR
Specific Gravity	1.002	0		1 9/15/2017 2:17:00 PM R456
EPA METHOD 300.0: ANIONS				Analyst: MRA
Fluoride	5.9	0.50 *	mg/L	5 9/14/2017 3:12:54 PM R456
Chloride	600	25 *	mg/L	50 9/27/2017 4:01:08 PM R459
Nitrogen, Nitrite (As N)	ND	0.50	mg/L	5 9/14/2017 3:12:54 PM R456
Bromide	2.3	0.50	mg/L	5 9/14/2017 3:12:54 PM R456
Nitrogen, Nitrate (As N)	ND	0.50	mg/L	5 9/14/2017 3:12:54 PM R456
Phosphorus, Orthophosphate (As P)	ND	2.5	mg/L	5 9/14/2017 3:12:54 PM R456

Value exceeds Maximum Contaminant Level. Qualifiers: *

Sample Diluted Due to Matrix D

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

Analyte detected in the associated Method Blank в

E Value above quantitation range

Analyte detected below quantitation limits Page 1 of 13 J

Sample pH Not In Range Ρ

RL Reporting Detection Limit

Sample container temperature is out of limit as specified W

Analytical Report Lob Order 1780746

Hall Environmental Analys	is Labora	atory, In	c.		-	Lab Order 1709746 Date Reported: 10/18/20	017
CLIENT: Western Refining Southwest, Project: BPT Injection Well 9 13 17 Lab ID: 1709746-001		AQUEOU			te: 9/13	ection Well 3/2017 11:20:00 AM 4/2017 7:05:00 AM	<u></u>
Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst	MRA
Sulfate	80	2.5		mg/L	5	9/14/2017 3:12:54 PM	R45644
SM2510B: SPECIFIC CONDUCTANCE						Analyst	JRR
Conductivity	3100	5.0		µmhos/cm	1	9/19/2017 2:03:47 PM	R45747
	0.00					Analyst	JRR
SM2320B: ALKALINITY	499.0	20.00		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
Bicarbonate (As CaCO3) Carbonate (As CaCO3)	499.0 ND	20.00		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
Total Alkalinity (as CaCO3)	499.0	20.00		mg/L CaCO3	1	9/19/2017 2:03:47 PM	R45747
SM2540C MOD: TOTAL DISSOLVED S				-		Analyst	: KS
Total Dissolved Solids	1920	100	*D	mg/L	1	9/22/2017 10:23:00 AM	
	1020		-			Analyst	
SM4500-H+B: PH	7.34		н	pH units	1	9/19/2017 2:03:47 PM	R45747
pH	7.34		11	prisunito		Analyst	
EPA METHOD 7470: MERCURY					4	9/27/2017 9:25:56 AM	
Mercury	ND	0.00020		mg/L	1		34071
EPA METHOD 6010B: DISSOLVED M	TALS					Analyst	
Calcium	53	5.0		mg/L	5	9/19/2017 1:02:14 PM	A45714
Magnesium	43	5.0		mg/L	5	9/19/2017 1:02:14 PM 9/19/2017 1:02:14 PM	A45714 A45714
Potassium	14 530	5.0 10		mg/L mg/L	5 10	9/28/2017 1:04:41 PM	A45714
Sodium		10		mg/L	10		
EPA 6010B: TOTAL RECOVERABLE I				a		Analyst	
Arsenic	0.035	0.020 0.020		mg/L mg/L	1 1	9/19/2017 11:57:19 AM 9/19/2017 11:57:19 AM	
Barium Cadmium	0.17 ND	0.020		mg/L	1	9/19/2017 11:57:19 AM	
Chromium	ND	0.0060		mg/L	1	9/19/2017 11:57:19 AM	
Lead	ND	0.0050		mg/L	1	9/19/2017 11:57:19 AM	33882
Selenium	ND	0.050		mg/L	1	9/19/2017 11:57:19 AM	33882
Silver	ND	0.0050		mg/L	1	9/19/2017 11:57:19 AM	33882
TCLP VOLATILES BY 8260B						Analyst	: RAA
Benzene	ND	0.50		mg/L	200	9/15/2017 1:25:00 AM	T45638
1,2-Dichloroethane (EDC)	ND	0.50		mg/L		9/15/2017 1:25:00 AM	T45638
2-Butanone	ND	200		mg/L		9/15/2017 1:25:00 AM	T45638
Carbon Tetrachloride	ND	0.50		mg/L) 9/15/2017 1:25:00 AM	T45638
Chloroform	ND	6.0		mg/L mg/l		9/15/2017 1:25:00 AM	T45638 T45638
1,4-Dichlorobenzene	ND	7.5 0.70		mg/L mg/L) 9/15/2017 1:25:00 AM) 9/15/2017 1:25:00 AM	T45638
1,1-Dichloroethene Hexachlorobutadiene	ND ND	0.70		mg/L) 9/15/2017 1:25:00 AM	T45638

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Qualifiers:

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- 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 Page 2 of 13

Analytical Report

- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analys	sis Laborat	tory, Inc.		Date Reported: 10/18/2	017
CLIENT: Western Refining Southwest, Project: BPT Injection Well 9 13 17 Lab ID: 1709746-001		AQUEOUS	Collection J	e ID: Injection Well Date: 9/13/2017 11:20:00 AM Date: 9/14/2017 7:05:00 AM	
Analyses	Result	PQL Qua	l Units	DF Date Analyzed	Batch
TCLP VOLATILES BY 8260B				Analyst	: RAA
Tetrachloroethene (PCE)	ND	0.70	mg/L	200 9/15/2017 1:25:00 AM	T45638
Trichloroethene (TCE)	ND	0.50	mg/L	200 9/15/2017 1:25:00 AM	T45638
Vinyl chloride	ND	0.20	mg/L	200 9/15/2017 1:25:00 AM	T45638
Chlorobenzene	ND	100	mg/L	200 9/15/2017 1:25:00 AM	T45638
Surr: 1,2-Dichloroethane-d4	97.4	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: 4-Bromofluorobenzene	95.6	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: Dibromofluoromethane	100	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638
Surr: Toluene-d8	91.2	70-130	%Rec	200 9/15/2017 1:25:00 AM	T45638

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analy
	D	Sample Diluted Due to Matrix	Е	Value
	Н	Holding times for preparation or analysis exceeded	J	Analy
	ND	Not Detected at the Reporting Limit	Р	Samp
	PQL	Practical Quanitative Limit	RL	Repo

- % Recovery outside of range due to dilution or matrix S
- lyte detected in the associated Method Blank
- e above quantitation range
- lyte detected below quantitation limits Page 3 of 13

Analytical Report Lab Order 1709746

- ple pH Not In Range
- orting Detection Limit
- W Sample container temperature is out of limit as specified

1709746-001G INJECTION WELL Collected date/time: 09/13/17 11:20

SAMPLE RESULTS - 01

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Wet Chemistry by Method 4500 CN E-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / lime		تا ا
Reactive Cyanlde	ND		0.00500	1	09/21/2017 18:03	WG1023142	Ĺ
Wet Chemistry by	Method 9034-9	030B					3
	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / time		4
Reactive Sulfide	0.125		0.0500	1	09/18/2017 17:47	WG1021084	L
Wet Chemistry by	Method 9040C						5
	Result	Qualifier	Dilution	Analysis	Batch		
Analyte	SU			date / time			
Corrosivity by pH	7.09	18	1	09/18/2017 10:3	2 <u>WG1021485</u>		L. [2]
							7
Sample Narrative:							L.
L936656-01 WG1021485: 7	.09 at 15.2c						, [·
Wet Chemistry by	Method D93/10	10A					[
	Result	Qualifier	Dilution	Analysis	Batch	, , , , , , , , , , , , , , , , , , ,	
Analyte	deg F			date / time			L
Flashpoint	DNF at 170		1	09/22/2017 15:1	1 WG1023539		

VY G IVZ314Z Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

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Method Blank (MB)

MB) R3251293-1 09/21/17 17:54			
MB) R3251293-1 09/21/17 17:54			
MB) R3251293-1 09/21/17 17:54			
-		(MB) R3251293-1 09/21/17 17:54	

	կցու մնո	
MB Result	∬ĝm	D
	Analyte	Reactive Cyanide

(LCS) R3251293-2 09/21/17 17:55 • (LCSD) R3251293-3 09/21/7 17:56	17 17:55 • (LCSC	X) R3251293-3 09/21/7	09/21/17 17:56						Anno and a sub
	Spike Amount LCS Result	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier RPD	RPD Limits
Analyte	Ш0/ј	∭gm	Ng/1	96	96	%		3 ⁶	Ж
Reactive Cyanide	0.100	0.104	0.104	104	104	85-115		D	20

	<u> </u>	Ss		5 ,		<u>ب</u>		్ ర		ច		2	S S S
											RPD Limits	8	20
				and a start of the start of t	RPD Limits	9 ⁶	20				MSD Qualifier RPD	8	ហ
					LCSD Qualifier RPD	36	D				MS Qualifier		
											Dijution Rec. Limits	8 6	75-125
					LCS Qualifier				SD)		Dijution		-
			te (LCSD)		Rec. Lim its	96	85-115		Spike Duplicate (MSD)	18:07	MSD Rec.	25	82
			le Duplicat		LCSD Rec.	98	104		x Spille Du	93-5 09/2W7	MS Rec.	8 6	86
	иĝи	0.00500	ntrol Samp	9	LCS Rec.	96	104		MS) • Matri	(MSD) R32512	MSD Result	l/gm	0.0861
MB MDL	Ngm	0.0018	oratory Cor	3 09/21/17 17:5	LCSD Result LCS Rec.	ng/l	0.104		nk Spike (I	9/21/17 18:06 -	it MS Result	mg/l	1060.0
MB Qualifier			-CS) + Labo	D) R3251293-0	Spike Amount LCS Result	∐gm	0.104		(OS) • Mat	3251293-4 0	Spike Amount Original Result MS Result	Ц <i>б</i> ш	QN
MB Result	идн	D	itrol Sample (L	9/21/17 17:55 • (LCS	Spike Amoun	l∕gm	0.100		iginal Sample	/21/17 18:03 · (MS) I	Spike Amount	l∕6m	0.100
Chdrad Chdrad	allipin	Reactive Cyanide	Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)	(LCS) R3251293-2 09/21/17:55 • (LCSD) R3251293-3 09/21/17 17:56		Analyte	Reactive Cyanide		L936656-01 Original Sample (OS) • Matrix Spike (MS) • Matrix	(OS) L936656-01 09/2/17 18:03 • (MS) R3251293-4 09/21/17 18:06 • (MSD) R3251293-5 09/2/17 18:07		Analyte	Reactive Cyanide

PROJECT:

	od 9034-9030B
W61021084	Wet Chemistry by Metho

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(MD)
Blank
Aethod
<u>~</u>

(MB) R3250199-1 09/18/17 17:42

	MB RDL	ПgЛ	0,0500	
	MB NDL	l)Gm	0.0065	
	MB Qualifier			
71.5 0	MB Result	1/Gm	Э	
	MB Result	Analyte	Reactive Sulfide	

L934254-02 Original Sample (OS) • Duplicate (DUP)

	09//8/1/ 1/:44
	4
	09/18/17 17:43 •
	(OS) L934254-02

				ŧ		
	Original Result DUP Result Dilution DUP RPD	DUP Result	Dilution	ԾՍԲ ԶԲԾ	DUP Qualifier	er Limits
Analyte	₩g/l	шg/I		8€		9 ₆
Reactive Sulfide	1.06	1.06	2	0		20

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

	RPD Limits	86	20
	LCSD Qualifier RPD	88	2
	LCS Qualifier		
	Rec. Limits	ጽ	85-115
	LCSD Rec.	⁹⁶	102
	LCS Rec.	ж	101
09/18/17 17:43	LCS Result LCSD Result LCS Rec.	ug/i	0.511
J R3250199-3	LCS Result	Идт	0.503
/18/17 17:43 • (LCSI	Spike Amount	լ/ճա	0.500
(LCS) R3250199-2 09/18/17 17:43 • (LCS) 1		Analyte	Reactive Sulfide

PROJECT:

WGIUZ1485 Wet Chemistry by Method 9040C

QUALITY CONTROL SUMMARY

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L936656-01 Original Sample (OS) • Duplicate (DUP)

		25:01 /1/21/60 5-5841701914 (JOC) + 75:01 /1/21/60 10-000050 (CO)	0L/1/8L/60	1:32		
	Original Res	Original Result DUP Result Dilution DUP RPD	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ปร	SU		96		54
Corrosivity by pH	20'2	7,09	-	0.000	12	-
Sample Narrative: OS: 7,09 at 15.2c DUP: 7,09 at 15.2c						

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1021485-1	(LCS) WG1021485-1 09/18/17 10:32 • (LCSD) WG1021485-2 09/18/17 10:32	D) WG102148	5-2 09/18/17 10.	32						
	Spike Amount	LCS Result	Spike Amount LCS Result LCSD Result LCS Rec.	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier RPD	RPD Limits	
Analyte	SIL	SU	SU	*	26	સ્		8	æ	
Corrosivity by pH	10.0	9.95	9.96	99.5	33.6	98.4-102		0.100	-	
Sample Narrative:										

LCS: 9.95 at 20.1c

LCSD; 9,96 at 20.0c

SDG: L936656

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QUALITY CONTROL SUMMARY

L936656-01 Original Sample (OS) • Duplicate (DUP)

(OS) L936656-01 09/22/17 15/11 - (DUP) WG1023539-1 09/22/17 15/11

	Original Result	t DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F (deg F		26		96 96
Flashpoint	DNF at 170	DNF at 170	*	0.000		0

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

	RPD Limits	ጽ	10	
	LCSD Qualifier RPD	8	0.000	
	LCS Qualifier			
	Rec. Limits	₽ ²	96.0-104	
	LCSD Rec.	98	98.0	
	LCS Rec.	8 ⁶	98.0	
09/22/17 15:11	Spike Amount LCS Result LCSD Result	deg F	80.6	
R3251560-2	LCS Result	deg F	80.3	
22/17 15:11 • (LCSD)	Spike Amount	deg F	82.0	
(LCS) R3251560-1 09/22/17 15:11 • (LCSD) R3251560-2 09/22/17 15:11		Analyte	Flashpoint	

S S S S

ACCOUNT; Hall Environmental Analysis Laboratory

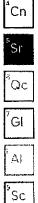
PROJECT:

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.

Wet Chemistry by Method 2580

	<i>,</i>					
	Result	Qualifier	Dilution	Analysis	Batch	
Analyie	mV			date / time		15
ORP	71.0		1	09/21/2017 16:57	WG1023075	TC
						L
						³ Ss



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	2580
ڻ ت	Method
10521	nistry by
M GIC	Wet Cher

QUALITY CONTROL SUMMARY

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L937490-01 Original Sample (OS) • Duplicate (DUP)

-	DUP RPD Limits	86	20
	DUP Qualifier		
6:57	Dilution DUP RPD	*	1.42
09/21/171	Dilution		-
/G1023075-3	DUP Result	шV	70.0
21/17 16:57 - (DUP) M	Original Result DUP Result	МŇ	71.0
(OS) L937490-01 09/21/17 16:57 - (DUP) WG1023075-3 09/21/17 16:57		Analyte	ORP

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

	RPD Limits	×	20
	LCSD Qualifier RPD		0.438
	LCS Qualifier		
	Rec, Limits	96	90.0-110
	LCSD Rec.	ж	100
16:57	LCS Rec.	*	100
75-2 09/21/17	Spike Amount LCS Result LCSD Result	٨	229
5D) WG10230.	LCS Result	лг	228
9/21/17 16:57 • (LCS	Spike Amount	шV	228
(LCS) WG1023075-1 09/21/17 16:57 . (LCSD) WG1023075-2 09/21/17		Analyte	ORP

GLOSSARY OF TERMS

Tc

Ss

Cn

Sr

Qc

GI

A

Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions MD! Method Detection Limit. ND Not detected at the Reporting Limit (or MDL where applicable). RDL Reported Detection Limit. Rec. Recovery. RPD Relative Percent Difference. SDG Sample Delivery Group. U Not detected at the Reporting Limit (or MDL where applicable). The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes Analyte reported. If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. Dilution These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported, Successful QC Sample analysis will target all analytes recovered or Limits duplicated within these ranges. The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control **Original Sample** sample. The Original Sample may not be included within the reported SDG. This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. Qualifier The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL' Result (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. Case Narrative (Cn) This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not **Quality Control** Summary (Qc) being performed on your samples typically, but on laboratory generated material. This is the document created in the field when your samples were initially collected. This is used to verify the time and Sample Chain of date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This Custody (Sc) chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. Sample Results (Sr) This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. Sample Summary (Ss) Qualifier Description Τ8 Sample(s) received past/too close to holding time expiration.

Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

-										
Sample ID MB	SampT	ype: mb	lk	Tes	Code: El	PA Method	300.0: Anions			
Client ID: PBW	Batch	n ID: R4	5644	R	unNo: 4	5644				
Prep Date:	Analysis D)ate: 9 /	14/2017	S	eqNo: 1	448506	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai
Fluoride	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Bromide	ND	0.100								
Nitrogen, Nitrate (As N)	ND	0.100								
Phosphorus, Orthophosphate (As P	ND	0.500								
Sulfate	ND	0.500								
Sample ID LCS	Samp	Type: Ics		Tes	tCode: El	PA Method	300.0: Anions	5		
Client ID: LCSW	Batc	h ID: R4	5644	F	RunNo: 4	5644				
Prep Date:	Analysis [Date: 9 /	14/2017	S	SeqNo: 1	448507	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.541	0.100	0.5000	0	108	90	110			
Nitrogen, Nitrite (As N)	0.953	0.100	1.000	0	95.3	90	110			
Bromide	2.45	0.100	2.500	0	97.9	90	110			
Nitrogen, Nitrate (As N)	2.53	0.100	2.500	0	101	90	110			
Phosphorus, Orthophosphate (As P	4.76	0.500	5.000	0	95.1	90	110			
Sulfate	9.84	0.500	10.00	0	98.4	90	110			
Sample ID MB	Samp	Type: mi	olk	Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID: PBW	Batc	h ID: R4	5948	F	RunNo: 4	5948				
Prep Date:	Analysis [Date: 9 /	27/2017	S	SeqNo: 1	460425	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sample ID LCS	Samp	Type: Ics	3	Tes	tCode: E	PA Method	300.0: Anion	5		
Client ID: LCSW	Bato	h ID: R4	5948	F	RunNo: 4	5948				
Prep Date:	Analysis I	Date: 9 /	/27/2017	5	SeqNo: 1	460426	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.5	90	110			

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
- PQL Practical Quanitative Limit
- 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
- Page 4 of 13

- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

1709746

WO#:

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

									· · · · · · · · · · · · · · · · · · ·	
Sample ID 100ng Ics	SampT	ype: LC	S	Tes	tCode: TO	CLP Volatil	es by 8260B			
Client ID: LCSW	Batch	D: T4	5638	F	lunNo: 4	5638				
Prep Date:	Analysis D	ate: 9/	14/2017	S	SeqNo: 1	448337	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai
Benzene	0.021	0.010	0.02000	0	105	70	130			
1,1-Dichloroethene	0.022	0.010	0.02000	0	110	70	130			
Trichloroethene (TCE)	0.020	0.010	0.02000	0	102	70	130			
Chlorobenzene	0.020	0.010	0.02000	0	99.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.0094		0.01000		94.3	70	130			
Surr: 4-Bromofluorobenzene	0.0097		0.01000		96.6	70	130			
Surr: Dibromofluoromethane	0,0097		0.01000		97.0	70	130			
Surr: Toluene-d8	0.0092		0.01000		91.6	70	130			
Sample ID rb	SampT	ype: MI	BLK	Tes	tCode: T	CLP Volatil	es by 8260B			
Client ID: PBW	Batcl	n ID: T4	5638	F	RunNo: 4	5638				
Prep Date:	Analysis E	Date: 9/	14/2017	ę	SeqNo: 1	448338	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
1,2-Dichloroethane (EDC)	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,1-Dichloroethene	ND	0.70								
Hexachlorobutadiene	ND	0.50								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Chlorobenzene	ND	100								
Surr: 1,2-Dichloroethane-d4	0.0096		0.01000		95.9	70	130			
Surr: 4-Bromofluorobenzene	0.0096		0.01000		96.2	70	130			
Surr: Dibromofluoromethane	0.0096		0.01000		96.0	70				
Surr: Toluene-d8	0.0091		0.01000		91.4	70	130			

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

Page 5 of 13

WO#: 1709746

Client: Western Refining Southwest, Inc.

BPT Injection Well 9 13 17 **Project:**

Sample ID 1709746-001cms	Samp	Туре: МЗ	i	Test	Code: EF	PA Method	8270C TCLP			
Client ID: Injection Well	Batc	h ID: 339	908	R	unNo: 4	5933				
Prep Date: 9/18/2017	Analysis [Date: 9/ 2	27/2017	s	eqNo: 14	460039	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.069	0.0010	0.1000	0	69.0	23.9	129			
3+4-Methylphenol	0.13	0.0010	0.2000	0	64.6	15	167			
2,4-Dinitrotoluene	0.063	0.0010	0.1000	0	63.3	15	147			
Hexachlorobenzene	0.073	0.0010	0.1000	0	72.5	41.4	136			
Hexachlorobutadiene	0.069	0.0010	0.1000	0	68.5	16.2	134			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	20.6	124			
Vitrobenzene	0.081	0.0010	0,1000	0	80.8	39.5	134			
Pentachlorophenol	0.028	0.0010	0.1000	0	28.3	15	137			
- Pyridine	0.011	0.0010	0.1000	0	11.0	15	129			S
2,4,5-Trichlorophenol	0.080	0.0010	0.1000	0	79.8	15	158			
2,4,6-Trichlorophenol	0.073	0.0010	0.1000	0	72.9	15	153			
Cresols, Total	0.20	0.0010	0.3000	0	66.1	10.6	179			
Surr: 2-Fluorophenol	0.095		0.2000		47.3	15	124			
Surr: Phenol-d5	0.078		0.2000		38.9	15	118			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		66.7	15	148			
Surr: Nitrobenzene-d5	0.085		0.1000		84.7	40.6	124			
Surr: 2-Fluorobiphenyl	0.070		0.1000		69.6	35.7	128			
Surr: 4-Terphenyl-d14	0.059		0.1000		58.7	18.8	115			
Sample ID 1709746-001cms	d Samp	Туре: М S	SD	Tes	tCode: El	PA Method	8270C TCLP			
Sample ID 1709746-001cms Client ID: Injection Well	-	Type: MS			tCode: El RunNo: 4		8270C TCLP			
	Bato		908	F		5933	8270C TCLP Units: mg/L			
Client ID: Injection Well	Bato	ch ID: 33	908 27/2017	F	RunNo: 4	5933		%RPD	RPDLimit	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte	Bato Analysis	ch ID: 33 Date: 9/	908 27/2017	F	RunNo: 4 SeqNo: 1	5933 460040	Units: mg/L	9.98	20	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol	Bato Analysis Result	ch ID: 33 Date: 9 / PQL	908 27/2017 SPK value	F S SPK Ref Val	RunNo: 4 SeqNo: 1 %REC	5933 460040 LowLimit	Units: mg/L HighLimit			Quai
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol	Bate Analysis Result 0.062	ch ID: 33 Date: 9/ PQL 0.0010	908 27/2017 SPK value 0.1000	F S SPK Ref Val 0	RunNo: 4 SeqNo: 1 %REC 62.5	5933 460040 LowLimit 23.9	Units: mg/L HighLimit 129	9.98	20 20 23.2	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene	Bate Analysis Result 0.062 0.12	ch ID: 33 Date: 9/ PQL 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000	F SPK Ref Val 0 0	RunNo: 4 SeqNo: 1 %REC 62.5 61.3	5933 460040 LowLimit 23.9 15	Units: mg/L HighLimit 129 167	9.98 5.28 11.7 2.46	20 20 23.2 20	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene	Bate Analysis Result 0.062 0.12 0.056	ch ID: 33 Date: 9/ <u>PQL</u> 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000	F S SPK Ref Val 0 0 0	RunNo: 4 SeqNo: 1 <u>%REC</u> 62.5 61.3 56.3	5933 460040 LowLimit 23.9 15 15	Units: mg/L HighLimit 129 167 147	9.98 5.28 11.7 2.46 5.98	20 20 23.2 20 20	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene	Bate Analysis Result 0.062 0.12 0.056 0.071	ch ID: 33 Date: 9/ 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000	F S SPK Ref Val 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 62.5 61.3 56.3 70.8	5933 460040 LowLimit 23.9 15 15 41.4	Units: mg/L HighLimit 129 167 147 136	9.98 5.28 11.7 2.46 5.98 9.27	20 20 23.2 20 20 31.3	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065	ch ID: 33 Date: 9 / PQL 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 62.5 61.3 56.3 70.8 64.5	5933 460040 LowLimit 23.9 15 15 41.4 16.2	Units: mg/L HighLimit 129 167 147 136 134	9.98 5.28 11.7 2.46 5.98	20 20 23.2 20 20	Qual
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051	h ID: 33 Date: 9/ PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 62.5 61.3 56.3 70.8 64.5 51.5	5933 460040 23.9 15 15 41.4 16.2 20.6	Units: mg/L HighLimit 129 167 147 136 134 124	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5	20 20 23.2 20 20 31.3 26.6 27.9	R
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081	ch ID: 33 Date: 9 / 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0	RunNo: 4 BeqNo: 1 %REC 62.5 61.3 56.3 70.8 64.5 51.5 80.9	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5	Units: mg/L HighLimit 129 167 147 136 134 124 134	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5 20.8	20 20 23.2 20 20 31.3 26.6 27.9 47.4	
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachlorobtadiene Nitrobenzene Pentachlorophenol Pyridine	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081 0.040	ch ID: 33 Date: 9 / PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 BeqNo: 1 62.5 61.3 56.3 70.8 64.5 51.5 80.9 40.5	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5 15	Units: mg/L HighLimit 129 167 147 136 134 124 134 134 137	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5	20 20 23.2 20 20 31.3 26.6 27.9 47.4 36.9	R
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachlorobutadiene Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081 0.040 0.040 0.0090	ch ID: 33 Date: 9/ PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 62.5 61.3 56.3 70.8 64.5 51.5 80.9 40.5 8.96	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5 15 15	Units: mg/L HighLimit 129 167 147 136 134 124 134 137 129	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5 20.8	20 20 23.2 20 20 31.3 26.6 27.9 47.4	R
Client ID: Injection Well Prep Date: 9/18/2017	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081 0.040 0.0090 0.072	ch ID: 33 Date: 9/ PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 62.5 61.3 56.3 70.8 64.5 51.5 80.9 40.5 8.96 71.6	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5 15 15 15	Units: mg/L HighLimit 129 167 147 136 134 124 134 137 129 158	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5 20.8 10.9	20 20 23.2 20 20 31.3 26.6 27.9 47.4 36.9	R
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachlorobutadiene Hexachlorobenaene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081 0.040 0.0090 0.072 0.077	ch ID: 33 Date: 9/ PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 62.5 61.3 56.3 70.8 64.5 51.5 80.9 40.5 8.96 71.6 77.0	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5 15 15 15 15 15	Units: mg/L HighLimit 129 167 147 136 134 124 134 137 129 158 153	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5 20.8 10.9 5.42	20 20 23.2 20 20 31.3 26.6 27.9 47.4 36.9 37.2	R
Client ID: Injection Well Prep Date: 9/18/2017 Analyte 2-Methylphenol 3+4-Methylphenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobenzene Hexachlorophenol Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Cresols, Total	Bate Analysis Result 0.062 0.12 0.056 0.071 0.065 0.051 0.081 0.040 0.0090 0.072 0.077 0.18	ch ID: 33 Date: 9/ PQL 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010	908 27/2017 SPK value 0.1000 0.2000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000	F SPK Ref Val 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RunNo: 4 SeqNo: 1 %REC 62.5 61.3 56.3 70.8 64.5 51.5 80.9 40.5 8.96 71.6 77.0 61.7	5933 460040 23.9 15 15 41.4 16.2 20.6 39.5 15 15 15 15 15 10.6	Units: mg/L HighLimit 129 167 147 136 134 124 134 137 129 158 153 179	9.98 5.28 11.7 2.46 5.98 9.27 0.124 35.5 20.8 10.9 5.42 6.89	20 20 23.2 20 31.3 26.6 27.9 47.4 36.9 37.2 27.4	R

Qualifiers:

Value exceeds Maximum Contaminant Level. *

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded H

Not Detected at the Reporting Limit ND

PQL Practical Quanitative Limit

- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В

Value above quantitation range Е

Analyte detected below quantitation limits Ĵ

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Sample pH Not In Range Reporting Detection Limit RL

Р

Sample container temperature is out of limit as specified W

WO#:

1709746

Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

Sample ID 1709746-001cmsd	SampTy	ype: MS	SD	Test	Code: EF	PA Method	8270C TCLP			
Client ID: Injection Well	Batch	ID: 33	908	R	unNo: 4	5933				
Prep Date: 9/18/2017	Analysis Da	ate: 9/	/27/2017	S	eqNo: 14	460040	Units: mg/L			
Analvte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai
Surr: Nitrobenzene-d5	0.082		0.1000		81.7	40.6	124	0	0	
Surr: 2-Fluorobiphenyl	0.070		0.1000		69.8	35.7	128	0	0	
Sur: 4-Terphenyl-d14	0.051		0.1000		51.1	18.8	115	0	0	

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
- PQL Practical Quanitative Limit
- 8 % 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
- W Sample container temperature is out of limit as specified

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WO#: 1709746

QC SUMMARY REPORT

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H	all	Envi	onmental	Analysis	Laboratory,	Inc.

Client: Western Refining Southwest, Inc.

Project:	BPT Injec	ction Wel	19131	7							
Sample ID	MB-34071	Samp	Туре: М	BLK	Test	Code: EF	PA Method	7470: Mercury	/		
Client ID:	PBW	Bato	ch ID: 34	1071	R	unNo: 4	5912				
Prep Date:	9/26/2017	Analysis	Date: 9	/27/2017	S	eqNo: 14	459048	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		ND	0.00020	1							
Sample ID	LCS-34071	Samp	Type: L	cs	Test	tCode: El	PA Method	7470: Mercur	y		
Client ID:	LCSW	Bate	ch ID: 34	1071	R	RunNo: 4	5912				
Prep Date:	9/26/2017	Analysis	Date: S	/27/2017	S	SeqNo: 1	459049	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury		0.0049	0.00020	0.005000	0	97.0	80	120			
Sample ID	1709746-001DMS	Samp	Туре: М	S	Tes	tCode: El	PA Method	7470: Mercur	У		
Client ID:	Injection Well	Bate	ch ID: 34	4071	F	RunNo: 4	5912				
Prep Date:	9/26/2017	Apolycic			~		450052	Units: mg/L			
i iep Dale.	JILUILUII	Analysis	Date: §)/27/2017	5	SeqNo: 1	409000	Units, mg/c			
	SILUILUII	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Analyte	512012011	Result		SPK value				5	%RPD	RPDLimit	Qual
Analyte Mercury	1709746-001DMS	Result 0.0050	PQL	SPK value 0 0.005000	SPK Ref Val .00004788	%REC 98.8	LowLimit 75	HighLimit		RPDLimit	Qual
Analyte Mercury		Result 0.0050 D Samp	PQL 0.00020	SPK value 0 0.005000	SPK Ref Val .00004788 Tes	%REC 98.8	LowLimit 75 PA Method	HighLimit 125		RPDLimit	Qual
Analyte Mercury Sample ID	1709746-001DMS	Result 0.0050 D Samp Bat	PQL 0.00020 oType: N ch ID: 3	SPK value 0 0.005000	SPK Ref Val .00004788 Tes F	%REC 98.8 tCode: E	LowLimit 75 PA Method 5912	HighLimit 125		RPDLImit	Qual
Analyte Mercury Sample ID Client ID:	1709746-001DMS	Result 0.0050 D Samp Bat	PQL 0.00020 oType: N ch ID: 3	SPK value 0 0.005000 ISD 4071 9/27/2017	SPK Ref Val .00004788 Tes F	%REC 98.8 tCode: E RunNo: 4	LowLimit 75 PA Method 5912 459054	HighLimit 125 7470: Mercur		RPDLimit RPDLimit 20	Qual

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

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WO#: 1709746

Client: Project:		Western Refining S BPT Injection Wel									- IT 1000 F 1
Sample ID	MB-A	Samp	Туре: МЕ	3LK	Test	Code: El	PA Method	6010B: Disso	lved Meta	als	
Client ID:	PBW	Bato	h ID: A4	5714	R	tunNo: 4	5714				
Prep Date:		Analysis I	Date: 9/	19/2017	S	eqNo: 1	452976	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		ND	1.0								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Sample ID	LCS-A	Samp	Type: LC	s	Tes	tCode: E	PA Method	6010B: Disso	lved Meta	als	
Client ID:	LCSW	Bato	h ID: A4	5714	F	RunNo: 4	5714				
Prep Date:		Analysis	Date: 9/	19/2017	9	SeqNo: 1	452977	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		52	1.0	50.00	0	104	80	120			
Magnesium		54	1.0	50.00	0	108	80	120			
Potassium		53	1.0	50.00	0	106	80	120			
Sample ID	MB-A	Samp	Type: MI	BLK	Tes	tCode: E	PA Method	6010B: Disso	lved Met	als	
Client ID:	PBW	Bate	h ID: A4	5960	F	RunNo: 4	5960				
Prep Date:		Analysis	Date: 9	/28/2017	5	SeqNo: 1	461012	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Vai	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium		ND	1.0								
Sample ID	LCS-A	Samp	Type: LO	s	Tes	tCode: E	PA Method	6010B: Disso	lved Met	als	
Client ID:	LCSW	Bat	ch iD: A4	15960	F	RunNo: 4	5960				
Prep Date:		Analysis	Date: 9	/28/2017	5	SeqNo: 1	461013	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium		51	1.0	50.00	0	102	80	120			

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

- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1709746 18-Oct-17

WO#:

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Client:	Western Refining Southwest, Inc.
Project:	BPT Injection Well 9 13 17

Sample ID MB-33882	SampType: MBLK	TestCode: EPA 6010B:	Total Recoverable Metals
Client ID: PBW	Batch ID: 33882	RunNo: 45714	
Prep Date: 9/15/2017	Analysis Date: 9/19/2017	SeqNo: 1451478	Units: mg/L
Analyte	Result PQL SPK va	ue SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Arsenic	ND 0.020		
Barlum	ND 0.020		
Cadmium	ND 0.0020		
Chromium	ND 0.0060		
Lead	ND 0.0050		
Silver	ND 0.0050		
Sample ID LCS-33882	SampType: L CS	TestCode: EPA 6010B:	Total Recoverable Metals
Client ID: LCSW	Batch ID: 33882	RunNo: 45714	
Prep Date: 9/15/2017	Analysis Date: 9/19/2017	SeqNo: 1451479	Units: mg/L
Analyte	Result PQL SPK va	ue SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Arsenic	0.52 0.020 0.50	00 0 103 80	120
Barium	0.49 0.020 0.50	00 0 98.6 80	120
Cadmium	0,49 0.0020 0.50	00 0 98.8 80	120
Chromium	0,49 0.0060 0.50	00 0 98.1 80	120
Lead	0.48 0.0050 0.50	00 0 95.7 80	120
Silver	0.10 0.0050 0.10	00 0 103 80	120
Sample ID MB-33882	SampType: MBLK	TestCode: EPA 6010B:	Total Recoverable Metals
Client ID: PBW	Batch ID: 33882	RunNo: 45714	
Prep Date: 9/15/2017	Analysis Date: 9/19/2017	SeqNo: 1451496	Units: mg/L
Analyte	Result PQL SPK va	ue SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Selenium	ND 0.050		
Sample ID LCS-33882	SampType: LCS	TestCode: EPA 6010B:	Total Recoverable Metals
Client ID: LCSW	Batch ID: 33882	RunNo: 45714	
Prep Date: 9/15/2017	Analysis Date: 9/19/2017	SeqNo: 1451497	Units: mg/L
Analyte	Result PQL SPK va	ue SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Selenium	0,49 0.050 0.50	00 0 98.4 80	120

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- в Analyte detected in the associated Method Blank
- Е Value above quantitation range
- J Analyte detected below quantitation limits
- р Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

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18-Oct-17

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc.

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Project:		ection Well 9		,							
Sample ID	mb-1	SampTyp	e: MB	LK	Test	:Code: SN	W2320B: All	kalinity			
Client ID:	PBW	Batch II	D: R4 !	5747	R	tunNo: 48	5747				
Prep Date:		Analysis Dat	e: 9/ 1	19/2017	S	eqNo: 14	452652	Units: mg/L	CaCO3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fotal Alkalinity ((as CaCO3)	, ND :	20.00								
Sample ID	lcs-1	SampTyp	e: LC	s	Test	iCode: SI	M2320B: All	kalinity			
Client ID:	LCSW	Batch I	D: R4	5747	R	RunNo: 48	5747				
Prep Date:		Analysis Dat	e: 9 /'	19/2017	S	SeqNo: 14	452653	Units: mg/L	. CaCO3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
otal Alkalinity	(as CaCO3)	80.40	20.00	80.00	0	101	90	110			
Sample ID	mb-2	SampTyp	be: MB	BLK	Test	tCode: SI	M2320B: Al	kalinity			
Client ID:	PBW	Batch I	D: R4	5747	R	RunNo: 4	5747				
Prep Date:		Analysis Dat	te: 9/	19/2017	S	SeqNo: 14	452675	Units: mg/L	. CaCO3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity	(as CaCO3)	ND	20.00								
Sample ID	lcs-2	SampTyp	be: LC	S	Tes	tCode: SI	M2320B: AI	kalinity			
Client ID:	LCSW	Batch I	D: R4	5747	F	RunNo: 4	5747				
Prep Date:		Analysis Dat	te: 9/	19/2017	S	SeqNo: 1	452676	Units: mg/L	CaCO3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fotal Alkalinity	(as CaCO3)	80.92	20.00	80.00	0	101	90	110			
Sample ID	mb-3	SampTy	oe: ME	3LK	Tes	tCode: SI	M2320B: Al	ikalinity			
Client ID:	PBW	Batch i	D: R4	5747	F	RunNo: 4	5747				
Prep Date:		Analysis Dat	te: 9/	19/2017	5	SeqNo: 1	452699	Units: mg/l	CaCO3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity	(as CaCO3)	ND	20.00								
Sample ID	lcs-3	SampTy	pe: LC	s	Tes	tCode: S	M2320B: Al	lkalinity			
Client ID:	LCSW	Batch i	iD: R4	5747	F	RunNo: 4	5747				
Prep Date:		Analysis Da	te: 9/	19/2017	5	SeqNo: 1	452700	Units: mg/l	L CaCO3		
Anaiyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Anaiyte											

Qualifiers:

- Value exceeds Maximum Contaminant Level. *
- D Sample Diluted Due to Matrix
- Holding times for preparation or analysis exceeded \mathbf{H}
- Not Detected at the Reporting Limit ND
- PQL Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
 - Sample pH Not In Range
- Reporting Detection Limit RL

Р

Sample container temperature is out of limit as specified W

1709746

WO#:

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Client: Western Refining Southwest, Inc.

Project: BPT Injection Well 9 13 17

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Sample ID 1709746-001EDUP	SampType	DUP		Test	Code: S	Specific Grav	rity			
Client ID: Injection Well	Batch ID	R45658		R	unNo:	45658				
Prep Date:	Analysis Date	: 9/15/20	17	S	eqNo:	1449109	Units:			
Analyte	Result F	QL SPK	value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.001	0						0.110	20	

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
- PQL Practical Quanitative Limit
- 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
- W Sample container temperature is out of limit as specified

1709746 18-Oct-17

WO#:

ation limits Page 12 of 13

Client: Western Refining Southwest, Inc.

-

Project: BPT Injection Well 9 13 17

Sample ID MB-33959	SampType: MBLK	TestCode: SM2540C MOD	: Total Dissolved Solids
Cilent ID: PBW	Batch iD: 33959	RunNo: 45804	
Prep Date: 9/20/2017	Analysis Date: 9/22/2017	SeqNo: 1455608	Jnits: mg/L
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qual
Fotal Dissolved Solids	ND 20.0		
		TastOrder CM2C40C MOD	
Sample ID LCS-33959	SampType: LCS	Testcode: SWI2540C WOL): Total Dissolved Solids
	Batch ID: 33959	RunNo: 45804	; Total Dissolved Solids
Client ID: LCSW	1 51	RunNo: 45804	Jnits: mg/L
	Batch ID: 33959 Analysis Date: 9/22/2017	RunNo: 45804 SeqNo: 1 455609 U	

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
- PQL Practical Quanitative Limit
- 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
- Page 13 of 13

- P Sample pH Not In Range RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

WO#: 1709746

ANALY	ONMENTAL (SIS RATORY	TEL: 505-345-3975	4901 Hawkins NE querque, NM 87109	Sam	ple Log-in Ci	neck List
Client Name: Western Refining Southw		Work Order Number:	1709746		RcptNo:	1
Received By:	Isaiah Ortiz	9/14/2017 7:05:00 AM	:	IGh		
Completed By:	Ashley Gallegos	9/14/2017 9:01:05 AM	5	AZ		
Reviewed By:	ENM	9/14/17		Q		
<u>Chain of Cus</u>	<u>tody</u>					
1. Custody sea	ils intact on sample bottles?		Yes 🗌	No 🗌	Not Present 🗹	
2. Is Chain of C	Custody complete?		Yes 🗹	No 🗌	Not Present	
3, How was the	a sample delivered?		Courier			
<u>Log In</u>						
4. Was an atte	empt made to cool the sample	es?	Yes 🗹	No 🗆	NA 🗔	
5. Were all sar	nples received at a temperati	ure of >0° C to 6.0°C	Yes 🗹	No 🗌	NA 🗖	
6. Sample(s) i	n proper container(s)?		Yes 🗹	No 🗆		
7, Sufficient sa	mple volume for indicated te	st(s)?	Yes 🗹	No 🗆		
8. Are samples	e (except VOA and ONG) pro	perly preserved?	Yes 🗹	No 🗌		
9. Was preserv	vative added to bottles?		Yes 🗋	No 🗹	NA 🗌	
10.VOA vials h	ave zero headspace?		Yes 🔽	No 🗆	No VOA Viais 🗌	
11, Were any s	ample containers received br	oken?	Yes 🗆	No 🗹	# of preserved	·········
• •	work match bottle labels? pancies on chain of custody)		Yes 🗹	No 🗌	bottles checked for pH:	2, 2
13, Are matrices	s correctly identified on Chain	of Custody?	Yes 🗹	No 🗌	Adjusted?	
14, Is it clear wh	nat analyses were requested?	?	Yes 🗹	No 🗌		Ke,
	ding times able to be met? customer for authorization.)		Yes 🗹	No 🗖	Checked by:	

Special Handling (if applicable)

Per	rson Notified:			Date				
Ву	Whom:	annan 11 an 11 1 11 10 10 10 10 10 10 10 10 10 10 1	inflaçora la faja de come ar anti do futura.	Via:	eMail	📋 Phone [] Fax	🗌 In Person
Re	garding:	in an an is al labor to Mildinian instalant	alarasi mabasanni si sasi s					
;		And the second second second second		ALC: NOT THE OWNER OF THE OWNER OWNER OF THE OWNER OWN	CONTRACTOR OF A CONTRACTOR		and the second second	an a
Clie 17. Addition	ent Instructions: al remarks:							
17. Addition 18. <u>Cooler I</u>	al remarks:	<u> </u>		1				
17. Addition	al remarks: Information		Seal Intact Yes	Seal No	Seal Date	Signed	і Ву	,

- -- --

 HALL ENVIRONMENTAL HALL ENVIRONMENTAL ANALYSIS LABORATORY www.hallenvironmental.com 4901 Hawkins NE - Albuquerque, NM 87109 Tel. 505-345-3975 Fax 505-345-4107 Tel. 505-345-3975 Fax 505-345-4107 	3TEX + MTBE + TMB's (8021) 3TEX + MTBE + TPH (Gas only) FPH 8015B (GRO / DRO / MRO) TPH (Melhod 504.1) 2DB (Melhod 504.1) Anions (F,CI,NO ₃ ,NO ₂ ,PO ₄ ,SO ₄) 3081 Pesticides / 8082 PCB's 3081 PESTICIDES (7 OCN)		Remarks: See our of yHe 1737 sossibility. Any sub-contracted data will be clearly notated on the analytical report.
Chain-of-Custody Record Turn-Around Time: Client: Westury Refiniting Address: あうして、A Standard コ Rush Mailing Address: あうして、4990 BPT-Injection Well-9-13-1 Bloomfreld, NM B7413 Project # Phone # CDC - 622-411.9 POF 13631358	Time Matrix Sample Request ID Type	9-13-17 11.30 A>0 Injection Will 3-11 Amber -001 3-10As HCL 1-350AL AMber -001 1-350AL AMber -001 1-35	Cate: Time: Relincuished by Received by Date Time Remarks: 9/13/17 1/0 7/0 1/1 1/0 5/2 0.4 4/2 1/3 fr Date: Time: Relinquished by Received by 0/1 1/6/0 5/2 0.4 4/2 1/3 fr 1/3/17 1/8/16 5/2 0.4 4/4 1/3 fr 5/2 0.4 4/4 1/3 fr 1/3/17 1/8/16 5/2 0.4 4/4 1/3 fr 5/2 0.4 4/4 1/3 fr 1/1 1/1 1/1 1/10 5/2 0.4 4/4 1/3 fr 1/3 fr 1/1 1/1 1/1 1/10 5/2 0.4 4/14 1/3 fr 1/1 1/1 1/1 1/10 5/2 0.4 4/14 1/3 fr 1/1 1/1 1/1 1/10 5/2 0.4 4/14 1/3 fr 1/1 1/1 1/1 1/10 5/2 0.4 4/14 1/1 1/1 1/1 1/10 5/2 0.4 4/14 1/1 1/1 1/1 1/1 1/1 1/1 1/1

WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

UICI-011 (WDW-2) July 20, 2016

immediately or within a specified time period, or assess a civil penalty, or both (see Section 74-6-10 NMSA 1978). The compliance order may also include a suspension or termination of this Discharge Permit. OCD may also commence a civil action in district court for appropriate relief, including injunctive relief (see Section 74-6-10(A)(2) NMSA 1978). The Permittee may be subject to criminal penalties for discharging a water contaminant without a discharge permit or in violation of a condition of a discharge permit; making any false material statement, representation, certification or omission of material fact in a renewal application, record, report, plan or other document filed, submitted or required to be maintained under the Water Quality Act; falsifying, tampering with or rendering inaccurate any monitoring device, method or record required to be maintained under the Water Quality Act; or failing to monitor, sample or report as required by a Discharge Permit issued pursuant to a state or federal law or regulation (see Section 74-6-10.2 NMSA 1978).

2. GENERAL FACILITY OPERATIONS:

2.A. QUARTERLY MONITORING REQUIREMENTS FOR CLASS I NON-

HAZARDOUS WASTE INJECTION WELL: The Permittee shall properly conduct waste management injection operations at its facility by injecting only non-hazardous (RCRA exempt and RCRA non-hazardous, non-exempt) oil field waste fluids. Injected waste fluids shall not exhibit the RCRA characteristics, i.e., ignitability, reactivity, corrosivity, or toxicity under 40 CFR 261 Subpart "C" 261.21 - 261.24 (July 1, 1992), at the point of injection into WDW-2, based upon environmental analytical laboratory testing. Pursuant to 20.6.2.5207B, the Permittee shall provide analyses of the injected fluids at least quarterly to yield data representative of their toxicity characteristic.

The Permittee shall also analyze the injected fluids quarterly for the following characteristics:

- pH (Method 9040);
- Eh;
- Specific conductance;
- Specific gravity;
- Temperature;
- Major dissolved cations and anions, including: fluoride, calcium, potassium, magnesium, sodium bicarbonate, carbonate, chloride, sulfate, bromide, total dissolved solids, and cation/anion balance using the methods specified in 40 CFR 136.3); and,
- EPA RCRA Characteristics for Ignitability (ASTM Methods); Corrosivity (SW-846) and Reactivity (determined through Permittee's application of knowledge or generating process).

The Permittee shall analyze the injected fluids quarterly for the constituents identified in the Quarterly Monitoring List (below) to demonstrate that the injected fluids do not exhibit the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure, BPA SW-846 Test Method 1311 (see Table 1, 40 CFR 261.24(b)).

WESTERN REFINING SOUTHWEST, INC. WASTE DISPOSAL WELL NO. 2

UICI-011	(WDW-2)
	20, 2016

D010	Selenium	1311	1.0
D011	Silver	1311	5.0
D039	Tetrachloroethylene	8260B	0.7
D040	Trichloroethylene	8021B	0.5
		8260B	
D041	2,4,5-Trichlorophenol	8270D	400.0
D042	2,4,6-Trichlorophenol	8041A	2.0
	and a state of the	8270D	1.0066
D043	Vinyl chloride	8021B	0.2
CT. B. OFF		8260B	

If o-, m-, and p-cresol concentrations cannot be differentiated, then the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

If the quantitation limit is greater than the regulatory level, then the quantitation limit becomes the regulatory level. If metals (dissolved), the EPA 1311 TCLP Laboratory Method is required with the exception of Mercury (total).

1. Monitor and Piezometer Wells: Groundwater with a total dissolved solids concentration of less than 10,000 mg/L occurs at an estimated depth of approximately 10 - 30 ft. below ground surface at the WDW-2 well (hereafter, "uppermost water-bearing unit"). Groundwater monitoring well (MW) with GW sampling capability shall be installed proximal to and hydrogeologically downgradient from WDW-2 in order to monitor the uppermost waterbearing unit. The MW shall be screened (15 ft. screen with top of screen positioned 5 ft. above water table) into the uppermost water-bearing unit. The Permittee shall propose a monitoring frequency with chemical monitoring parameters in order to detect potential groundwater contamination either associated with or not associated with WDW-2.

2.B. CONTINGENCY PLANS: The Permittee shall implement its proposed contingency plan(s) included in its application to cope with failure of a system(s) in the Discharge Permit.

2.C. CLOSURE: Prior to closure of the facility, the Permittee shall submit for OCD's approval, a closure plan including a completed form C-103 for plugging and abandonment of the waste injection well. The Permittee shall plug and abandon its well pursuant to 20.6.2.5209 NMAC and as specified in Permit Condition 2.D.

- Pre-Closure Notification: Pursuant to 20.6.2.5005A NMAC, the Permittee shall submit a pre-closure notification to OCD's Environmental Bureau at least 30 days prior to the date that it proposes to close or to discontinue operation of WDW-2. Pursuant to 20.6.2.5005B NMAC, OCD's Environmental Bureau must approve all proposed well closure activities before the Permittee may implement its proposed closure plan.
- Required Information: The Permittee shall provide OCD's Environmental Bureau with the following information in the pre-closure notification specified in Permit Condition 2.C.1:
 - Name of facility;
 - Address of facility;
 - Name of Permittee (and owner or operator, if appropriate);

Page 7

	Samler		Matt Krakow
	Time		11:00 AM
eters	Date	המוב	52.3 1/25/2017 11:00 AM
aram	Temp.	(F)	52.3
Field Parameters	Hd	(g/L) (mg/L) (mV) (Units)	44,200 1.33 211.9 5.13
	ORP	(mV)	211.9
	DO	(mg/L)	1.33
	TDS	(g/L)	44,200
	Sp. Cond.	(uS/cm)	68,017
	(1 1	alle	DWD#2

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

February 01, 2017

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: DWD #2

OrderNo.: 1701A75

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/26/2017 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 <u>www.hallenvironmental.com</u> 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

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Hall Environmental Analy	sis Laborat]	Date Reported: 2/1/2017	·	
CLIENT: Western Refining Southwes Project: DWD #2 Lab ID: 1701A75-001	t, Inc. Matrix: A	AQUEOUS	(ient Sample II Collection Dat Received Dat	e: 1/25		
Analyses	Result	PQL Qu	al	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst	MRA
Fluoride	ND	2.0		mg/L	20	1/26/2017 6:37:17 PM	R40335
Chloride	23000	2500	*	mg/L	5E	1/27/2017 7:20:01 PM	R40361
Bromide	ND	2.0		mg/L	20	1/26/2017 6:37:17 PM	R40335
Phosphorus, Orthophosphate (As P)	ND	10		mg/L	20	1/26/2017 6:37:17 PM	R40335
Sulfate	910	25	*	mg/Ľ	50	1/27/2017 7:07:36 PM	R40361
Nitrate+Nitrite as N	ND	20		mg/L	100	1/27/2017 7:32:26 PM	R40361
SM2510B: SPECIFIC CONDUCTANC	E					Analyst	JRR
Conductivity	94000	50		µmhos/cm	50	1/30/2017 1:40:54 PM	R40366
SM2320B: ALKALINITY						Analyst	: JRR
Bicarbonate (As CaCO3)	255.3	20.00		mg/L CaCO3	1	1/30/2017 11:39:53 AM	R40366
Carbonate (As CaCO3)	ND	2.000		mg/L. CaCO3	1	1/30/2017 11:39:53 AM	R40366
Total Alkalinity (as CaCO3)	255.3	20.00		mg/L CaCO3	1	1/30/2017 11:39:53 AM	R40366
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analyst	: KS
Total Dissolved Solids	48900	2000 *	*D	mg/L	1	2/1/2017 3:56:00 PM	29970
EPA 6010B: TOTAL RECOVERABLE	METALS					Analyst	: pmf
Calcium	1700	20		mg/L	20	1/30/2017 10:59:56 AM	29930
Magnesium	200	20		mg/L	20	1/30/2017 10:59:56 AM	29930
Potassium	450	20		mg/L	20	1/30/2017 10:59:56 AN	29930
Sodium	16000	500		mg/L	500	1/30/2017 11:06:12 AN	29930

Oualifiers:	*	Value exceeds Maximum Contaminant Level.	в	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 5
	ND	Not Detected at the Reporting Limit	Р	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	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc

Analytical Report Lab Order 1701A75



LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	Hall Environmental
Project:	Not Indicated
Lab ID:	B17011690-001
Client Sample ID:	1701A75-001C DWD 2 Formation Water

Report Date: 01/27/17 Collection Date: 01/25/17 11:00 DateReceived: 01/27/17 Matrix: Aqueous

Analyses	Result Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
CORROSIVITY pH	6. 46 s.u.		0.10		SW9040C	01/27/17 10:54 / jmg

Report Definitions: RL - Analyte reporting limit. QCL - Quality control limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Hall Environmental

Project: Not Indicated

Report Date: 01/27/17 Work Order: B17011690

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	SW9040C	<u></u>					Analytical Ru	n: ORION	720A HZW	_170127A
Lab ID: pH	ICV	Initial Calibratio 8.11	on Verification s.u.	n Standard 0.10	101	98	102	= <u></u>	01/27	7/17 10:54
Method:	SW9040C	191 A 1991							Balch	: R273874
Lab ID: pH	B17011590-001ADUP	Sample Duplic 6.49	ate s.u.	0.10		Run: ORIC)n 720a HZW_	170127A 0.5	01/27 3	7/17 10:54

ND - Not detected at the reporting limit.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client: Western Refining Southwest, Inc. Project: DWD #2

Project:	DWD #2										
Sample ID MB		SampT	ype: mł	olk	Tes	TestCode: EPA Method 300.0: Anions					
Client ID: PBW		Batch	n ID: R4	0335	RunNo: 40335						
Prep Date:		Analysis D	ate: 1/	26/2017	S	SegNo: 1	264291	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		ND	0.10								
Bromide		ND	0.10								
Phosphorus, Orthophos	phate (As P	ND	0.50								
Sample ID LCSb		SampT	ype: Ics	3	Tes	tCode: E	PA Method	300.0: Anions	;		
Client ID: LCSW	1	Batcl	h ID: R4	0335	F	RunNo: 4	0335				
Prep Date:		Analysis D	Date: 1/	26/2017	5	GeqNo: 1	264293	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride		0.52	0.10	0.5000	0	104	90	110			
Bromide		2.4	0.10	2,500	0	96.4	90	110			
Phosphorus, Orthophos	sphate (As P	4.8	0.50	5,000	0	96.7	90	110			
Sample ID MB		Samp	Type: ml	blk	Tes	tCode: E	PA Method	300.0: Anions	;		
Client ID: PBW		Batc	h ID: R4	0361	F	RunNo: 4	0361				
Prep Date:		Analysis [Date: 1	/27/2017	S	SeqNo: 1	265117	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								
Nitrate+Nitrite as N		ND	0.20								-
Sample ID LCS		Samp	Fype: Ic:	5	Tes	tCode: E	PA Method	300.0: Anions	5	·	
Client ID: LCSW	1	Batc	h ID: R4	40361	I	RunNo: 4	0361				
Prep Date:		Analysis [Date: 1	/27/2017	:	SeqNo: 1	265118	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		4.8	0.50		0	95.5	90	110			
Sulfate		9.7	0.50			97.2	90	110			
Nitrate+Nitrite as N		3.5	0,20	3.500	0	98.8	90	110			

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
- W Sample container temperature is out of limit as specified

Page 2 of 5

WO#: 1701A75 01-Feb-17

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

Client:	Western Refining Southwest, Inc.
Project:	DWD #2

Sample ID MB-29930	SampT	ype: MB	ILK	Test	TestCode: EPA 6010B: Total Recoverable Metals					
Client ID: PBW	Batch	ID: 299	930	R	unNo: 40)375				
Prep Date: 1/27/2017	Analysis D	ate: 1/3	30/2017	S	eqNo: 12	265583	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
	ND ND	1.0 1.0								
Potassium Sodium Sample ID LCS-29930	ND		s	Tes	tCode: El	PA 6010B: 1	Fotal Recove	rable Meta	als	
Sodium Sample ID LCS-29930	ND SampT	1.0			tCode: El		Fotal Recove	rable Meta	als	
Sodium	ND SampT	1.0 ype: LC	930	F		0375	Total Recove		als	
Sodium Sample ID LCS-29930 Client ID: LCSW Prep Date: 1/27/2017	ND SampT Batch	1.0 ype: LC	930 30/2017	F	RunNo: 4	0375			als RPDLimit	Qual
Sodium Sample ID LCS-29930 Client ID: LCSW Prep Date: 1/27/2017 Analyte	ND SampT Batch Analysis D	1.0 ype: LC 1D: 299 ate: 17	930 30/2017	R S SPK Ref Val	RunNo: 4 SeqNo: 1	0375 265584	Units: mg/L			Qual
Sodium Sample ID LCS-29930 Client ID: LCSW Prep Date: 1/27/2017 Analyte Calcium	ND SampT Batch Analysis D Result	1.0 ype: LC 1 ID: 299 ate: 1/ PQL	930 30/2017 SPK value	R SPK Ref Val 0	RunNo: 4 SeqNo: 1 %REC	265584 LowLimit	Units: mg/L HighLimit			Qual
Sodium Sample ID LCS-29930 Client ID: LCSW Prep Date: 1/27/2017	ND SampT Batch Analysis D Result 49	1.0 ype: LC 1D: 299 ate: 1/ PQL 1.0	930 30/2017 SPK value 50.00	F SPK Ref Val 0 0	RunNo: 4 SeqNo: 1 %REC 98.3	0375 265584 LowLimit 80	Units: mg/L HighLimit 120			Qual

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Н
- Not Detected at the Reporting Limit ND
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- Р Sample pH Not In Range
- Reporting Detection Limit RL
- Sample container temperature is out of limit as specified W

Page 3 of 5

WO#: 01-Feb-17

1701A75

Western Refining Southwest, Inc. **Client: Project:** DWD #2

Sample ID mb-1	SampType: mblk			TestCode: SM2320B: Alkalinity						
Client ID: PBW	Batch ID: R40366			RunNo: 40366						
Prep Date:	Analysis D	ate: 1/3	30/2017	8	SeqNo: 1	266120	Units: mg/L	. CaCO3		
Anaiyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								
Total Alkalinity (as CaCO3) Sample ID Ics-1		20.00 ype: Ics	· · · · · · · · · · · · · · · · · · ·	Tes	tCode: SI	W2320B: Al	kalinity			
Sample ID Ics-1	SampT				tCode: SI RunNo: 4		kalinity			
Sample ID Ics-1 Client ID: LCSW	SampT	ype: Ics	0366	F		0366	kalinity Units: mg/L	CaCO3		
	SampT Batch	ype: Ics	0366 30/2017	F	RunNo: 4	0366	-	- CaCO3 %RPD	RPDLimit	Qual

Qualifiers:

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

Page 4 of 5

с.

Client:	Western Refining Southwest, Inc
Project:	DWD #2

Project: DWD	#2		
Sample ID MB-29970	SampType: MBLK	TestCode: SM2540C M	OD: Total Dissolved Solids
Client ID: PBW	Batch ID: 29970	RunNo: 40436	
Prep Date: 1/31/2017	Analysis Date: 2/1/2017	SeqNo: 1267368	Units: mg/L
Analyte	Result PQL SPK valu	e SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qua
Total Dissolved Solids	ND 20.0		
Sample ID LCS-29970	SampType: LCS	TestCode: SM2540C M	OD: Total Dissolved Solids
Client ID: LCSW	Batch ID: 29970	RunNo: 40436	
Prep Date: 1/31/2017	Analysis Date: 2/1/2017	SeqNo: 1267369	Units: mg/L
Analyte	Result PQL SPK valu	ue SPK Ref Val %REC LowLimit	HighLimit %RPD RPDLimit Qua
Total Dissolved Solids	1010 20.0 100	0 0 101 80	120

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Η
- Not Detected at the Reporting Limit ND
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Value above quantitation range Е
- Analyte detected below quantitation limits J
- P Sample pH Not In Range
- RLReporting Detection Limit
- Sample container temperature is out of limit as specified W

WO#: 1701A75 01-Feb-17

Page 5 of 5

Air ANALYSIS ANALYSIS TEL: 505-345-397	I Analysis Laboratory 490I Hawkins NE buquerque, NM 87109 5 FAX: 505-345-4107 nallenvironmental.com	Samp	ble Log-In Ch	eck List
Client Name: Western Refining Southw Work Order Number	er: 1701A75		ReptNo:	1
Received by/date: AT 61/216/17				
Logged By: Anne Thome 1/26/2017 7:05:00 Al	VI (Dane Arm	-	
Completed By: Anne Thorne 1/26/2017 9:13:16 Al	VI 2	Done Ar-	-	
Reviewed By: 126/17				
Chain of Custody				
1. Custody seals intact on sample bottles?	Yes	NoL	Not Present 🗹	
2. Is Chain of Custody complete?	Yes 🗹	No 🛄	Not Present 🗌	
How was the sample delivered?	<u>Courier</u>			
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 🗹	# _ f	
	_		# of preserved bottles checked	1.
12. Does paperwork match bottle labels?	Yes 🗹	No 📖	for pH:	r >12 unless noted)
(Note discrepancies on chain of custody) 13, Are matrices correctly identified on Chain of Custody?	Yes 🗹	No 🗀	Adjusted?	M2
14, Is it clear what analyses were requested?	Yes 🔽	No 🗌		La
15. Were all holding times able to be met?	Yes 🗹	No 🗆	Checked by:	$\underline{\mathcal{M}}$
(if no, notify customer for authorization.)				
<u>Special Handling (if applicable)</u>	_	_		
16. Was client notified of all discrepancies with this order?	Yes 🗌	No 🗌	NA 🗹	٦
Person Notified: Date		*		
By Whom: Via:	eMail Pho	ne 🗌 Fax	In Person	
Regarding:				
Client Instructions:				
17. Additional remarks:				
18. <u>Cooler Information</u> <u>Cooler No</u> Temp ^o C Condition Seal Intact Seal No 1 1.0 Good Yes	Seal Date S	igned By		
Page 1 of 1				<u></u>

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TAI	ANALYSIS LABORATORY							(N	01	Y) s	alddu Brif								 				report.
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	XRush 2-day			E-12061 101	-		Robinson	Kra Kow.	ON D		HEAL NG	P	- CO-	1012							Date Time 125/17 リザイ	A Date Time	to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Time:	[1	DW D# 9			iger:	Kelly Ro		XIII SI	peratification	Preservative Type	Pely	HWD3	H2504	_		-				12 houte	10 m	accredited laborate
Turn-Around Time:	□ Standard	Project Name	ΡW	ج #) C	Project Manager:	×	Sampler: Matt	On Joe	Sample Temperature	Container Type and #	H-500M1	1-Sam	1-12541							Received by:	Received by	
Chain-of-Custody Record				R7413	-637-4169	email or Fax#:	QA/QC Package:		🗆 NELAP 🕺 🗆 Other	D EDD (Type)	Date Time Matrix Sample Request ID	-25-17 11:00 H2 DWD3 Formatan way - 500.11	×								Date: Tume: Relinquished by: 15/17 1447 77 18(1) /00/	<u> </u>	If necessary, sarrives submitted to Ha

• •

All Anions	EPA Method 300.0	1-500ml unpreserved plastic 1-125 ml H2SO4 plastic
Alkalinity	SM2320 B	Volume will come from the 500ml unpreserved plastic
eC	SM 2510B	Volume will come from the 500ml unpreserved plastic
TD5	SM 2540 C	Volume will come from the 500ml unpreserved plastic
Cations	EPA Method 200.7	1-500ml HNO3 Plastic
рН	EPA Method 9040	Volume will come from the 500ml unpreserved plastic

SM = Standard Methods

EPA Methods 310.1, 150.1, 160.1, 320.1 and 120.1 have been withdrawn by EPA. Most labs have are accredited for all of the tests listed above and we perform these methods regularly for l

We will ship out one bottle set today as listed below. Fill all bottles to the neck and keep the sa We can rush this work on a 1-2 business day TAT.

1-500ml unpreserved plastic

1-125ml H2SO4 Plastic

1-500ml HNO3 plastic

Appendix D

Well Logs

			Larry Candelaria		Witnessed By	Witr
			Avery Becker			Rec
		Ft Morgan, CO	9115	Location:		Unit
		05:00:00	07-Sep-2016	Time	Logger on Bottom	Log
		20:25:00	06-Sep-2016	Time	Circulation Stopped	Circ
			177 degF	atures	Max Recorded Temperatures	.Max
		7 0.37 @ 177	0.46 @ 177	RMF @ BHT		RM
		ulated	Pressed	RMC	Source RMF	Sou
		@ 68 degF	1.4 ohm.m		RMC @ Meas Temp	RMC
			0.9 ohm.m		RMF @ Meas Temp	RMF
		@ 68 degF	1.13 ohm.m		@ Meas Temp	RM
		the second	Active Tank		Source of Sample	ML
		8.6	9 cm3	PH	Fluid Loss	-
		55 s	9.9 lbm/gal	Viscosity		
			WBM		Type Fluid In Hole	Туре
			8.75 in		ize	Bit Size
			3498 ft		Casing Schlumberger	Casi
		3500.00 ft	9.625 in @)epth	Casing Driller Size @ Depth	Casi
			3498.00 ft		Top Log Interval	Тор
			7532.00 ft		Bottom Log Interval	Botto
			7532.00 ft		Schlumberger Depth	Schl
			7525.00 ft		Depth Driller	Dept
			One		Run Number	Run
			05-Sep-2016		Logging Date	Logg
11W	29N			30-045-35747-0000	Field Loca Well Com	Cou
Range:	Township:			-	atio : npa	
		Kelly Bushing	ed From:	Drilling Measured From:	ny:	:
above Perm.Datum		Kelly Bushing	From:			
5535.00 f	Elev.:	Ground Level	um:		WV Wesl	Sar
. 5549.00 ft	D.F.		86/-107.97035	Lat/Long: 36.6986/-107.97035	c 27 VD	
5535.00	G.L.		X 111' FEL	SHL: 2028' FNL X 111' FEL	7, T #2	
	Elev.: K.B.		R11W	Sec 27, T29N, R11W		
				Triple Combo	I, R11W outhwest, Inc.	
			ess	Plattorm Express		
				Calloradi		8
0	New Mexico	State: N		San Juan	County:	Co
				Wildcat	ld:	Field:
				WWD #2		Well:
		Western Refining, Southwest, Inc.	tefining, So	Western R	Company:	Co
Inimal.Agi.	JUIL					
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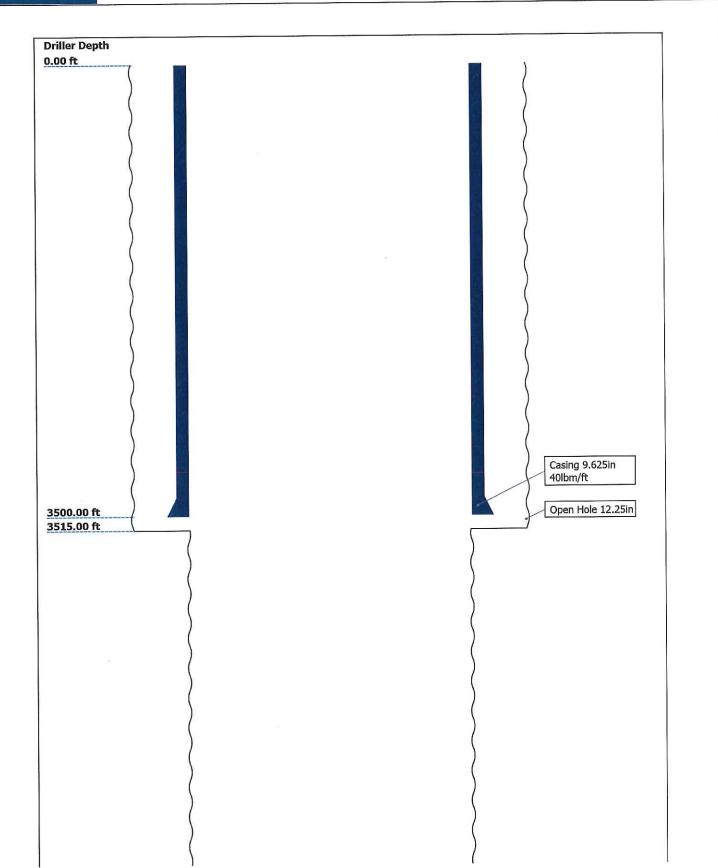
Disclaimer

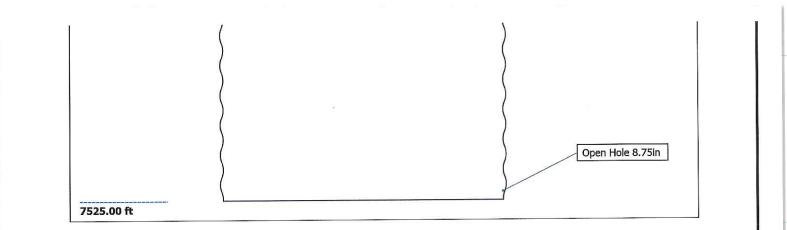
THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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- 9. One 5" Triple Combo
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- 9.2 Log (TripleCombo-5 RA)
- 10. Calibration Report
- 11. Tail

Well Sketch



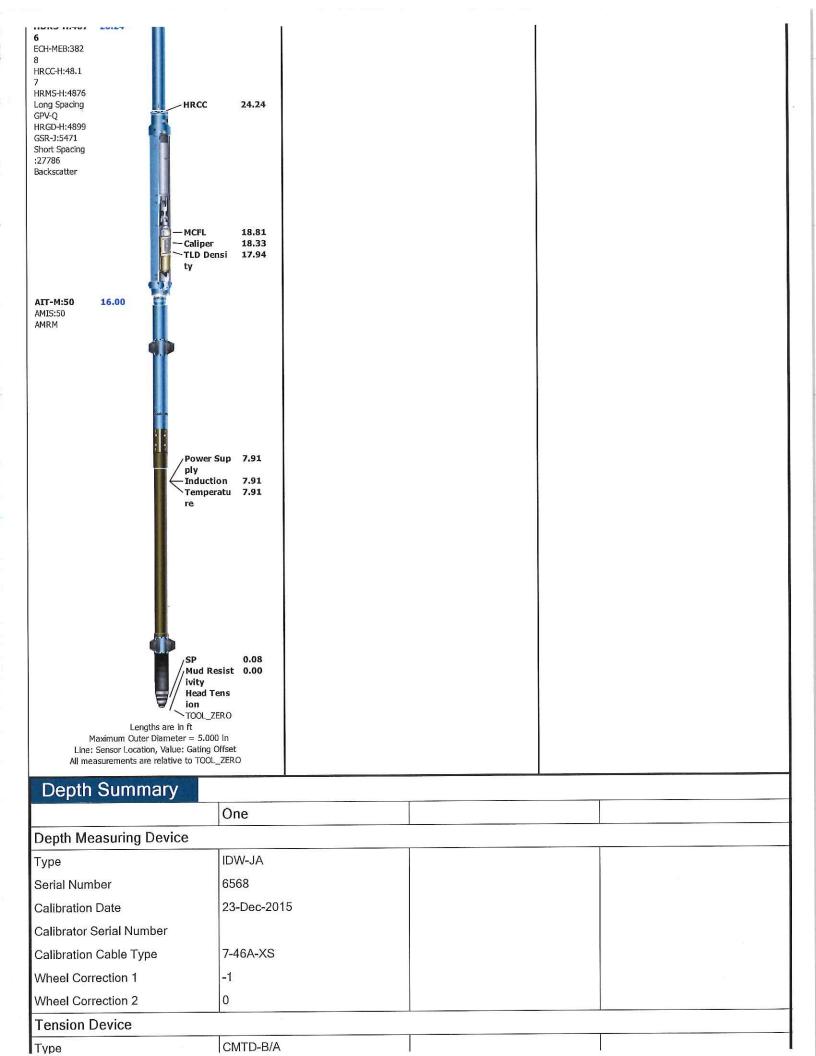


Borehole Size/Casing/Tubing Record

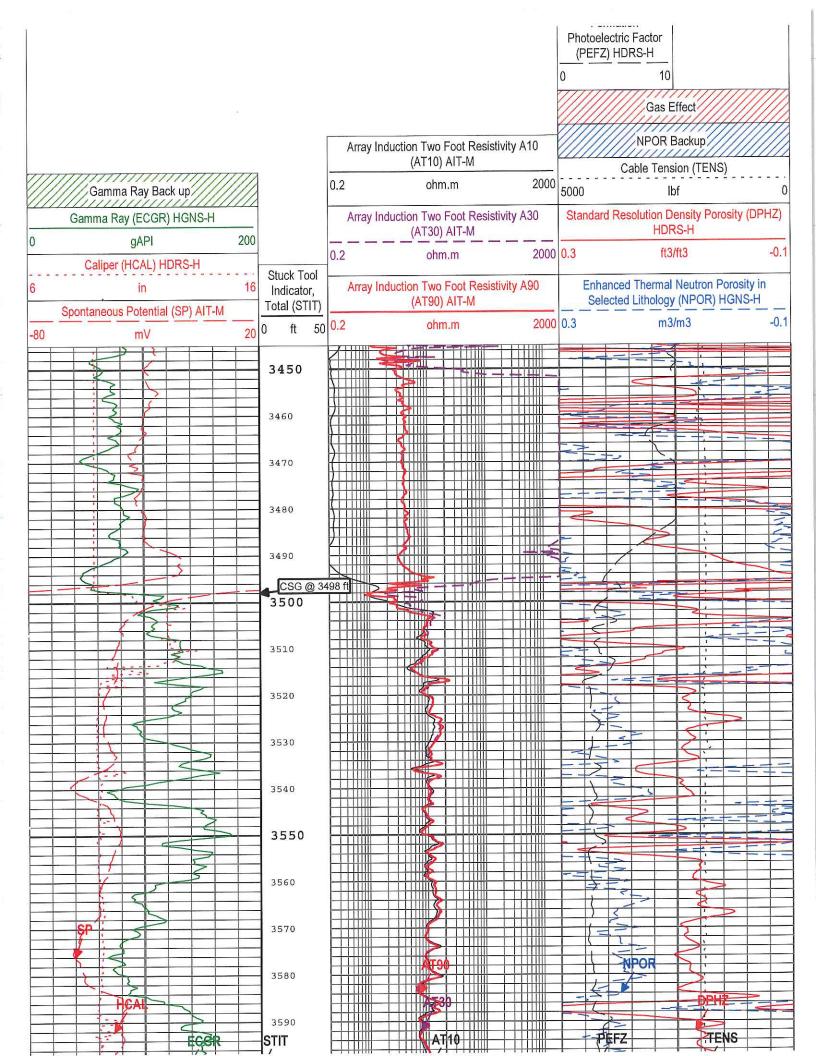
Bit					
Bit Size (in)	12.25	8.75			
Top Driller (ft)	0	3515			
Top Logger (ft)	0	3515			
Bottom Driller (ft)	3515	7525			
Bottom Logger (ft)	3515	7532		Q.	
Casing					
Size (in)	9.625				
Weight (lbm/ft)	40				
Inner Diameter (in)	8.835				
Grade	N/A				
Top Driller (ft)	0				
Top Logger (ft)	0			11	
Bottom Driller (ft)	3500				
Bottom Logger (ft)	3498				

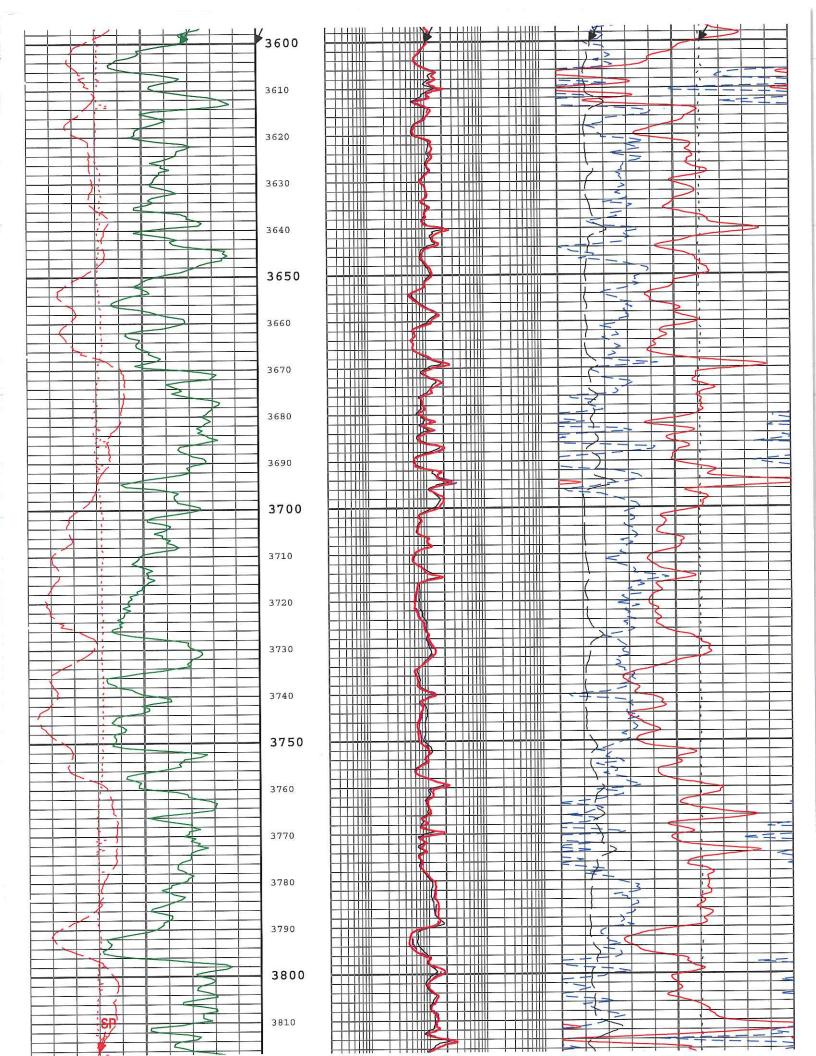
Remarks and Equipment Summary

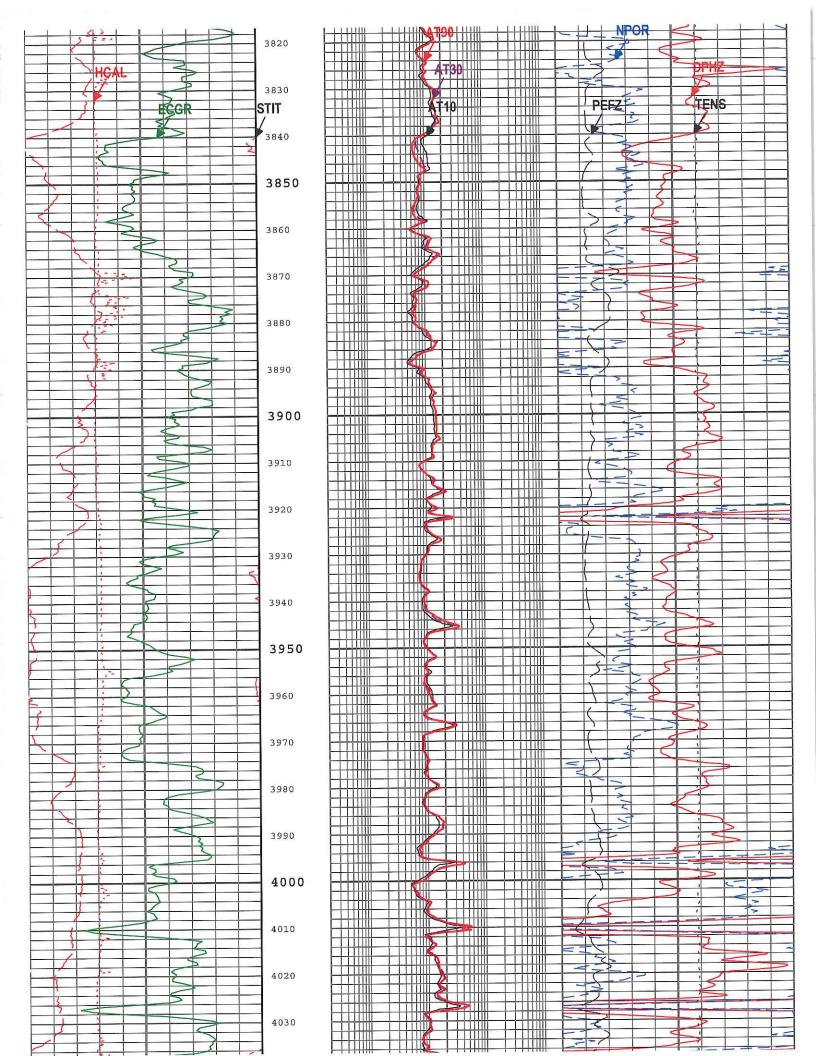
	One: T	oolstring		One: Remarks
Equip name	Length	MP name	Offset	Toolstring run as per tool sketch
LEH-QT LEH-QT	43.57	Ŭ.		Matrix: Sandstone (2.65 g/cc)
				Log may be affected by 20% LCM in drilling mud
DTC-H:8980	40.65	astr.	100% - 1000	Caliper check in casing=8.87 in, within tolerance
ECH-KC:1005 3 DTC-H:8980			39.75 0.00	Cement volume calculated using 7 in future casing diameter
HGNS-H:481	37.65	TelStatus ToolStatus Temperatu	37.65 37.65 37.62	Rig: Aztec 920
7 HGNH:4865	37.03	re		Crew: Derrick Hunter
NPV-N NSR-F:5068		GR GR	36.91	Thank you for choosing Schlumberger
HGNS-H:4817 HACCZ-H:699 1				
HMCA-H	1			
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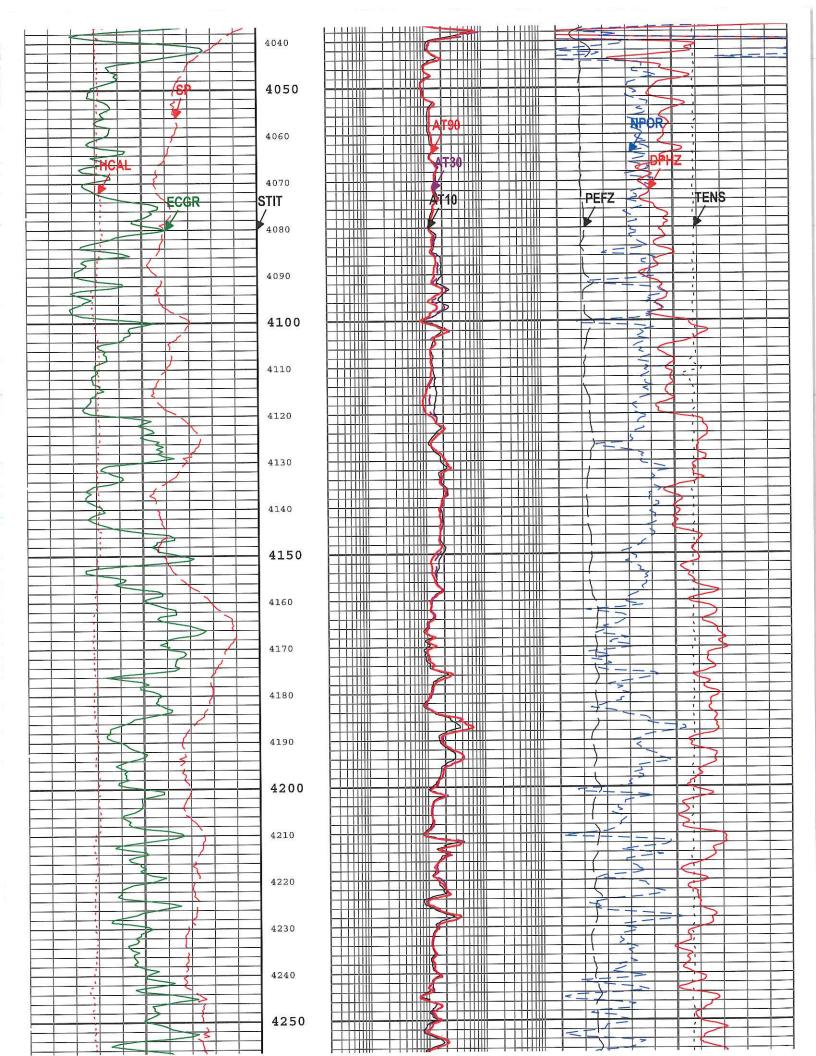


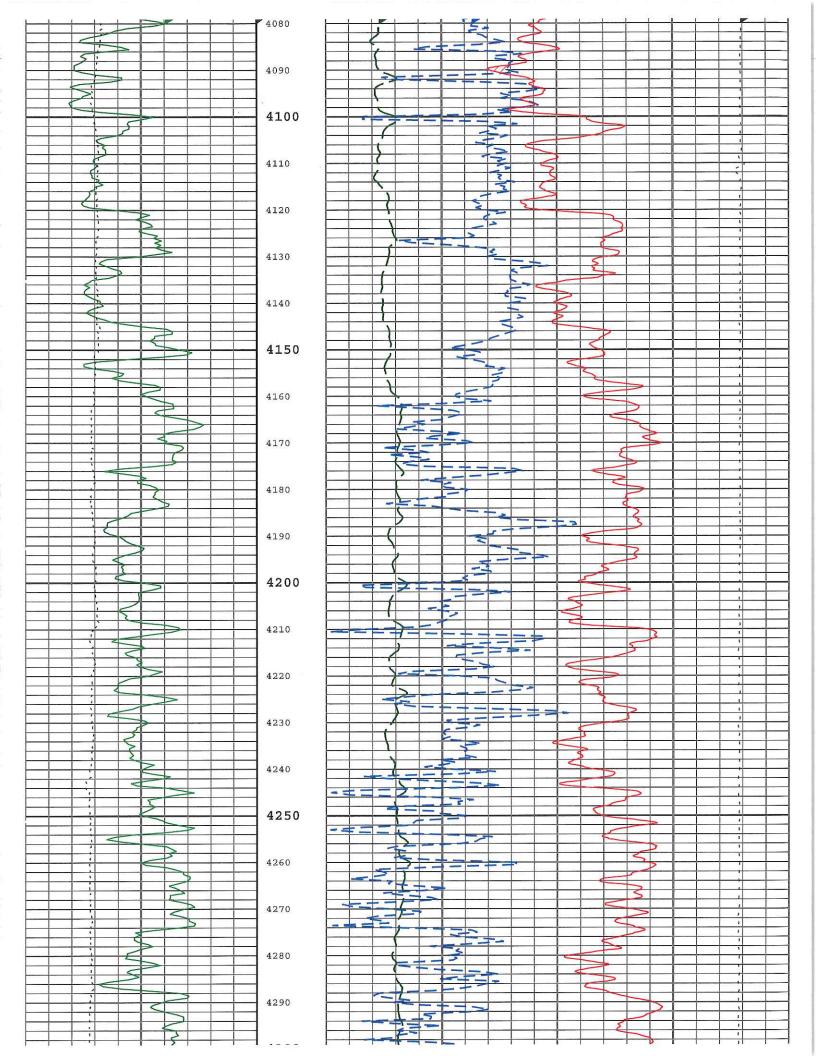
		1			1				1
Serial Numbe	۶r	147							
Calibration Da	ate	18-Aug-	2016						
Calibrator Se	rial Number	78805A							
Number of Ca	alibration Points	10				12			
Calibration Re Error	oot Mean Square	7							
Calibration P	eak Error	10							
Logging Ca	ble								
Туре		7-46A-X	S						
Serial Numbe	ər	U71504	3						
Length		24000.0	0 ft						
Conveyance	Туре	Wireline	i						
Rig Type		Land							
One:Depth	Control Parame	ters			Depth Cor	ntrol Remark	S		
Log Sequence			g In the Well		First run in v	vell depth cont	rol procedures	s followed	
Rig Up Lengt					IDW used a	s primary dept	h device, z-ch	art used for se	condary
Rig Up Lengt									
Rig Up Lengt									
Stretch Corre									
Tool Zero Ch	eck At Surface								
				C)ne				
				5" Trip	e Combo				
				5 mp	C COMBC				
Pass S	ummary				C COMDC				
Pass S Run Name	ummary Pass Objective	Direction	Тор	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
	the second s	Direction Up	Тор		Start 07-Sep-2016		DSC Mode	Depth Shift	
Run Name	Pass Objective	Up	Тор	Bottom	Start				Parallel Data
Run Name	Pass Objective	Up	Тор	Bottom	Start 07-Sep-2016 5:52:06 AM		ON	0.00 ft st, Inc. W	Parallel Data No ell:WWD #2
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Run NameOneAll depths areLogDescription: HGType: MeasuredChannelSAT10AAT30AAT90AGRHOPHZHPEFZSPASTITD	Pass Objective Log[4]:Up referenced to toolstr BNS standard resolution d Depth Creation Data ource IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS DRS-H:HRCC-H:HRC DRS-H:HRMS-H:HRC IGNS-H:HGNS-H:HG IGNS-H:HGNS-H:HG IDRS-H:HRMS-H:HG IDRS-H:HRMS-H:HG IDRS-H:HRMS-H:HG IDRS-H:HRMS-H:HG IDRS-H:HRMS-H:HG IDRS-H:HRMS-H:HRC IDRS-H:HRMS-H:HRC IT-M:AMIS:AMIS PepthCorrection	Up ing zero on porosities ate: 07-Sep-2 Samp 3in 3in 3in 3in 3in 3in 3in 3in 3in 3in	for Platform E 2016 07:05:13	Bottom 7548.83 ft	Start 07-Sep-2016 5:52:06 AM Company:V	Stop Vestern Refin	ON ing, Southwe	0.00 ft st, Inc. W One: Lo	Parallel Data No ell:WWD #2 q[4]:Up:S012
Run NameOneAll depths areLogDescription: HGType: MeasuredChannelSAT10AAT30AAT90ACALIDPHZHGRHPEFZHSPASTITDTENS	Pass Objective Log[4]:Up referenced to toolstr GNS standard resolution d Depth Creation Da ource IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS DRS-H:HRCC-H:HRC IDRS-H:HRMS-H:HRC IGNS-H:HGNS-H:HGI IGNS-H:HGNS-H:HGI IDRS-H:HRMS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H	Up ing zero on porosities ate: 07-Sep-2 Samp 3in 3in 3in 3in CC-H 1in GD-H 2in NS-H 6in NS-H 6in GD-H 2in 6in	for Platform E 2016 07:05:13 Jling	Bottom 7548.83 ft	Start 07-Sep-2016 5:52:06 AM Company:V	Stop Vestern Refin	ON ing, Southwe	0.00 ft st, Inc. W One: Lo	Parallel Data No ell:WWD #2 q[4]:Up:S012
Run Name One All depths are Log Description: HG Type: Measured Channel S AT10 A AT30 A AT90 A CALI H DPHZ H GR H NPOR H PEFZ H SP A STIT D TENS W TIME_1900 W	Pass Objective Log[4]:Up referenced to toolstr BNS standard resolution d Depth Creation Da ource IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS DRS-H:HRCC-H:HRC IDRS-H:HRNS-H:HRC IDRS-H:HRNS-H:HRC IDRS-H:HRNS-H:HRC IDRS-H:HRNS-H:HRC IDRS-H:HRNS-H:HRC IDRS-H:HRMS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H IDRS	Up ing zero on porosities ate: 07-Sep-2 Samp 3in 3in 3in 3in CC-H 1in GD-H 2in NS-H 6in SD-H 2in 6in 6in 6in 6in 6in	for Platform E 2016 07:05:13 Jling	Bottom 7548.83 ft	Start 07-Sep-2016 5:52:06 AM Company:V	Stop Vestern Refin	ON ing, Southwe	0.00 ft st, Inc. W One: Lo	Parallel Data No ell:WWD #2 q[4]:Up:S012
Run Name One All depths are Log Description: HG Type: Measured Channel S AT10 A AT30 A AT90 A CALI H DPHZ H GR H NPOR H PEFZ H SP A STIT D TENS W TIME_1900 W	Pass Objective Log[4]:Up referenced to toolstr GNS standard resolution d Depth Creation Da ource IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS IT-M:AMIS:AMIS DRS-H:HRCC-H:HRC IDRS-H:HRMS-H:HRC IGNS-H:HGNS-H:HGI IGNS-H:HGNS-H:HGI IDRS-H:HRMS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HRC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H:HC IDRS-H	Up ing zero on porosities ate: 07-Sep-2 Samp 3in 3in 3in 3in CC-H 1in GD-H 2in NS-H 6in SD-H 2in 6in 6in 6in 6in 6in	for Platform E 2016 07:05:13 Jling	Bottom 7548.83 ft	Start 07-Sep-2016 5:52:06 AM Company:V	Stop Vestern Refin	ON ing, Southwe	0.00 ft st, Inc. W One: Loo 100 ft Index L	Parallel Data No ell:WWD #2 q[4]:Up:S012

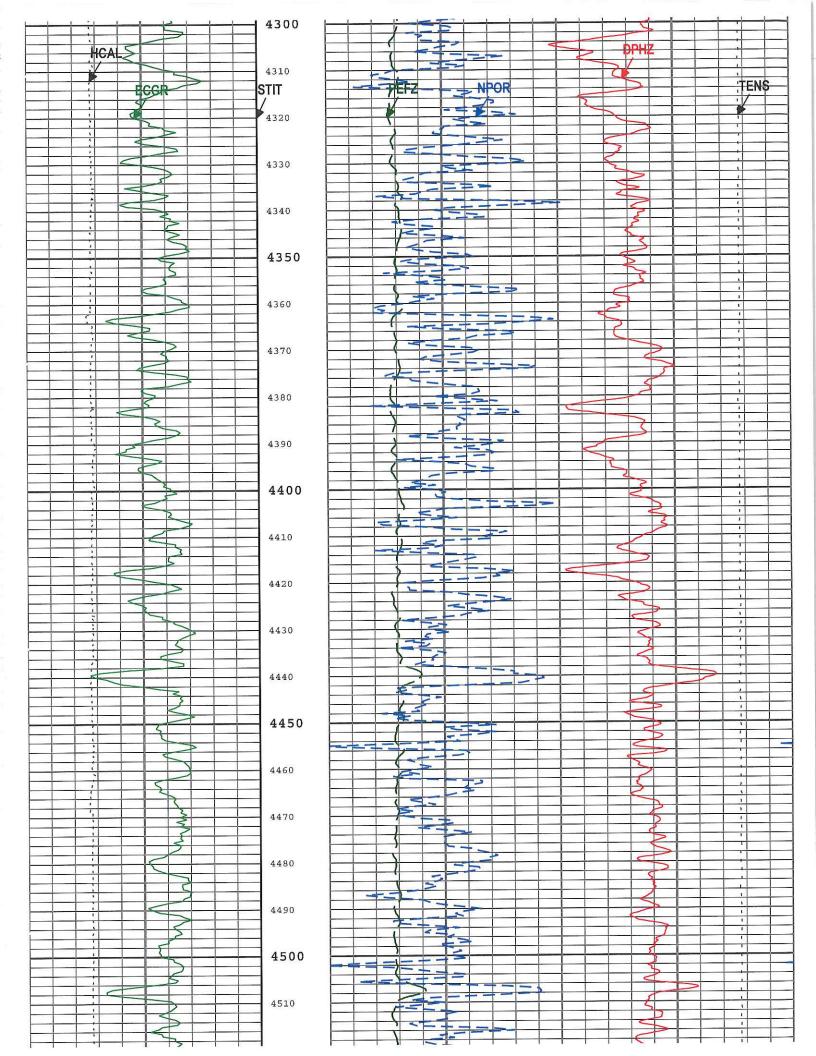


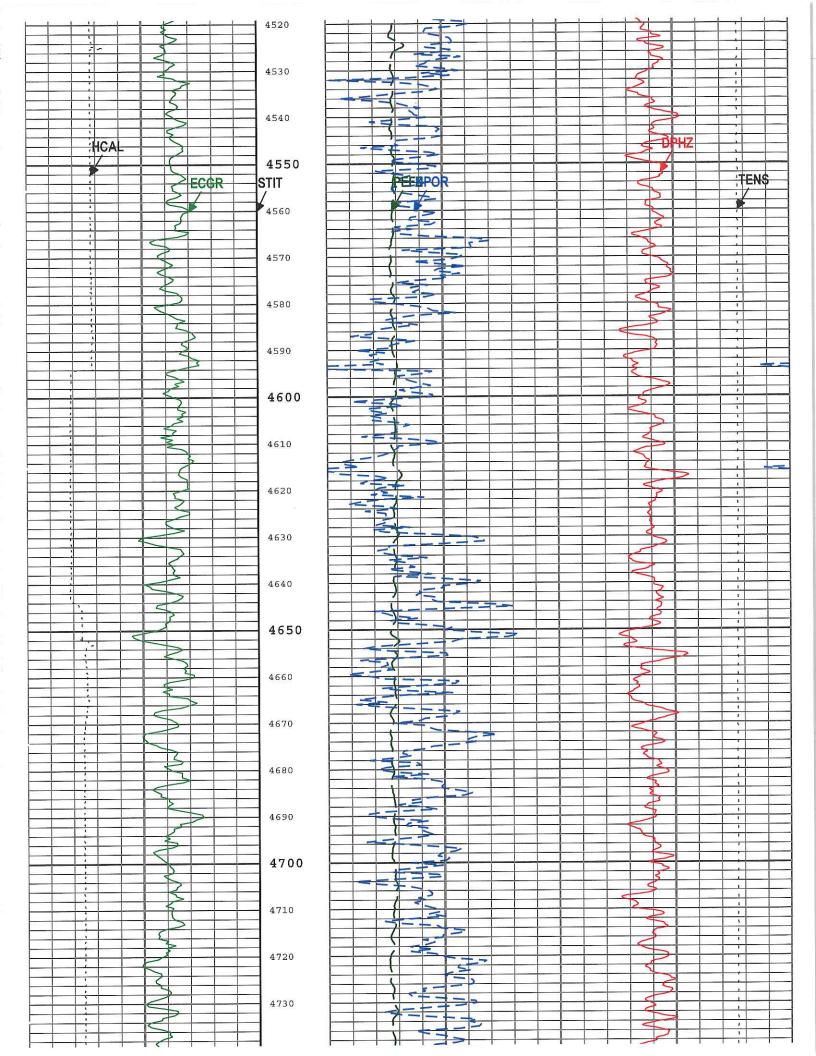


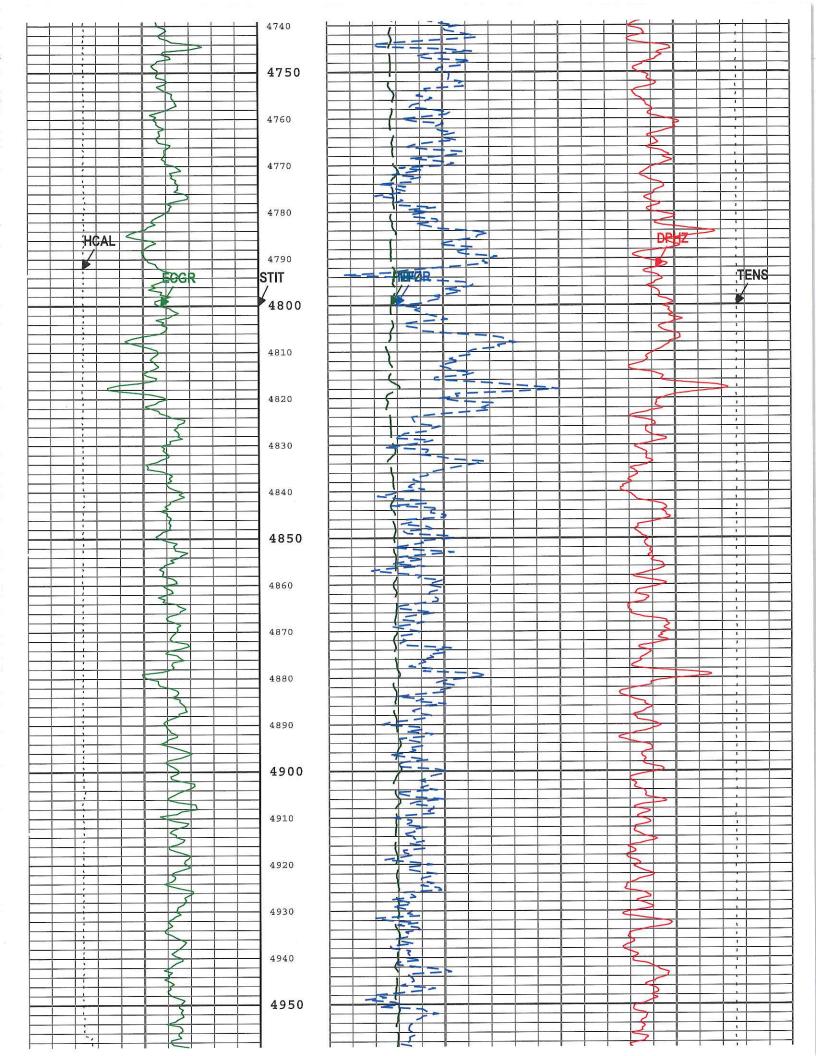


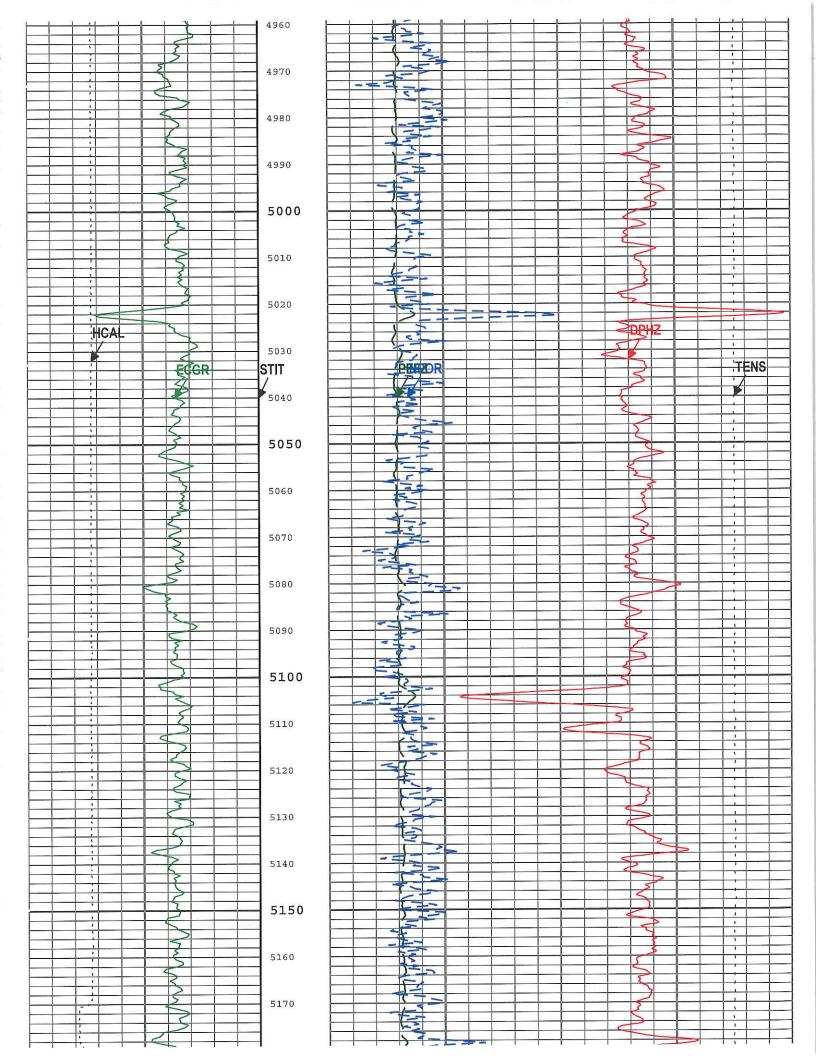


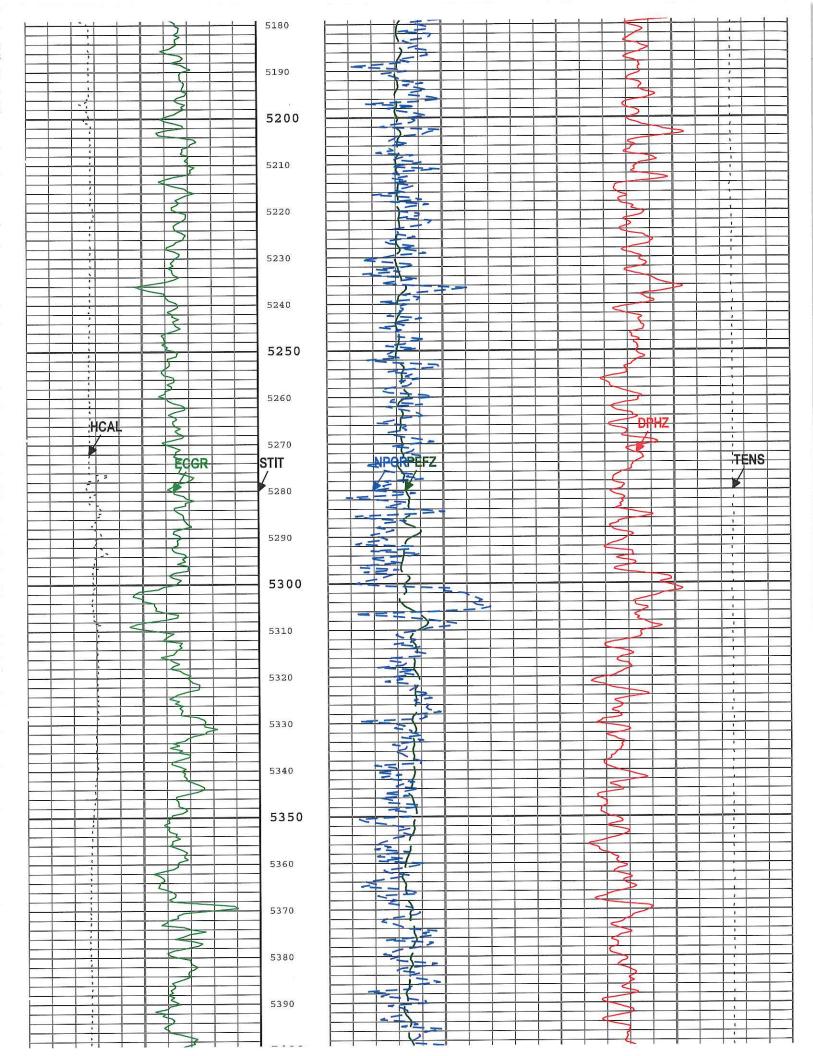


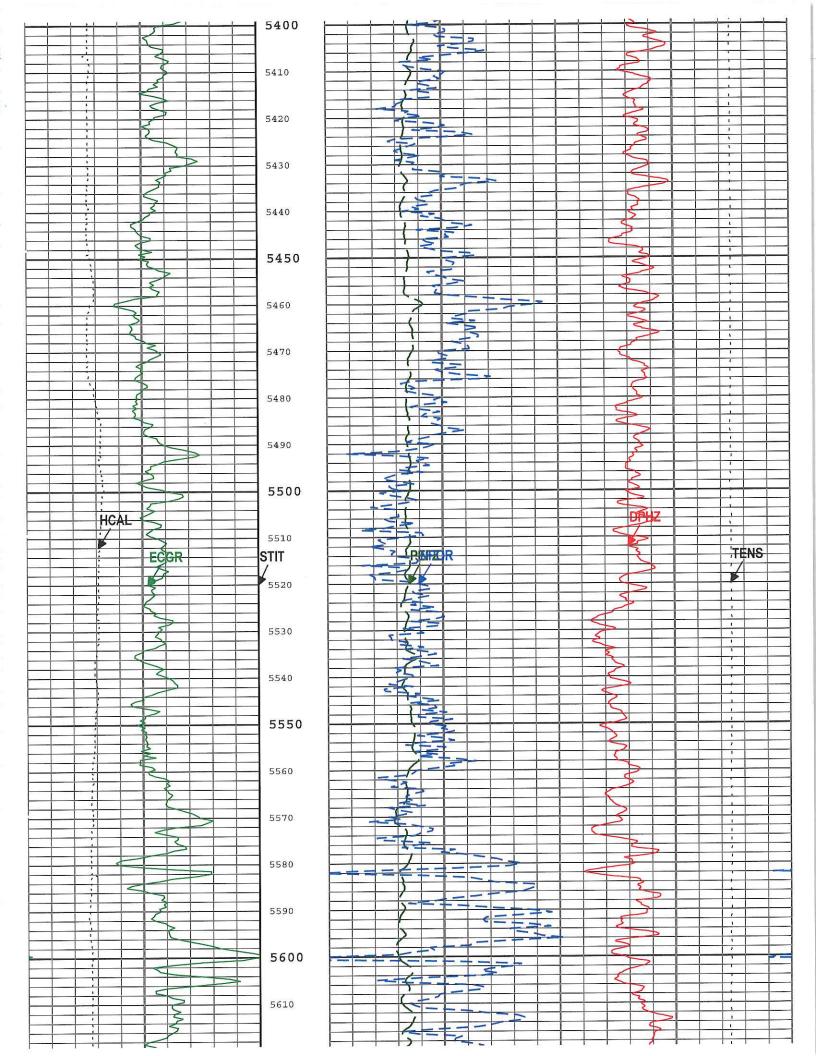


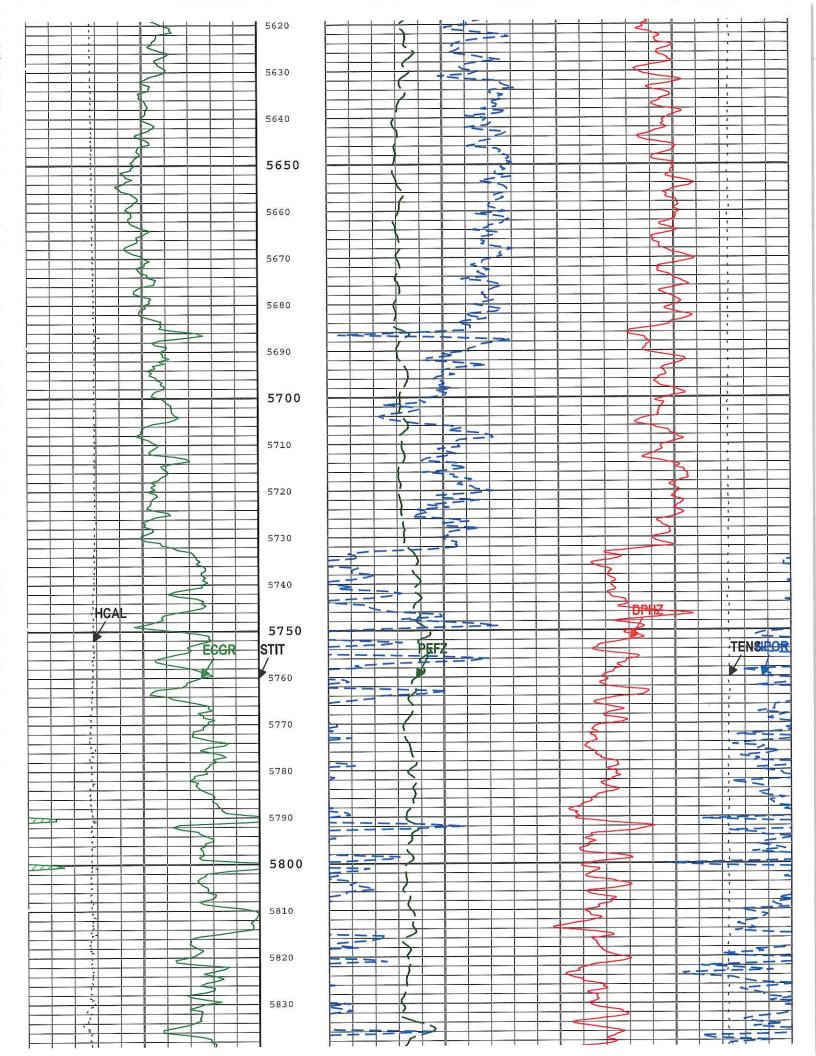


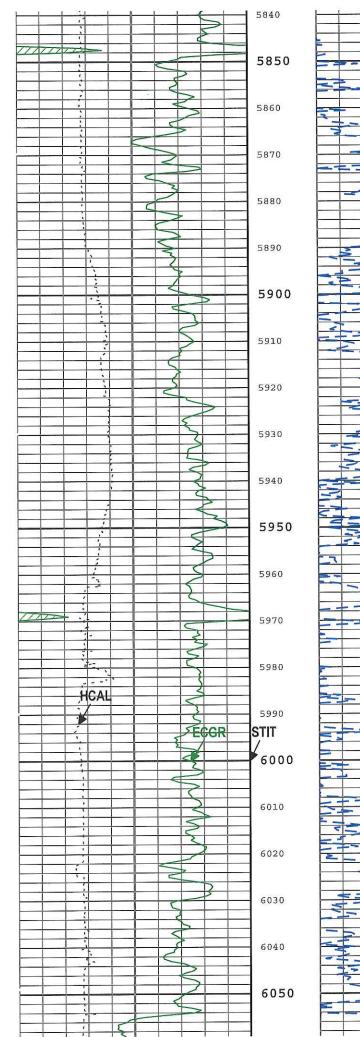


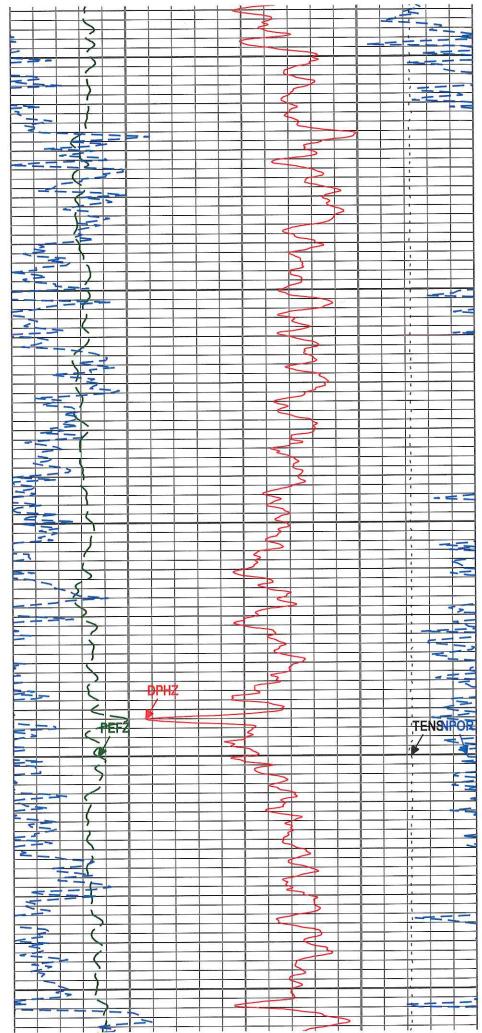


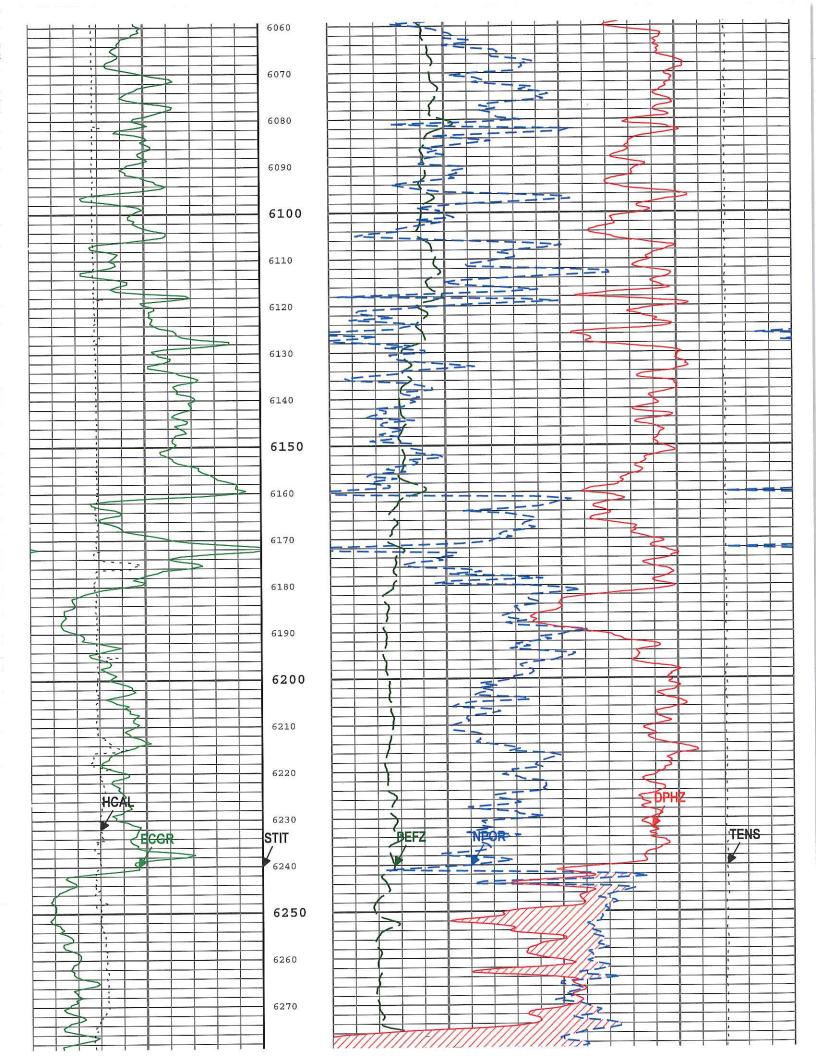


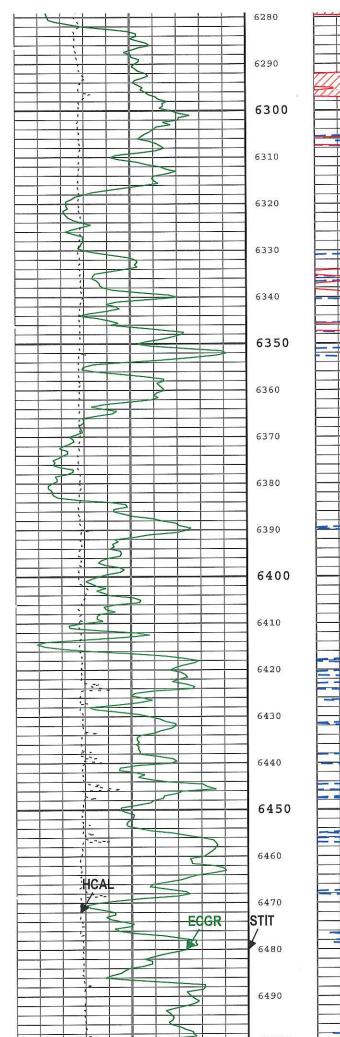


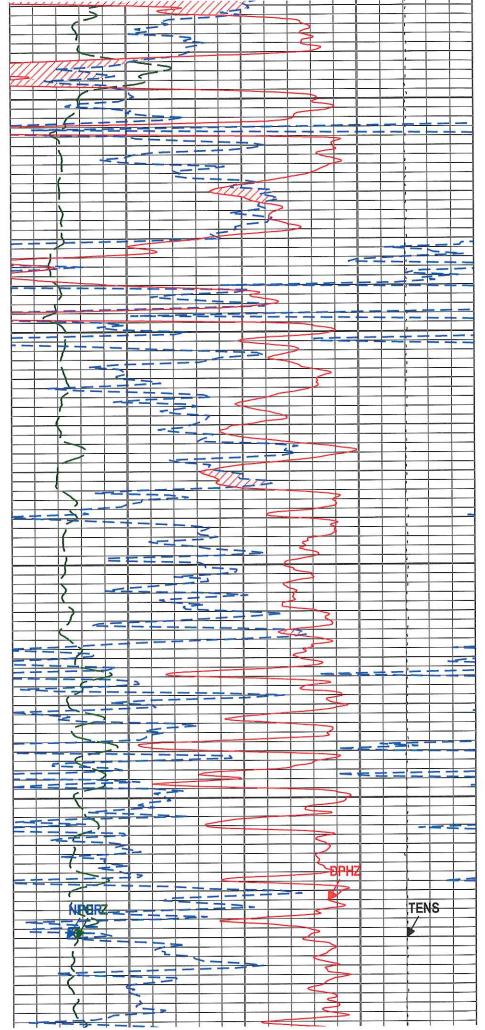


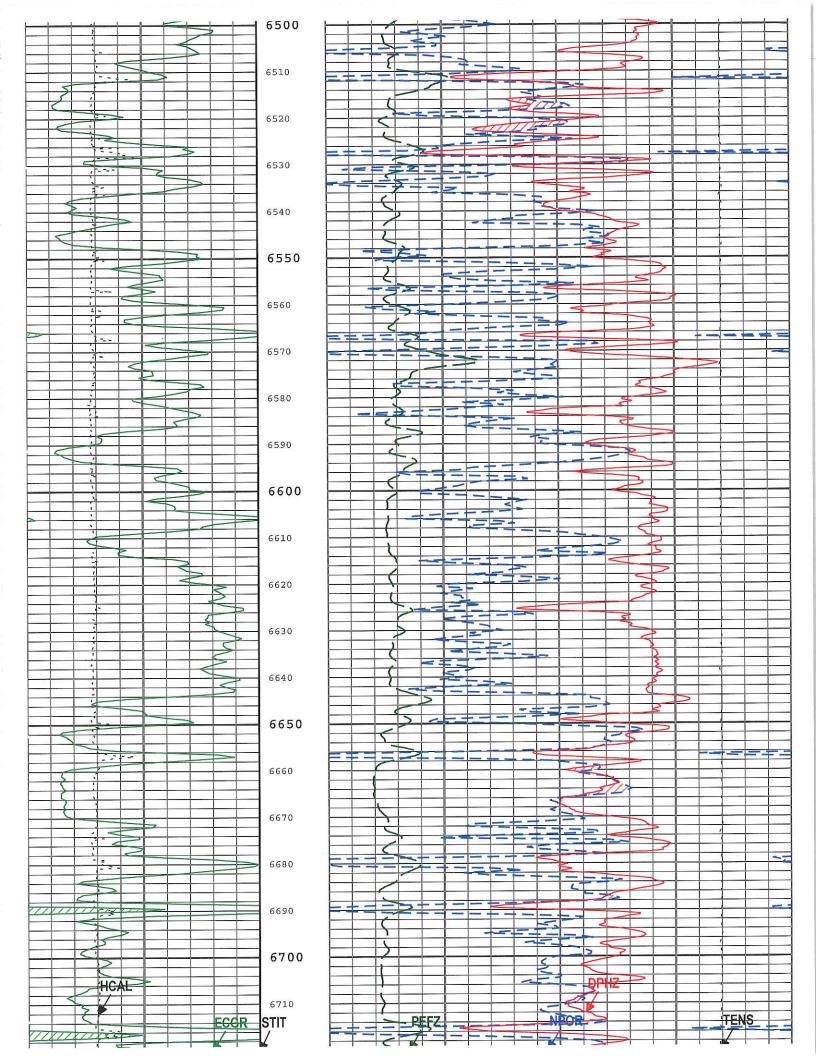


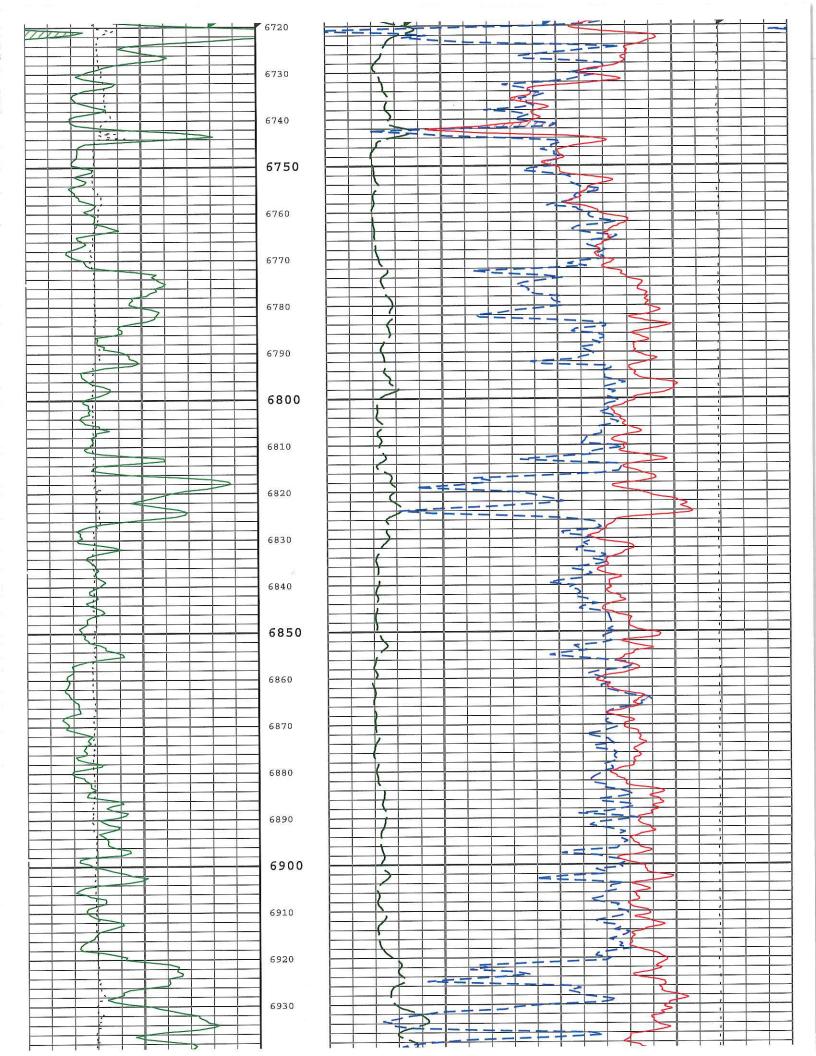


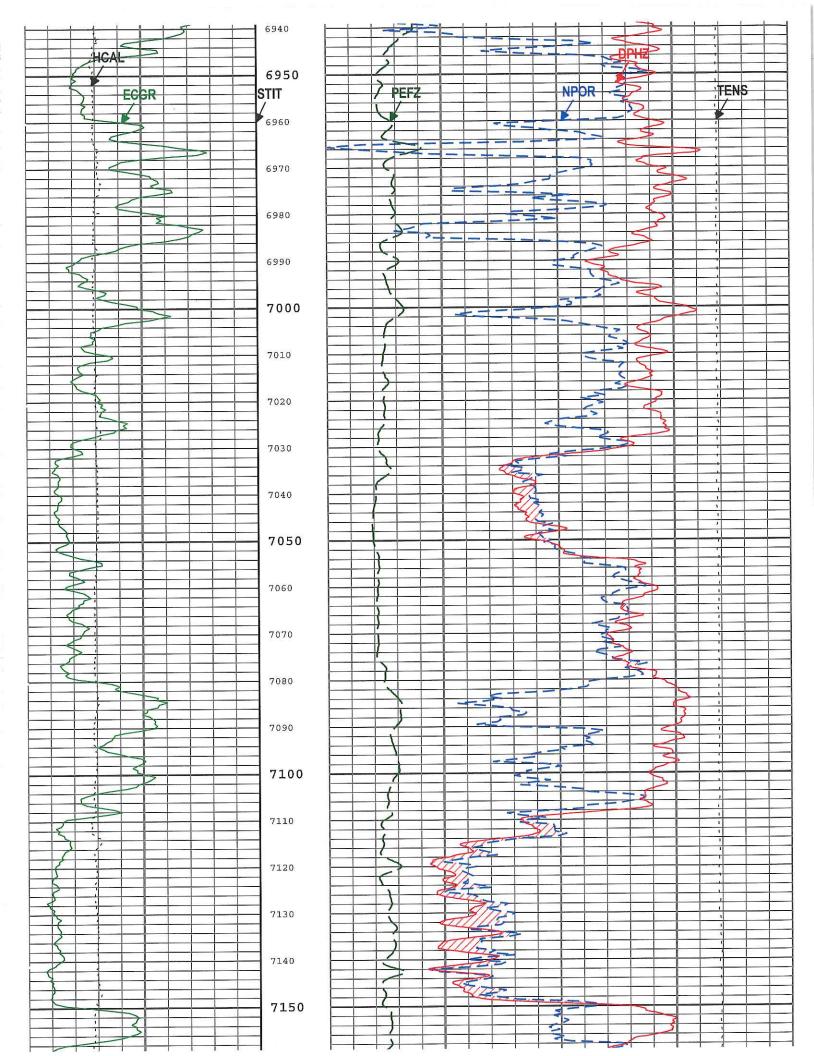


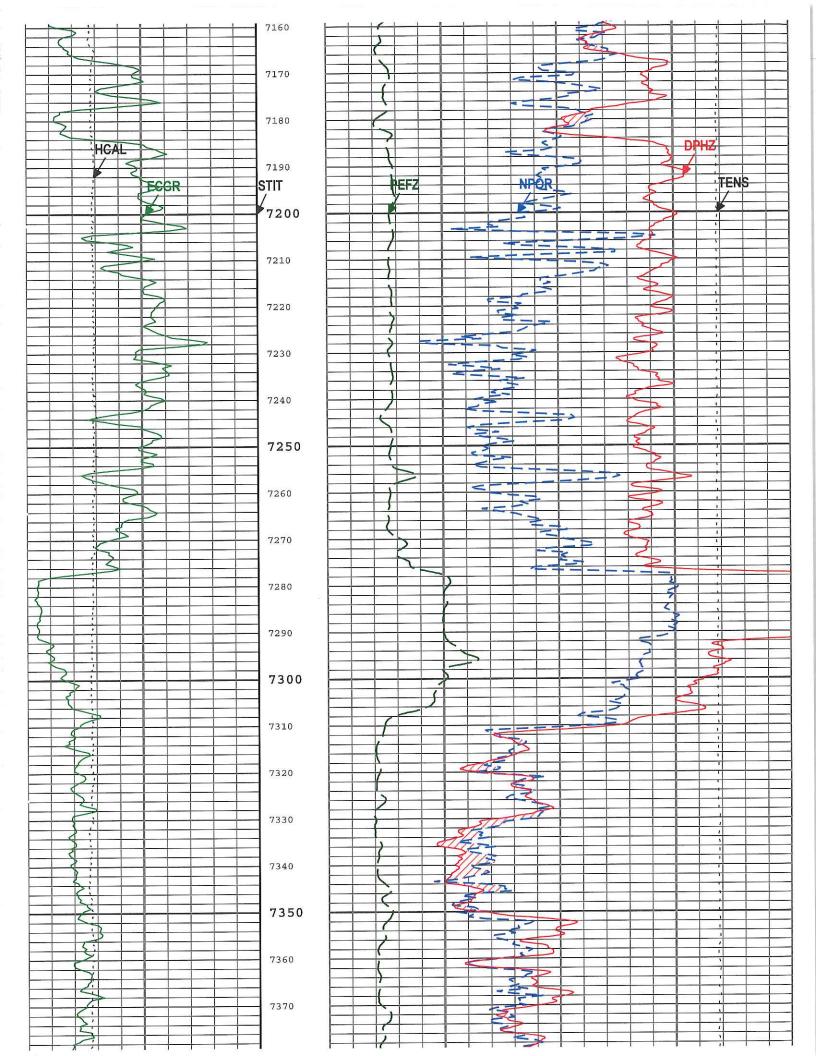


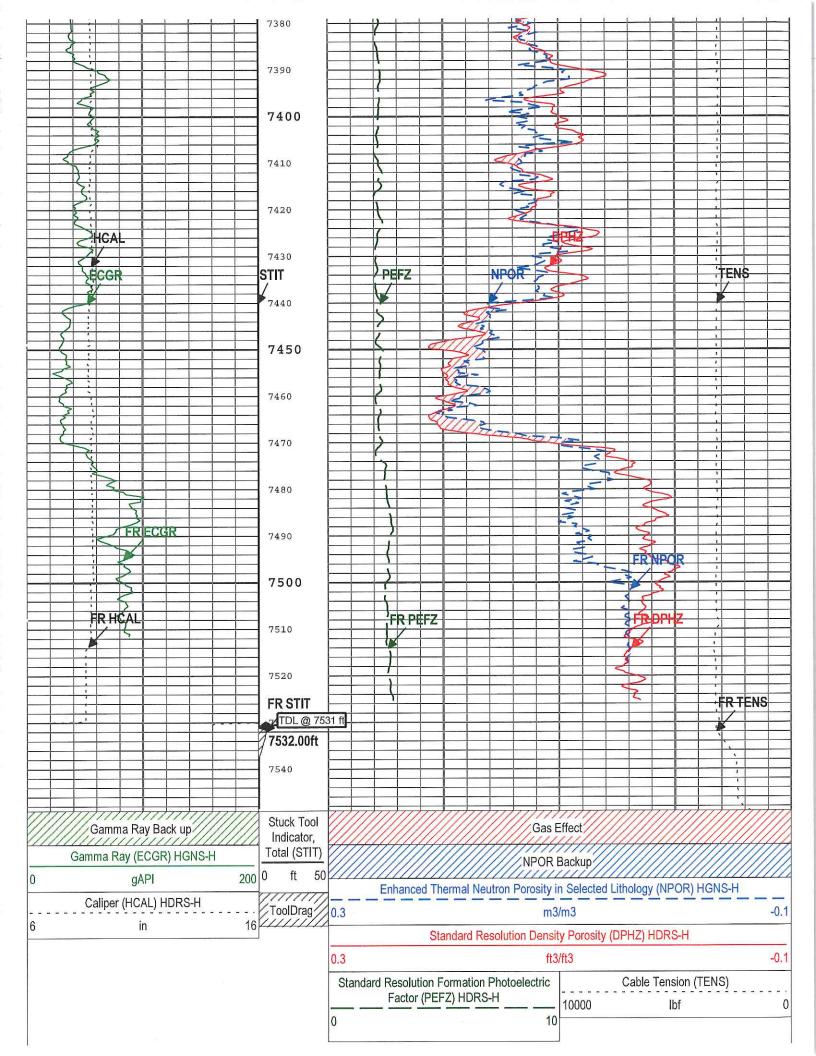










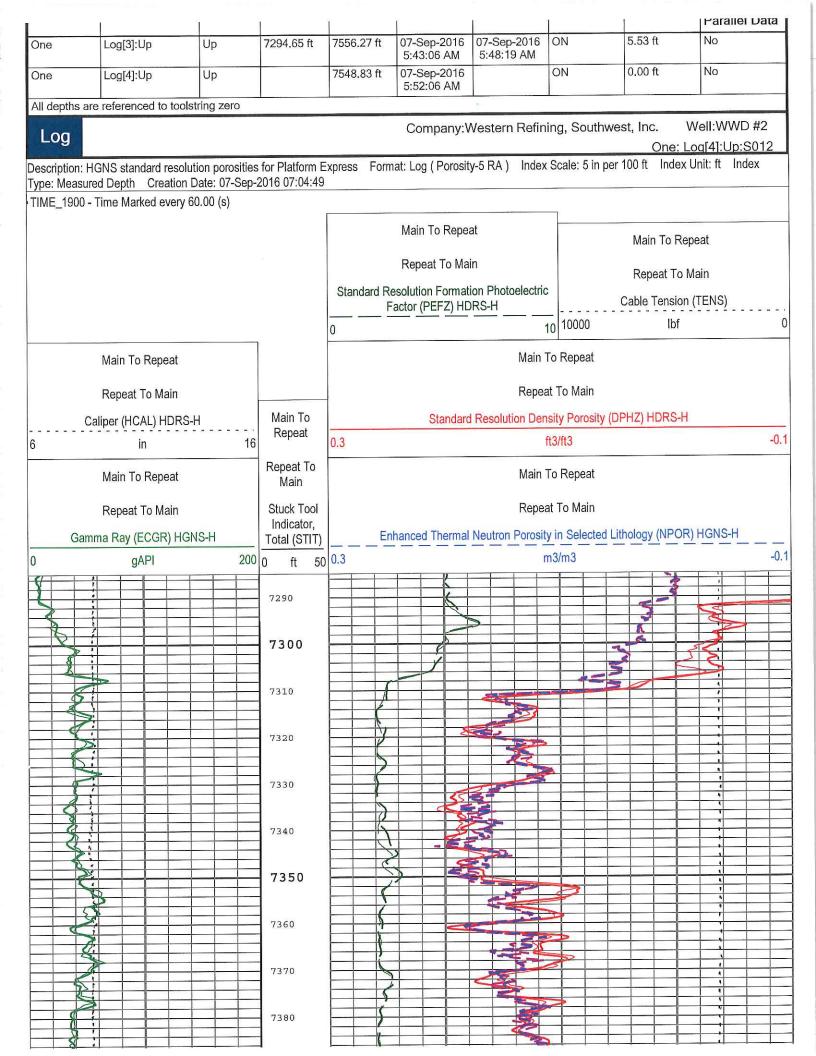


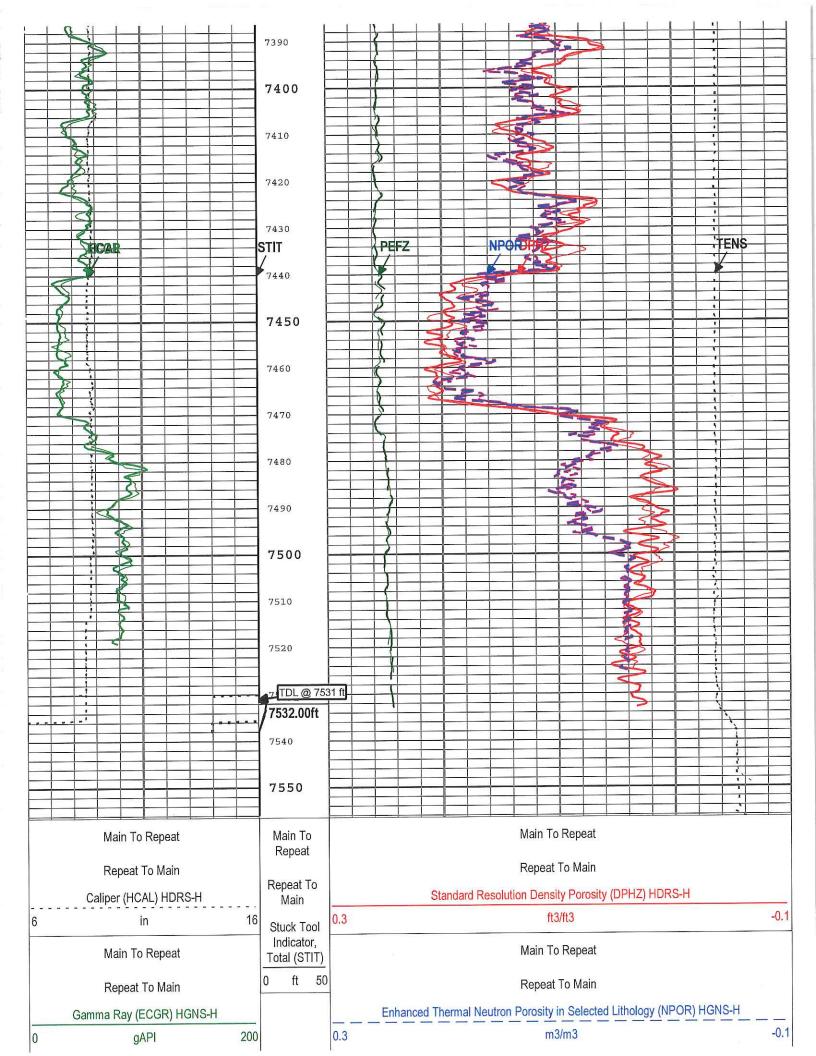
Description: HGNS standard resolution porosities for Platform Express Format: Log (Porosity-5) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 07-Sep-2016 07:04:46

Channel Processing Parameters

One: Parameters

Parameter	Description		Tool	Value	Unit
SSBAR	Barite Mud Presence	Flag	Borehole	Yes	
HS	Borehole Status (Ope	en or Cased Hole)	Borehole	Open	
HT	Bottom Hole Temper	ature	Borehole	177	degF
S	Bit Size		WLSESSION	Depth Zoned	in
SAL	Borehole Salinity		Borehole	900	ppm
CALI_SHIFT	CALI Supplementary	Offset	HDRS-H	0.1	in
CBLO	Casing Bottom (Logg	jer)	WLSESSION	3498	ft
CDEN	Cement Density		HGNS-H	2	g/cm3
DFD	Drilling Fluid Density	10 	Borehole	9.9	lbm/gal
DFT	Drilling Fluid Type		Borehole	Water	
DFT_WATER	Drilling Fluid Water T	уре	Borehole	WBM	
DHC	Density Hole Correct	ion	HDRS-H	Bit Size	
Đ	Fluid Density		Borehole	1	g/cm3
FSAL	Formation Salinity		Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper	Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper	Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Re Computed Mud Resi	sistivity Selection, from Measured or stivity	Borehole	AMF	
GTSE	A	ature Selection, from Measured or	Borehole	CTEM	
HSCO	Hole Size Correction	Option	HGNS-H	Yes	
MATR	Rock Matrix for Neut	ron Porosity Corrections	Borehole	SANDSTONE	
MDEN	Matrix Density for De	ensity Porosity	Borehole	2.65	g/cm3
MFST	Mud Filtrate Sample	Temperature	Borehole	68	degF
RMFS	Resistivity of Mud Fi	Itrate Sample	Borehole	0.9	ohm.m
SOCO	Standoff Correction	Option	HGNS-H	Yes	
TD	Total Measured Dep	th	Borehole	7532	ft
Depth Zone Par	ameters				
Parameter	Value	Start (ft)		Stop (ft)	
BS	12.25			3515	
BS	8.75	3515		7532	
All depth are actual.				<i>₽</i>	
Tool Control	Parameters		an yn de yn ddan yn yn yn ddan ddan yn yn		
One: Paramete	rs				
Parameter	Description		Tool	Value	Unit
HMCA_BOARD_TYPE	HMCA Board Type		HGNS-H	1	
HRGD_BOARD_TYPE	HRGD Board Type		HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum	Logging Speed	WLSESSION	3600	ft/h
		Or	ne		
		5" Po			
		5 70	TOSILY		
Pass Summa					
Run Name Pass O	bjective Direction	Top Bottom S	itart Stop	DSC Mode	Depth Shift Include





Main To Repeat	Main To Repeat	
Repeat To Main	Repeat To Main	
Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H	Cable Tension (TENS)	
0 10	10000 lbf	0
	1	

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (Porosity-5 RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 07-Sep-2016 07:04:49

Channel Processing Parameters

One: Parameters

Parameter	Description		Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	g	Borehole	Yes	
BHS	Borehole Status (Open o	r Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	9	Borehole	177	degF
BS	Bit Size		WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity		Borehole	900	ppm
CALI_SHIFT	CALI Supplementary Offs	set	HDRS-H	0.1	in
CBLO	Casing Bottom (Logger)		WLSESSION	3498	ft
CDEN	Cement Density	11274	HGNS-H	2	g/cm3
DFD	Drilling Fluid Density		Borehole	9.9	lbm/gal
DFT	Drilling Fluid Type		Borehole	Water	
DFT_WATER	Drilling Fluid Water Type		Borehole	WBM	
DHC	Density Hole Correction		HDRS-H	Bit Size	
FD	Fluid Density		Borehole	1	g/cm3
FSAL	Formation Salinity		Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Sele	ection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Sele	ection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resisti Computed Mud Resistivi	vity Selection, from Measured or ly	Borehole	AMF	
GTSE	Generalized Temperatur Computed Temperature	e Selection, from Measured or	Borehole	CTEM	
HSCO	Hole Size Correction Opt	lion	HGNS-H	Yes	
MATR	Rock Matrix for Neutron I	Porosity Corrections	Borehole	SANDSTONE	
MDEN	Matrix Density for Densit	y Porosity	Borehole	2.65	g/cm3
MFST	Mud Filtrate Sample Ten	nperature	Borehole	68	degF
RMFS	Resistivity of Mud Filtrate	e Sample	Borehole	0.9	ohm.m
SOCO	Standoff Correction Opti-	on	HGNS-H	Yes	
TD	Total Measured Depth		Borehole	7532	ft
Depth Zone Pa	arameters			1	
Parameter	Value	Start (ft)		Stop (ft)	
BS	12.25			3515	
BS	8.75	3515		7532	
All depth are actual.			0		
	Dorometera				
Tool Contro	Parameters				
One: Paramet	ers				

Parameter	Description	Tool	Value	Unit
HMCA_BOARD_TYPE	HMCA Board Type	HGNS-H	1	
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
		114 05001011	0000	6.0

MAX_LOG_SPEED	Looistring Maxin	num Logging ຮ	peed	WLSES	SION	3600	tt/n	
Calibration	Report							
HDRS-H (HILT	Density and Rx	o Sonde	, 150 degC) Calibration	n - Run One			
rimary Equipment					0.11		40 17	
	HILT High-Resolution Co	ontrol Cartrid	ge, 150 degC	HRC	C-H		48.17	
	HILT Resistivity Gamma	-Ray Density	Device, 150 degC	C HRG	D-H		4899	
Auxiliary Equipmen	t:							
	HRDD Backscatter Dete	ctor		Back	scatter			
	HRDD Long Spacing De	tector		Long	Spacing			
	HRDD Short Spacing De	etector		Shor	t Spacing		27786	
	Cesium 137 Gamma-Ra	v Logging S	ource	GSR	-J		5471	
	HILT High-Resolution C			HRC	C-H		48.17	
				HRM			4876	
	HILT High-Resolution M	echanical So	nde, 150 dego	HKW			1070	
Calibration Parame		Callbard	Cmall Dir -	0.00				
	Small Ring Size (Calipe			8.00				
	Large Ring Size (Calipe	r Calibration	Large Ring)	12.0	0			
HDRS Caliper	Calibration - Cal	iper Acc	umulations					
Before (Measured):	21:07:42 05-Se	le con						
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring		in	Before	8.00	6.00	7.80	10.00	
.arge Ring		in	Before	12.00	9.00	12.20	15.00	
HDRS Density	Calibration - Inv	ersion F	Results					
Aaster (EEPROM):	11:40:40 24-Au							
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Rho Aluminum		g/cm3	Master	2.596	2.586	2.600	2.606	
Rho Magnesium		g/cm3	Master	1.686	1.676	1.685	1.696	
Pe Aluminum			Master	2.570	2.470	2.571	2.670	
Pe Magnesium			Master	2.650	2.550	2.618	2.750	
	Calibration - De		Summary					
Master (EEPROM):	11:40:40 24-Au						18.01.00	
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit 0.6000	
BS Average Deviation		%	Master	0	-0.6000 -1.6000	0.2221	1.6000	╞═╤╾╋╸┿
BS Max Deviation		%	Master Master	0	-1.0000	0.8388	1.0000	┝╤╤╼╋╤╪
SS Average Deviation		%	Master	0	-2.5000	0.9144	2.5000	
S Average Deviation		%	Master	0	-1.5000	0.6741	1.5000	
LS Max Deviation		%	Master	0	-3.5000	1.7270	3.5000	
HDRS Density	Calibration - Ba	ckgroun	d Summarv	1	<i>8.7</i>			
Master (EEPROM):	11:40:40 24-AL			Before (Measured):	21:08:15 05-Sep	-2016	
Measurement	4 (1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Window Ratio			Master	1.0000		0.7337		
			Before	0.7337	0.6970	0.7348	0.7704	
		1000	Before-Master			0.0011		
3S Window Sum		1/s	Master	1	23979	25241 25499	26504	╞╾┯╋┲┯
			Before Before-Master	25241	20979	25499		╞═╧═╋┹╧
SS Window Ratio			Master	1.0000		0.4797		
			Before	0.4797	0.4557	0.4811	0.5037	
			Before-Master			0.0014		
SS Window Sum		1/s	Master	1	212221000000000	11057	1000 and 1000	
			Before	11057	10504	11035	11610	
		_	Before-Master	1.0000		-22 0.3012		
LS Window Ratio			Master Before	0.3012	0.2861	0.3012	0.3162	
		1	Delote	0.0012				

LS Window Sum							i i	
		1/s	Master	1		1233	1001	
			Before	1233	1171	1232	1294	
			Before-Master			-1		
HDRS Density	Calibration - Pho	to-mult	iplier High	Voltages				
Master (EEPROM):	11:40:40 24-Aug	-2016		Before (Measured):		21:08:15 05-Sep-		
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS PM High Voltage		V	Master		1000	1452	2400	
			Before		1000	1449	2400	
			Before-Master		-100	-3	100	
SS PM High Voltage		V	Master		1000	1410	2400	
			Before		1000	1411	2400	
			Before-Master		-100	1	100	
S PM High Voltage		V	Master		1000	1480	2400	
			Before		1000	1473	2400	
			Before-Master		-100	-7	100	
HDRS Density	Calibration - Cry	stal Qua	ality Resolu	utions				
Master (EEPROM):	11:40:40 24-Aug	-2016		Before (Measured)	:	21:08:15 05-Sep-	Contract Contract Contract	
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Crystal Resolution		%	Master		5.00	11.74	25.00	
			Before		5.00	11.74	25.00	
			Before-Master		-1.00	0.00	1.00	
SS Crystal Resolution		%	Master		5.00	10.26	20.00	
			Before		5.00	10.24	20.00	
			Before-Master		-1.00	-0.02	1.00	
LS Crystal Resolution		%	Master		5.00	8.09	20.00	
			Before		5.00	7.85	20.00	
2			Before-Master		-1.00	-0.24	1.00	
HDRS MCFL C	Calibration - MCF	L Accur	nulations					
Before (Measured):	21:10:47 05-Sep	-2016						
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Main Resistivity		ohm.m	Before	3875	3565	3886	4185	
		 A CONTROL NUMBER 		0000	3524	3830	4136	
Deep Resistivity		ohm.m	Before	3830				
		ohm.m ohm.m	Before Before	3830	3524	3839	4136	
Shallow Resistivity	Gamma-Ray an	ohm.m	Before	3830	3524 Calibration -		4136 4817	
Shallow Resistivity HGNS-H (HILT Primary Equipment	: HILT Gamma-Ray and N	ohm.m	Before	³⁸³⁰ 150 degC) C	3524 Calibration -			
Shallow Resistivity HGNS-H (HILT Primary Equipment	: HILT Gamma-Ray and N	ohm.m I <mark>d Neutr</mark> leutron Son	Before	3830 150 degC) (3524 Calibration -			
Deep Resistivity Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen	: HILT Gamma-Ray and N t : HGNS Accelerometer, 18	ohm.m Id Neutr leutron Son 50 degC	Before	3830 150 degC) (з524 Calibration - Is-н cz-н		4817	
Shallow Resistivity HGNS-H (HILT Primary Equipment	: HILT Gamma-Ray and N t :	ohm.m Id Neutr leutron Son 50 degC	Before	3830 150 degC) (HGN HAC	з524 Calibration - Is-н cz-н		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment	: HILT Gamma-Ray and N t : HGNS Accelerometer, 1 AmBe Neutron Logging :	ohm.m Id Neutr leutron Son 50 degC	Before	3830 150 degC) (HGN HAC	з524 Calibration - Is-н cz-н		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen	: HILT Gamma-Ray and N t : HGNS Accelerometer, 18 AmBe Neutron Logging : ter :	ohm.m Id Neutr leutron Son 50 degC	Before	3830 150 degC) (HGN HAC	з524 Calibration - Is-н cz-н		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen	: HILT Gamma-Ray and N t : HGNS Accelerometer, 1 AmBe Neutron Logging : ter : Water Temperature	ohm.m Id Neutr leutron Son 50 degC Source	Before Fon Sonde, de, 150 degC	3830 150 degC) (HGN HAC	з524 Calibration - Is-н cz-н		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen Calibration Parame	: HILT Gamma-Ray and N t : HGNS Accelerometer, 1 AmBe Neutron Logging : ter : Water Temperature Housing Size	ohm.m Id Neutr leutron Son 50 degC Source	Before Fon Sonde, de, 150 degC	3830 150 degC) C HGN HAC NSR 165	3524 Calibration - IS-H CZ-H -F		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen Calibration Parame	: HILT Gamma-Ray and N t : HGNS Accelerometer, 1 AmBe Neutron Logging : ter : Water Temperature Housing Size JIG-BKG (Jig minus bac	ohm.m Id Neutr leutron Son 50 degC Source kground ref on - Acc	Before Fon Sonde, de, 150 degC	3830 150 degC) C HGN HAC NSR 165	3524 Calibration - IS-H CZ-H -F		4817 6991	
Shallow Resistivity HGNS-H (HILT Primary Equipment Auxiliary Equipmen Calibration Parame	: HILT Gamma-Ray and N t : HGNS Accelerometer, 15 AmBe Neutron Logging 3 ter : Water Temperature Housing Size JIG-BKG (Jig minus back	ohm.m Id Neutr leutron Son 50 degC Source kground ref on - Acc	Before Fon Sonde, de, 150 degC	3830 150 degC) C HGN HAC NSR 165	3524 Calibration - IS-H CZ-H -F		4817 6991	

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-May-2007							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Accelerometer Manufacturer		Master			QAT_160		
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0	
Accelerometer Coefficients - 0		Master	<u></u> *		-4298.000		
Accelerometer Coefficients - 1		Master			50.180	(1997) And	

Accelerometer Coefficients - 2	Master			-0.002		
Accelerometer Coefficients - 3	Master	(<u>* 1971)</u>	<u> </u>	0.000		
Accelerometer Coefficients - 4	Master			2.754		
Accelerometer Coefficients - 5	Master			0.000		
Accelerometer Coefficients - 6	Master		× <u> </u>	0.000		
Accelerometer Coefficients - 7	Master			0.000		
Accelerometer Coefficients - 8	Master			300.500		
Accelerometer Coefficients - 9	Master			0.994	an and a second s	

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 15:25:00 19-Jul-2016		Before (Measured):			21:06:20 05-Sep-2016		
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Near Zero Measurement	1/s	Master	0	5.0	27.6	40.0	
		Before	0	5.0	28.2	40.0	
		Before-Master	10 <u>1101100</u>	-4.1	0.6	4.1	
Far Zero Measurement	1/s	Master	0	5.0	29.5	40.0	
		Before	0	5.0	29.7	40.0	
		Before-Master		-4.4	0.2	4.4	
Near Plus Measurement	1/s	Master	6031.0	4700.0	5290.0	6900.0	T
		Before		<u></u>		-	
		Before-Master			1	—	
Far Plus Measurement	1/s	Master	2793.0	1900.0	2194.0	2900.0	
		Before					
		Before-Master	<u></u>				
Near Corrected Plus Measurement	1/s	Master		4700.0	5156.0	6900.0	T
		Before					
		Before-Master					
Far Corrected Plus Measurement	1/s	Master		1900.0	2097.0	2900.0	
		Before					
		Before-Master					
HGNS Gamma-Ray Calibrat	tion - Gam	ma-Ray Acc	umulations	***			
Before (Measured): 21:11:47 0.	5-Sep-2016						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before	30.0	0	78.9	120.0	
RGR Plus Measurement	gAPI	Before	185.4	157.1	165.1	206.3	
GR Calibration Gain	1	Before	0.89	0.80	1.00	1.05	

Company:	Western Refining, Southwest, Inc.	Schlumberger					
Well:	WWD #2						
Field:	Wildcat						
County:	San Juan						
State:	New Mexico						
Platform E	xpress						
Compensated Neutron							
Litho-Density							

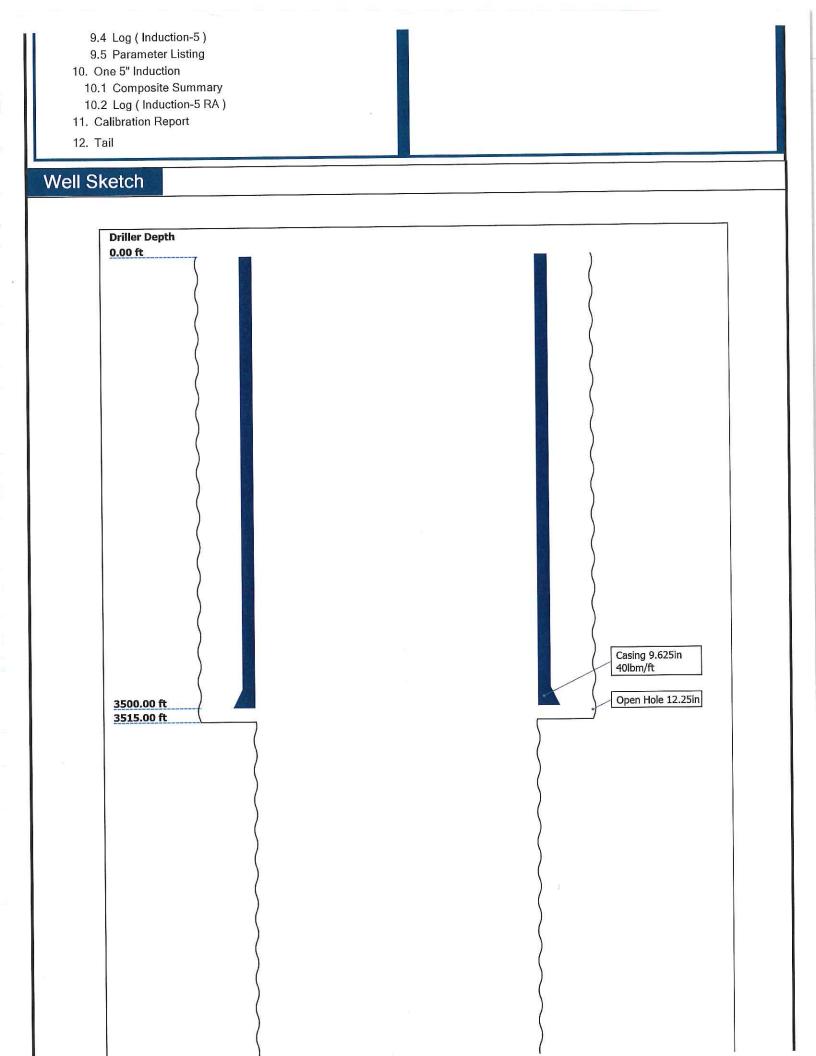
			Larry Candelaria	Lan			By	Witnessed By	Nitne
			Avery Becker	Ave			Зy	Recorded By	Reco
		Ft Morgan, CO	o	9115	Location:		er	Unit Number	Jnit N
-		05:00:00	07-Sep-2016	Time 07-	Th	m	Botto	Logger on Bottom	-ogg
		20:25:00	06-Sep-2016	Time 06-	П	ped	Stop	Circulation Stopped	Jircu
			177 degF	177	Max Recorded Temperatures	Tempe	ded 1	Recor	Aax F
	177	0.37 @	i @ 177	BHT 0.46	RMF @		7	RM @ BHT	RM (
		Calculated	Pressed	Pre	RMC		П	Source RMF	ourc
		68 degF	1.4 ohm.m @	1.4		RMC @ Meas Temp	leas	@ N	MC
		68 degF	0.9 ohm.m @	0.9		RMF @ Meas Temp	eas -	@ N	MF
			2	1.13		@ Meas Temp	eas T	@ M	RM
				Acti		Source of Sample	of S	ource	ML S
		8.6	ы Ш	9 cm3	PH		sso	Fluid Loss	
		55 s	9.9 lbm/gal	9.9	Viscosity			Density	0
			Λ	WBM		e	In Ho	Type Fluid In Hole	ype
			ij	8.75 in				ze	Bit Size
			3 ft	3498 ft		Casing Schlumberger	lumb	g Sch	asin
		3500.00 ft	5 in @	9.625 in	Casing Driller Size @ Depth	ze @	er Si	g Dril	asin
			3498.00 ft	349			erval	Top Log Interval	орг
			7532.00 ft	753;		val	Inter	Bottom Log Interval	ottor
			7532.00 ft	753		epth	jer D	Schlumberger Depth	chlu
			7525.00 ft	752			4	Depth Driller	epth
				One			Ť	Run Number	un N
			05-Sep-2016	05-9			fe	Logging Date	oggi
11W	29N	27		30-045-35747-0000	30-04	Cor	We		Fiel
т Т	Township:	Section:	S	API Serial No.	AF	npa	11:	atic	unty Id:
		Kelly Bushing		Drilling Measured From:		22		on:	•
ft above Perm.Datum	15.00 ft	Kelly Bushing		Log Measured From:	catio	_			
S	Elev.:	Ground Level	• and	Permanent Datum:	- 1		wv		Sar Wil
D.F. 5549.00 ft			107.97035	Lat/Long: 36.6986/-107.97035	Lat/L	tern F	٧D		
5535.00			11' FEL	SHL: 2028' FNL X 111' FEL	SHL	Refini	#2		
K.B.	Elev.:		V	Sec 27, T29N, R11W	Sec	ng, So		29N	
			lation	with Linear Correlation	with L	outhwest		, R11	
				Array Induction	Array			W	
				Platform Expres	Platfo				
lexico	New Mexico	State:	(0	San Juan	Sa			County:	lo
				Wildcat	Wil				Field:
				WWD #2	WW				Well:
	<u>,</u>	westelli hellillig, oodulwest, inc.	lilliy, vo	Stelli Nell	Ve		ny:	Company:	Ôn
4		Hawoot In	0		101-				
Schumberger									

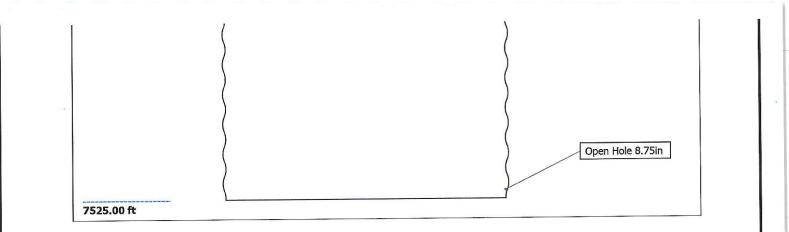
Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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- 9. One 5" Induction
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 - 9.2 Software Version
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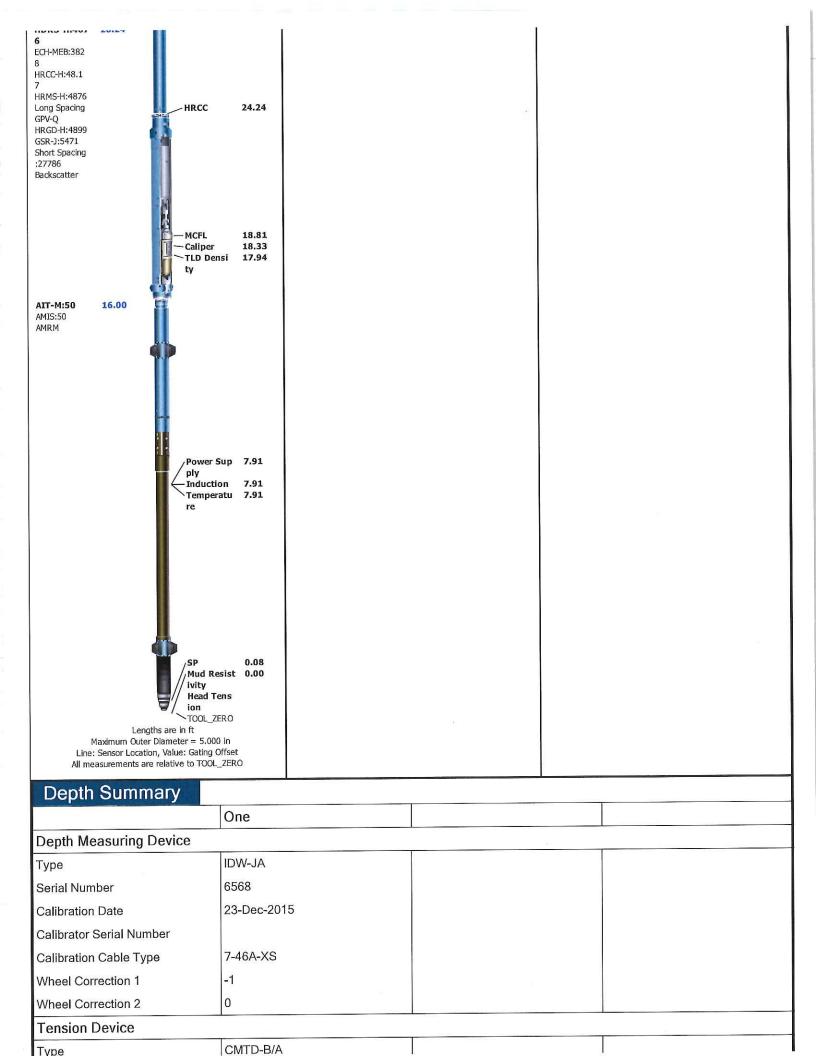


Borehole Size/Casing/Tubing Record

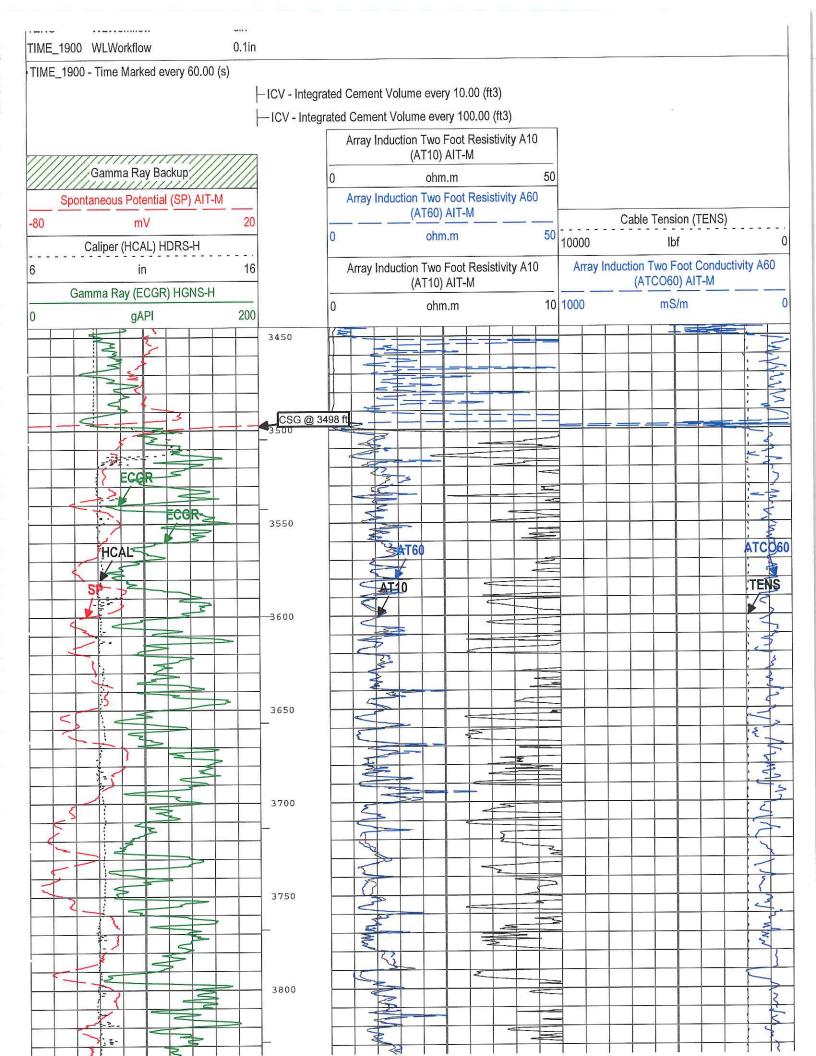
		the second se		
Bit				
Bit Size (in)	12.25	8.75		
Top Driller (ft)	0	3515		
Top Logger (ft)	0	3515		
Bottom Driller (ft)	3515	7525		
Bottom Logger (ft)	3515	7532		
Casing				
Size (in)	9.625			
Weight (lbm/ft)	40			
Inner Diameter (in)	8.835			
Grade	N/A			
Top Driller (ft)	0			
Top Logger (ft)	0			
Bottom Driller (ft)	3500			
Bottom Logger (ft)	3498			

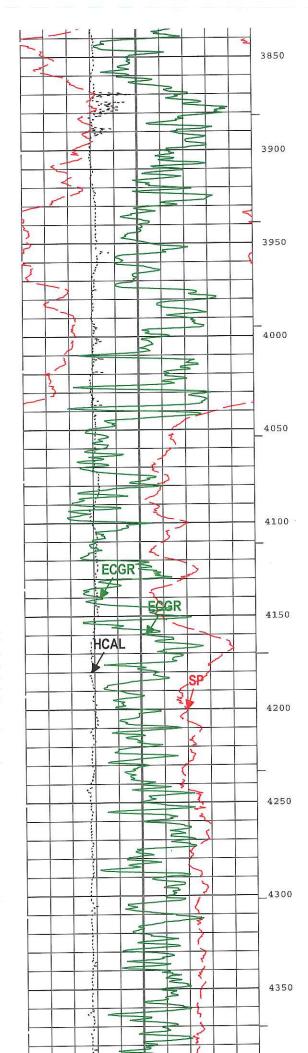
Remarks and Equipment Summary

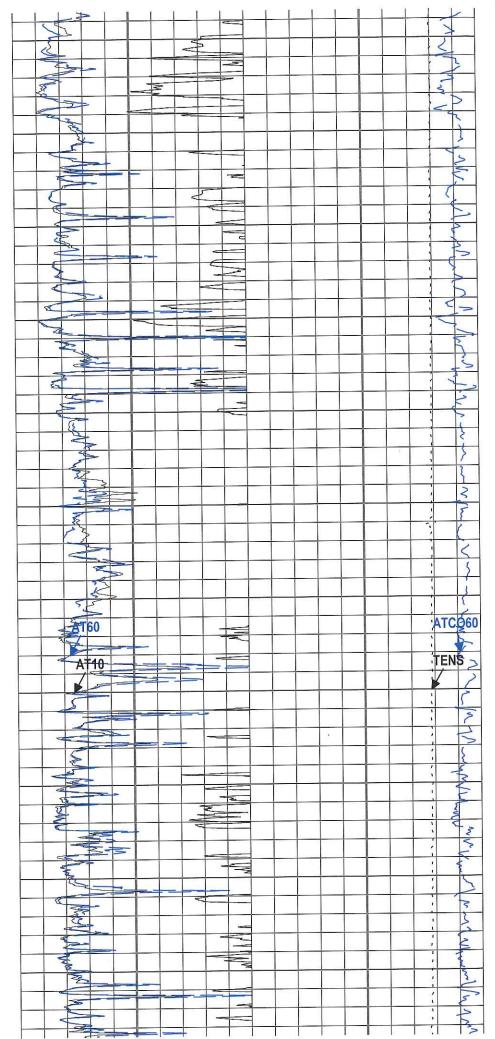
	One: To	olstring		One: Remarks
Equip name LEH-QT	Length 43.57	MP name	Offset	Toolstring run as per tool sketch
LEH-QT DTC-H:8980 ECH-KC:1005	40.65	CTEM HV	39.75 0.00	Matrix: Sandstone (2.65 g/cc) Log may be affected by 20% LCM in drilling mud Caliper check in casing=8.87 in, within tolerance Cement volume calculated using 7 in future
3 DTC-H:8980 HGNS-H:481	37.65	TelStatus ToolStatus Temperatu	37.65	casing diameter Rig: Aztec 920
7 HGNH:4865 NPV-N NSR-F:5068 HGNS-H:4817 HACCZ-H:699 1 HMCA-H		re — GR	36.91	Crew: Derrick Hunter Thank you for choosing Schlumberger
		CNL Poros ity HMCA HGNS Accelerom eter	30.57 28.24 28.24 0.00	

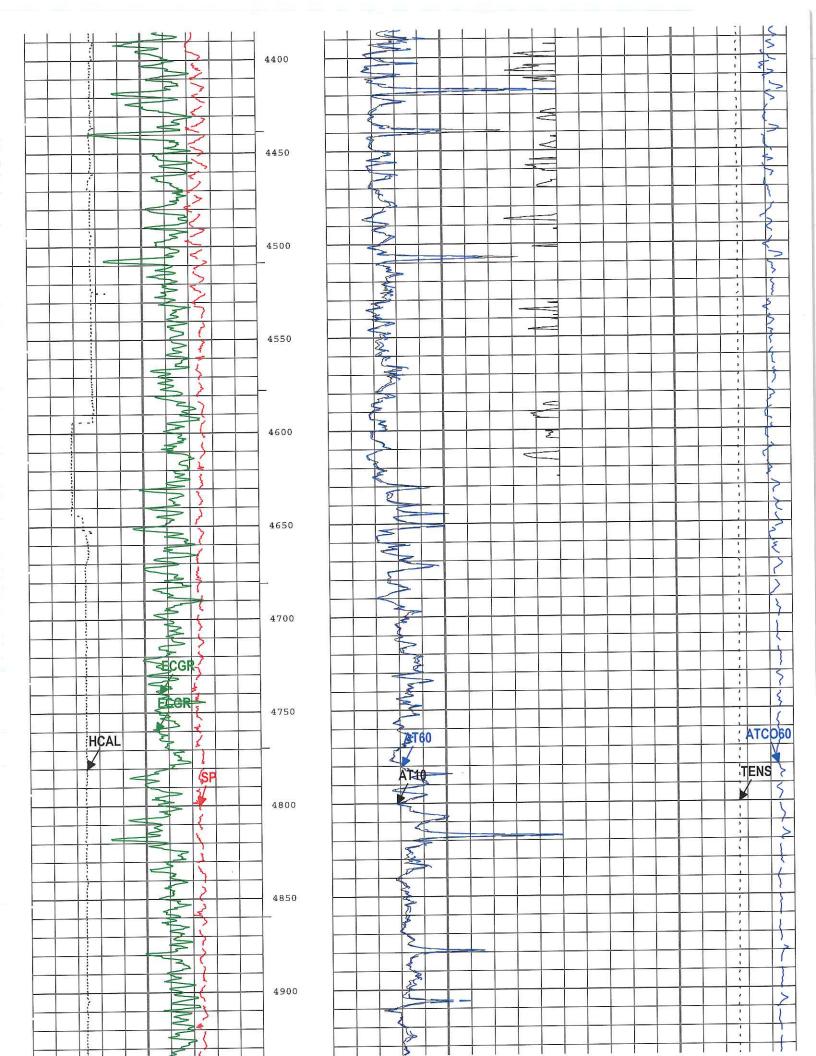


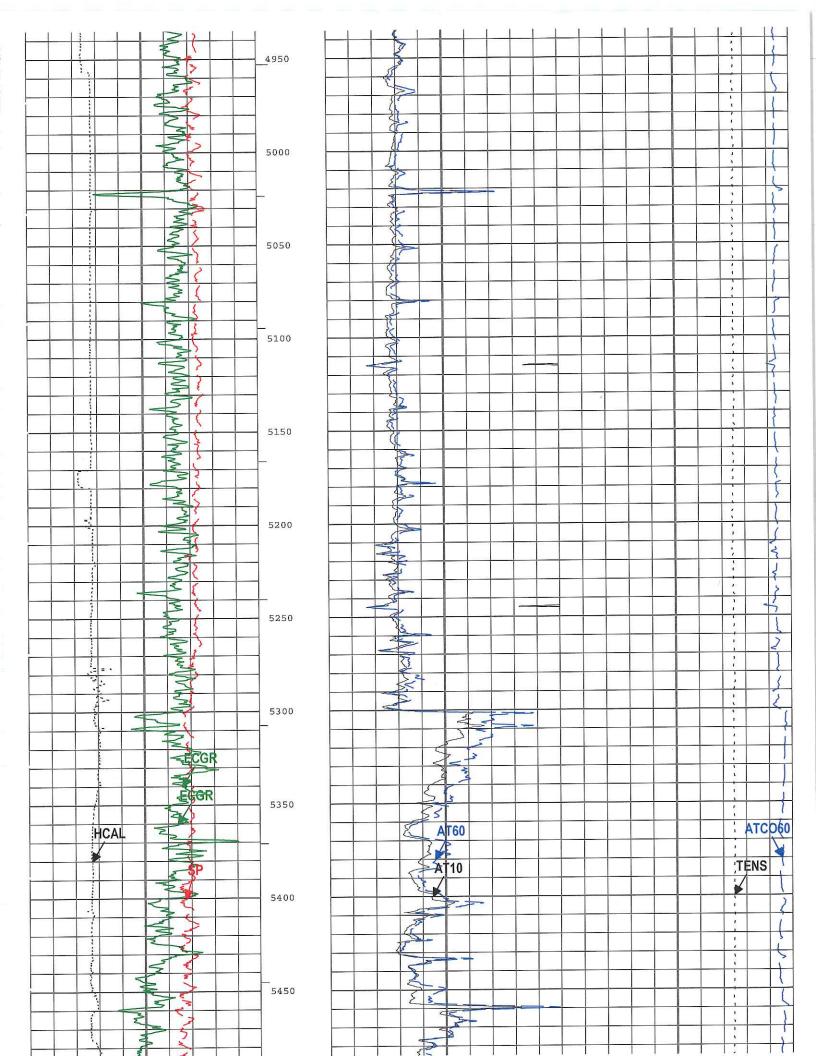
 Serial Number			147							
	-31		147 18-Aug-2	0016						
Calibration Date				010						
Calibrator Seria			78805A							
Number of Calib			10							
Calibration Roo Error	t wean Squ	lare	7							
Calibration Pea	k Error		10							
Logging Cabl	е									
Туре			7-46A-X	S						
Serial Number			U715043	3						
Length			24000.00) ft						
Conveyance Ty	/pe		Wireline							
Rig Type	F		Land							
One:Depth C	ontrol Par	amete	1364 (557 (567 (577 (577 (577 (577 (577 (577			Depth Cor	ntrol Rem	arks		
Log Sequence		aneu		In the Well				control procedures	s followed	
	At Surface		i nat LUG					lepth device, z-ch		condarv
Rig Up Length .							o prindry C			
Rig Up Length										
Rig Up Length										
Stretch Correct										
Tool Zero Cheo	k At Surfac	e				One				Territory In Maria
					Z II.	duction				
Integration	Number of Street or other Designation of the Owner, where	and the second	y It Descript	ion	Input Par	ameter		Output Value	Unit	
	、 <i>/</i>		ted Cemen			PASS, FCD		623.08	ft3	
	CONTRACTOR OF THE	distanti di Stati	lea oemen	Volumo	[4602_0.					
Software	and the second s						Versior			
Acquisition Sy							6.2.6862			
Maxwell 2016 S	and the second se	15					0.2.0002			
Pass Su				<u> </u>	D	0	Oterr	DCC Mada	Donth Shift	Include
Run Name F	ass Objec	tive	Direction	Тор	Bottom	Start	Stop	DSC Mode	Depth Shift	Parallel Dat
One L	.og[4]:Up	l	Up		7548.83 ft	07-Sep-2016 5:52:06 AM		ON	0.00 ft	No
All depths are re	eferenced to	toolstrir	ng zero						No. 12 Second Second	
Log						Company:V	Vestern R	efining, Southwe		/ell:WWD #2
LUY									and the second	a[4]:Up:S012
Description: AIT E		o Fori	mat: Log (Ir	iduction-2)	Index Scale: 2	in per 100 ft li	ndex Unit: ft	Index Type: Meas	sured Depth C	reation Date:
07-Sep-2016 07:0 Channel Sou			Samp	ling						
	-M:AMIS:AMI	IS	3in	J						
	-M:AMIS:AMI		3in							
	-M:AMIS:AMI	IS	3in							
	in an on an									
CALI HDI	RS-H:HRCC-		C-H 1in							
		H:HRC								
GR HG	RS-H:HRCC-	H:HRC		RT						
GR HG ICV Bor	RS-H:HRCC- NS-H:HGNS-	H:HRC H:HGN	IS-H 6in	RT						

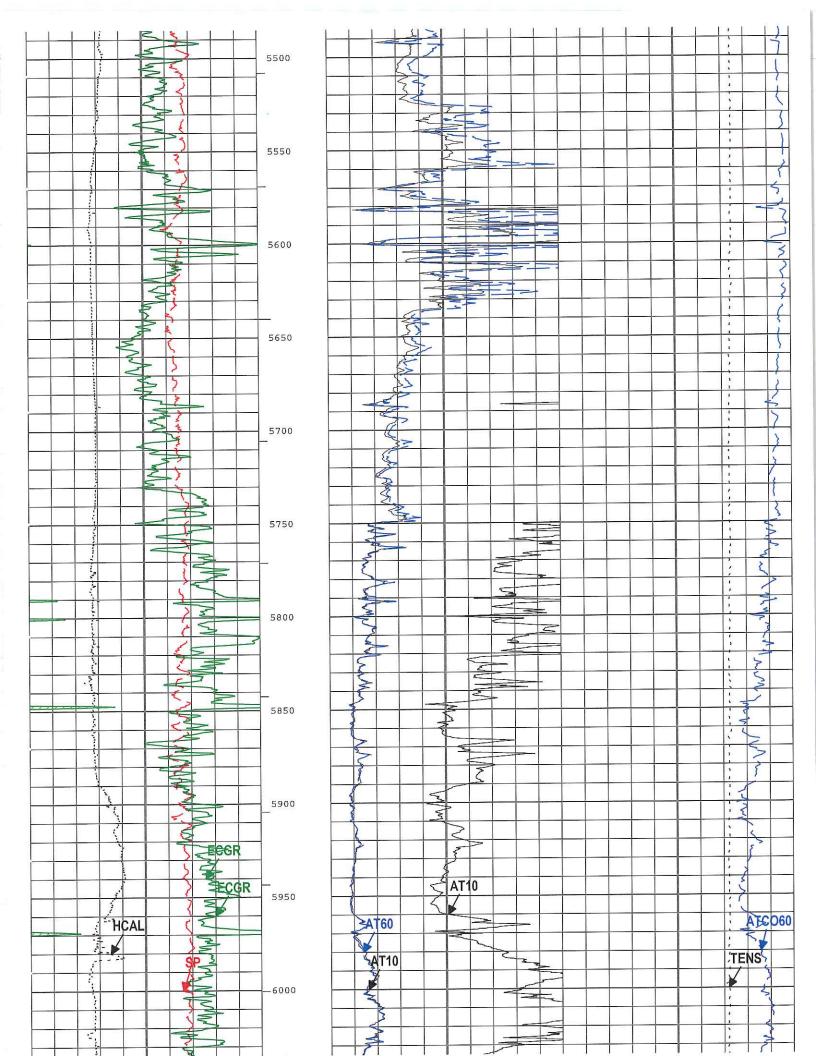


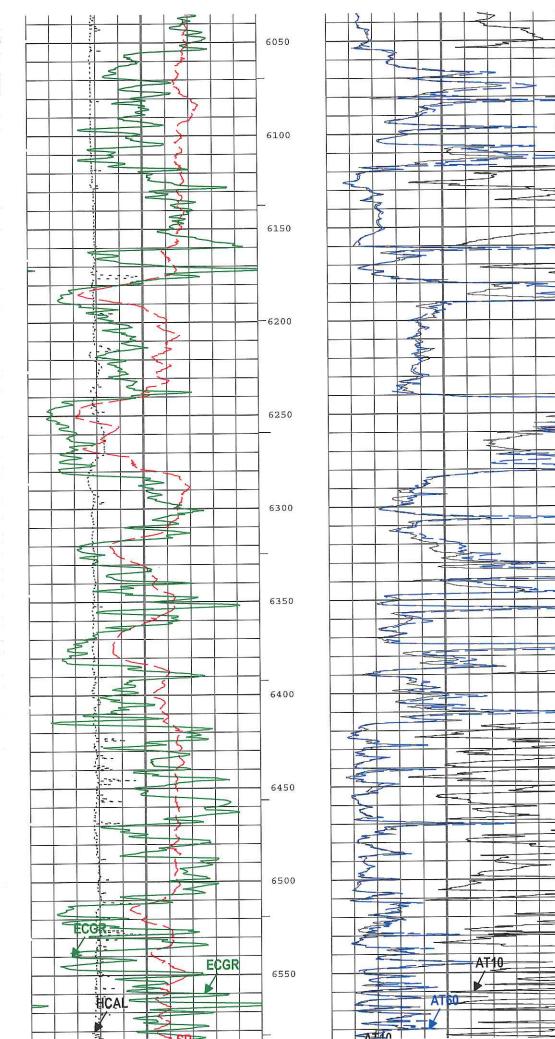


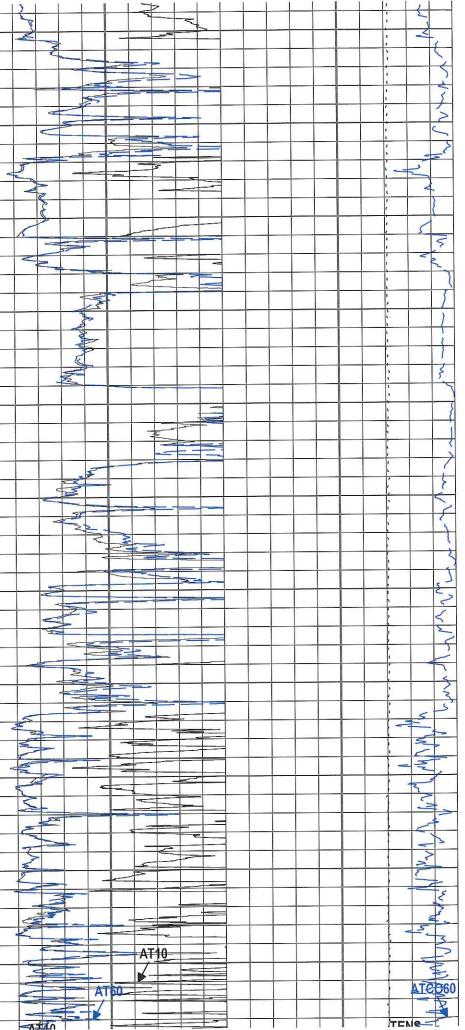


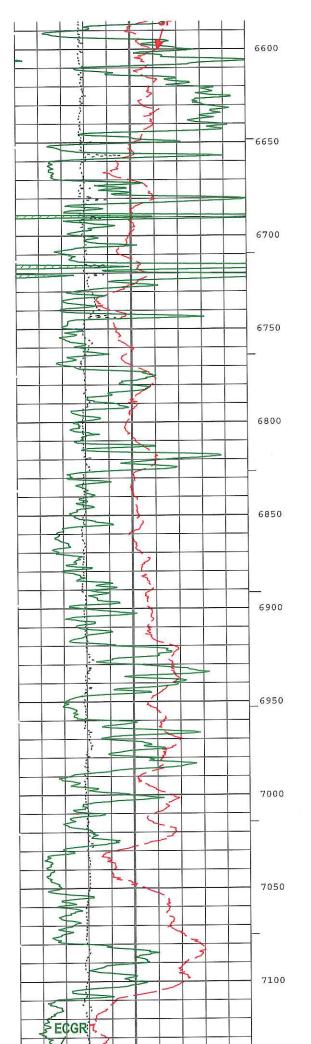


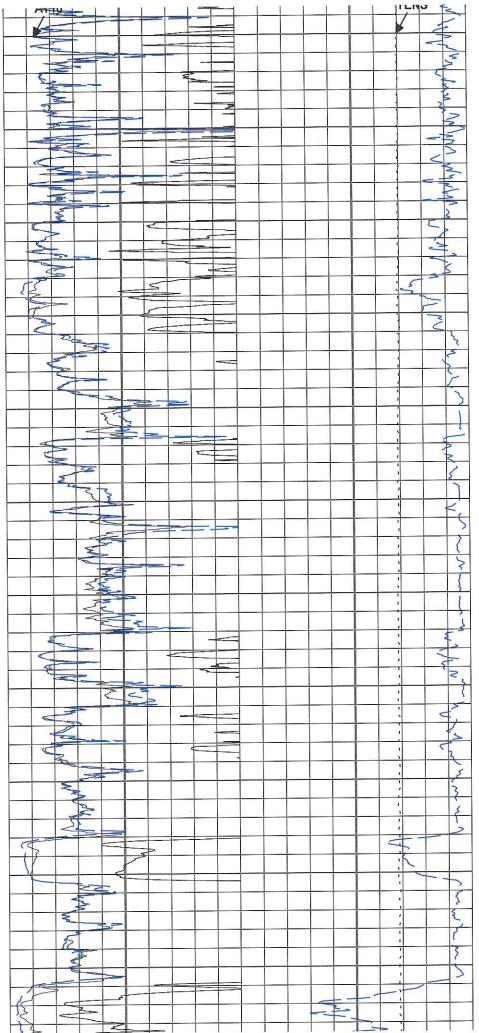


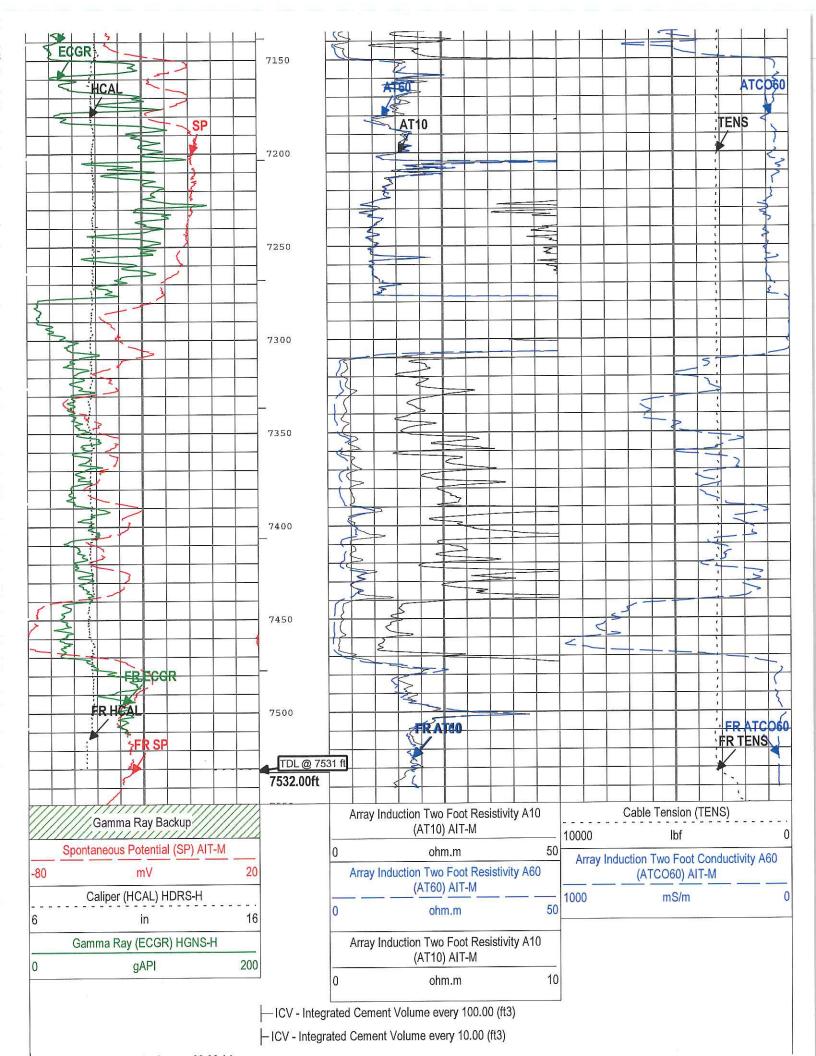












Description: AIT Basic Log Two Format: Log (Induction-2) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 07-Sep-2016 07:04:12

Channel Processing Parameters

1	3	-	-			-	-	-	040	No.	
	U,	n	e	-	P	а	ra	m	ete	rs	
	-		-	-	-	-	-				

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ASTA	Array Induction Tool Standoff	AIT-M	0.6	in
SSBAR	Barite Mud Presence Flag	Borehole	Yes	
3HS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.1	in
CBLO	Casing Bottom (Logger)	WLSESSION	3498	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	9.625	in
DFD	Drilling Fluid Density	Borehole	9.9	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	7	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)	
BS	12.25		3515	
BS	8.75	3515	7532	

All depth are actual.

Tool Control Parameters

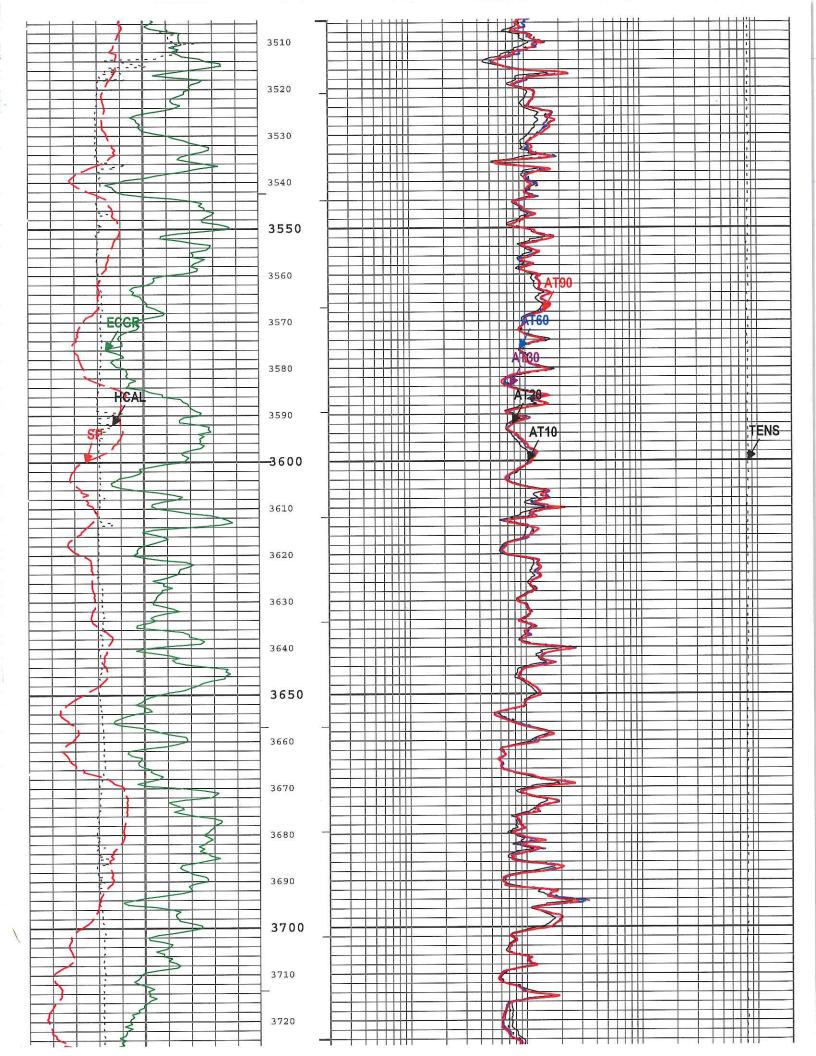
One: Parameters

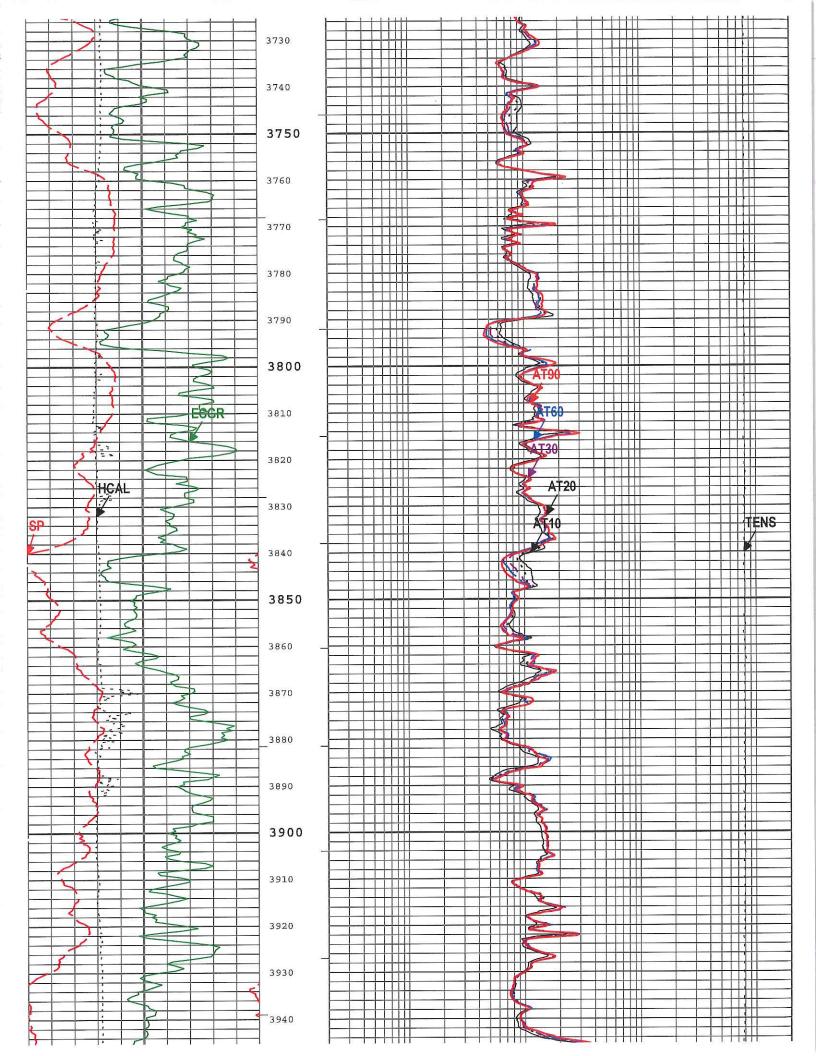
Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

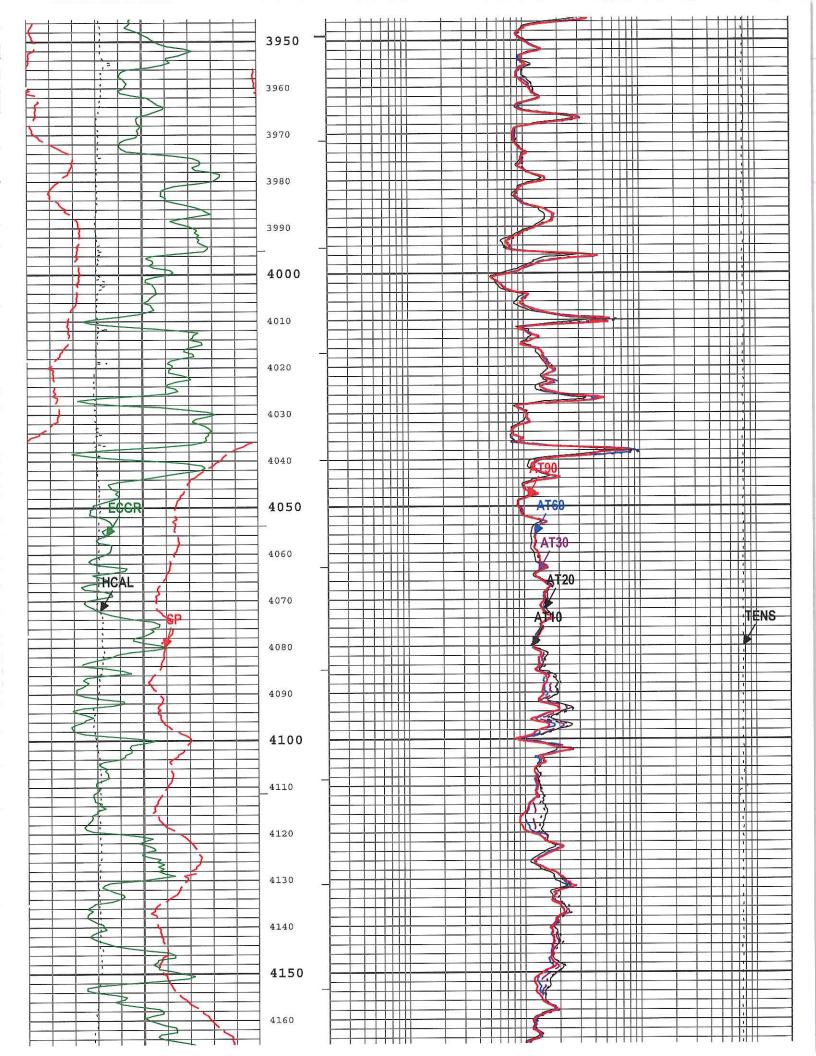
5" Induction

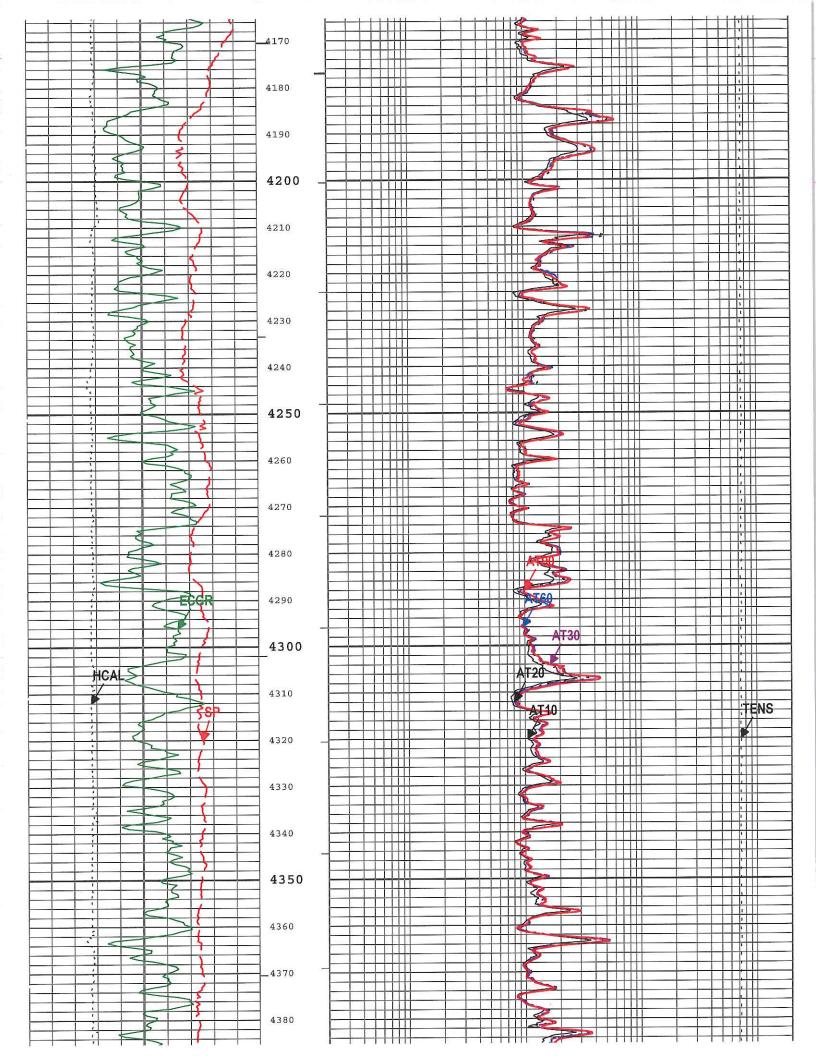
Integra	tion Summa	ry							
Output Cha	nnel(s) Outr	out Descript	tion	Input Pa	rameter		Output Value	Unit	
ICV	Integ	rated Cemen	t Volume	GCSE_UF	P_PASS, FCD		623.08	ft3	
IHV	Integ	rated Hole Vo	olume	GCSE_UF	P_PASS		1705.5	ft3	
Softwa	re Version								
Acquisition	System		-			Versio	on		
Maxwell 2016	SP2					6.2.686	624.3100		
Pass S	ummary								
Run Name	Pass Objective	Direction	Тор	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up		7548.83 ft	07-Sep-2016 5:52:06 AM		ON	0.00 ft	No

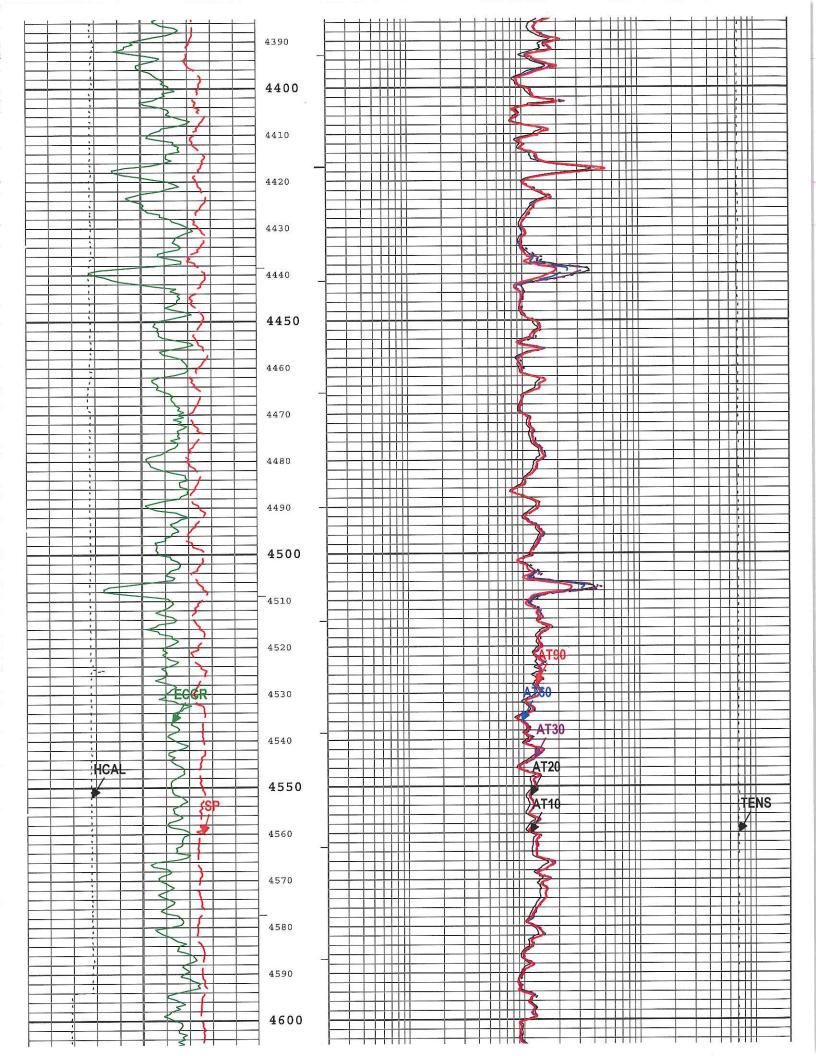
Log					Company	y:Western Re	efining, S	outnwes	t, Inc.	Well:V	
Log									One	: Log[4]:	Up:S01
escription: 7-Sep-2016	AIT Basic Log Two 07:04:14	Format: Log (Induction-5)	Index Scale: 5 i	in per 100 ft	Index Unit: ft	Index Ty	vpe: Measu	ired Depth	Creatio	n Date:
Channel	Source	Sam	pling								
T10	AIT-M:AMIS:AMIS	3in									
T20	AIT-M:AMIS:AMIS	3in									
T30	AIT-M:AMIS:AMIS	3in									
T60	AIT-M:AMIS:AMIS	3in									
T90	AIT-M:AMIS:AMIS	3in									
ALI	HDRS-H:HRCC-H:H	HRCC-H 1in									
BR	HGNS-H:HGNS-H:H	HGNS-H 6in									
CV	Borehole	6in ·	- RT								
HV	Borehole	6in ·	- RT								
P	AIT-M:AMIS:AMIS	6in									
ENS	WLWorkflow	6in									
IME_1900	WLWorkflow	0.1in	1								
				HV - Integrate	d Hole Volun	ne everv 10.00	(ft3)				
				- HV - Integrate							
				a• =:			(10)				
			FICV - Integ	rated Cement Vo	lume every 1	0,00 (ft3)					
		60.00 (s)									
		00.00 (S)							able Tensi		5)
	,	60.00 (S)		·	Arrow	Induction Two F	 100	00	lbf	 f	5)
	,	60.00 (S)		0.2	Array	Induction Two F	oot Resist	00	lbf	 f	
			_	0.2			oot Resist ohm.m	00 tivity A10 (.	lbf AT10) AIT-	f M	3)
//////						Induction Two F	oot Resist ohm.m oot Resist	00 tivity A10 (.	lbf AT10) AIT-	f M	
	Gamma Ray Backup			0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (.	lb1 AT10) AIT- AT20) AIT-	f M M	
Spont	Gamma Ray Backup			0.2	Array		oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (.	lb1 AT10) AIT- AT20) AIT-	f M M	
	Gamma Ray Backup				Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (.	lb1 AT10) AIT- AT20) AIT-	f M M	
30	Gamma Ray Backup aneous Potential (SP	2) <u>AIT-M</u> 20		0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (.	lb1 AT10) AIT- AT20) AIT- AT30) AIT-	f M M M	
30	Gamma Ray Backup aneous Potential (SP mV	2) <u>AIT-M</u> 20		0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (.	lb1 AT10) AIT- AT20) AIT- AT30) AIT-	f M M M	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in	2) <u>AIT-M</u> 20 3-H 16		0.2	Array Array Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG	2) <u>AIT-M</u> 20 3-H 16 5NS-H		0.2 0.2 0.2 0.2	Array Array Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in	2) <u>AIT-M</u> 20 3-H 16		0.2	Array Array Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3450	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
BO (Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in nma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3450	0.2 0.2 0.2 0.2	Array	Induction Two F Induction Two F Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG	2) <u>AIT-M</u> 20 3-H 16 5NS-H		0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in nma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3450 3460	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H		0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in nma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H		0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
BO (Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
80 (Gan	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
80	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460 3470	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
80 (Gan	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460 3470 3480	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
80 (Gan	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460 3470	0.2 0.2 0.2 0.2	Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
80 (Gan	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460 3470 3480		Array	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	
30	Gamma Ray Backup aneous Potential (SP mV Caliper (HCAL) HDRS in mma Ray (ECGR) HG gAPI	2) <u>AIT-M</u> 20 3-H 16 5NS-H	3460 3470 3480 3490	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	Array I	Induction Two F	oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m oot Resist ohm.m	00 tivity A10 (. tivity A20 (. tivity A30 (.	Ibf AT10) AIT- AT20) AIT- AT30) AIT- AT60) AIT-	f -M -М -М -М	

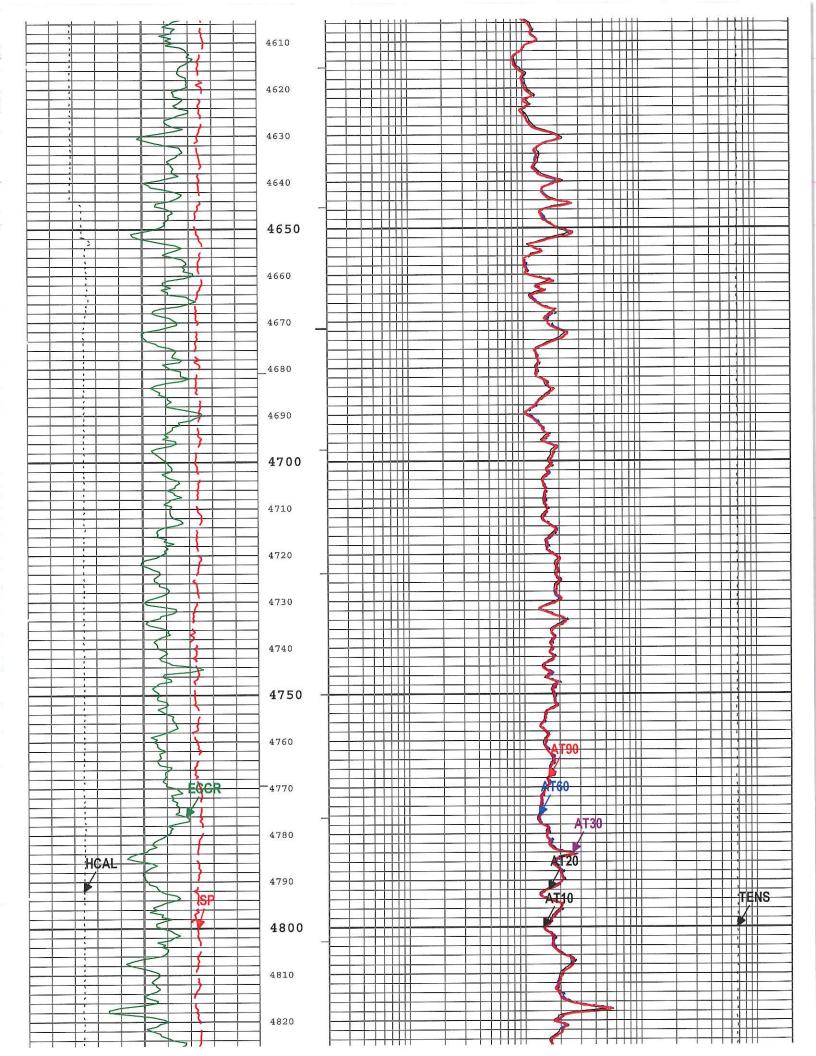


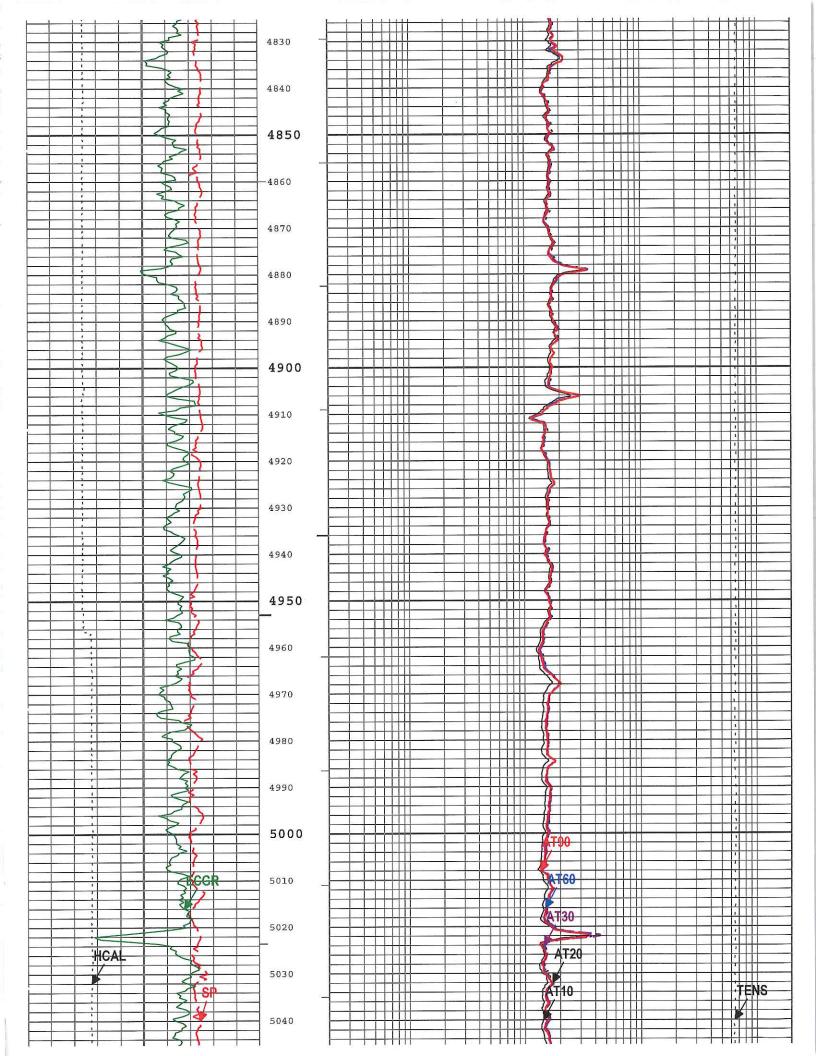


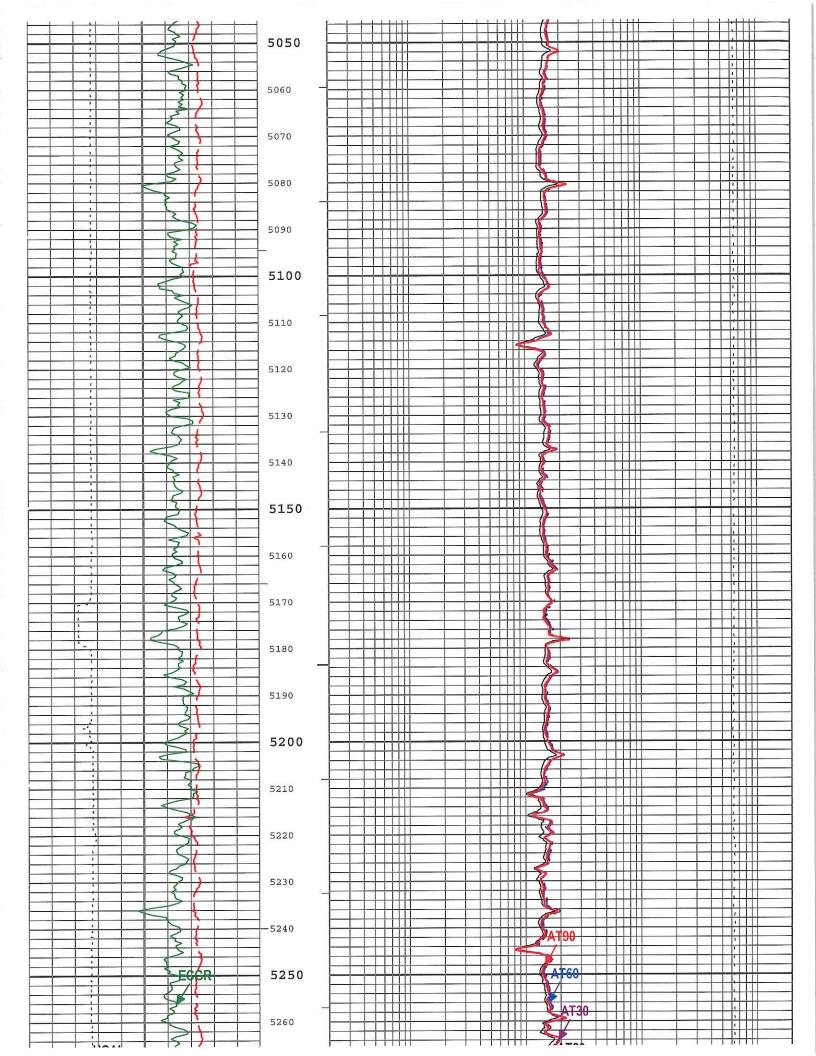


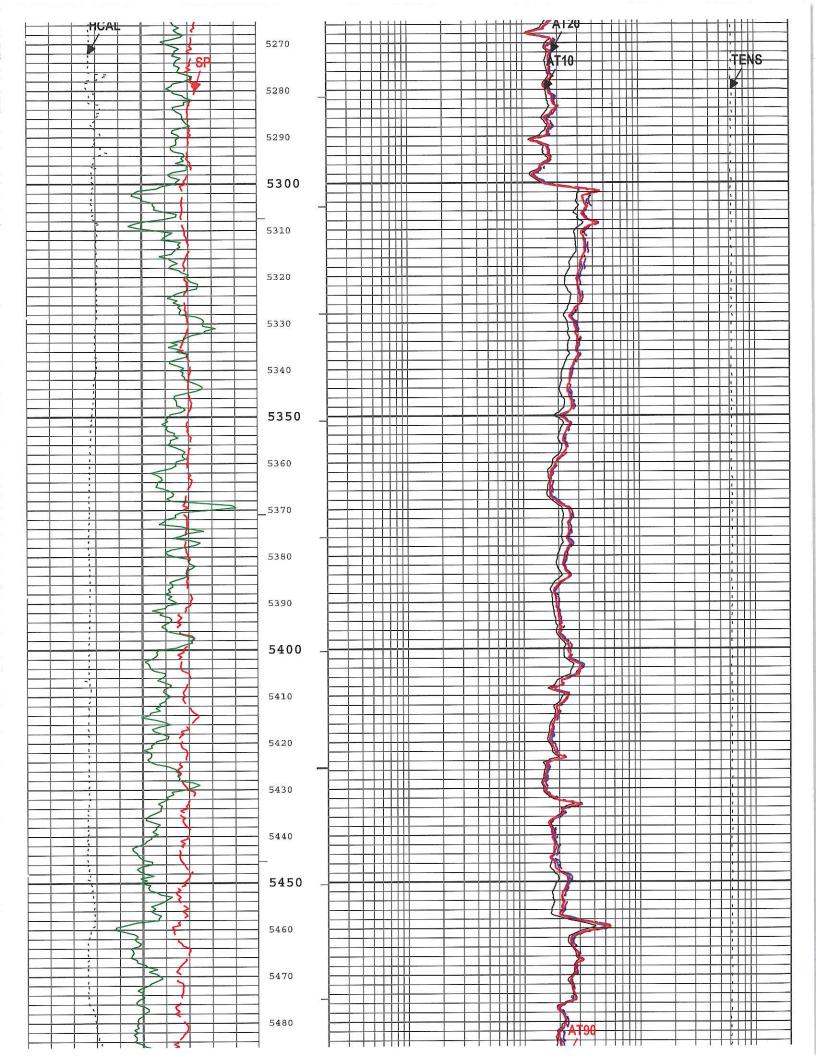


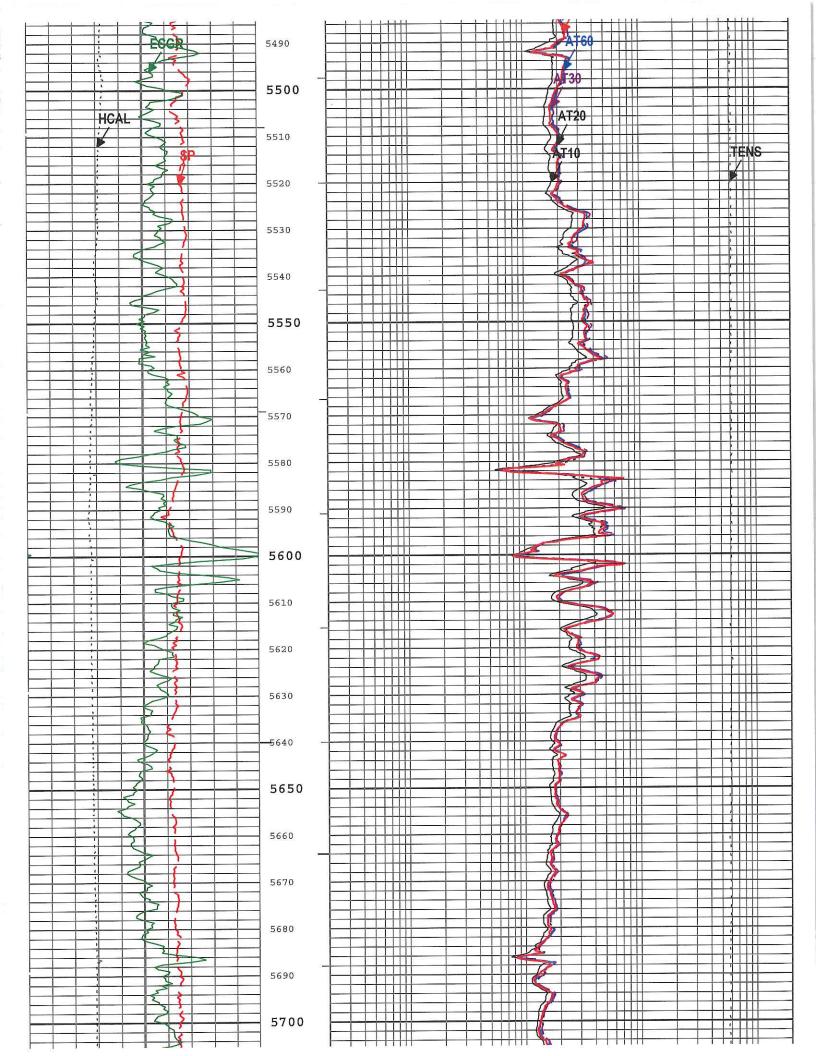


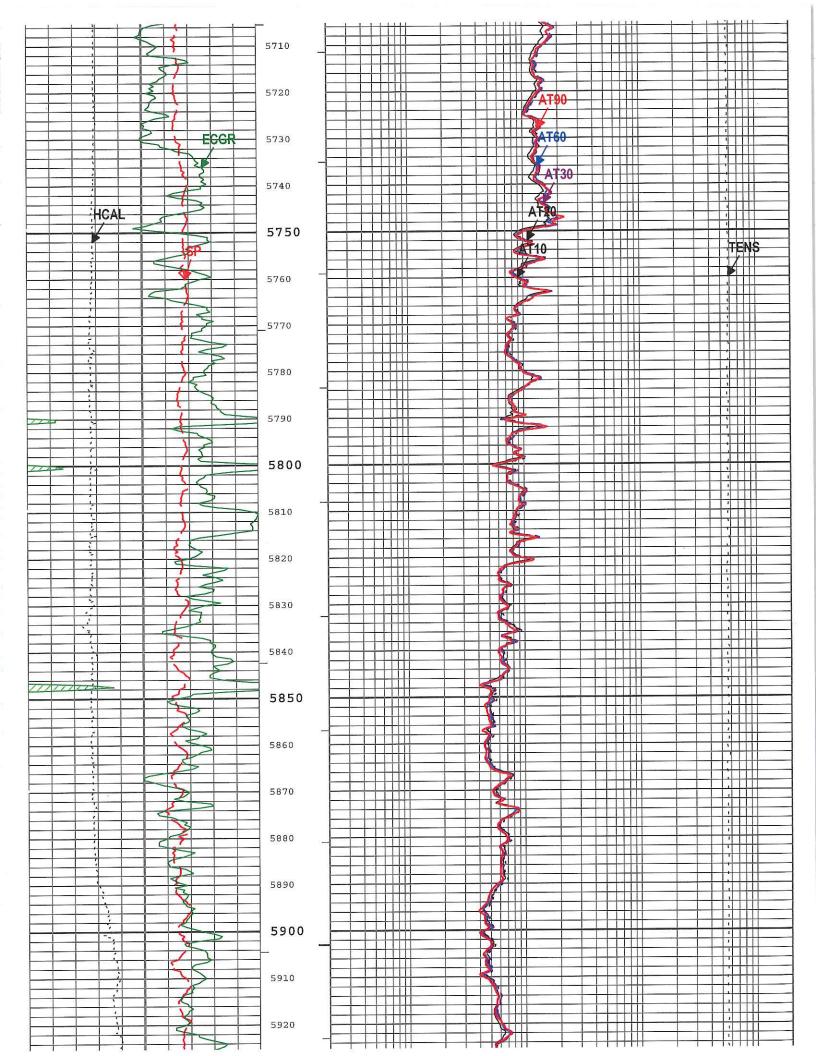


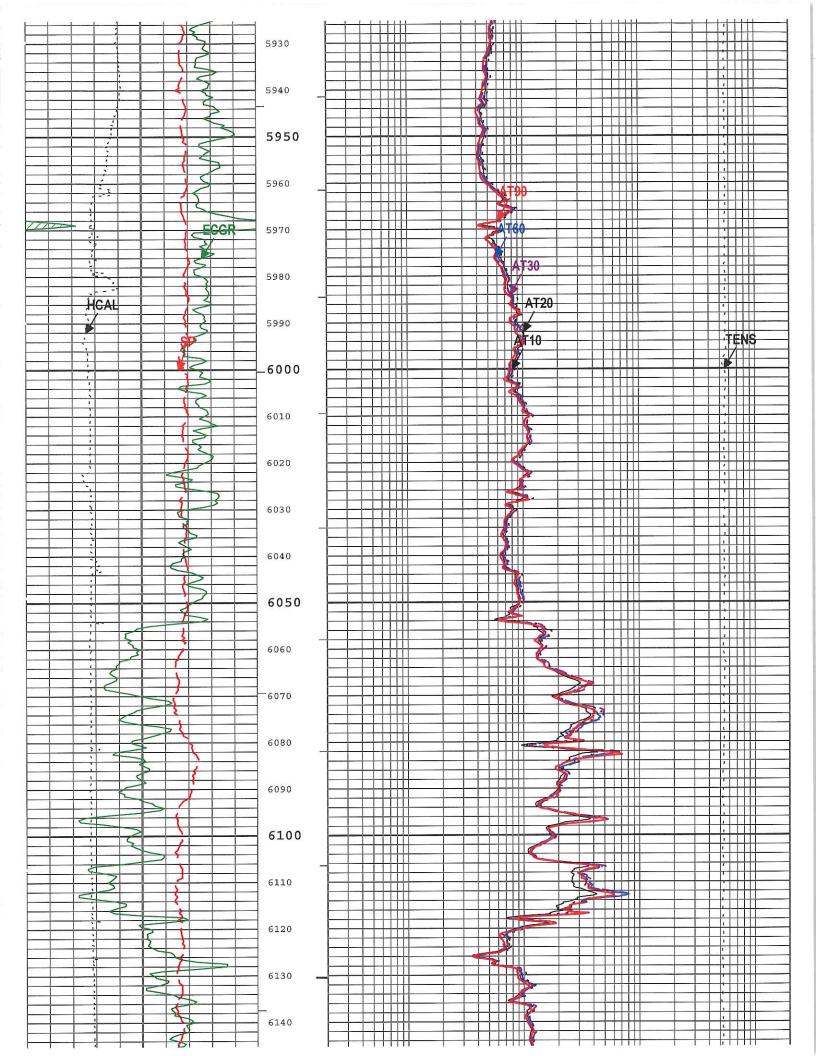


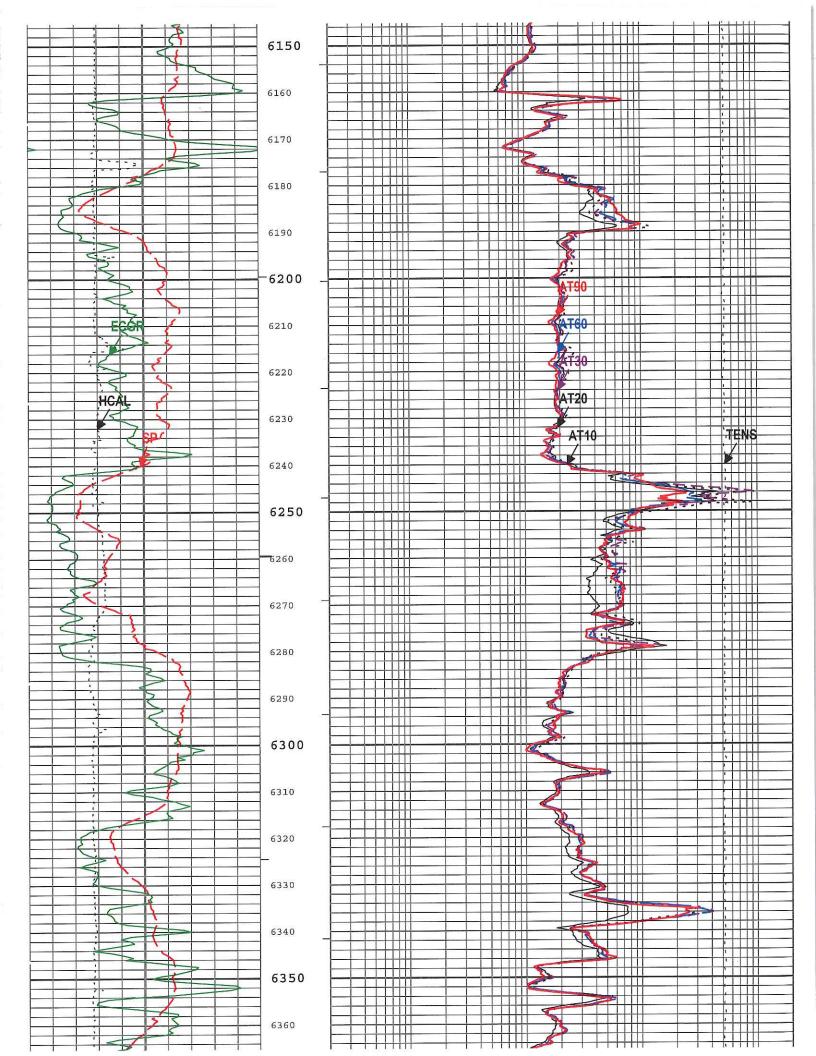


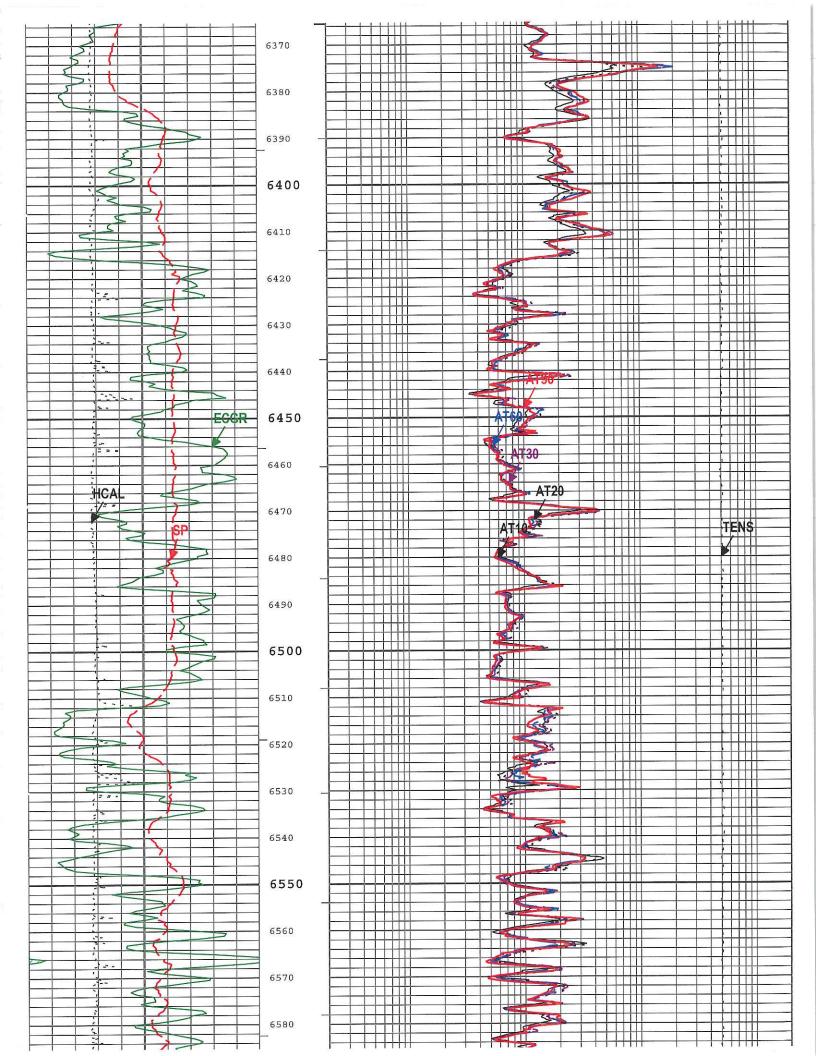


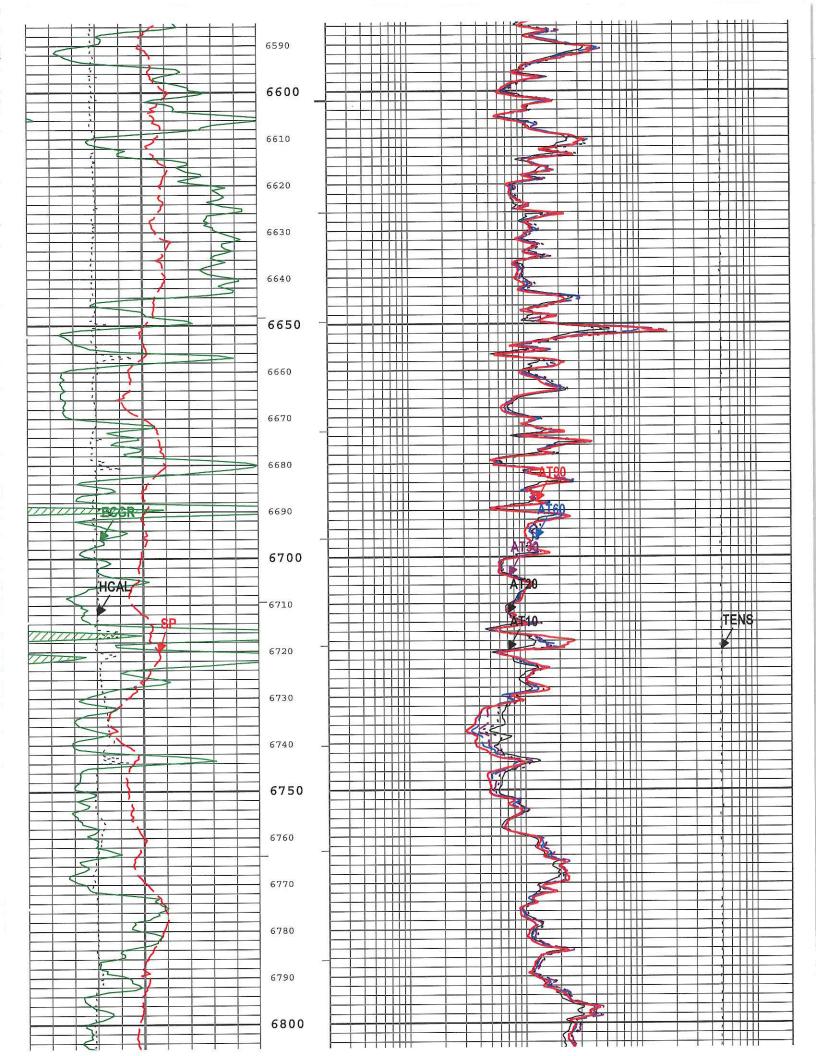


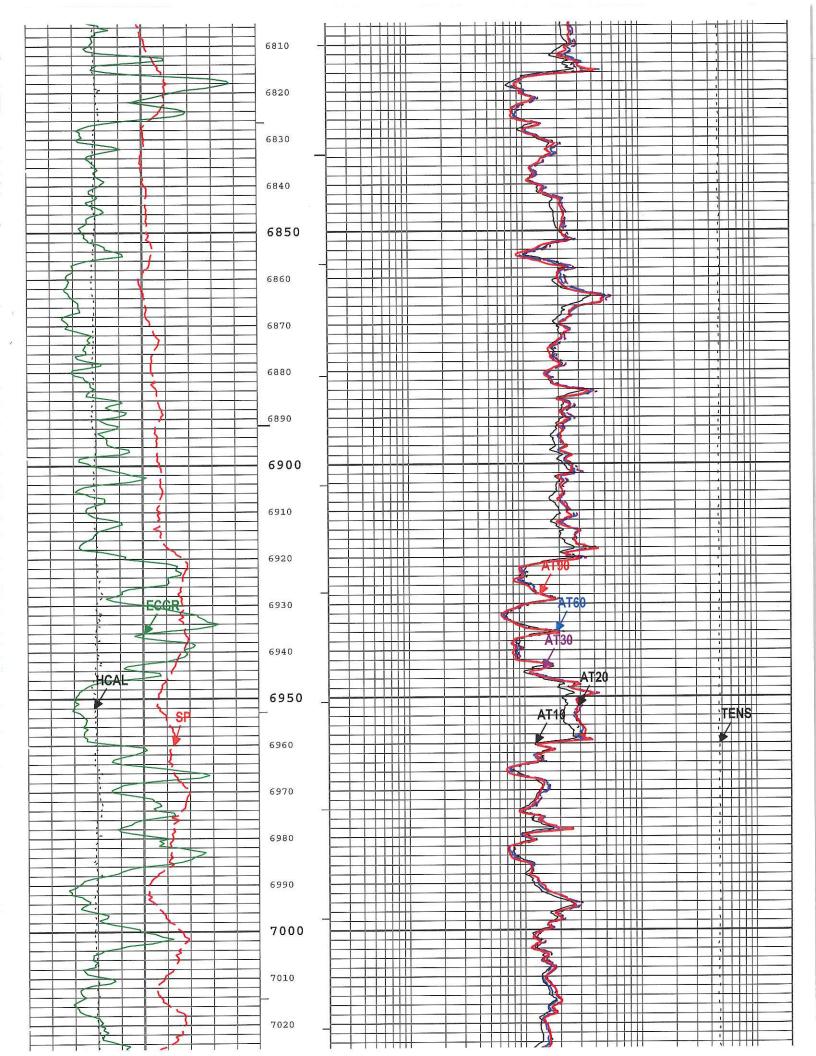


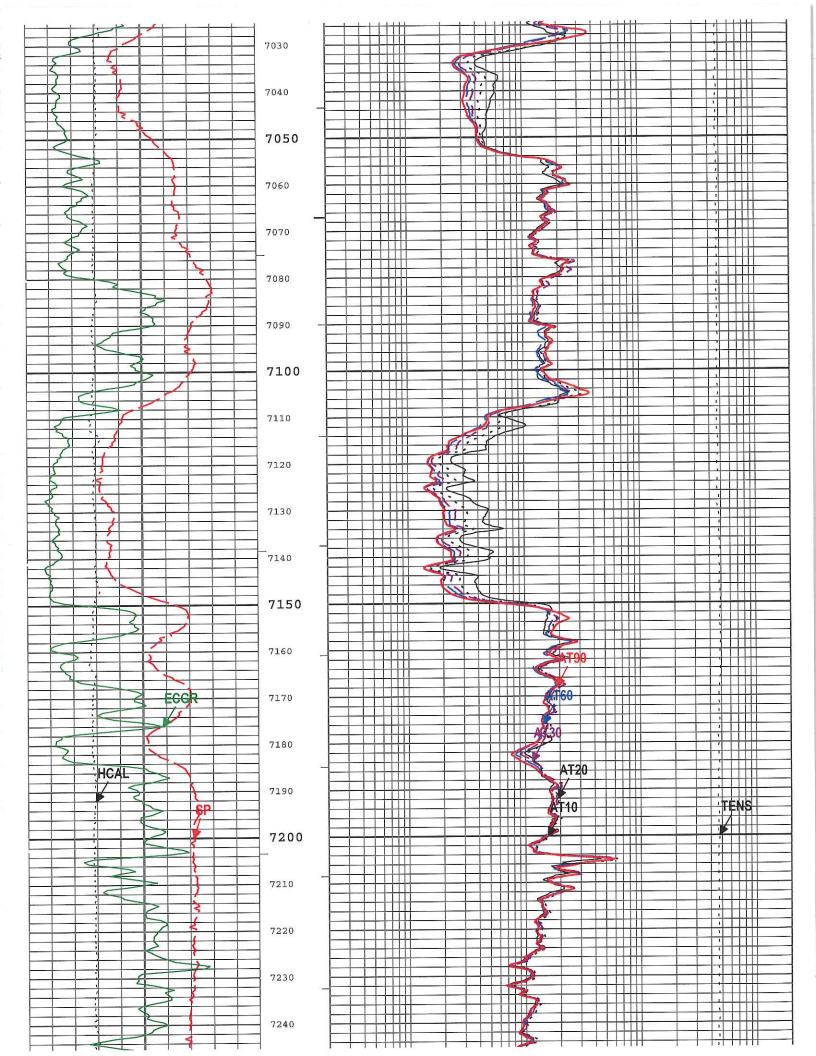


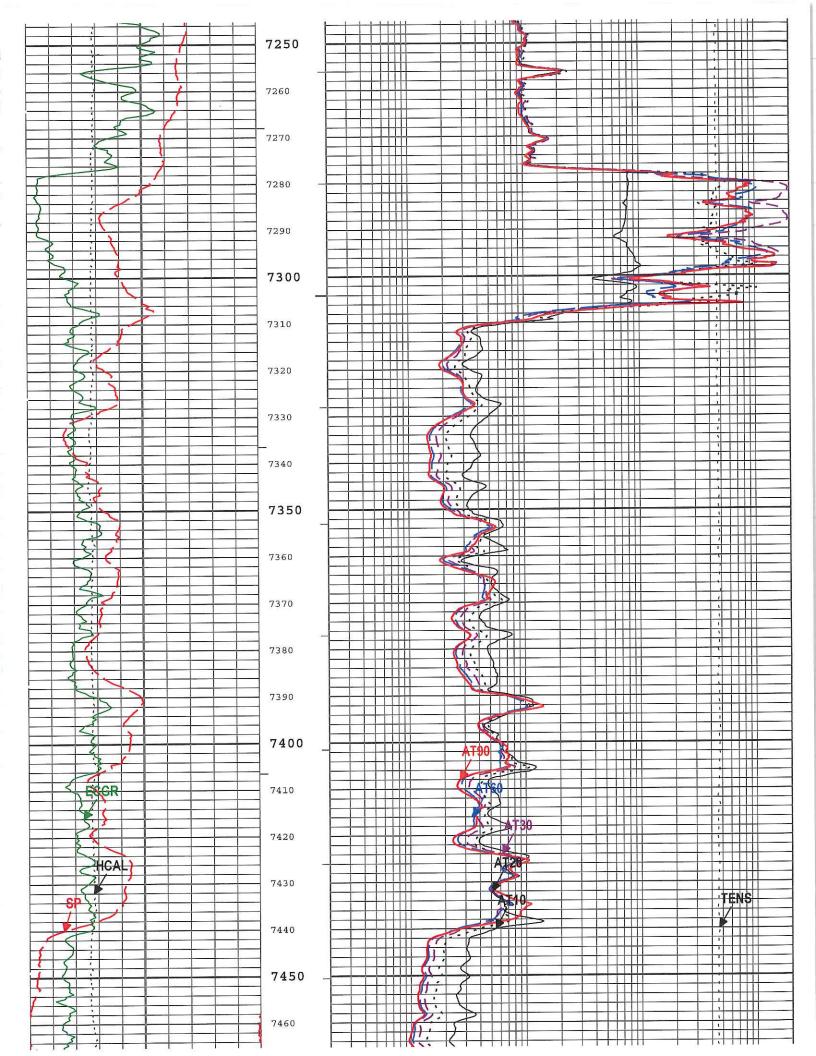


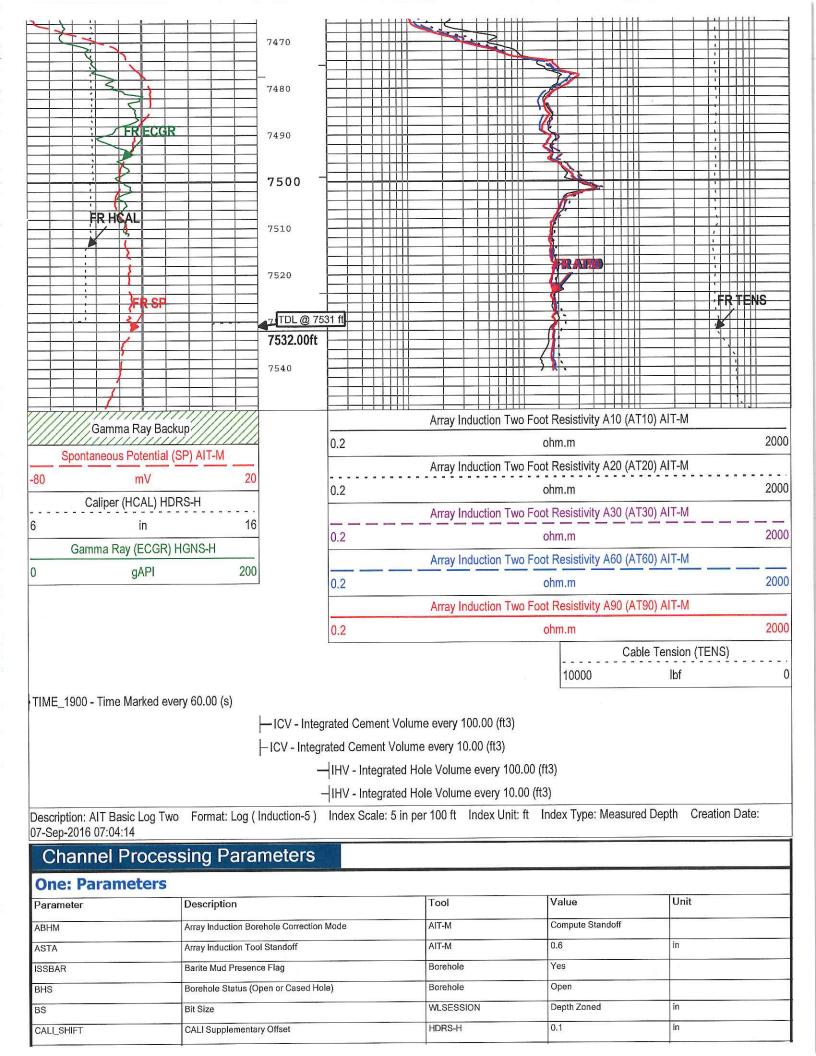




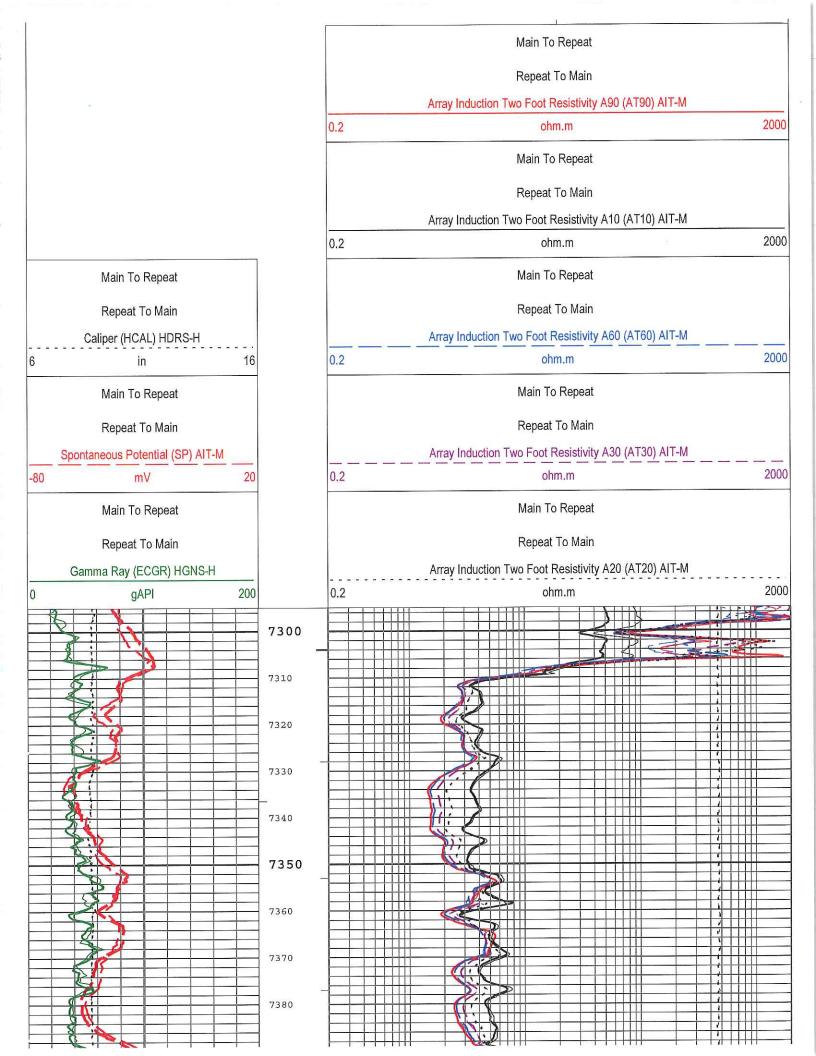


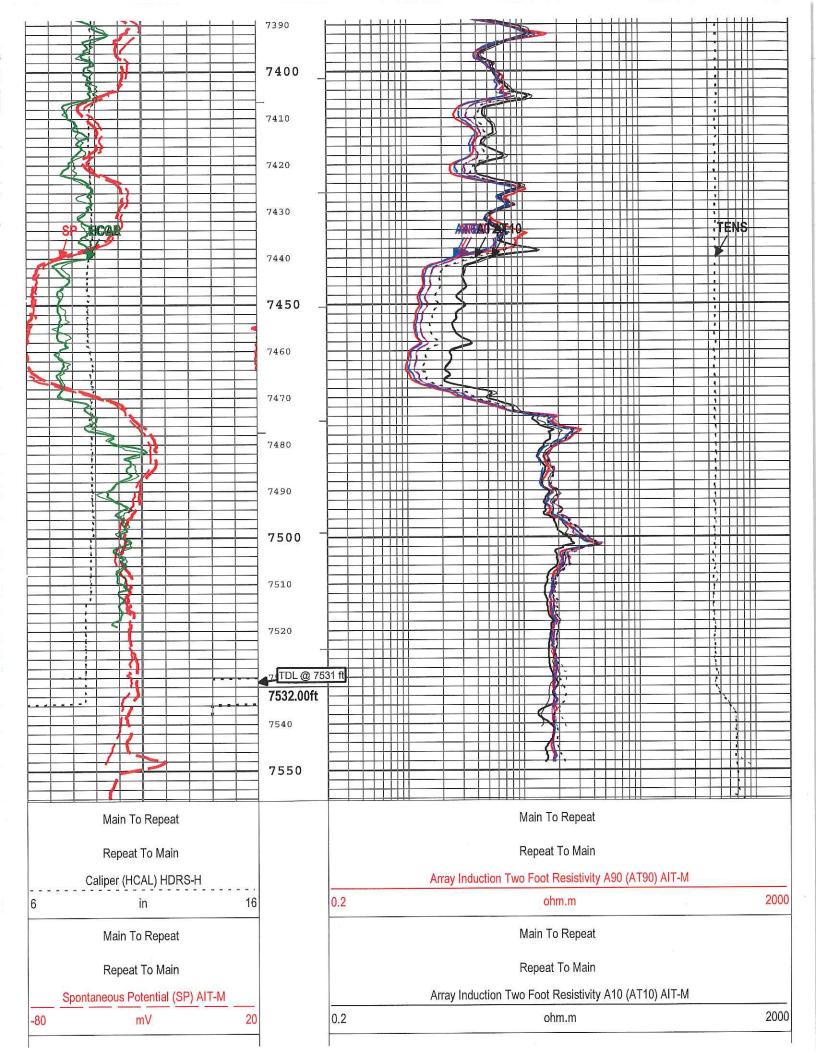


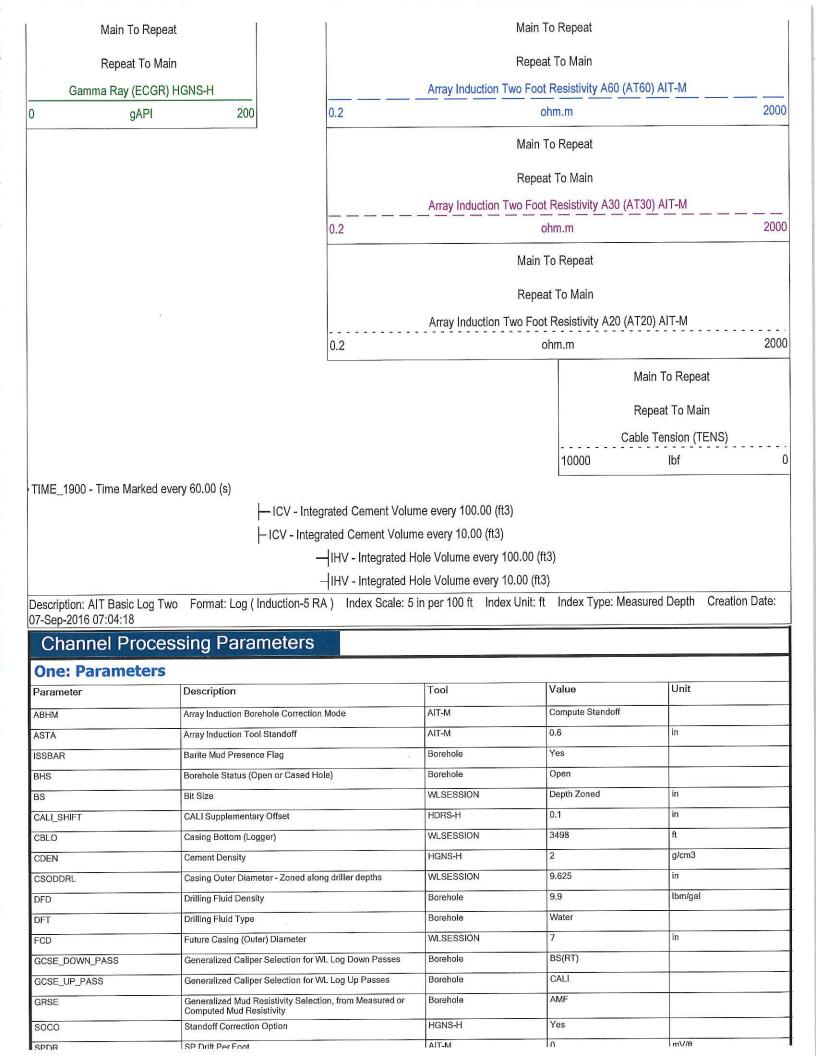




CDEN	Cas	ing Bottom (Logg	ier)		WLSESSION		3498	ft	
UDEN	Cen	ent Density			HGNS-H	2	2	g/cm3	
CSODDRL	Cas	ing Outer Diamet	er - Zoned along	driller depths	WLSESSION	1 9	9.625	in	
DFD	Drill	ing Fluid Density			Borehole	5	9.9	lbm/gal	
DFT	Drill	ing Fluid Type			Borehole	- N	Water		
FCD	Fut	ire Casing (Outer	r) Diameter		WLSESSION	1	7	in	
GCSE_DOWN_PA	ASS Ger	eralized Caliper	Selection for WL	Log Down Passes	Borehole	1	BS(RT)		
GCSE_UP_PASS	Ger	eralized Caliper	Selection for WL	Log Up Passes	Borehole		CALI		
GRSE		eralized Mud Re nputed Mud Resi		, from Measured o	r Borehole		AMF		
SOCO		ndoff Correction (HGNS-H		Yes		
SPDR	SP	Drift Per Foot			AIT-M		0	mV/ft	
Depth Zo	ne Paramet	ers							
Parameter	Va		Start	(ft)			Stop (ft)		
BS	12.3	25					3515		
BS	8.7	5	3515				7532		
All depth are ad	ctual.		and a second sec						
Tool Co	ontrol Parar	neters							
One: Para	ameters								
Parameter		scription			Tool		Value	Unit	
MAX_LOG_SPEE	D Too	Istring Maximum	Logging Speed		WLSESSION	N	3600	ft/h	
		I Statistic		(Dne				
				5" In	duction				
and the second								n Englisherts og få	
Softwar	re Version								
Softwar Acquisition S						Version	1999-1997 1999-1997		
	System					Version 6.2.68624.3	100		
Acquisition S	System SP2					1	100		
Acquisition S	System	Direction	Тор	Bottom	Start	1	100 DSC Mode	Depth Shift	Include Parallel Data
Acquisition S Maxwell 2016 Pass S	System SP2 UMMAry	Direction Up	Top 7294.65 ft		Start 07-Sep-2016	6.2.68624.3 Stop 07-Sep-2016		Depth Shift 5.53 ft	Include Parallel Data No
Acquisition S Maxwell 2016 Pass S Run Name	System SP2 UMMARY Pass Objective			Bottom	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016	6.2.68624.3	DSC Mode		Parallel Data
Acquisition S Maxwell 2016 Pass S Run Name One One	System SP2 UMMARY Pass Objective Log[3]:Up	Up Up		Bottom 7556.27 ft	Start 07-Sep-2016 5:43:06 AM	6.2.68624.3 Stop 07-Sep-2016	DSC Mode	5.53 ft	Parallel Data
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up	Up Up		Bottom 7556.27 ft	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM	DSC Mode	5.53 ft 0.00 ft st, Inc. W	Parallel Data No No Vell:WWD #2
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero	7294.65 ft	Bottom 7556.27 ft 7548.83 ft	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin	ON ON	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero		Bottom 7556.27 ft 7548.83 ft	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin	ON ON	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft	DSC Mode ON ON ing, Southwe Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3 every 100.00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume olume every 10.0	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All 07-Sep-2016 07	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up referenced to tools T Basic Log Two F 7:04:18	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 uq[4]:Up:S012
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All 07-Sep-2016 07	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume olume every 10.0	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W <u>One: Lo</u> easured Depth	Parallel Data No No Vell:WWD #2 og[4]:Up:S012 Creation Date:
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All 07-Sep-2016 07	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up referenced to tools T Basic Log Two F 7:04:18	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume olume every 10.0	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Data No No Vell:WWD #2 og[4]:Up:S012 Creation Date:
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All 07-Sep-2016 07	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up referenced to tools T Basic Log Two F 7:04:18	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume olume every 10.0	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W <u>One: Lo</u> easured Depth	Parallel Data No No Vell:WWD #2 og[4]:Up:S012 Creation Date:
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All 07-Sep-2016 07	System SP2 UMMAIY Pass Objective Log[3]:Up Log[4]:Up referenced to tools T Basic Log Two F 7:04:18	Up Up tring zero ormat: Log (I	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale IHV - Integrate IHV - Integrate	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume ed Hole Volume olume every 10.0	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3) 00 (ft3)	DSC Mode ON ON ing, Southwe Index Type: M) 3)	5.53 ft 0.00 ft st, Inc. W One: Lo easured Depth	Parallel Data No No Vell:WWD #2 Oreation Date: Creation Date:
Acquisition S Maxwell 2016 Pass S Run Name One One All depths are Log Description: All	System SP2 UMMARY Pass Objective Log[3]:Up Log[4]:Up referenced to tools	Up Up tring zero	7294.65 ft nduction-5 RA	Bottom 7556.27 ft 7548.83 ft) Index Scale	Start 07-Sep-2016 5:43:06 AM 07-Sep-2016 5:52:06 AM Company:V e: 5 in per 100 ft ed Hole Volume	6.2.68624.3 Stop 07-Sep-2016 5:48:19 AM Vestern Refin Index Unit: ft every 10.00 (ft3	DSC Mode ON ON ing, Southwea Index Type: M	5.53 ft 0.00 ft st, Inc. W One: Lo	Parallel Da No No Vell:WWD #2







			····		• ¹		an				
Depth Zone Param	eters										
Parameter	Value	Start (ft)			Stop (ft)						
					3515						
BS	12.25										
BS	8.75	3515			7532						
All depth are actual.											
Tool Control Par	rameters										
Contraction of the second s	ameters										
One: Parameters											
Parameter	Description		То	lo	Value	Unit					
MAX_LOG_SPEED	Toolstring Maximum Logging	Speed	WL	SESSION	3600	ft/h					
Calibration Repo	ort										
AIT-M (Array Induction Tool - M) Calibration - Run One											
Primary Equipment :											
File cod	e for AIT-MA Sonde Tool E	ement	1	AMIS		50					
Auxiliary Equipment :											
The second	m/SP Bottom Nose	2	2	AMRM							
	Manual Victoria Victoria Victoria										
AIT Sonde Calibration - Test Loop Gain											
Master (EEPROM):	20:19:37 05-Aug-2016	No. of Concession, Name									
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit					
Test Loop Gain - 0		Master	1.000	0.950	1.013	1.050					
Test Loop Phase - 0	deg	Master	0	-3.000	1.893	3.000					
Test Loop Gain - 1	dag	Master	1.000	-3.000	0.092	3.000					
Test Loop Phase - 1	deg	Master Master	1.000	0.950	1.015	1.050					
Test Loop Gain - 2 Test Loop Phase - 2	dog	Master	0	-3.000	-0.008	3.000					
Test Loop Gain - 3	deg	Master	1.000	0.950	1.012	1.050					
Test Loop Phase - 3	deg	Master	0	-3.000	0.319	3.000					
Test Loop Gain - 4		Master	1.000	0.950	0.998	1.050					
Test Loop Phase - 4	deg	Master	0	-3.000	0.071	3.000					
Test Loop Gain - 5	209	Master	1.000	0.950	1.022	1.050					
Test Loop Phase - 5	deg	Master	0	-3.000	0.391	3.000					
Test Loop Gain - 6		Master	1.000	0.950	1.035	1.050					
Test Loop Phase - 6	deg	Master	0	-3,000	0.531	3.000					
Test Loop Gain - 7		Master	1.000	0.950	1.047	1.050					
Test Loop Phase - 7	deg	Master	0	-3.000	0.270	3.000					
AIT Sonde Calibratio	n - Sonde Error C	orrection									
Master (EEPROM):	20:19:37 05-Aug-2016										
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit					
Sonde Error Correction Real - 0	mS/m	Master		-231.000	-97.409	119.000					
Sonde Error Correction Quad - 0)	Master		-2250.000	-596.848	2250.000					
Sonde Error Correction Real - 1	mS/m	Master		114.000	156.040	204.000					
Sonde Error Correction Quad - 1		Master		-625.000	-247.744	625.000					
Sonde Error Correction Real - 2	mS/m	Master	<u></u>	66.000	112.609	156.000					
Sonde Error Correction Quad - 2	2	Master	1	-350.000	120.325	350.000					
Sonde Error Correction Real - 3	mS/m	Master		39.000	68.195	89.000					
Sonde Error Correction Quad - 3	3	Master		-250.000	-161.507	250.000					
Sonde Error Correction Real - 4	mS/m	Master		15.000	24.223	35.000					
Sonde Error Correction Quad - 4	ł	Master	1 <u>111111</u> 1	-63.000	-0.939	63.000					
Sonde Error Correction Real - 5	mS/m	Master		4.000	15.665	24.000					
Sonde Error Correction Quad - 5	5	Master		-50.000	-27.113	50.000					
Sonde Error Correction Real - 6	mS/m	Master		5.000	10.064	15.000					
Sonde Error Correction Quad - 6		Master		-30.000	-6.498	30.000	│ <mark>╞═╪╼╋╼╪╼╡</mark>				
Sonde Error Correction Real - 7		Master		-5.000	-1.483	5,000	╞═┿═╋═┿═╣				
Sonde Error Correction Quad - 7	7	Master		-30.000	-4.619	30.000					

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 20:19	9:37 05-Aug-2016			1	T	-	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coarse Gain		Master	1.000	0.800	0.934	1.200	
Fine Gain		Master	1.000	0.800	0.938	1.200	
AIT Electronics Check -	Thru Calibratio	n Check					
Master (EEPROM): 20:19	9:37 05-Aug-2016		Before (Measured	i):	21:11:27 05-Sep-	-2016	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	r
Thru Cal Mag - 0	V	Master		0.366	0.603	0.854	
5		Before	11 1-11-11	0.366	0.603	0.854	
		Before-Master	8 		0.000		
Thru Cal Phase - 0	deg	Master		137.000	-165.864	-103.000	
		Before		137.000	-161.111	-103.000	12.51
		Before-Master		<u></u>	4.753		
Thru Cal Mag - 1	V	Master	8 -1-1	0.762	1.237	1.778	
		Before		0,762	1.237	1.778	
		Before-Master			0.000		
Thru Cal Phase - 1	deg	Master	1 1	136.000	-166.823	-104.000	
		Before	(136.000	-162.071	-104.000	
		Before-Master			4.752		
Thru Cal Mag - 2	V	Master).	0.372	0.613	0.868	
		Before		0.372	0.613	0,868	
		Before-Master			0.000		
Thru Cal Phase - 2	deg	Master		132.000	-170.304	-108.000	
		Before Before Montor		132.000	-165.578 4.726	-108.000	
Thru Cal Mag 2	v	Before-Master Master	State	0.420	0.691	0.980	
Thru Cal Mag - 3	v	Before		0.420	0.691	0.980	
		Before-Master		0.420	0,000	0.550	
Thru Cal Phase - 3	deg	Master		131.000	-171.041	-109.000	
	dog	Before		131.000	-166.313	-109.000	
		Before-Master			4.728		
Thru Cal Mag - 4	V	Master	19 <u>11-19</u>	0.804	1.297	1.876	i Tit
C C		Before		0.804	1.296	1.876	
		Before-Master			-0.001		
Thru Cal Phase - 4	deg	Master		125.000	-177.009	-115.000	
		Before	······	125.000	-172.279	-115.000	
		Before-Master	:		4.730		
Thru Cal Mag - 5	V	Master)/*******	1.176	1.888	2.744	
		Before	8 -8-8 -9	1.176	1.887	2.744	
		Before-Master	() -1(-1)		-0.001		
Thru Cal Phase - 5	deg	Master	1.000	122.000	-178.544	-118.000	
		Before	Y	122.000	-173.812	-118.000	
		Before-Master	(4.732		
Thru Cal Mag - 6	V	Master		1.176	1.887	2.744	
		Before Before-Master	1. - 1 1. -	1.176	1.886 -0.001	2.744	╞━┻╋━┺╸
Thru Cal Phase - 6	dog			121.000	-178.521	-119.000	
Thru Cal Phase - o	deg	Master Before		121.000	-173.790	-119.000	
		Before-Master			4.731		
Thru Cal Mag - 7	v	Master		0.846	1.358	1.974	
		Before	3 	0.846	1.353	1.974	
		Before-Master	1		-0.005	surrenting - 200	
Thru Cal Phase - 7	deg	Master		115.000	-179.305	-125.000	
arana arang pananang 1	5	Before	1.0	115.000	-174.661	-125.000	
		Before-Master			4.644		
SPA Zero	mV	Master		-50.000	0.156	50.000	
		Before		-50.000	0.146	50.000	
		Before-Master	. : · · · · · ·		-0.010		
SPA Plus	mV	Master		941.000	988.093	1040.000	
		Before		941 000	988.030	1040.000	

Before

Before-Master

Master

V

941.000

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988.030

1040.000

-

0.050

		Before	-0.050	0.000	0.050	
		Before-Master	 	0.000		
Temperature Plus	V	Master	0.870	0.915	0.960	
an a		Before	0.870	0.915	0.960	
		Before-Master	 	0.000		

Company:	Western Refining, Southwest, Inc.	Schlumberger
Well:	WWD #2	
Field:	Wildcat	
County:	San Juan	
State:	New Mexico	
Platform Ex	res	
Array Induc	tion	
with Linear	Correlation	

Appendix E

October 5, 2017 Falloff test data

				F162A					F328A
			F162A13					F328A13	13 Deg
Date	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/3/17 8:58:00	0.00	0.0	0.0	60.0	10/3/17 9:02:00	0.00	0.0	0.0	61.2
10/3/17 9:47:15	0.03	49.3	985.4	60.5	10/3/17 9:47:30	0.03	45.5	990.2	62.2
10/3/17 10:02:15	0.04	64.3	976.6	66.0	10/3/17 10:02:30	0.04	60.5	984.8	67.7
10/3/17 10:17:15	0.06	79.3	3,313.8	100.2	10/3/17 10:17:30	0.05	75.5	3,423.5	106.0
10/3/17 10:32:15	0.07	94.3	4,144.1	160.6	10/3/17 10:32:30	0.06	90.5	4,147.0	162.3
10/3/17 10:53:15	0.08	115.3	4,224.2	165.2	10/3/17 10:55:45	0.08	113.8	4,226.4	165.7
10/3/17 11:12:00	0.09	134.0	4,239.4	165.3	10/3/17 11:14:30	0.09	132.5	4,242.1	165.5
10/3/17 11:36:45	0.11	158.8	4,249.5	163.9	10/3/17 11:43:00	0.11	161.0	4,252.9	164.0
10/3/17 12:12:00	0.13	194.0	4,255.9	162.4	10/3/17 12:25:00	0.14	203.0	4,258.1	162.4
10/3/17 12:54:00	0.16	236.0	4,266.7	160.9	10/3/17 13:07:00	0.17	245.0	4,269.4	160.9
10/3/17 13:36:00	0.19	278.0	4,271.9	159.7	10/3/17 13:49:00	0.20	287.0	4,274.2	159.8
10/3/17 14:18:00	0.22	320.0	4,277.3	158.9	10/3/17 14:31:00	0.23	329.0	4,279.3	159.0
10/3/17 15:00:00	0.25	362.0	4,282.9	158.2	10/3/17 15:13:00	0.26	371.0	4,285.0	158.3
10/3/17 15:42:00	0.28	404.0	4,288.3	157.7	10/3/17 15:55:00	0.29	413.0	4,290.3	157.8
10/3/17 16:37:30	0.32	459.5	4,292.8	157.0	10/3/17 16:40:00	0.32	458.0	4,295.5	157.3
10/3/17 17:24:00	0.35	506.0	, 4,293.4	156.5	10/3/17 17:37:00	0.36	515.0	4,298.0	156.7
10/3/17 18:06:00	0.38	548.0	4,298.6	156.0	10/3/17 18:19:00	0.39	557.0	4,300.7	156.2
10/3/17 18:48:00	0.41	590.0	4,303.8	155.7	10/3/17 19:01:00	0.42	599.0	4,305.7	155.8
10/3/17 19:47:15	0.45	649.3	4,309.9	155.2	10/3/17 19:28:00	0.45	647.8	4,310.5	155.4
10/3/17 20:30:00	0.48	692.0	4,309.2	154.7	10/3/17 20:10:00	0.49	701.0	4,310.9	154.9
10/3/17 21:12:00	0.51	734.0	4,314.5	154.3	10/3/17 20:53:30	0.52	743.0	4,316.1	154.4
10/3/17 22:12:00	0.55	794.0	4,314.4	154.0	10/3/17 21:52:00	0.56	799.3	4,321.0	154.2
10/3/17 22:54:00	0.58	836.0	4,319.9	153.6	10/3/17 22:34:00	0.59	845.0	4,321.0	153.8
10/3/17 23:43:30	0.61	885.5	4,324.3	153.4	10/3/17 23:34:00	0.62	887.0	4,326.2	153.6
10/4/17 0:36:00	0.65	938.0	4,324.5	153.0	10/4/17 0:16:00	0.66	947.0	4,326.2	153.2
10/4/17 1:35:15	0.69	997.3	4,330.7	152.9	10/4/17 1:16:00	0.69	995.8	4,331.3	153.1
10/4/17 2:18:00	0.72	1,040.0		152.5	10/4/17 1:58:00	0.73	1,049.0	4,331.1	152.7
10/4/17 3:00:00	0.75	1,082.0	, 4,334.9	152.2	10/4/17 2:40:00	0.76	1,091.0	4,336.6	152.4
10/4/17 3:48:45	0.79	1,130.8	4,340.0	152.0	10/4/17 3:40:00	0.79	1,133.0	4,341.5	152.1
10/4/17 4:42:00	0.82	,	4,339.5		10/4/17 4:22:00	0.82	1,184.8	4,346.4	151.8
10/4/17 5:24:00	0.85	•			10/4/17 5:04:00	0.86	1,235.0	4,346.6	151.3
10/4/17 6:06:00	0.88				10/4/17 5:47:30	0.89	1,277.0	4,351.5	150.9
10/4/17 7:06:00	0.92	-	-		10/4/17 6:46:00	0.93	1,337.0	4,352.3	150.6
10/4/17 8:06:00	0.96				10/4/17 7:46:00	0.97	1,397.0	4,351.9	150.6
10/4/17 8:54:00	1.00				10/4/17 8:46:00	1.00	1,434.5	4,351.6	150.7
10/4/17 9:48:00	1.03				10/4/17 9:19:00	1.03	1,490.0	4,351.7	150.8
10/4/17 10:48:00	1.08			150.8	10/4/17 10:19:00	1.08	1,550.0	4,351.7	151.1
10/4/17 11:30:00	1.11				10/4/17 11:07:45		-		151.0
10/4/17 12:30:00	1.15				10/4/17 12:01:00			4,356.5	151.0
10/4/17 13:30:00	1.19				10/4/17 13:01:00				151.1
10/4/17 14:30:00	1.23		-		10/4/17 14:01:00			4,356.5	151.2
10/4/17 15:25:00	1.27				10/4/17 14:56:00				
10/4/17 16:20:00	1.31		-		10/4/17 15:51:00				151.5
10, 1, 1, 10,20,00	2.01	_,	.,		• •				

				F162A					F328A
			F162A13					F328A13	13 Deg
Date D	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/4/17 16:57:00	1.33	1,919.0	4,357.8	151.3	10/4/17 16:37:45	1.33	1,919.0	4,359.2	151.5
10/4/17 17:52:00	1.37	1,974.0	, 4,357.6	151.3	10/4/17 17:23:00	1.37	1,974.0	4,359.1	151.6
10/4/17 18:29:00	1.40	2,011.0	4,365.1	151.2	10/4/17 18:11:15	1.40	2,011.0	4,366.2	151.3
10/4/17 19:08:15	1.42	2,050.3	4,369.8	150.9	10/4/17 18:55:00	1.42	2,048.0	4,371.4	151.1
10/4/17 20:02:00	1.46	2,104.0	, 4,369.9	150.5	10/4/17 19:33:00	1.46	2,104.0	4,371.3	150.7
10/4/17 20:57:00	1.50	2,159.0	4,369.8	150.4	10/4/17 20:28:00	1.50	2,159.0	4,371.5	150.6
10/4/17 21:43:45	1.53	2,205.8	4,374.7	150.4	10/4/17 21:23:00	1.53	2,202.8	4,376.7	150.5
10/4/17 22:29:00	1.56	2,251.0	4,377.0	150.1	10/4/17 22:00:00	1.55	2,233.0	4,378.5	150.3
10/4/17 23:24:00	1.60	2,306.0	4,378.9	150.0	10/4/17 22:37:00	1.59	2,288.0	4,378.4	150.2
10/5/17 0:19:00	1.64	2,361.0	4,379.4	149.9	10/4/17 23:21:30	1.61	2,325.0	4,380.7	150.1
10/5/17 1:14:00	1.68	2,416.0	4,382.3	149.8	10/5/17 0:09:00	1.64	2,365.0	4,383.5	150.1
10/5/17 2:09:00	1.72	2,471.0	4,382.3	149.8	10/5/17 0:46:00	1.68	2,417.0	4,383.6	149.9
10/5/17 3:00:15	1.75	2,522.3	4,380.9	149.8	10/5/17 1:41:00	1.71	2,460.8	4,383.9	150.0
10/5/17 3:23:00	1.77	2,545.0	4,387.5	149.7	10/5/17 2:18:00	1.74	2,509.0	4,383.1	150.0
10/5/17 4:18:00	1.81	2,600.0	4,387.2	149.6	10/5/17 3:01:00	1.76	2,528.0	4,388.2	150.0
10/5/17 4:55:00	1.83	2,637.0	4,390.1	149.5	10/5/17 3:32:00	1.79	2,583.0	4,388.6	149.8
10/5/17 5:50:00	1.87	2,692.0	4,393.3	149.3	10/5/17 4:24:45	1.82	2,620.0	4,391.5	149.7
10/5/17 6:45:00	1.91	2,747.0	4,393.3	149.2	10/5/17 5:04:00	1.85	2,660.8	4,394.7	149.6
10/5/17 7:40:00	1.95	2,802.0	4,395.1	149.2	10/5/17 5:41:00	1.88	2,712.0	4,394.9	149.4
10/5/17 8:35:00	1.98	2,857.0	4,395.6	149.1	10/5/17 6:36:00	1.92	2,767.0	4,394.8	149.4
10/5/17 9:27:45	2.02	2,909.8	4,401.1	149.2	10/5/17 7:21:15	1.95	2,804.0	4,396.7	149.3
10/5/17 10:12:00	2.05	2,954.0	4,395.3	149.2	10/5/17 8:13:00	1.99	2,864.0	4,396.8	149.3
10/5/17 11:02:00	2.09	3,004.0	4,395.5	149.3	10/5/17 9:03:00	2.02	2,907.3	4,396.2	149.4
10/5/17 11:03:00	2.09	3,005.0	4,395.5	149.3	10/5/17 9:04:00	2.02	2,907.5	4,396.5	149.4
10/5/17 11:04:00	2.09	3,006.0	4,395.4	149.3	10/5/17 9:05:00	2.02	2,907.8	4,397.0	149.4
10/5/17 11:05:00	2.09	3,007.0	4,395.2	149.3	10/5/17 9:06:00	2.02	2,908.0	4,397.1	149.4
10/5/17 11:06:00	2.09	3,008.0	4,395.4	149.3	10/5/17 9:07:00		2,908.3	4,397.2	149.4
10/5/17 11:07:00	2.09	3,009.0	4,395.4	149.3	10/5/17 9:08:00		2,908.5	4,397.2	149.4
10/5/17 11:08:00	2.09	3,010.0	4,384.7	149.3	10/5/17 9:09:00	2.02	2,908.8	4,396.8	149.4
10/5/17 11:08:15	2.09	3,010.3	4,375.9	149.3	10/5/17 9:10:00	2.02	2,909.0	4,397.0	
10/5/17 11:08:30	2.09	3,010.5	4,370.4	149.3	10/5/17 9:11:00		-	4,396.9	149.4
10/5/17 11:08:45	2.09	3,010.8	4,365.6	149.3	10/5/17 9:12:00				149.4
10/5/17 11:11:15	2.09	3,013.3	4,339.6	149.4	10/5/17 9:22:00				149.4
10/5/17 11:13:45	2.09	3,015.8	4,326.7	149.6	10/5/17 9:28:15				149.4
10/5/17 11:16:15	2.10	3,018.3	4,317.3	149.9	10/5/17 9:30:45				149.4
10/5/17 11:18:45	2.10	3,020.8			10/5/17 9:33:15				
10/5/17 11:33:45	2.11	3,035.8	4,284.9		10/5/17 10:25:00				149.5
10/5/17 11:54:00	2.12	3,056.0			10/5/17 11:12:15			-	
10/5/17 12:54:00	2.16	3,116.0	4,238.6	158.0	10/5/17 11:27:15				
10/5/17 13:54:00	2.21	3,176.0	4,222.0		10/5/17 11:42:15				
10/5/17 14:54:00	2.25				10/5/17 11:57:15				
10/5/17 15:54:00	2.29	3,296.0	4,200.5		10/5/17 12:52:00				
10/5/17 16:54:00	2.33	3,356.0	4,192.6	164.9	10/5/17 13:52:00	2.22	3,203.0	4,217.3	161.9

				F162A					F328A
			F162A13					F328A13	13 Deg
Date	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/5/17 17:54:00	2.37	3,416.0	4,185.8	165.9	10/5/17 14:52:00	2.27	3,263.0	4,206.8	163.2
10/5/17 18:54:00	2.41	3,476.0	4,179.8	166.7	10/5/17 15:52:00	2.31	3,323.0	4,198.1	164.2
10/5/17 19:54:00	2.46	3,536.0	4,174.5	167.5	10/5/17 16:52:00	2.35	3,383.0	4,190.8	165.0
10/5/17 20:54:00	2.50	3,596.0	4,169.7	168.2	10/5/17 17:52:00	2.39	3,443.0	4,184.5	165.6
10/5/17 21:54:00	2.54	3,656.0	4,165.3	168.7	10/5/17 18:52:00	2.43	3,503.0	4,178.9	166.0
10/5/17 22:54:00	2,58	3,716.0	4,161.3	169.3	10/5/17 19:52:00	2.47	3,563.0	4,173.8	166.5
10/5/17 23:54:00	2.62	3,776.0	4,157.6	169.8	10/5/17 20:52:00	2.52	3,623.0	4,169.2	166.9
10/6/17 0:54:00	2.66	3,836.0	4,154.0	170.2	10/5/17 21:52:00	2.56	3,683.0	4,165.0	167.3
10/6/17 1:54:00	2.71	3,896.0	4,150.8	170.6	10/5/17 22:52:00	2.60	3,743.0	4,161.1	167.7
10/6/17 2:54:00	2.75	3,956.0	4,147.7	171.0	10/5/17 23:52:00	2.64	3,803.0	4,157.4	168.1
10/6/17 3:54:00	2.79	4,016.0	4,144.8	171.3	10/6/17 0:52:00	2.68	3,863.0	4,154.2	168.4
10/6/17 4:54:00	2.83	4,076.0	4,142.1	171.6	10/6/17 1:52:00	2.72	3,923.0	4,151.2	168.7
10/6/17 5:54:00	2.87	4,136.0	4,139.5	171.9	10/6/17 2:52:00	2.77	3,983.0	4,148.2	169.0
10/6/17 6:54:00	2.91	4,196.0	4,137.1	172.2	10/6/17 3:52:00	2.81	4,043.0	4,145.3	169.2
10/6/17 7:54:00	2.96	4,256.0	4,134.7	172.4	10/6/17 4:52:00	2.85	4,103.0	4,142.7	169.5
10/6/17 8:54:00	3.00	4,316.0	4,132.4	172.7	10/6/17 5:52:00	2.89	4,163.0	4,140.1	169.7
10/6/17 9:54:00	3.04	4,376.0	4,130.2	172.9	10/6/17 6:52:00	2.93	4,223.0	4,137.7	169.9
10/6/17 10:54:00	3.08	4,436.0	4,128.1	173.1	10/6/17 7:52:00	2.97	4,283.0	4,135.4	170.1
10/6/17 11:54:00	3.12	4,496.0	4,126.1	173.3	10/6/17 8:52:00	3.02	4,343.0	4,133.2	170.3
10/6/17 12:54:00	3.16	4,556.0	4,124.1	173.5	10/6/17 9:52:00	3.06	4,403.0	4,131.0	170.5
10/6/17 13:54:00	3.21	4,616.0	4,122.2	173.6	10/6/17 10:52:00	3.10	4,463.0	4,128.9	170.7
10/6/17 14:54:00	3.25	4,676.0	4,120.5	173.8	10/6/17 11:52:00	3.14	4,523.0	4,127.0	170.9
10/6/17 15:54:00	3.29	4,736.0	4,118.8	173.9	10/6/17 12:52:00	3.18	4,583.0	4,125.0	171.0
10/6/17 16:54:00	3.33	4,796.0	4,117.1	174.1	10/6/17 13:52:00	3.22	4,643.0	4,123.2	171.2
10/6/17 17:54:00	3.37	4,856.0	4,115.5	174.2	10/6/17 14:52:00		4,703.0	4,121.5	171.3
10/6/17 18:54:00	3.41	4,916.0	4,113.8	174.4	10/6/17 15:52:00		4,763.0	4,119.8	171.5
10/6/17 19:54:00	3.46	4,976.0	4,112.3	174.5	10/6/17 16:52:00		4,823.0	4,118.2	171.6
10/6/17 20:54:00	3.50	5,036.0	4,110.8	174.6	10/6/17 17:52:00		4,883.0	4,116.6	171.8
10/6/17 21:54:00	3.54	5,096.0	4,109.2	174.7	10/6/17 18:52:00		4,943.0	4,115.0	171.9
10/6/17 22:54:00	3.58	5,156.0	4,107.8	174.8	10/6/17 19:52:00	3.47	5,003.0	4,113.4	172.0
10/6/17 23:54:00		5,216.0			10/6/17 20:52:00		5,063.0	4,112.0	172.1
10/7/17 0:54:00	3.66		4,105.0		10/6/17 21:52:00				172.2
10/7/17 1:54:00	3.71	5,336.0			10/6/17 22:52:00				172.4
10/7/17 2:54:00		5,396.0			10/6/17 23:52:00				172.5
10/7/17 3:54:00	3.79	5,456.0	4,101.1		10/7/17 0:52:00		-	-	172.6
10/7/17 4:54:00	3.83	5,516.0	4,099.8		10/7/17 1:52:00				172.7
10/7/17 5:54:00		5,576.0	4,098.6		10/7/17 2:52:00			-	172.8
10/7/17 6:54:00		5,636.0			10/7/17 3:52:00				172.9
10/7/17 7:54:00		•			10/7/17 4:52:00		-		173.0
10/7/17 8:54:00					10/7/17 5:52:00				173.1
10/7/17 9:54:00		-			10/7/17 6:52:00			-	173.1
10/7/17 10:54:00					10/7/17 7:52:00				173.2
• •		5,876.0	-		10/7/17 8:52:00			-	173.3
10/7/17 11:54:00	4.12	0,026,0	4,091.7	110.3	10///1/ 0.02.00	, 1 .02	3,703.0	1,000.0	1,0,0

				F162A					F328A
			F162A13	-				F328A13	-
Date	Days	Minutes	Psig	F		Days	Minutes	Psig	F
10/7/17 12:54:00	4.16	5,996.0	4,090.6	176.0	10/7/17 9:52:00	4.06	5,843.0	4,095.5	173.4
10/7/17 13:54:00	4.21	6,056.0	4,089.6	176.1	10/7/17 10:52:00	4.10	5,903.0	4,094.4	173.5
10/7/17 14:54:00	4.25	6,116.0	4,088.5	176.1	10/7/17 11:52:00	4.14	5,963.0	4,093.2	173.6
10/7/17 15:54:00	4.29	6,176.0	4,087.5	176.2	10/7/17 12:52:00	4.18	6,023.0	4,092.2	173.6
10/7/17 16:54:00	4.33	6,236.0	4,086.5	176.2	10/7/17 13:52:00	4.22	6,083.0	4,091.2	173.7
10/7/17 17:54:00	4.37	6,296.0	4,085.6	176.3	10/7/17 14:52:00	4.27	6,143.0	4,090.2	173.8
10/7/17 18:54:00	4.41	6,356.0	4,084.6	176.3	10/7/17 15:52:00	4.31	6,203.0	4,089.2	174.0
10/7/17 19:54:00	4.46	6,416.0	4,083.6	176.4	10/7/17 16:52:00	4.35	6,263.0	4,088.2	174.0
10/7/17 20:54:00	4.50	6,476.0	4,082.6	176.4	10/7/17 17:52:00	4.39	6,323.0	4,087.2	174.1
10/7/17 21:54:00	4.54	6,536.0	4,081.6	176.5	10/7/17 18:52:00	4.43	6,383.0	4,086.3	174.1
10/7/17 22:54:00	4.58	6,596.0	4,080.8	176.5	10/7/17 19:52:00	4.47	6,443.0	4,085.4	174.2
10/7/17 23:54:00	4.62	6,656.0	4,079.8	176.6	10/7/17 20:52:00	4.52	6,503.0	4,084.4	174.2
10/8/17 0:54:00	4.66	6,716.0	4,079.0	176.7	10/7/17 21:52:00	4.56	6,563.0	4,083.5	174.3
10/8/17 1:54:00	4.71	6,776.0	4,078.1	176.7	10/7/17 22:52:00	4.60	6,623.0	4,082.5	174.4
10/8/17 2:54:00	4.75	6,836.0	4,077.2	176.8	10/7/17 23:52:00	4.64	6,683.0	4,081.6	174.4
10/8/17 3:54:00	4.79	6,896.0	4,076.3	176.8	10/8/17 0:52:00	4.68	6,743.0	4,080.7	174.5
10/8/17 4:54:00	4.83	6,956.0	4,075.5	176.9	10/8/17 1:52:00	4.72	6,803.0	4,079.9	174.5
10/8/17 5:54:00	4.87	7,016.0	4,074.7	176.9	10/8/17 2:52:00	4.77	6,863.0	4,079.1	174.6
10/8/17 6:54:00	4.91	7,076.0	4,073.9	177.0	10/8/17 3:52:00	4.81	6,923.0	4,078.2	174.6
10/8/17 7:54:00	4.96	7,136.0	4,073.0	177.0	10/8/17 4:52:00	4.85	6,983.0	4,077.4	174.7
10/8/17 8:54:00	5.00	7,196.0	4,072.2	177.1	10/8/17 5:52:00	4.89	7,043.0	4,076.6	174.7
10/8/17 9:54:00	5.04	7,256.0	4,071.5	177.1	10/8/17 6:52:00	4.93	7,103.0	4,075.8	174.8
10/8/17 10:54:00	5.08	7,316.0	4,070.7	177.2	10/8/17 7:52:00	4.97	7,163.0	4,075.0	174.8
10/8/17 11:54:00	5.12	7,376.0	4,069.9	177.2	10/8/17 8:52:00	5 <i>.</i> 02	7,223.0	4,074.2	174.9
10/8/17 12:54:00	5.16	7,436.0	4,069.1	177.2	10/8/17 9:52:00	5.06	7,283.0	4,073.4	174.9
10/8/17 13:54:00	5.21	7,496.0	4,068.3	177.3	10/8/17 10:52:00	5.10	7,343.0	4,072.6	174.9
10/8/17 14:54:00	5.25	7,556.0	4,067.6	177.3	10/8/17 11:52:00	5.14	7,403.0	4,071.8	175.0
10/8/17 15:54:00	5.29	7,616.0	4,066.8	177.4	10/8/17 12:52:00	5.18	7,463.0	4,071.1	175.0
10/8/17 16:54:00	5.33	7,676.0	4,066.1	177.4	10/8/17 13:52:00	5.22	7 <i>,</i> 523.0	4,070.3	175.1
10/8/17 17:54:00	5.37	7,736.0	4,065.4	177.4	10/8/17 14:52:00	5.27	7,583.0	4,069.6	175.1
10/8/17 18:54:00	5.41	7,796.0	4,064.7	177.5	10/8/17 15:52:00	5.31	7,643.0	4,068.8	175.2
10/8/17 19:54:00	5.46	7,856.0	4,063.9	177.5	10/8/17 16:52:00	5.35	7,703.0	4,068.1	175.2
10/8/17 20:54:00	5.50	7,916.0	4,063.2	177.6	10/8/17 17:52:00	5.39	7,763.0	4,067.4	175.3
10/8/17 21:54:00	5.54	7,976.0	4,062.5	177.6	10/8/17 18:52:00	5.43	7,823.0	4,066.7	175.3
10/8/17 22:54:00	5.58	8,036.0	4,061.8	177.6	10/8/17 19:52:00	5.47	7,883.0	4,066.1	175.3
10/8/17 23:54:00	5.62	8,096.0	4,061.1	177.7	10/8/17 20:52:00	5.52	7,943.0	4,065.4	175.4
10/9/17 0:54:00	5.66	8,156.0	4,060.4	177.7	10/8/17 21:52:00	5.56	8,003.0	4,064.6	175.4
10/9/17 1:54:00	5.71	8,216.0	4,059.7	177.7	10/8/17 22:52:00	5.60	8,063.0	4,063.9	175.5
10/9/17 2:54:00	5.75	8,276.0	4,059.1	177.8	10/8/17 23:52:00	5.64	8,123.0	4,063.2	175.5
10/9/17 3:54:00		8,336.0	4,058.5	177.8	10/9/17 0:52:00	5.68	8,183.0	4,062.6	175.5
10/9/17 4:54:00		8,396.0	4,057.8	177.8	10/9/17 1:52:00	5.72	8,243.0	4,061.9	175.6
10/9/17 5:54:00		8,456.0	4,057.1	177.9	10/9/17 2:52:00	5.77	8,303.0	4,061.3	175.6
10/9/17 6:54:00	5.91	8,516.0	4,056.5	177.9	10/9/17 3:52:00	5.81	8,363.0	4,060.6	175.6

				F162A					F328A
			F162A13					F328A13	13 Deg
Date	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/9/17 7:54:00	5.96	8,576.0	4,055.9	177.9	10/9/17 4:52:00	5.85	8,423.0	4,060.0	175.7
10/9/17 8:54:00	6.00	8,636.0	4,055.3	178.0	10/9/17 5:52:00	5.89	8,483.0	4,059.4	175.7
10/9/17 9:54:00	6.04	8,696.0	, 4,054.7	178.0	10/9/17 6:52:00	5.93	8,543.0	4,058.8	175.7
10/9/17 10:54:00	6.08	, 8,756.0	4,054.1	178.0	10/9/17 7:52:00	5.97	8,603.0	4,058.2	175.8
10/9/17 11:54:00	6.12	8,816.0	4,053.5	178.0	10/9/17 8:52:00	6.02	8,663.0	4,057.6	175.8
10/9/17 12:54:00	6.16	8,876.0	4,052.8	178.1	10/9/17 9:52:00	6.06	8,723.0	4,057.0	175.9
10/9/17 13:54:00	6.21	8,936.0	4,052.2	178.1	10/9/17 10:52:00	6.10	8,783.0	4,056.4	175.9
10/9/17 14:54:00	6.25	8,996.0	4,051.6	178.1	10/9/17 11:52:00	6.14	8,843.0	4,055.7	175.9
10/9/17 15:54:00	6.29	9,056.0	4,051.0	178.2	10/9/17 12:52:00	6.18	8,903.0	4,055.2	176.0
10/9/17 16:54:00	6.33	9,116.0	4,050.4	178.2	10/9/17 13:52:00	6.22	8,963.0	4,054.5	176.0
10/9/17 17:54:00	6.37	9,176.0	4,049.9	178.2	10/9/17 14:52:00	6.27	9,023.0	4,053.9	176.0
10/9/17 18:54:00	6.41	9,236.0	4,049.2	178.2	10/9/17 15:52:00	6.31	9,083.0	4,053.3	176.1
10/9/17 19:54:00	6.46	9,2 9 6.0	4,048.7	178.3	10/9/17 16:52:00	6.35	9,143.0	4,052.8	176.1
10/9/17 20:54:00	6.50	9,356.0	4,048.2	178.3	10/9/17 17:52:00	6.39	9,203.0	4,052.2	176.1
10/9/17 21:54:00	6.54	9,416.0	4,047.6	178.3	10/9/17 18:52:00	6.43	9,263.0	4,051.7	176.2
10/9/17 22:54:00	6.58	, 9,476.0	4,047.0	178.3	10/9/17 19:52:00	6.47	9,323.0	4,051.1	176.2
10/9/17 23:54:00	6.62	9,536.0	4,046.4	178.4	10/9/17 20:52:00	6.52	9,383.0	4,050.5	176.2
10/10/17 0:54:00	6.66	9,596.0	4,045.8	178.4	10/9/17 21:52:00	6.56	9,443.0	4,049.9	176.2
10/10/17 1:54:00	6.71	9,656.0	4,045.3	178.4	10/9/17 22:52:00	6.60	9,503.0	4,049.4	176.3
10/10/17 2:54:00	6.75	9,716.0	4,044.7	178.4	10/9/17 23:52:00	6.64	9,563.0	4,048.8	176.3
10/10/17 3:54:00		9,776.0	4,044.2	178.5	10/10/17 0:52:00	6.68	9,623.0	4,048.2	176.3
10/10/17 4:54:00	6.83	9,836.0	4,043.7	178.5	10/10/17 1:52:00	6.72	9,683.0	4,047.7	176.4
10/10/17 5:54:00	6.87	9,896.0	4,043.1	178.5	10/10/17 2:52:00	6.77	9,743.0	4,047.2	176.4
10/10/17 6:54:00		9,956.0		178.5	10/10/17 3:52:00	6.81	9,803.0	4,046.6	176.4
10/10/17 7:54:00		10,016.0	4,042.0	178.6	10/10/17 4:52:00	6.85	9,863.0	4,046.1	176.4
10/10/17 8:54:00		10,076.0	4,041.5	178.6	10/10/17 5:52:00	6.89	9,923.0	4,045.6	176.5
10/10/17 9:54:00		10,136.0	4,041.1	178.6	10/10/17 6:52:00	6.93	9,983.0	4,045.1	176.5
10/10/17 10:54:00		10,196.0	4,040.5	178.6	10/10/17 7:52:00	6.97	10,043.0	4,044.5	176.5
10/10/17 11:54:00		10,256.0	4,040.0	178.7	10/10/17 8:52:00	7.02	10,103.0	4,044.0	176.5
10/10/17 12:54:00		10,316.0	4,039.5	178.7	10/10/17 9:52:00	7.06	10,163.0	4,043.5	176.6
10/10/17 13:54:00		10,376.0	4,039.0	178.7	10/10/17 10:52:00	7.10	10,223.0	4,043.0	176.6
10/10/17 14:54:00	7.25	10,436.0	4,038.4	178.7	10/10/17 11:52:00	7.14	10,283.0	4,042.5	176.6
10/10/17 15:54:00	7.29	10,496.0	4,037.9	178.7	10/10/17 12:52:00	7.18	10,343.0	4,042.0	176.6
10/10/17 16:54:00		10,556.0	4,037.4	178.8	10/10/17 13:52:00	7.22	10,403.0	4,041.5	176.7
10/10/17 17:54:00	7.37	10,616.0	4,037.0	178.8	10/10/17 14:52:00	7.27	10,463.0	4,041.0	176.7
10/10/17 18:54:00				178.8	10/10/17 15:52:00	7.31	10,523.0	4,040.4	176.7
10/10/17 19:54:00		-		178.8	10/10/17 16:52:00	7.35	10,583.0	4,039.9	176.8
10/10/17 20:54:00					10/10/17 17:52:00		10,643.0	4,039.5	176.8
10/10/17 21:54:00					10/10/17 18:52:00		10,703.0	4,039.1	176.8
10/10/17 22:54:00					10/10/17 19:52:00		10,763.0	4,038.5	176.8
10/10/17 23:54:00		-			10/10/17 20:52:00		10,823.0	4,038.1	176.9
10/11/17 0:54:00		-			10/10/17 21:52:00		10,883.0	4,037.5	176.9
10/11/17 1:54:00			-		10/10/17 22:52:00		10,943.0	4,037.1	176.9
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				F162A					F328A
			F162A13					F328A13	13 Deg
Date I	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/11/17 2:54:00	7,75	11,156.0	4,032.5	179.0	10/10/17 23:52:00	7.64	11,003.0	4,036.6	176.9
10/11/17 3:54:00	7.79	11,216.0	4,032.0	179.0	10/11/17 0:52:00	7.68	11,063.0	4,036.1	176.9
10/11/17 4:54:00	7.83	11,276.0	4,031.6	179.0	10/11/17 1:52:00	7.72	11,123.0	4,035.6	177.0
10/11/17 5:54:00	7.87	11,336.0	4,031.1	179.0	10/11/17 2:52:00	7.77	11,183.0	4,035.1	177.0
10/11/17 6:54:00	7.91	11,396.0	4,030.6	179.0	10/11/17 3:52:00	7.81	11,243.0	4,034.6	177.0
10/11/17 7:54:00	7.96	11,456.0	, 4,030.2	179.0	10/11/17 4:52:00	7.85	11,303.0	4,034.2	177.0
10/11/17 8:54:00	8.00	11,516.0	4,029.8	179.1	10/11/17 5:52:00	7.89	11,363.0	4,033.8	177.1
10/11/17 9:54:00	8.04	, 11,576.0	4,029.3	179.1	10/11/17 6:52:00	7.93	11,423.0	4,033.3	177.1
10/11/17 10:54:00	8.08	11,636.0	4,028.8	179.1	10/11/17 7:52:00	7.97	11,483.0	4,032.9	177.1
10/11/17 11:54:00	8.12	11,696.0	4,028.4	179.1	10/11/17 8:52:00	8.02	11,543.0	4,032.5	177.1
10/11/17 12:54:00	8.16	11,756.0	4,028.0	179.1	10/11/17 9:52:00	8.06	11,603.0	4,032.0	177.1
10/11/17 13:54:00	8.21	11,816.0	4,027.5	179.2	10/11/17 10:52:00	8.10	11,663.0	4,031.5	177.2
10/11/17 14:54:00	8.25	11,876.0	4,027.0	179.2	10/11/17 11:52:00	8.14	11,723.0	4,031.1	177.2
10/11/17 15:54:00	8.29	11,936.0	4,026.5	179.2	10/11/17 12:52:00	8.18	11,783.0	4,030.7	177.2
10/11/17 16:54:00	8.33	11,996.0	4,026.1	179.2	10/11/17 13:52:00	8.22	11,843.0	4,030.3	177.2
10/11/17 17:54:00	8.37	12,056.0	4,025.7	179.2	10/11/17 14:52:00	8.27	11,903.0	4,029.9	177.2
10/11/17 18:54:00	8.41	12,116.0	4,025.3	179.2	10/11/17 15:52:00	8.31	11,963.0	4,029.4	177.3
10/11/17 19:54:00	8.46	12,176.0	4,024.8	179.3	10/11/17 16:52:00	8.35	12,023.0	4,028.9	177.3
10/11/17 20:54:00	8.50	12,236.0	4,024.3	179.3	10/11/17 17:52:00	8.39	12,083.0	4,028.5	177.3
10/11/17 21:54:00	8.54	12,296.0	4,024.0	179.3	10/11/17 18:52:00	8.43	12,143.0	4,028.1	177.3
10/11/17 22:54:00	8.58	12,356.0	4,023.5	179.3	10/11/17 19:52:00	8.47	12,203.0	4,027.6	177.3
10/11/17 23:54:00	8.62	12,416.0	4,023.1	179.3	10/11/17 20:52:00	8.52	12,263.0	4,027.2	177.3
10/12/17 0:54:00	8.66	12,476.0	4,022.7	179.3	10/11/17 21:52:00	8.56	12,323.0	4,026.8	177.4
10/12/17 1:54:00	8.71	12,536.0	4,022.2	179.4	10/11/17 22:52:00	8.60	12,383.0	4,026.3	177.4
10/12/17 2:54:00	8.75	12,596.0	4,021.8	179.4	10/11/17 23:52:00	8.64	12,443.0	4,025.9	177.4
10/12/17 3:54:00	8.79	12,656.0	4,021.4	179.4	10/12/17 0:52:00	8.68	12,503.0	4,025.5	177.4
10/12/17 4:54:00	8.83	12,716.0	4,020.9	179.4	10/12/17 1:52:00		12,563.0	4,025.1	177.4
10/12/17 5:54:00	8.87	12,776.0	4,020.6	179.4	10/12/17 2:52:00		12,623.0	4,024.7	177.5
10/12/17 6:54:00	8.91	12,836.0	4,020.2	179.4	10/12/17 3:52:00	8.81	12,683.0		
10/12/17 7:54:00	8.96	12,896.0	4,019.7	179.4	10/12/17 4:52:00	8.85	12,743.0	4,023.9	177.5
10/12/17 8:54:00	9.00	12,956.0	4,019.3	179.5	10/12/17 5:52:00		12,803.0	4,023.5	177.5
10/12/17 9:54:00	9.04	13,016.0	4,018.9	179.5	10/12/17 6:52:00		12,863.0		
10/12/17 10:54:00	9.08	13,076.0	4,018.5	179.5	10/12/17 7:52:00		12,923.0		177.6
10/12/17 11:54:00	9.12	13,136.0	4,018.1	179.5	10/12/17 8:52:00		12,983.0		177.6
10/12/17 12:54:00	9.16	13,196.0	4,017.6	179.5	10/12/17 9:52:00		13,043.0		177.6
10/12/17 13:54:00	9.21	13,256.0	4,017.2	179.5	10/12/17 10:52:00		13,103.0		177.6
10/12/17 14:54:00	9.25	13,316.0	4,016.8	179.6	10/12/17 11:52:00		13,163.0		177.6
10/12/17 15:54:00	9.29	13,376.0			10/12/17 12:52:00		13,223.0		177.6
10/12/17 16:54:00	9.33	13,436.0	4,016.0	179.6	10/12/17 13:52:00		13,283.0		
10/12/17 17:54:00	9.37	13,496.0	4,015.7	179.6	10/12/17 14:52:00		13,343.0		177.7
10/12/17 18:54:00	9.41	13,556.0	4,015.3	179.6	10/12/17 15:52:00		13,403.0		177.7
10/12/17 19:54:00	9.46	13,616.0	4,014.9		10/12/17 16:52:00		13,463.0		
10/12/17 20:54:00	9.50	13,676.0	4,014.5	179.6	10/12/17 17:52:00) 9.39	13,523.0	4,018.7	177.7

				F162A					F328A
			F162A13					F328A13	13 Deg
Date I	Days	Minutes	Psig	F	Date	Days	Minutes	Psig	F
10/12/17 21:54:00	9.54	13,736.0	4,014.1	179.6	10/12/17 18:52:00	, 9.43	13,583.0	4,018.3	177.7
10/12/17 22:54:00	9.58	13,796.0	4,013.7	179.7	10/12/17 19:52:00	9.47	13,643.0	4,018.0	177.8
10/12/17 23:54:00	9.62	13,856.0	4,013.4	179.7	10/12/17 20:52:00	9.52	, 13,703.0	4,017.5	177.8
10/13/17 0:54:00	9.66	13,916.0	4,013.0	179.7	10/12/17 21:52:00	9.56	13,763.0	4,017.1	177.8
10/13/17 1:54:00	9,71	13,976.0	4,012.6	179.7	10/12/17 22:52:00	9.60	13,823.0	, 4,016.7	177.8
10/13/17 2:54:00	9,75	14,036.0	4,012.2	179.7	10/12/17 23:52:00	9.64	13,883.0	4,016.3	177.8
10/13/17 3:54:00	9.79	14,096.0	4,011.8	179.7	10/13/17 0:52:00	9.68	, 13,943.0	4,016.0	177.8
10/13/17 4:54:00	9.83	14,156.0	4,011.4	179.7	10/13/17 1:52:00	9.72	14,003.0	4,015.6	177.8
10/13/17 5:54:00	9.87	14,216.0	4,011.0	179.8	10/13/17 2:52:00	9.77	14,063.0	4,015.3	177.9
10/13/17 6:54:00	9.91	14,276.0	4,010.7	179.8	10/13/17 3:52:00	9.81	14,123.0	4,014.9	177.9
10/13/17 7:04:00	9.92	14,286.0	4,010.6	179.8	10/13/17 4:02:00	9.81	14,133.0	4,014.8	177.9
10/13/17 7:14:00	9.93	14,296.0	4,010.5	179.8	10/13/17 4:12:00		14,143.0	4,014.8	177.9
10/13/17 7:24:00	9.93	14,306.0	4,010.4	179.8	10/13/17 4:22:00	9.83	14,153.0	4,014.7	177.9
10/13/17 7:34:00	9.94	14,316.0	4,010.4	179.8	10/13/17 4:32:00	9.84	14,163.0	4,014.6	177.9
10/13/17 7:44:00	9.95	14,326.0	4,010.3	179.8	10/13/17 4:42:00		14,173.0	4,014.5	177.9
10/13/17 7:54:00	9.96	14,336.0	4,010.3	179.8	10/13/17 4:52:00		14,183.0	4,014.4	177.9
10/13/17 8:04:00	9.96	14,346.0	4,010.2	179.8	10/13/17 5:02:00		14,193.0	4,014.4	177.9
10/13/17 8:14:00	9.97	14,356.0	4,010.1	179.8	10/13/17 5:12:00		14,203.0	4,014.3	177.9
10/13/17 8:14:00	9.98	14,366.0	4,010.1	179.8	10/13/17 5:22:00		14,213.0	4,014.3	177.9
10/13/17 8:24:00	9.98	14,376.0	4,009.7	179.9	10/13/17 5:32:00		14,223.0	4,014.2	177.9
10/13/17 8:35:00	9.98 9.98	14,377.0	4,009.7	179.9	10/13/17 5:33:00		14,224.0	4,014.2	177.9
10/13/17 8:36:00	9.98	14,378.0	4,009.8	179.9	10/13/17 5:34:00		14,225.0	4,014.2	177.9
10/13/17 8:37:00	9.99	14,379.0	4,009.7	179.9	10/13/17 5:35:00		14,226.0	4,014.2	177.9
10/13/17 8:38:00	9.99	14,375.0	4,009.7	180.0	10/13/17 5:36:00		14,227.0	4,014.2	177.9
10/13/17 8:39:00	9.99 9.99	14,380.0 14,381.0	3,981.2	180.0	10/13/17 5:37:00		14,228.0	4,014.2	177.9
10/13/17 8:39:15	9,99	14,381.3	3,968.2	180.0	10/13/17 5:38:00		14,229.0	4,014.2	177.9
10/13/17 8:39:30	9.99	14,381.5	3,954.9		10/13/17 5:39:00		14,230.0	4,014.2	177.9
10/13/17 8:39:45	9.99	14,381.8	3,941.1		10/13/17 5:40:00		14,231.0	4,014.2	177.9
10/13/17 8:39:43	9.99	14,384.3	3,876.3	181.3	10/13/17 5:50:00		14,241.0	4,014.1	177.9
10/13/17 8:44:45	9.99	14,386.8	3,876.9		10/13/17 6:00:00		14,251.0	4,014.1	177.9
10/13/17 8:47:15	9.99	-			10/13/17 6:10:00				177.9
10/13/17 8:49:45	9.99	14,391.8			10/13/17 6:20:00			-	177.9
10/13/17 8:52:15					10/13/17 6:30:00		-		177.9
10/13/17 8:54:45					10/13/17 6:40:00				177.9
10/13/17 8:57:15					10/13/17 6:50:00				177.9
10/13/17 8:59:45					10/13/17 7:00:00		-	•	177.9
10/13/17 9:02:15		-			10/13/17 7:10:00				177.9
10/13/17 9:04:45					10/13/17 7:20:00		-		177.9
10/13/17 9:04:45		,	-		10/13/17 7:30:00		•		177.9
10/13/17 9:09:45					10/13/17 7:40:00		-		177.9
10/13/17 9:12:15					10/13/17 7:50:00				177.9
10/13/17 9:14:45					10/13/17 8:00:00				178.0
10/13/17 9:17:15					10/13/17 8:10:00				178.4
10/10/1/01/10	10.01	17,713,3					,	,	

				F162A
			F162A13	13 Deg
Date	Days	Minutes	Psig	F
10/13/17 9:19:45	10.02	14,421.8	1,739.4	117.0
10/13/17 9:22:15	10.02	14,424.3	1,737.7	108.5
10/13/17 9:24:45	10.02	14,426.8	1,735.2	101.6
10/13/17 9:27:15	10.02	14,429.3	1,447.6	97.0
10/13/17 9:29:45	10.02	14,431.8	1,302.5	90.0
10/13/17 9:32:15	10.02	14,434.3	1,300.3	84.1
10/13/17 9:34:45	10.03	14,436.8	1,298.0	80.1
10/13/17 9:37:15	10.03	14,439.3	957.7	76.6
10/13/17 9:39:45	10.03	14,441.8	866.5	72.0
10/13/17 9:42:15	10.03	14,444.3	866.2	66.8
10/13/17 9:44:45	10.03	14,446.8	864.6	63.6
10/13/17 9:47:15	10.03	14,449.3	857.7	61.9
10/13/17 9:49:45	10.04	14,451.8	856.9	61.3
10/13/17 9:53:00	10.04	14,455.0	0.0	61.3
10/13/17 9:55:30	10.04	14,457.5	0.0	61.7
10/13/17 9:58:00	10.04	14,460.0	0.0	62.1
10/13/17 10:00:30	10.04	14,462.5	0.0	62.2
10/13/17 10:09:00	10.05	14,471.0	0.0	60.5

				F328A
			F328A13	13 Deg
Date	Days	Minutes	Psig	F
10/13/17 8:20:00	9.99	14,381.3	3,878.9	180.1
10/13/17 8:30:00	9.99	14,383.8	3,879.4	181.1
10/13/17 8:40:00	9.99	14,386.3	3,751.8	181.2
10/13/17 8:42:30	9.99	14,388.8	3,469.9	178.4
10/13/17 8:45:00	9.99	14,391.3	3,460.2	173.7
10/13/17 8:47:30	10.00	14,393.8	3,458.0	169.4
10/13/17 8:50:00	10.00	14,396.3	3,290.2	166.3
10/13/17 8:52:30	10.00	14,398.8	3,032.7	160.0
10/13/17 8:55:00	10.00	14,401.3	3,032.6	153.2
10/13/17 8:57:30	10.00	14,403.8	3,030.4	148.3
10/13/17 9:00:00	10.00	14,406.3	2,783.1	144.2
10/13/17 9:02:30	10.01	14,408.8	2,602.2	138.9
10/13/17 9:05:00	10.01	14,411.3	2,600.4	132.8
10/13/17 9:07:30	10.01	14,413.8	2,598.8	129.0
10/13/17 9:10:00	10.01	14,416.3	2,310.8	125.7
10/13/17 9:12:30	10.01	14,418.8	1,810.6	119.0
10/13/17 9:15:00	10.01	14,421.3	1,740.5	110.5
10/13/17 9:17:30	10.02	14,423.8	1,736.9	103.1
10/13/17 9:20:00	10.02	14,426.3	1,543.0	98.3
10/13/17 9:22:30	10.02	14,428.8	1,303.9	91.9
10/13/17 9:25:00	10.02	14,431.3	1,303.8	85.8
10/13/17 9:27:30	10.02	14,433.8	1,301.6	81.5
10/13/17 9:30:00	10.03	14,436.3	1,054.4	78.1
10/13/17 9:32:30	10.03	14,438.8	869.2	73.9
10/13/17 9:35:00	10.03	14,441.3	870.3	67.9
10/13/17 9:37:30	10.03	14,443.8	869.9	63.3
10/13/17 9:40:00	10.03	14,446.3	864.8	60.7
10/13/17 9:42:30	10.03	14,448.8	860.7	60.2
10/13/17 9:45:00	10.04	14,451.3	859.3	60.6
10/13/17 9:47:30	10.04	14,453.8	0.0	61.4
10/13/17 9:50:00	10.04	14,456.3	0.9	62.3
10/13/17 9:52:30	10.04	14,458.8	0.8	63.1
10/13/17 9:55:00	10.05	14,468.0	2.5	60.7
10/13/17 9:57:30	10.05	14,478.0	2.5	60.3

Appendix F

Test gauge calibration certificates



Gauge Model	SP-2000	Pressure Range 5 K		
Gauge S/N	162	Accuracy 0.05	% Full Scale	
		v		
Applied	Recorded			
Pressure	Pressure	Differ	rence	
psig	psig	psi	Percent (%)	
0.01	0.01	0.00	0.0000%	
774.08	772.83	-1.25	-0.0250%	
1498.24	1497.46	-0.78	-0.0156%	
2222.36	2220,75	-1.61	-0,0322%	
2946.53	2944.89	-1.64	-0.0328%	
3670.66	3669.06	-1.60	-0.0320%	
4394.87	4393.46	-1.41	-0.0283%	
5119.00	5117.54	-1.46	-0.0292%	
4394.87	4393,90	~0.97	-0.0195%	
3670.66	3669.82	-0.84	-0.0168%	
2946,53	2945.67	-0.86	-0.0173%	
2222.36	2221.50	-0.86	-0.0172%	
1498,24	1497.46	-0.78	-0.0156%	
774.08	773.32	-0.76	-0.0151%	
0.01	0.01	0.00	0.0000%	

Oven Temperature:

273.3 °F

Probe Temperature:

273.5 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity



Gauge Model	SP-2000	Pressure Range	5 K
Gauge S/N	162	Accuracy 0.05%	Full Scale

Applied	Recorded	መ ያ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ	
Pressure	Pressure	2	ference
psig	psig	psi	Percent (%)
0.01	0.71	0.70	0.0139%
0.01	0.71		
774.08	774.96	0.88	0.0177%
1498.24	1499.12	0,88	0.0176%
2222.36	2222.99	0,63	0.0126%
2946.53	2947.04	0.51	0.0102%
3670,66	3671,23	0.57	0.0113%
4394.87	4395,53	0,66	0.0133%
5119,00	5119.94	0.94	0.0187%
4394.87	4396.16	1,29	0.0258%
3670.66	3671.99	1.33	0.0265%
2946.53	2947.97	1.44	0.0287%
2222.36	2223,84	1.48	0.0296%
1498.24	1499.73	1.49	0.0299%
774.08	775.18	1.10	0.0220%
0.01	0.25	0.24	0.0049%

Oven Temperature:

144.7 °F

Probe Temperature:

144.7 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity



Gauge Model Gauge S/N	SP-2000 162	Pressure Range Accuracy 0.059	5 K Ƙ Full Scale
Applied Pressure psig	Recorded Pressure psig	Differ [.] psi	ence Percent (%)
0.01	0.01	0.00	0.0000%
774.08	773,90	-0.19	-0.0037%
1498.24	1497.87	-0.38	-0.0075%
2222.36	2221.81	-0.55	-0.0110%
2946,53	2945.90	-0.63	-0.0126%
3670.66	3669,99	-0.67	-0.0134%
4394.87	4394,44	-0.43	-0,0087%
5119.00	5118.94	-0.06	-0.0012%
4394.87	4394.97	0.10	0,0019%
3670.66	3670.88	0.22	0.0045%
2946.53	2946.76	0,23	0.0046%
2222.36	2222.61	0.25	0.0050%
1498.24	1498.39	0.15	0.0031%
774.08	774.11	0.03	0.0007%
0.01	0.01	0.00	0.0000%
		second and the last second	

Oven Temperature:

179.7 °F

Probe Temperature:

179.6 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity



Gauge Model	SP-2000	Pressure Range		5 K
Gauge S/N	162	Accuracy 0.	.05%	Full Scale

Applied	Recorded			
Pressure	Pacesona.c	Diffe		
psig	psig	psi	Percent (%)	Contra
0.01	0.01	0.00	0,0000%	
774.08	773.21	-0.87	-0.0175%	
1498.24	1497.32	-0.92	-0.0185%	
2222.36	2221.23	-1.14	-0.0227%	
2946.53	2945.55	-0.98	-0.0196%	
3670,66	3669,54	-1.12	~0.0224%	
4394.87	4394.04	-0.83	-0.0166%	
5119.00	5118.21	-0.79	-0.0158%	
4394.87	4394.41	-0.47	-0.0093%	
3670.66	3670,40	-0.26	-0.0053%	
2946.53	2945,98	-0.55	-0.0109%	
2222.36	2222,05	-0,31	-0.0061%	
1498.24	1497.93	-0.31	-0.0062%	
774.08	773.76	-0.32	-0.0064%	
0.01	0,01	0,00	0.0000%	
0.01	0,01			
	And the second			

Oven Temperature:

253.9 °F

Probe Temperature:

253.8 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity



ACCURACY VERIFICATION 11-July-2017

Gauge Model	SP-2000		Pressure Range	5K
Gauge S/N	328		Accuracy +/-0.05%	Full Scale
		ŧ.		

Applied	Recorded		
Pressure	Pressure	Difference	
psig	psig	psi	Percent (%)
			0.00000/
0.01	0.01	0.00	0.0000%
774.08	773.67	-0.41	-0.0082%
1498.24	1497.45	-0.79	-0.0158%
2222.36	2221.56	-0.80	-0.0160%
2946.53	2946.12	-0.41	-0.0082%
3670.66	3670.01	-0.65	-0.0130%
4394.87	4394.33	-0.54	-0.0108%
5119.00	5118.90	-0.10	-0,0020%
4394.87	4395.08	0.21	0.0042%
3670.66	3671.10	0.44	0.0088%
2946.53	2947.05	0.52	0.0104%
2222,36	2222.82	0.46	0.0092%
1498.24	1498.64	0.40	0.0080%
774.08	774.48	0.40	0.0080%
0.01	0.62	0.61	0.0122%

Oven Temperature: 178

178.8 °F

Probe Temperature:

177.9 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity



ACCURACY VERIFICATION 11-July-2017

Gauge Model	SP-2000	Pressure Range		
Gauge S/N	328	Accuracy +/-0.05%	Full Scale	

Applied	Recorded		8
Pressure Pressure		Difference	
psig	psig	psi	Percent (%)
0.01	0.11	0.10	0.0020%
774.08	773.86	-0.22	-0.0044%
1498.24	1497.71	-0.53	-0.0106%
2222.36	2221.44	-0.92	-0.0184%
2946.53	2945.47	-1.06	-0.0212%
3670.66	3669.65	-1.01	-0.0202%
4394.87	4393.92	-0.95	-0.0190%
5119.00	5118.53	-0.47	-0.0094%
4394.87	4394.68	-0.19	-0.0038%
3670.66	3670.46	-0.20	-0.0040%
2946.53	2946.75	0.22	0.0044%
2222.36	2222.81	0.45	0.0090%
1498.24	1499.02	0.78	0.0156%
774.08	775.17	1.09	0.0218%
0.01	0.01	0.00	0.0000%

Oven Temperature: 2

: **218.7** °F

Probe Temperature:

218.6 °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-700-00 Serial #26618, Mass Set Serial #25608 Compensated to local acceleration due to gravity

Appendix G

Mechanical Integrity Test Report (MIT)



NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

ORUIC
fern Cef. Sw Mapi # 30-0 45-35747
Location: Unit $\frac{1}{4}$ Sec $\frac{27}{7}$ Twn $\frac{29}{8}$ Rge $\frac{11}{7}$
Well Type: Water Injection Salt Water Disposal Gas Injection Producing Oil/Gas Pressure obervation
TA Expires:
Pres Max. Inj. Pres
30 mins. Test passed/failed
Jup 1312-1470
t 15 min.
Itness Monula Kuelleng (NMOCD)
Revised 02-11-02

Oil Conservation Division * 1000 Rio Brazos Road * Aztec, New Mexico 87410 Phone: (505) 334-6178 * Fax (505) 334-6170 * <u>http://www.emnrd.state.nm.us</u>

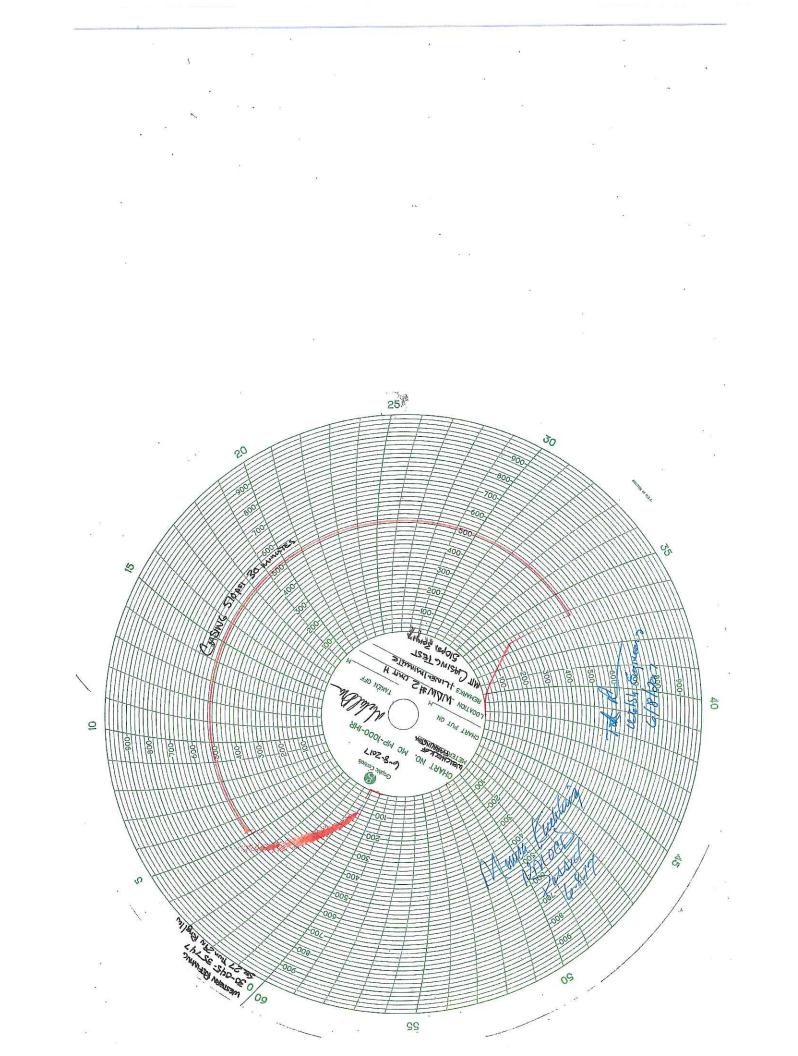


NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM 87410 (505) 334-6178 FAX: (505) 334-6170 http://emnrd.state.nm.us/ocd/District III/3distric.htm

BRADEN (submit	HEAD TEST REPORT 1 copy to above address)
Date of Test 6-8-17 Operation	or Western Les API #30-0 45-35747
	<u>2</u> Location: Unit <u>H</u> Section <u>77</u> Township <u>79</u> Range <u>11</u>
,	Subing 000 Intermediate O Casing 00 Bradenhead O
OPEN BRADENHEAD AND INTERMEDIATE	E TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH
PRESSURE Testing Bradenhead INTERM BH Int Csg Int Csg	FLOW CHARACTERISTICS BRADENHEAD INTERMEDIATE
$\begin{array}{c c} \text{TIME} \\ 5 \text{ min} \end{array} 0 0 (00 0 0 0) \\ \hline \end{array}$	Steady Flow
$10 \min 0 0 100 0 100$	Surges
$15 \min_{D_{12}} D_{12} D_{12} (00) O_{12} (00)$. Down to Nothing
20 min	Nothing
25 min	Gas
30 min	Gas & Water
A DE A	Water
If bradenhead flowed water, check all of the descript	ions that apply below:
CLEAR FRESH SALTY	SULFURBLACK
5 MINUTE SHUT-IN PRESSURE BRADENN	HEAD INTERMEDIATE
REMARKS: BA-Dulbuhen	Denecl. Nothing when
to cled ut 5 Deconder	Nothing when ever after
By Det R Sthen Shut	Witness Monda Cuelileup
(Position)	
E-mail address	

1 :



Appendix H

Table of wells in a one mile radius

Wells
Area
2 and
Well #2
Disposal V

Ĺ.																																								
Pne Inj	Zone Yes	°N S	o z	2 S	٥N	°N N	å	°Z	22		2 g	٩	° N	Ŷ	å	٥	٩ Z	°Z :	°z;	2:	° Z	²:	°2	^o Z	e Z				<u>0</u> 2	2	oz -	e z	2	²,	82		°,			N
	Status ACTIVE INJ	ACTIVE		INACTIVE	P&A	ACTIVE	ACTIVE	Р&А	ACTIVE	С 8 Г 2 4 1 (4	P&A P&A	P&A	ACTIVE	Ρ&Α	ACTIVE	INACTIVE	INACTIVE	INACTIVE	ACTIVE	ACTIVE		ACTIVE	ACTIVE	ACTIVE	P & A	P&A								ACIIVE	4 ~ ∞ 4	P & A		ACTIVE		ACTIVE
	Reservoir ENTRADA	FRUITLAND COAL	CHACKA	Laknown	MESAVERDE	GALLUP	DAKOTA	MESAVERDE	FRUITLAND COAL	CHACKA	DAKOTA	CHACRA	FRUITLAND COAL	PICTURED CLIFFS	DAKOTA	FRUITLAND COAL	PICTURED CLIFFS	FRUITLAND COAL	GALLUP	FRUITLAND COAL	(N/A)	CHACRA	CHACRA	DAKOTA	DAKOTA	FRUITLAND SAND	Morrison Bluff Entrada	ENTRADA	PICTURED CLIFFS	GALLUP	DAKOTA	DAKOTA	CHACRA	FRUITLAND SAND	PICTURED CLIFFS		(N/A)	CHACKA		FRUITANU COAL
	Operator WESTERN REFINING			/ XIU ENERGY, INU.		XTO ENERGY, INC.	XTO ENERGY, INC.		- ,		XIU ENERGY, INC. BD AMERICA				V HILCORP ENERGY	(N/A)	~	-	_		_	-			C	,		~						_	_		-	· · ·		V HOLCOMB OIL& GAS
	ULSTR H-27-29N-11W	H-27-29N-11W	H-27-29N-11W	H-Z/-Z9N-11W	1-27-29N-11W	I-27-29N-11W	I-27-29N-11W	F-26-29N-11W	F-26-29N-11W	F-Z6-Z9N-11W	F-26-29N-11W	W11-N62-72-1	I-27-29N-11W	I-27-29N-11W	M-26-29N-11W	-27-29N-11W	-27-29N-11W	F-27-29N-11W	K-26-29N-11W	N-26-29N-11W	M-26-29N-11W	P-22-29N-11W	N-26-29N-11W	B-26-29N-11W	P-22-29N-11W	0-22-29N-11W	B-26-29N-11W	B-26-29N-11W	K-27-29N-11W	K-27-29N-11W	F-27-29N-11W	J-26-29N-11W	F-27-29N-11W	F-27-29N-11W	G-26-29N-11W	G-26-29N-11W	G-27-29N-11W	B-26-29N-11W	A-34-29N-11W	K-23-29N-11W
Total	Depth P&A Date 7470	1689	6262	6262 1750	3514 P & A		6177	4030 P & A	1	4030 P & A	6242 2008 D P A	L D	-	1804 P&A	6348	3028*	3028*	1850	5870	1760		2754	2869	6160	ቢ.	1466 P&A	7382	7382	5808	5808	6160	6430	2710	1354	3028* P & A	1442 P&A		2761	6148	2761
Perf Botto				6262	3514						6242 6200			1746*	6348		1679* :	1679*	5870	1760		2754	2869	6160	6274	1466	7070	7382	1770	5808	6160	6430	2710	1354	1679*	1746*		2761	6148	1648
Perf		1483	2701	6163	327G	5314	6177	3970	1462	2631	6086 64 <i>5</i> 7	1010	1543	1692*	6176			1474*	5295	1468		2627	2746	6047	6072	1380	6952	7224	1680	5419	6024	6172	2578	1326	1474*	1692*		2750	6086	1470
	# API No 2 30-045-35747	_		IE 30-045-24084		1R 30-045-30833		1 30-045-25329	1 30-045-25329	1 30-045-25329	E 30-045-24083	1 30-040-07020	1 30-045-23254	1 30-045-07812	1 30-045-12003			1S 30-045-34266	3 30-045-25612	100 30-045-31118	0 30-045-07776	2 30-045-26721	9 30-045-24572	1 30-045-07733	1 30-045-07961	1 30-045-07959	1 30-045-30788	1 30-045-30788		18 30-045-25673	1E 30-045-24673	1F 30-045-33093	1 30-045-27365	1 30-045-27361	1X 30-045-29107	X 30-045-07870	0 30-045-07896		16 30-045-25657	1 30-045-23550
Miles Map to	Seq DW2 Wellname	1 0.20 JACQUE	2 0.22 DAVIS GAS COM F 1		3 U.ZZ PRE-UNGARU WELL		DAVIS GAS COM F	0.31	0.31	0.31	0.32			450	0.45	0.49	049	0.51 MANGUM	0.52 CALVIN	0.55 CALVIN	0.55		0.57	0.59	0.60		0.64	24 0.64 ASHCROFT SWD	0.65 CONGRESS	25 0.65 CONGRESS	26 D.66 MANGUM	0.68 CALVIN	28 0.69 MARIAN S	29 0.69 LAUREN KELLY	0.72 PRE-ONGARD WELL	31 0.72 PRE-ONGARD WELL	32 0.72 PRE-ONGARD WELL	LIVAN	CONGRESS	35 0.75 STATE GAS COM BS

Wells
Area
2 and
Vell #2
Disposal /

Pne Inj Zone No	N N N	2 9 2	oN o	No	o No	No	°N :	oN N	2 g	No	No	No	No	No	No	°N N	No	۵N	No	No	°N
Status INACTIVE	7 8 7 7 7 8 8 1 1 1 1	ACTIVE	ACTIVE	ACTIVE	P&A P&A	ACTIVE	ACTIVE	ACTIVE D 2. A	ACTIVE	ACTIVE	ACTIVE	Ρ&Α	ACTIVE	INACTIVE	ACTIVE	ACTIVE	Р&А	Ъ&А	ACTIVE	INACTIVE	INACTIVE
Reservoir CHACRA	DAKOTA DAKOTA EDIIETI AND COAL	CHACRA CHACRA	FRUITLAND COAL	FRUITLAND SAND	FRUITLAND SAND	GALLUP	CHACRA	GALLUP DICTIDED CLIFES	CHACRA	GALLUP	DAKOTA	PICTURED CLIFFS	FRUITLAND COAL	GALLUP	CHACRA	DAKOTA	PICTURED CLIFFS	FARMINGTON	DAKOTA	MANCOS	CHACRA
Operator HOLCOMB OIL& GAS	BP AMERICA BURLINGTON HOL COMP OIL \$ CAS	MANANA GAS INC MANANA GAS INC HIII CORP FNFRGY	MANANA GAS INC MANANA GAS INC	MANANA GAS INC	PRE-ONGARD WELL	HILCORP ENERGY	SOUTHLAND ROYALTY	SOUTHLAND ROYALTY	SOUTHLAND ROYALTY	HILCORP ENERGY	HILCORP ENERGY	BURLINGTON	HOLCOMB OIL& GAS	HOLCOMB OIL& GAS	HILCORP ENERGY	HILCORP ENERGY	CHAPARRAL ENERGY	GENERAL MINERALS	XTO ENERGY, INC.	XTO ENERGY, INC.	XTO ENERGY, INC.
ULSTR K-23-29N-11W K 22 20N 41W	L-27-29N-11VV L-27-29N-11W	L-27-29N-11VV N-22-29N-11W A-34-29N-11W	N-22-29N-11W	N-22-29N-11W	H-26-29N-11W K-23-29N-11W	C-35-29N-11W	I-26-29N-11W	C-34-29N-11W	M-27-29N-11W	P-26-29N-11W	P-26-29N-11W	M-27-29N-11W	H-26-29N-11W	H-26-29N-11W	E-35-29N-11W	E-35-29N-11W	E-35-29N-11W	P-26-29N-11W	J-23-29N-11W	J-23-29N-11W	J-23-29N-11W
Perf Botto Total m Depth P 2761 2761	6214 6214	2 1001 0214 2 2732 2732 7 3857 3857	1608 1508	1410	1478 1478 3 1468 1468 P&A	5943 5943	2856	5970 5970 4747 4747 D	2790 2790	5530		3 1678 1678 P&A	1706	5622	2906	5 6328 6328	3 1790 1790 P&A	945 945 P&A	3 6263 6263	3 6263 6263	3 6263 6263 for area
		1 30-045-07835 1368 1 30-045-26731 2622 9 30-045-24574 2747	30-045-34312 30-045-34312		2 30-045-07868 1444 1 30-045-08009 1443		30-045-21457		3 30-04507903 1664 3 30-04524573 2668		1E 30-045-24772 6209	1R 30-045-21732 1648	2 30-045-25621 1535	2 30-045-25621 5264	4E 30-045-24837 2784	4E 30-045-24837 6216	1 30-045-20752 1776	11 30-045-22639 940	1E 30-045-24082 6078	1E 30-045-24082 6078	1E 30-045-24082 6078 6263 * Estimated for area
Miles to DW2 0.75		3/ U./B WANGUM 38 0.79 MARY JANE 30 0.80 STIMMIT		0.83	43 0.87 SULLIVAN 44 0.87 PRE-ONGARD WELL	0.88	0.89	0.00	48 0.90 PRE-UNGARD WELL 49 0.91 GARLAND	0.93		52 0.94 GARLAND B	53 0.95 EARL B SULLIVAN	53 0.95 EARL B SULLIVAN	54 0.96 CONGRESS	54 0.96 CONGRESS	55 0.97 LEA ANN	56 0.98 DELO			57 0.99 PEARCE GAS COM

Appendix I

Injection History

					<i>.</i>			
Date	Flow Rate GPM	Average Casing Pressure	Minimum Injection Pressure	Average Injection Pressure	Maximum Injection Pressure	Totalizer BBLS	Gallons Injected	Flow Rate bbl/min
6-Mar-17								
7-Mar-17	·							
8-Mar-17	20.63		-	1,353	1,353	1,018	42,756	0.49
9-Mar-17	16.17		-	1,289	1,392	1,570	65,933	0.39
10-Mar-17	13.63	1.00	1,310	1,380	1,383	2,010	84,413	0.32
11-Mar-17	10.19	1.00	1,381	1,382	1,383	2,344	98,448	0.24
12-Mar-17	6.75	2.22	1,382	1,382	1,383	2,391	100,422	0.16
13-Mar-17		9.43	957	1,135	1,383	2,391	100,422	
14-Mar-17	15.68	14.92	888	1,116	1,423	2,601	109,235	0.37
15-Mar-17	11.01	7.06	957	1,195	1,423	2,703	113,526	0.26
16-Mar-17		24.48	845		953	2,703	113,526	
17-Mar-17	12.35	18.83	813	1,061	1,393	2,869	120,498	0.29
18-Mar-17		25.14	814	863	940	2,869	120,498	
19-Mar-17	18.76	25.24	777	1,001	1,393	3,044	127,848	0.45
20-Mar-17	15.50	11.82	867	1,057	1,392	3,166	132,972	0.37
21-Mar-17	15.43	16.85	825	1,028	1,393	3,303	138,726	0.37
22-Mar-17	12.19	10.91	852	1,153	1,429	3,503	147,126	0.29
22-Mar-17	10.98	9.86	897	1,202	1,442	3,647	153,174	0.26
24-Mar-17	20.30	13.25	910	1,017	1,442	3,720	156,240	0.48
25-Mar-17	20.30	29.08	808	849	906	3,720	156,240	
26-Mar-17		40.00	758	781	807	3,720	156,240	
27-Mar-17	20.44	25.46	736	898	1,443	3,817	160,314	0.49
27-Mar-17 28-Mar-17	17.96	21.81	757	1,030	1,451	4,003	168,126	0.43
28-Mar-17	14.06	6.75	904	1,133	1,451	4,177	175,434	0.33
30-Mar-17	12.65	8.97	862	1,133	1,447	4,341	182,322	0.30
31-Mar-17	9.55	5.29	977	1,258	1,428	4,453	187,026	0.23
1-Apr-17	5.55	13.50	888	1,046	1,351	4,452	186,984	
2-Apr-17	13.05	19.65	830	1,040	1,393	4,563	191,646	0.31
3-Apr-17		8.62	915	1,148	1,393	4,601	193,242	0.32
4-Apr-17		9.62	912	1,146	1,393	4,713	197,946	0.30
		11.63	905	1,072	1,343	4,735	198,870	0.36
5-Apr-17		20.38	838	981	1,343	4,779	200,718	0.25
6-Apr-17		14.03	838	1,048	1,393	4,773	200,710	0.29
7-Apr-17				845	914	4,848	203,616	0.23
8-Apr-17		29.00	805 774	988	1,393	4,848	203,610	0.30
9-Apr-17		28.26	842	988	1,393	4,943	207,830	0.30
10-Apr-17		15.17		1,004		5,100	203,874	0.23
11-Apr-17		23.03	793		1,393	5,100	214,200	0.34
12-Apr-17		14.06	873	1,015		· · · · · · · · · · · · · · · · · · ·	217,140	0.28
13-Apr-17		14.96	837	1,109	1,393	5,298 5,340	222,510	0.32
14-Apr-17		15.02	878	1,020			224,280	0.31
15-Apr-17		18.27	856	1,014		5,384		0.33
16-Apr-17		35.33	790	819	856	5,385	226,170	1

			w	DW #2 In	jection Hi	story		
	Flow Rate	Average Casing	Minimum Injection	Average Injection	Maximum Injection	Totalizer	Gallons	Flow Rate bbl/min
Date	GPM	Pressure	Pressure	Pressure	Pressure	BBLS	Injected	
17-Apr-17		19.65	776	1,108	1,392	5,492	230,664	0.29
18-Apr-17		18.98	850	966	1,393	5,538	232,596	0.27
19-Apr-17		21.83	819	988	1,392	5,590	234,780	0.28
20-Apr-17		21.26	826	1,010	1,392	5,669	238,098	0.35
21-Apr-17	10.98	12.15	889	1,126	1,393	5,763	242,046	0.26
22-Apr-17	9.68	19.04	861	995	1,392	5,798	243,516	0.23
23-Apr-17	18.02	23.16	825	1,000	1,393	5,850	245,700	0.43
24-Apr-17	11.40	26.15	825	905	1,393	5,879	246,918	0.27
25-Apr-17	14.02	23.94	800	972	1,393	5,950	249,900	0.33
26-Apr-17	14.77	20.50	818	981	1,392	6,025	253,050	0.35
27-Apr-17	12.57	18.41	819	1,040	1,393	6,125	257,250	0.30
28-Apr-17	14.99	14.69	866	1,067	1,393	6,205	260,610	0.36
29-Apr-17	12.51	16.48	862	1,015	1,393	6,272	263,424	0.30
30-Apr-17		28.58	803	847	927	6,272	263,424	
1-May-17	15.36	23.69	784	1,023	1,392	6,371	267,582	0.37
2-May-17		15.60	859	1,046	1,392	6,443	270,606	0.40
3-May-17		19.11	846	954	1,392	6,485	272,370	0.28
4-May-17		20.95	842	972	1,393	6,555	275,310	0.31
5-May-17		26.90	817	908	1,392	6,598	277,116	0.38
6-May-17		24.98	795	940	1,392	6,669	280,098	0.29
7-May-17		29.74	782	917	1,393	6,721	282,282	0.32
8-May-17		29.38	809	829	853	6,721	282,282	
9-May-17		25.50	005			6,721	282,282	
10-May-17						6,721	282,282	
10-May-17 11-May-17						6,721	282,282	
12-May-17						6,721	282,282	
12-May-17 13-May-17				1		6,721	282,282	
					no ⁽ 1, 1 ⁻¹ , 1 ⁻¹)	6,721	282,282	
14-May-17						6,721	282,282	
15-May-17						6,721	282,282	
16-May-17		<u>.</u>		-		6,721	282,282	
17-May-17						6,721	282,282	
18-May-17						6,721	282,282	
19-May-17							282,282	····
20-May-17						6,721		
21-May-17					<u> </u>	6,721	282,282	<u> </u>
22-May-17						6,721	282,282	
23-May-17		<u> </u>	<u> </u>			6,721	282,282	
24-May-17						6,721	282,282	
25-May-17						6,721	282,282	<u> </u>
26-May-17						6,721	282,282	
27-May-17						6,721	282,282	
28-May-17	7				<u> </u>	6,721	282,282	

Date	Flow Rate GPM	Average Casing Pressure	Minimum Injection Pressure	Average Injection Pressure	Maximum Injection Pressure	Totalizer BBLS	Gallons Injected	Flow Rate bbl/min
29-May-17						6,721	282,282	
30-May-17						6,721	282,282	
31-May-17						6,721	282,282	n ==h=fmrn + + + + +
1-Jun-17	1 <u></u>	<u> </u>				6,721	282,282	
2-Jun-17						6,721	282,282	
3-Jun-17	·					6,721	282,282	
4-Jun-17						6,721	282,282	
5-Jun-17						6,721	282,282	-
6-Jun-17						6,721	282,282	
7-Jun-17		103.72	560	561	563	6,721	282,282	
8-Jun-17	24.63	115.97	555	606	694	7,063	296,646	0.59
9-Jun-17	36.48	3.00	613	746	847	7,897	331,667	0.87
10-Jun-17	25.00	8.05	703	788	848	8,308	348,936	0.60
11-Jun-17	23.00	26.74	653	674	701	8,308	348,936	
11-Jun-17 12-Jun-17	36.52	39.78	640	749	847	8,973	376,866	0.87
12-Jun-17 13-Jun-17	28.85	55.76	844	901	957	9,968	418,649	0.69
	28.83	2.33	819	898	966	10,555	443,303	0.58
14-Jun-17		2,33	909	982	1,042	11,569	485,891	0.70
15-Jun-17	29.41			1,066	1,042	12,632	530,537	0.74
16-Jun-17	31.20		1,038		1,158	13,713	575,939	0.74
17-Jun-17	32.36		1,060	1,115		14,938	627,389	0.85
18-Jun-17	35.60		1,158	1,185	1,192			0.85
19-Jun-17	31.60		1,188	1,200	1,218	16,020	672,832	
20-Jun-17	31.12		1,213	1,228	1,242	17,084	717,521	0.74
21-Jun-17	29.22		1,237	1,247	1,257	18,085	759,563	0.70
22-Jun-17	32.05	3.44	1,072	1,189	1,262	18,741	787,122	0.76
23-Jun-17	27.95	1.09	1,149	1,224		19,653	825,426	0.67
24-Jun-17	29.04	1.00	1,252	1,271	1,295	20,642	866,964	0.69
25-Jun-17	29.54		1,294	1,310	1,326	21,658	909,629	0.70
26-Jun-17	27.60	1.00	1,322	1,326	1,335	22,604	949,361	0.66
27-Jun-17	22.91	2.40	1,183	1,271	1,337	23,237	975,954	0.55
28-Jun-17	21.34	1.81	1,214	1,271	1,278	23,953	1,006,026	0.51
29-Jun-17	21.17	1.48	1,242	1,277	1,288	24,678	1,036,469	0.50
30-Jun-17	20.91	1.58	1,274	1,279	1,284	25,386	1,066,212	0.50
1-Jul-17	20.11	1.73	1,277	1,281	1,284	26,075	1,095,150	0.48
2-Jul-17	19.54	2.00	1,279	1,281	1,285	26,741	1,123,122	0.47
3-Jul-17		1.73	1,278	1,287	1,293	27,416	1,151,465	0.46
4-Jul-17		2.00	1,288	1,291	1,293	28,071	1,178,982	0.45
5-Jul-17		2.17	1,288	1,291	1,293	28,709	1,205,771	0.44
6-Jul-17		2.77	1,278	1,290	1,293	29,331	1,231,902	0.43
7-Jul-17		3.00	1,278	1,290		29,935	1,257,270	0.42
8-Jul-17		3.00	1,289	1,295		30,556	1,283,345	0.43
9-Jul-17		2.85	1,289	1,304		31,178	1,309,476	0.43

					jection in			
	Flow Rate	Average Casing	Minimum Injection	Average Injection	Maximum Injection	Totalizer	Gallons	Flow Rate
Date	GPM	Pressure	Pressure	Pressure	Pressure	BBLS	Injected	bbl/min
10-Jul-17	18.46	3.02	1,304	1,307	1,313	31,793	1,335,299	0.44
11-Jul-17	20.50	2.54	1,308	1,325	1,342	32,482	1,364,237	0.49
12-Jul-17	18.51	2.58	1,328	1,332	1,343	33,116	1,390,865	0.44
13-Jul-17	18.62	2.88	1,319	1,338	1,353	33,761	1,417,955	0.44
14-Jul-17	18.71	3.00	1,349	1,351	1,355	34,401	1,444,842	0.45
15-Jul-17	17.66	3.00	1,348	1,351	1,353	35,004	1,470,168	0.42
16-Jul-17	17.78	3.02	1,347	1,350	1,353	35,588	1,494,696	0.42
17-Jul-17	17.06	3.37	1,330	1,344	1,354	36,152	1,518,377	0.42
18-Jul-17	17.08	3.57	1,339	1,347	1,353	36,714	1,541,981	0.42
19-Jul-17	17.31	3.60	1,347	1,351	1,353	37,282	1,565,844	0.43
20-Jul-17	16.04	4.00	1,348	1,351	1,354	37,831	1,588,902	0.38
21-Jul-17	16.11	4.00	1,348	1,354	1,359	38,383	1,612,079	0.38
22-Jul-17	15.77	4.00	1,353	1,356	1,358	38,925	1,634,850	0.3
23-Jul-17	15.72	3.88	1,354	1,356	1,358	39,465	1,657,530	0.3
24-Jul-17	15.81	4.00	1,354	1,360	1,368	40,007	1,680,287	0.3
25-Jul-17	15.70	4.00	1,362	1,366	1,369	40,542	1,702,757	0.3
26-Jul-17	14.99	4.20	1,364	1,366	1,370	41,054	1,724,261	0.3
27-Jul-17	15.18	4.48	1,365	1,372	1,379	41,573	1,746,059	0.3
28-Jul-17	15.27	4.89	1,374	1,376	1,378	42,086	1,767,612	0.3
29-Jul-17	14.96	4.27	1,373	1,376	1,379	42,603	1,789,319	0.3
30-Jul-17	14.39	4.17	1,374	1,376	1,379	43,097	1,810,074	0.3
31-Jul-17	14.06	4.38	1,374	1,376	1,378	43,580	1,830,353	0.3
1-Aug-17	14.31	4.46	1,374	1,376	1,378	44,069	1,850,898	0.3
2-Aug-17	14.21	6.89	1,185	1,316	1,379	44,381	1,864,002	0.3
3-Aug-17		18.85	1,118	1,146	1,183	44,381	1,864,002	
4-Aug-17		25.67	1,078	1,097	1,117	44,381	1,864,002	
5-Aug-17		30.54	1,048	1,062	1,078	44,381	1,864,002	
6-Aug-17		34.56	1,023	1,035	1,048	44,381	1,864,002	
7-Aug-17	23.70	20.40	1,013	1,128	1,241	44,805	1,881,803	0.5
8-Aug-17	21.81	2.63	1,245	1,283	1,322	45,546	1,912,932	0.5
9-Aug-17	21.33	2.15	1,323	1,339	1,352	46,277	1,943,626	0.5
10-Aug-17	19.08	2.88	1,276	1,355	1,363	46,931	1,971,095	0.4
11-Aug-17	16.75	3.00	1,358	1,361	1,363	47,508	1,995,336	0.4
12-Aug-17	15.38	3.38	1,359	1,361	1,364	48,033	2,017,386	0.3
13-Aug-17		4.00	1,359	1,361	1,363	48,522	2,037,924	0.3
14-Aug-17		4.31	1,360	1,365	1,369	49,000	2,058,000	0.3
15-Aug-17		4.77	1,364	1,366	1,369	49,466	2,077,565	0.3
16-Aug-17		5.00	1,304	1,365	1,368	49,909	2,096,178	0.3
17-Aug-17		5.00	1,366	1,378	1,388	50,346	2,114,525	0.3
17-Aug-17 18-Aug-17		7.96	1,176	1,307	1,388	50,556	2,123,352	0.2
19-Aug-17	· · · · · · · · · · · · · · · · · · ·	20.27	1,110	1,138	1,174	50,556	2,123,352	
20-Aug-17	*****	26.99	1,071	1,089	1,108	50,556	2,123,352	+

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		Average	Minimum	Average	Maximum Injection	Totalizer	Gallons	Flow Rate
	Flow Rate	Casing	Injection	Injection	Pressure	BBLS	Injected	bbl/min
Date	GPM	Pressure	Pressure	Pressure			2,123,352	
21-Aug-17		31.58	1,043	1,056	1,070	50,556		···
22-Aug-17		35.75	1,019	1,030	1,042	50,556	2,123,352	
23-Aug-17		39.38	999	1,009	1,019	50,556	2,123,352	0.29
24-Aug-17	12.29	19.73	993	1,131	1,218	50,817	2,134,314	0.29
25-Aug-17	12.19	5.26	1,216	1,263	1,288	51,178	2,149,476	
26-Aug-17	12.28	4.94	1,286	1,296	1,303	51,600	2,167,200	0.29
27-Aug-17	11.92	5.33	1,301	1,308	1,310	52,009	2,184,378	0.28
28-Aug-17	10.87	5.87	1,306	1,314	1,318	52,386	2,200,212	0.26
29-Aug-17	12.14	5.67	1,315	1,330	1,349	52,806	2,217,852	0.29
30-Aug-17	13.21	5.35	1,345	1,350	1,354	53,255	2,236,710	0.31
31-Aug-17	12.19	6.00	1,349	1,352	1,354	53,674	2,254,308	0.29
1-Sep-17	11.95	6.19	1,349	1,355	1,359	54,089	2,271,738	0.28
2-Sep-17	11.98	6.40	1,355	1,356	1,358	54,496	2,288,832	0.29
3-Sep-17	11.43	6.81	1,354	1,356	1,359	54,885	2,305,170	0.27
4-Sep-17	11.26	7.04	1,354	1,358	1,362	55,266	2,321,165	0.27
5-Sep-17	11.67	7.00	1,359	1,364	1,370	55,667	2,338,007	0.28
6-Sep-17	11.37	7.00	1,364	1,369	1,374	56,054	2,354,268	0.27
7-Sep-17	11.09	7.00	1,370	1,372	1,374	56,430	2,370,060	0.26
8-Sep-17	10.80	12.77	1,131	1,237	1,374	56,548	2,375,016	0.26
9-Sep-17		24.83	1,076	1,100	1,129	56,548	2,375,016	
10-Sep-17		30.85	1,043	1,058	1,075	56,548	2,375,016	
11-Sep-17		35.54	1,018	1,029	1,042	56,548	2,375,016	
12-Sep-17		39.42	997	1,007	1,017	56,548	2,375,016	
13-Sep-17		24.00	989	1,112	1,209	56,798	2,385,516	0.31
14-Sep-17		7.04	1,209	1,231	1,244	57,178	2,401,476	0.27
15-Sep-17		5.06	1,248	1,260	1,291	57,597	2,419,074	0.29
16-Sep-17		5.00	1,262	1,270	1,284	57,987	2,435,447	0.27
17-Sep-17		5.00	1,278	1,283	1,286	58,376	2,451,792	0.27
18-Sep-17		10.45	1,065	1,169	1,283	58,514	2,457,588	0.26
19-Sep-17		24.35	1,018	1,038	1,064	58,514	2,457,588	
20-Sep-17		15.89	1,005	1,143	1,331	58,842	2,471,364	0.59
21-Sep-17		21.25	1,001	1,026		58,842	2,471,364	#VALUE!
22-Sep-17		23.54	991	1,284	1,439	59,781	2,510,802	0.97
23-Sep-17		11.86	1,052	1,123	1,440	59,837	2,513,154	0.72
23 Sep 17 24-Sep-17		24.73	1,008	1,027	1,051	59,837	2,513,154	
25-Sep-17		32.10	981	993	1,007	59,837	2,513,154	· · · · · · · · · · · · · · · · · · ·
26-Sep-17		37.31	961	970		59,837	2,513,154	
20-Sep-17 27-Sep-17		41.25	944	952	960	59,837	2,513,154	1
27-Sep-17 28-Sep-17		44.67	930	937	944	59,837	2,513,154	
28-Sep-17 29-Sep-17		47.83	918	924		59,837	2,513,154	
30-Sep-17		50.23	907	912		59,837	2,513,154	
		52.96		901		59,837	2,513,154	
1-Oct-17	<u> </u>	52.90	020	501	500	55,057	2,010,104	I

		Average	Minimum	Average	Maximum			Flow
	Flow Rate	Casing	Injection	Injection	Injection	Totalizer	Gallons	Rate
Date	GPM	Pressure	Pressure	Pressure	Pressure	BBLS	Injected	bbl/min
2-Oct-17	14.89	22.80	893	1,012	1,103	60,176	2,527,392	0.35
3-Oct-17	13.74	3.63	1,068	1,120	1,152	60,598	2,545,116	0.33
4-Oct-17	13.97	2.54	1,155	1,184	1,211	61,079	2,565,311	0.33
5-Oct-17	13.79	6.73	1,002	1,125	1,228	61,307	2,574,894	0.33
6-Oct-17		23.17	954	973	1,000	61,307	2,574,894	
7-Oct-17		32.42	928	940	953	61,307	2,574,894	
8-Oct-17		38.14	910	919	928	61,307	2,574,894	
9-Oct-17		42.13	896	903	910	61,307	2,574,894	
10-Oct-17		37.25	884	890	895	61,307	2,574,894	
11-Oct-17		37.48	873	878	883	61,307	2,574,894	
12-Oct-17		40.44	864	868	873	61,307	2,574,894	
13-Oct-17		42.56	856	860	864	61,307	2,574,894	
14-Oct-17		44.52	848	852	856	61,307	2,574,894	
15-Oct-17		45.96	841	844	848	61,307	2,574,894	
16-Oct-17	11.45	21.94	838	946	1,047	61,542	2,584,757	0.27
17-Oct-17	11.77	1.00	1,057	1,084	1,108	61,941	2,601,515	0.28
18-Oct-17	11.30		1,106	1,124	1,143	62,328	2,617,769	0.27
19-Oct-17	11.37		1,140	1,155	1,169	62,637	2,630,747	0.27