Western Refining Southwest LLC
I-40 Exit 39
Jamestown, NM 87347
A subsidiary of Marathon Petroleum Corporation

October 27, 2021

Mr. Kevin Pierard, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: SWMU-1 Test Pit Installation Letter Report
Western Refining Southwest LLC D/B/A, Marathon Gallup Refinery
EPA ID# NMD000333211

Dear Mr. Pierard,

As communicated to you in our letter dated March 9, 2021 Solid Waste Management Unit 1 – Test Pits, Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Refinery) proceeded with the installation of four shallow test pits at Solid Waste Management Unit (SWMU) -1 to ascertain if shallow groundwater is present within the SMWU-1 waste horizon outside of the berms and is contributing to the shallow surface water observed in SWMU-1 evaporation ponds (AL-1 and AL-2). SWMU-1 is illustrated on Figure 1. This letter report describes the installation of the four test pits, the yield tests that were conducted in the test pits and summarizes the findings.

The dewatering sumps in AL-1 and AL-2 referenced in the March 9, 2021 letter were not installed due to safety concerns of very soft unstable sediments in AL-1 and AL-2. As an alternative, on June 8, 2021, a dewatering suction hose was installed in AL-2, along with a diaphragm pump that pumped to a frac tank. From there, fluids were pumped to Tank 35 for treatment by the Refinery's wastewater treatment system. To date, approximately 63,000 gallons of liquid has been removed from AL-2. Further discussion of surface water in AL-1 and AL-2 is provided below.

Test Pit Installation

On April 14, 2021, four 10 to 15 feet (ft) deep test pits were installed in the locations outside of the pond berms (Figure 1). The test pits were installed using a 14-inch hollow stem drill rig, rather than using the skid-steer mounted auger as originally proposed. The use of a drill rig allowed a large diameter borehole while providing better control of well screen and sand pack installation than would be possible with a skid steer auger. Each test pit well consisted of approximately 5 ft of 4-inch casing and 10 ft of 4-inch well screen. Due to supply issues, 6-inch screen was not available. Boring logs and construction details are provided in Attachment A. With the exception of TP-4, groundwater was not encountered during drilling, though damp soils were observed, and water was detected in all of the test pits the following day after installation. In general, the soils within the 0 to 15 ft below ground surface (bgs) consisted of low permeability clay.

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Drill cuttings were containerized in drums and sampled for disposal. The laboratory results (Attachment B) indicated non-hazardous soils, and the drums were disposed of at an approved disposal facility.

Test Pit Yield Testing

Yield testing of the test pits was conducted on April 15 and 16, 2021. Only TP-2, TP-3 and TP-4 had sufficient water for testing. The sustainable flow rate in all wells was less than 0.5 gallons per minute (gpm), which was achieved using a variable frequency drive groundwater sampling pump. Pumping well drawdown response was analyzed using an industry-standard pump test software package, which provided an estimate of aquifer parameters (transmissivity and storativity) for each location. All locations (TP-2, TP-3, and TP-4) showed relatively low transmissivity indicative of clay soils, with TP-4, located adjacent to EP-1, showing the highest transmissivity (11 ft^2/day). For the approximately 5 ft saturated interval tested, the corresponding hydraulic conductivities for TP-2, TP-3 and TP-4, were 0.36, 0.44, and 2.2 ft/day or 1.3E-4, 1.6E-4, and 7.7E-4 centimeters per second (cm/sec), respectively. Yield test data and analysis are provided in Attachment C.

The yield tests at TP-2 and TP-3 included data-logging of nearby monitoring wells to record any influence from the yield test. Observation wells for TP-3 consisted of NAPIS-2 and NAPIS-3, located approximately 22 ft and 45 ft from the TP-3. No influence was observed during the yield test in these wells. In addition, the low well yield of approximately 0.1 to 0.5 gpm caused rapid dewatering of the pumping well. A lower flow rate was not achievable using the pump.

Similar results were obtained for the yield test in TP-2, in which OAPIS-1, located approximately 19 ft from the TP-2, served as the observation well. A well yield of less than 0.5 gpm was achieved, with a sustainable yield of approximately 0.1 gpm. An apparent response in OAPIS-1 observed in early time was likely due to a shift of the data logger transducer, as the timing of this apparent response does not correspond with the activity at the pumping well.

Analysis of Water Levels at SWMU-1

A cross section of the area, including SWMU-1 area wells and ponds AL-1 and AL-2, is presented in Figure 2. This figure also includes historical water levels from local monitoring wells for the period 2011-2020 and water levels from the test pits from May 4, 2021, approximately 2 weeks after installation.

The topographical data are based on an unmanned aerial survey (UAS) flight conducted in 2018 using Trihydro's UAS drone. The topographic elevation surface was generated from aerial imagery, with vertical accuracies of 0.1 to 0.2 (ft) in open areas. The photograph in Figure 2 was also taken at the same time as the ground survey and showed the extent of water in the two ponds.

During the yield testing in April, closer inspection of the area around SWMU-1 indicated that a large diameter drainage pipe for surface water is present between the former API separator location and AL-1.

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The catchment area of the former API most likely contributed storm water to AL-1 in the past (the drain line was capped in May 2021).

As shown in Figure 2, groundwater elevations in the area of SWMU 1 indicate the following:

- Surface water is ponded on the surface of the aeration lagoons after periods of precipitation.
- Groundwater levels in wells and test pits surrounding SWMU 1 are generally below the level of the bottom of the sludge in ponds AL-1 and AL-2 (approximate depth of sludge 5 to 6 ft as determined during SWMU-1 sludge sampling).
- The groundwater levels in the area's monitoring wells, in relation to the higher water levels in AL-1 and AL-2, strongly suggest that seepage from groundwater into the ponds has likely not occurred. During future excavation, the bottom excavation elevation may encroach into the historical ranges of local groundwater elevations, but although this indicates the potential for flow into the excavation, the low permeability of the water-bearing unit combined with the compacted natural clay liner of the ponds indicate that groundwater seepage into the excavation should not be a problem. At a minimum, the seepage rate is likely low enough to control with standard excavation practices, such as a shallow diversion trench installed at the excavation bottom.

Surface Water Pumping of AL-2

As stated earlier, installation of the previously proposed dewatering sumps in the ponds was not feasible due to the unstable conditions. As an alternative, a dewatering system was installed in AL-2 on June 8, 2021, which was comprised of a 2-inch PVC suction pipe suspended into the pond water, a 2-inch air-operated diaphragm pump and a 21,000-gallon frac tank. When full, water from the frac tank was pumped into the Refinery wastewater system at Tank 35 for eventual treatment. Following the removal of approximately 63,000 gallons of water from AL-2, a small (approximately 15-foot diameter) puddle remained in AL-2. Water levels will be monitored, and pumping initiated to remove ponded water as needed.

Conclusions

Following are the conclusions from the installation of the test pits and yield testing at SWMU-1:

1. Significant groundwater seepage into the ponds is unlikely due to the higher water levels in the ponds relative to groundwater and the low permeability of soils underlying the area.
2. In addition, the low permeability of the surrounding soils implies groundwater seepage into the AL-1 and AL-2 during excavation is unlikely, and if encountered, can likely be controlled using common dewatering methods within the excavation.
3. A likely source of the accumulated water in ponds AL-1 and AL-2 is surface water and precipitation.

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4. Effective pond dewatering was achieved via pumping of AL-2 surface water, which was subsequently treated in the Refinery's permitted wastewater system.

Marathon will continue to monitor the water levels in ponds AL-1 and AL-2 for water accumulation. If necessary, pumping from TP-1, TP-2 and TP-3 can be initiated if groundwater seepage is observed during excavation.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore of my staff at 505-879-7643.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
Western Refining Southwest LLC, Marathon Gallup Refinery

Ruth A. Cade

Ruth Cade
Vice President

Enclosure

cc: D. Cobrain, NMED HWB
Leigh Barr, NMOCD
K. Luka, Marathon Petroleum Company
H. Jones, Trihydro Corporation
M. Suzuki, NMED HWB
G. McCartney, Marathon Petroleum Company
J. Moore, Marathon Gallup Refinery

Figures

EXPLANATION

- MONITORING WELL LOCATION
- TEST PIT LOCATION
- SWMU-1 BOUNDARY

NOTES:

AL - AERATION LAGOON
EP - EVAPORATION POND
SWMU - SOLID WASTE MANAGEMENT UNIT

N

0 80 '

Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1

SWMU-1 TEST PIT LOCATIONS

WESTERN REFINING SOUTHWEST, LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KEJ	Checked By: CF	Scale: 1 " = 80 '	Date: 10/20/21	File: 1_TestPit_Sump_March2021_Fig1.mxd

M:\MTN\MARATHON\GIS\GALLUP\EMAPPING\SWMU1_AERATION\BASEFOR\INSTES\TPTREPORT\2021\1_TESTPIT_SUMP_MARCH2021_FIG1.MXD

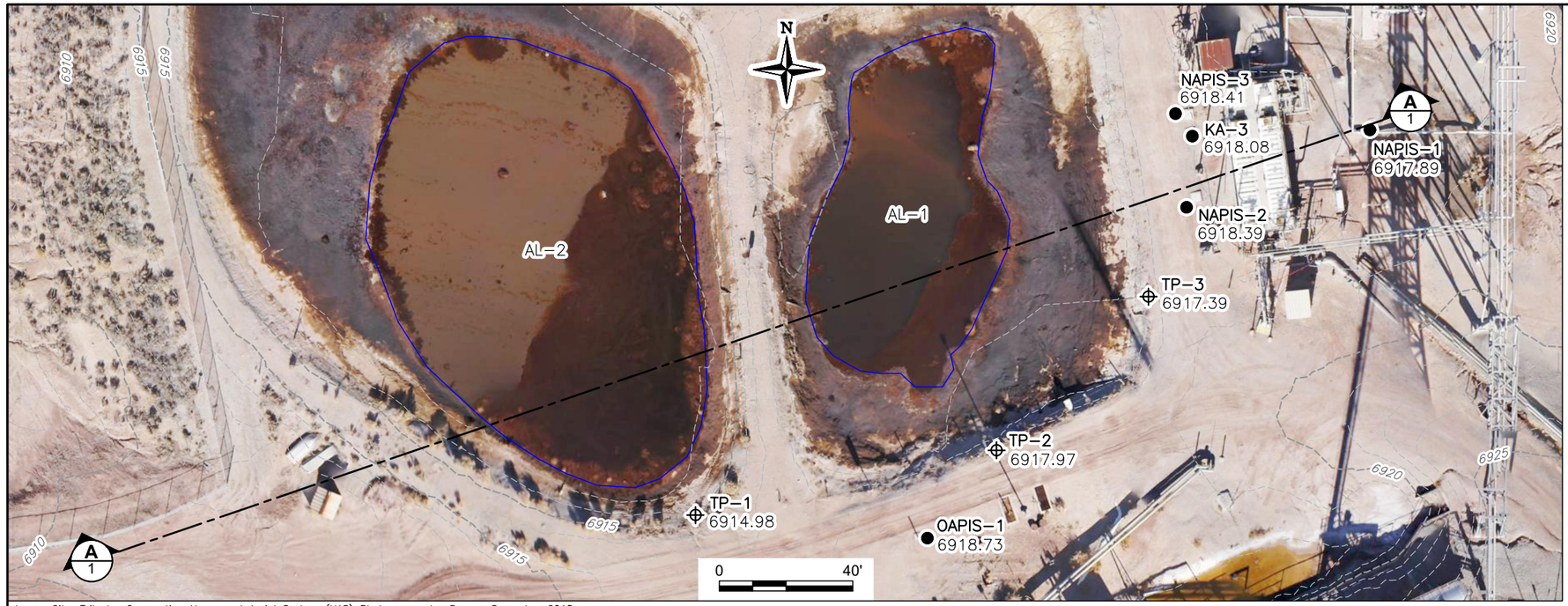


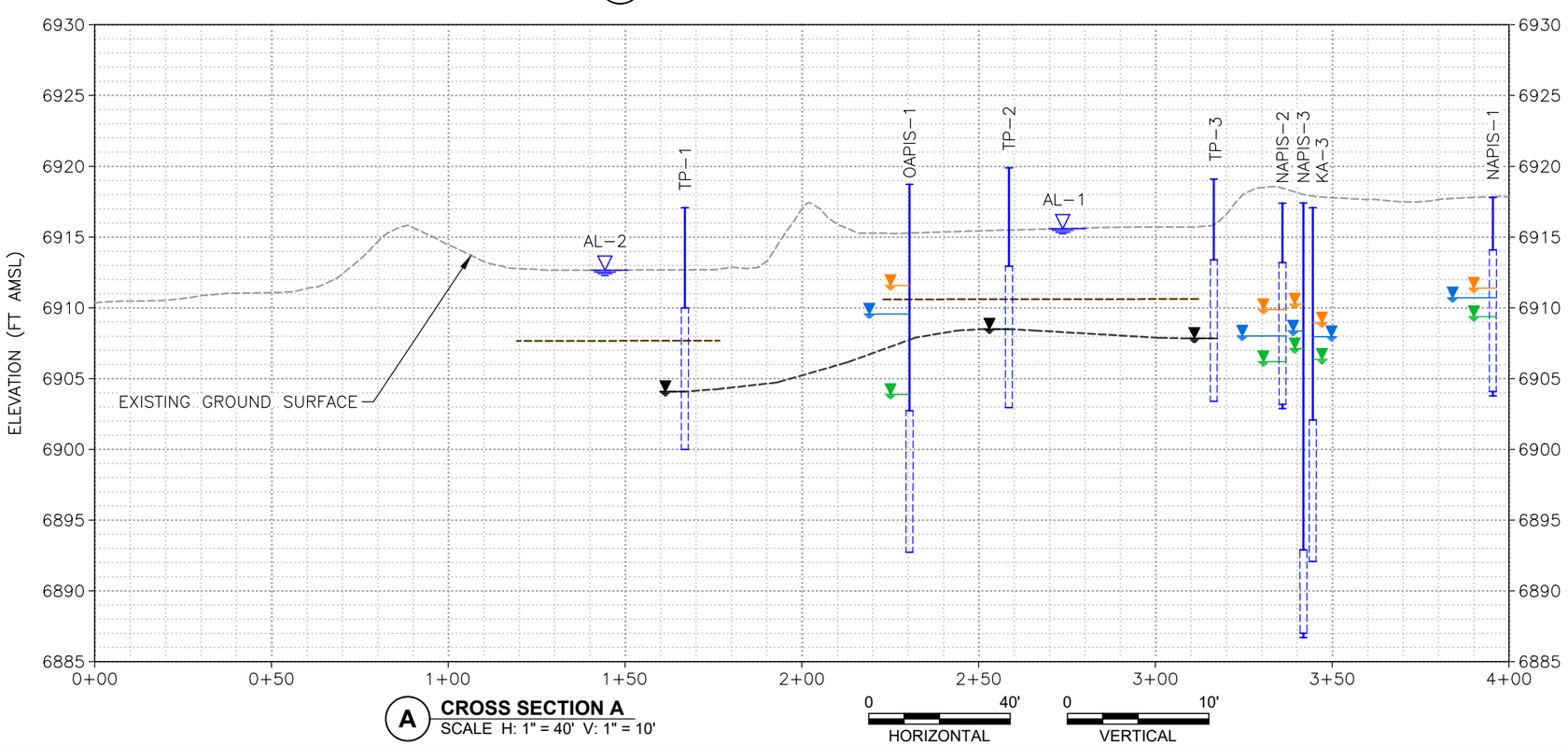
Image Cite: Trihydro Corporation Unmanned Aerial System (UAS) Photogrammetry Survey, December 2018

EXPLANATION

TP–1	TEST PIT AND DESIGNATION
OAPIS–1	MONITORING WELL AND DESIGNATION
6917.89	GROUND SURFACE ELEVATION (FT AMSL)
	POND WATER SURFACE
	WATER LEVEL (MAY 4, 2021 DATA)
	MINIMUM DTW (2011-2020)
	AVERAGE DTW (2011-2020)
	MAXIMUM DTW (2011-2020)
	APPROXIMATE DEPTH OF SLUDGE/TOP OF CLAY LINER
6600	SURFACE CONTOUR (1' INTERVAL)
	WATER BOUNDARY
AL	AERATION LAGOON
DTW	DEPTH TO WATER
FT BGS	FEET BELOW GROUND SURFACE
FT AMSL	FEET ABOVE MEAN SEA LEVEL
NAPIS	NEW API SEPARATOR

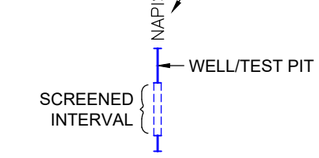
1 CROSS SECTION A PLAN VIEW

SCALE: 1" = 40'



A CROSS SECTION A

SCALE H: 1" = 40' V: 1" = 10'



WATER LEVEL DATA (2011 - 2020)

WELL	NO. OF DATA POINTS	DEPTH TO WATER, FT BGS		
		MAXIMUM	MINIMUM	AVERAGE
NAPIS-1	39	8.41	6.40	7.08
NAPIS-2	39	10.29	7.15	9.05
NAPIS-3	38	11.19	7.51	9.38
OAPIS-1	33	14.85	8.66	9.75
KA-3*	21	10.72	8.14	9.11

* KA-3 DATA 2014-2020

NAPIS REFERENCE DRAWINGS
NAPIS 42400-100, NAPIS 42400-106

REV.	DATE	DESCRIPTION REVISIONS	BY	CHK'D

DRAWN BY: PAC
CHECKED BY: JP
DATE: 8/2/2021
SCALE: AS SHOWN
FILE: 697-SWMU1-XSEC202108

Trihydro Corporation
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745-7474 (F) 307/745-7729

SWMU-1 AND NAPIS CROSS SECTION

WESTERN REFINING SOUTHWEST, LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

FIGURE 2

REV: -

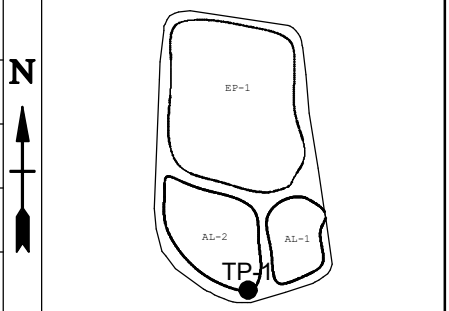
M:\TON\MARATHON\CADD\GALLUP__REPORTS\SWMU1_EVAPPONDCLOSURE\CROSSSECTION\697-SWMU1-XSEC202108

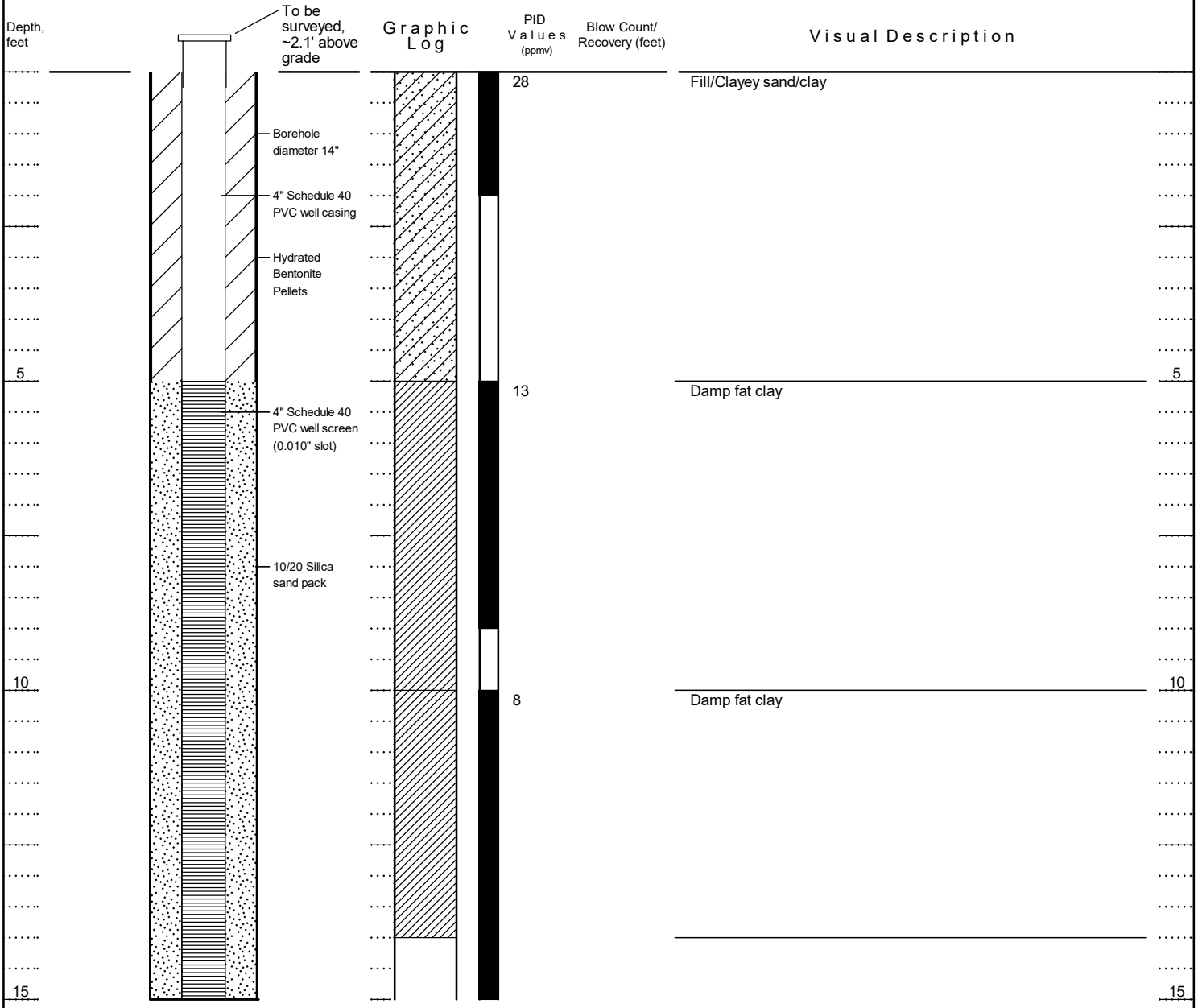
Attachment A Boring Logs

Well Log

Well: **TP-1**

Client: **Marathon Gallup Refinery**		
Date Started: **4/13/21**	Date Completed: **4/13/21**	Permit Number:
Logged By: **Mackenzie Swift**	Driller: **Jeff Cothron**	1/4, 1/4, S, T, R:
Drilling Co.: **Terracon**	Drilling Rig: **Truck Rig**	Borehole Diameter: **14"**
Method: **Hollow Stem Auger**	Measuring Point Elev. (ft.-msl):	Sample Type: **Grab**
Total Depth (ft): **15**	Ground Surface Elev. (ft.-msl):	Location: **SWMU-1**

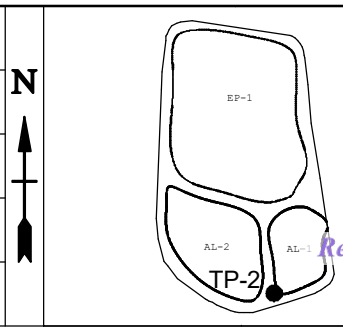




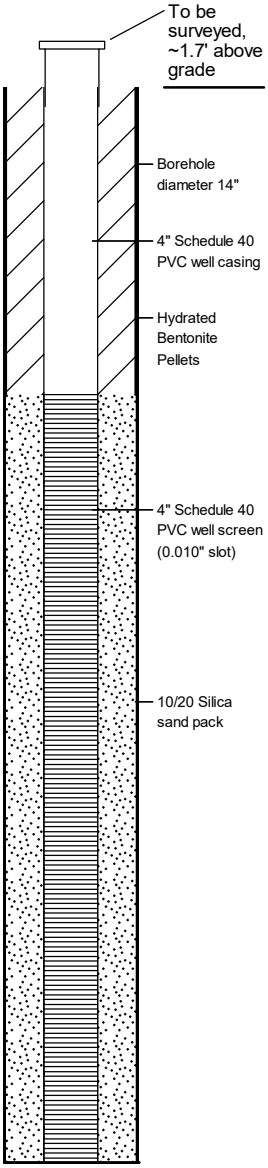
Well Log

Well: **TP-2**

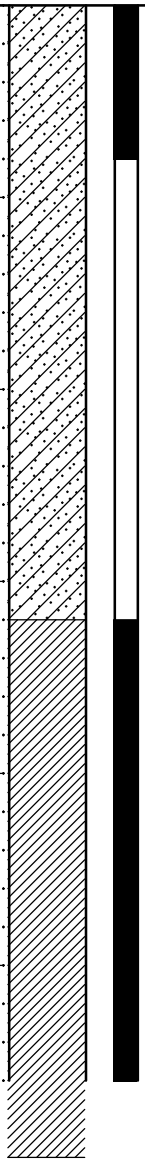
Client: **Marathon Gallup Refinery**		
Date Started: **4/13/21**	Date Completed: **4/13/21**	Permit Number:
Logged By: **Mackenzie Swift**	Driller: **Jeff Cothron**	1/4, 1/4, S, T, R:
Drilling Co.: **Terracon**	Drilling Rig: **Truck Rig**	Borehole Diameter: **14"**
Method: **Hollow Stem Auger**	Measuring Point Elev. (ft.-msl):	Sample Type: **Grab**
Total Depth (ft): **14**	Ground Surface Elev. (ft.-msl):	Location: **SWMU-1**



CONSTRUCTION



SAMPLING DATA



Depth, feet	PID Values (ppmv)	Blow Count/ Recovery (feet)
0	<1	
5		
10	19	

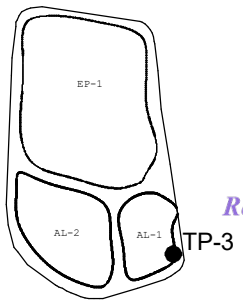
LITHOLOGY

Visual Description
Fill/Clayey sand/clay
Damp fat clay, damp

Well Log

Well: **TP-3**

Client: **Marathon Gallup Refinery**		
Date Started: **4/13/21**	Date Completed: **4/13/21**	Permit Number:
Logged By: **Mackenzie Swift**	Driller: **Jeff Cothron**	1/4, 1/4, S, T, R:
Drilling Co.: **Terracon**	Drilling Rig: **Truck Rig**	Borehole Diameter: **14"**
Method: **Hollow Stem Auger**	Measuring Point Elev. (ft.-msl):	Sample Type: **Grab**
Total Depth (ft): **15**	Ground Surface Elev. (ft.-msl):	Location: **SWMU-1**

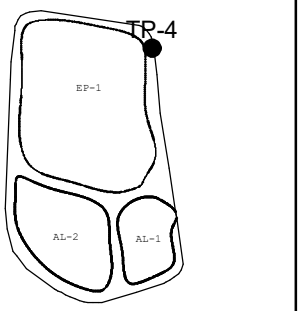


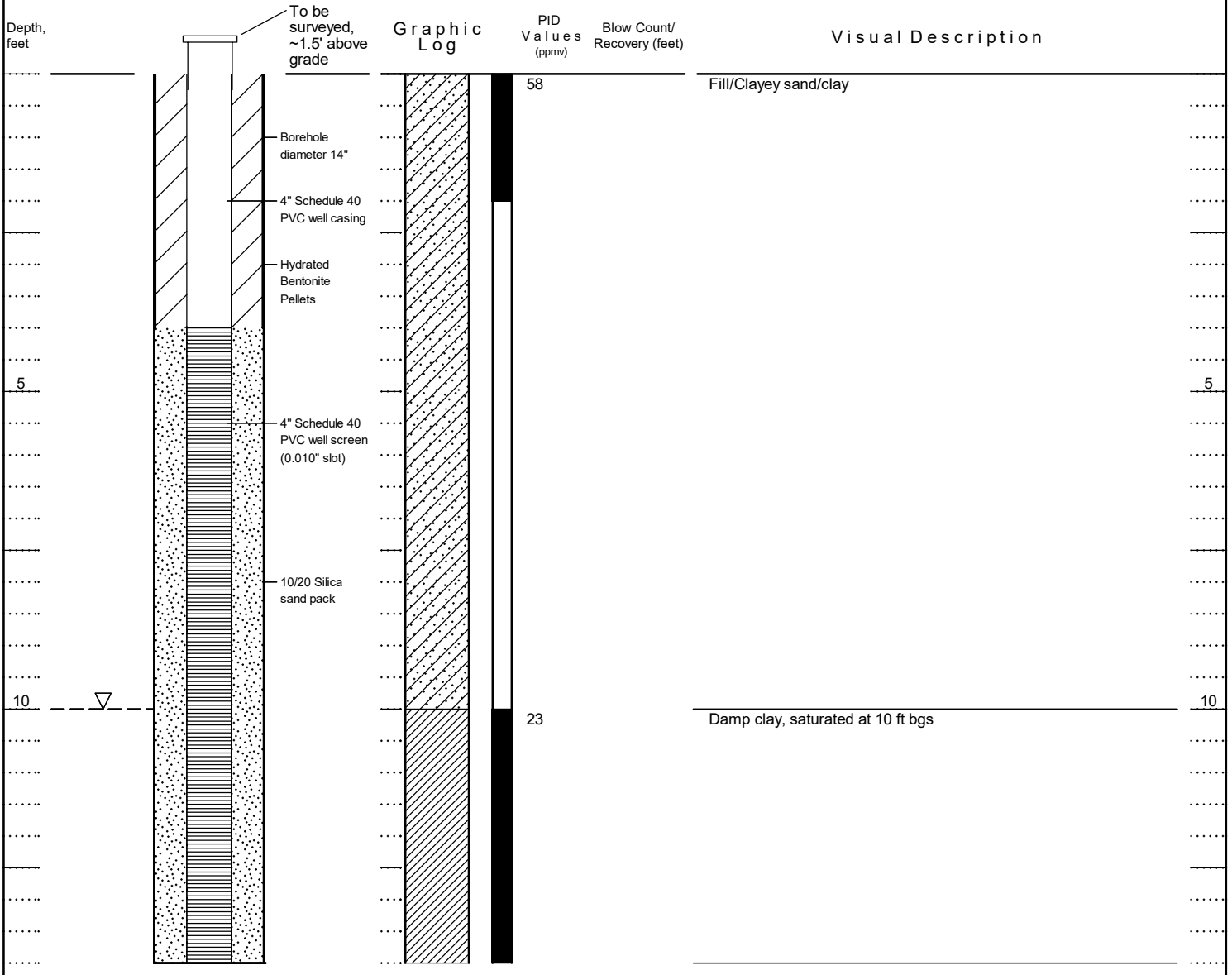
CONSTRUCTION	SAMPLING DATA		LITHOLOGY
Depth, feet	Graphic Log	PID Values (ppmv) / Blow Count/ Recovery (feet)	Visual Description
To be surveyed, ~1.9' above grade		0	Fill/Clayey sand/clay
Borehole diameter 14"			
4" Schedule 40 PVC well casing			
Hydrated Bentonite Pellets			
5		51	Damp fat clay
4" Schedule 40 PVC well screen (0.010" slot)			
10/20 Silica sand pack			
10		3	Damp fat clay
15			

Well Log

Well: **TP-4**

Client: **Marathon Gallup Refinery**		
Date Started: **4/13/21**	Date Completed: **4/13/21**	Permit Number:
Logged By: **Mackenzie Swift**	Driller: **Jeff Cothron**	1/4, 1/4, S, T, R:
Drilling Co.: **Terracon**	Drilling Rig: **Truck Rig**	Borehole Diameter: **14"**
Method: **Hollow Stem Auger**	Measuring Point Elev. (ft.-msl):	Sample Type: **Grab**
Total Depth (ft): **14**	Ground Surface Elev. (ft.-msl):	Location: **SWMU-1**





Attachment B SWMU-1 Drill Cuttings Analytical Results

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

May 03, 2021

John Pietz

Marathon
92 Giant Crossing Rd
Gallup, NM 87301
TEL: (505) 722-3833
FAX:

RE: SWMU 1 Test Pits Borrow Pit Sump OrderNo.: 2104821

Dear John Pietz:

Hall Environmental Analysis Laboratory received 2 sample(s) on 4/16/2021 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data 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 #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2104821**
Date Reported: **5/3/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: SWMV 1 Composite
Project: SWMU 1 Test Pits Borrow Pit Sump
Collection Date: 4/14/2021 12:00:00 PM
Lab ID: 2104821-001 **Matrix:** SOIL
Received Date: 4/16/2021 4:17:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **ags**	
Mercury	ND	0.020		mg/L	1	4/23/2021 11:11:07 AM	59582
EPA METHOD 6010B: TCLP METALS						Analyst: **JLF**	
Arsenic	ND	5.0		mg/L	1	4/23/2021 11:04:16 AM	59584
Barium	ND	100		mg/L	1	4/23/2021 11:04:16 AM	59584
Cadmium	ND	1.0		mg/L	1	4/23/2021 11:04:16 AM	59584
Chromium	ND	5.0		mg/L	1	4/23/2021 11:04:16 AM	59584
Lead	ND	5.0		mg/L	1	4/23/2021 1:08:02 PM	59584
Selenium	ND	1.0		mg/L	1	4/23/2021 11:04:16 AM	59584
Silver	ND	5.0		mg/L	1	4/23/2021 11:04:16 AM	59584
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	4/27/2021 6:30:35 PM	59621
3+4-Methylphenol	ND	200		mg/L	1	4/27/2021 6:30:35 PM	59621
2,4-Dinitrotoluene	ND	0.13		mg/L	1	4/27/2021 6:30:35 PM	59621
Hexachlorobenzene	ND	0.13		mg/L	1	4/27/2021 6:30:35 PM	59621
Hexachlorobutadiene	ND	0.50		mg/L	1	4/27/2021 6:30:35 PM	59621
Hexachloroethane	ND	3.0		mg/L	1	4/27/2021 6:30:35 PM	59621
Nitrobenzene	ND	2.0		mg/L	1	4/27/2021 6:30:35 PM	59621
Pentachlorophenol	ND	100		mg/L	1	4/27/2021 6:30:35 PM	59621
Pyridine	ND	5.0		mg/L	1	4/27/2021 6:30:35 PM	59621
2,4,5-Trichlorophenol	ND	400		mg/L	1	4/27/2021 6:30:35 PM	59621
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	4/27/2021 6:30:35 PM	59621
Cresols, Total	ND	200		mg/L	1	4/27/2021 6:30:35 PM	59621
Surr: 2-Fluorophenol	63.9	15-97.5		%Rec	1	4/27/2021 6:30:35 PM	59621
Surr: Phenol-d5	49.5	15-77.3		%Rec	1	4/27/2021 6:30:35 PM	59621
Surr: 2,4,6-Tribromophenol	73.8	15-112		%Rec	1	4/27/2021 6:30:35 PM	59621
Surr: Nitrobenzene-d5	75.6	15-119		%Rec	1	4/27/2021 6:30:35 PM	59621
Surr: 2-Fluorobiphenyl	71.6	15-89.2		%Rec	1	4/27/2021 6:30:35 PM	59621
Surr: 4-Terphenyl-d14	74.8	15-137		%Rec	1	4/27/2021 6:30:35 PM	59621
EPA METHOD 8260B: TCLP COMPOUNDS						Analyst: **JMR**	
Benzene	ND	0.50		ppm	10	4/20/2021 2:18:15 PM	59501
1,2-Dichloroethane (EDC)	ND	0.50		ppm	10	4/20/2021 2:18:15 PM	59501
2-Butanone	ND	200		ppm	10	4/20/2021 2:18:15 PM	59501
Carbon tetrachloride	ND	0.50		ppm	10	4/20/2021 2:18:15 PM	59501
Chlorobenzene	ND	100		ppm	10	4/20/2021 2:18:15 PM	59501
Chloroform	ND	6.0		ppm	10	4/20/2021 2:18:15 PM	59501
1,4-Dichlorobenzene	ND	7.5		ppm	10	4/20/2021 2:18:15 PM	59501
1,1-Dichloroethene	ND	0.70		ppm	10	4/20/2021 2:18:15 PM	59501
Tetrachloroethene (PCE)	ND	0.70		ppm	10	4/20/2021 2:18:15 PM	59501

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
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2104821**
Date Reported: **5/3/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: SWMV 1 Composite
Project: SWMU 1 Test Pits Borrow Pit Sump
Collection Date: 4/14/2021 12:00:00 PM
Lab ID: 2104821-001 **Matrix:** SOIL
Received Date: 4/16/2021 4:17:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: TCLP COMPOUNDS						Analyst: **JMR**	
Trichloroethene (TCE)	ND	0.50		ppm	10	4/20/2021 2:18:15 PM	59501
Vinyl chloride	ND	0.20		ppm	10	4/20/2021 2:18:15 PM	59501
Surr: 1,2-Dichloroethane-d4	95.8	70-130		%Rec	10	4/20/2021 2:18:15 PM	59501
Surr: 4-Bromofluorobenzene	82.8	70-130		%Rec	10	4/20/2021 2:18:15 PM	59501
Surr: Dibromofluoromethane	100	70-130		%Rec	10	4/20/2021 2:18:15 PM	59501
Surr: Toluene-d8	95.8	70-130		%Rec	10	4/20/2021 2:18:15 PM	59501

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

Qualifiers:

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

Pace Analytical®

ANALYTICAL REPORT

April 30, 2021

Hall Environmental Analysis Laboratory

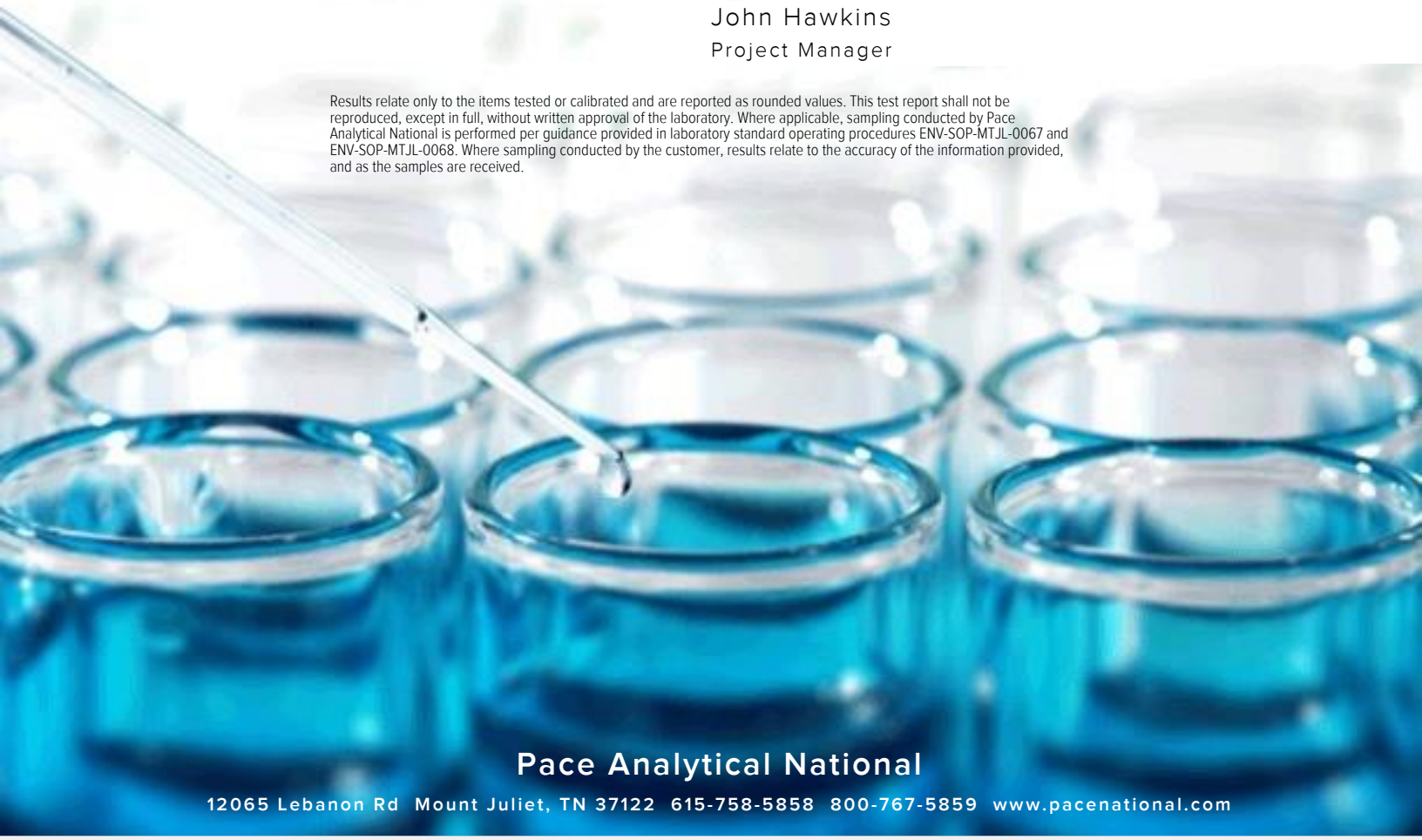
Sample Delivery Group:	L1341121
Samples Received:	04/20/2021
Project Number:	
Description:	

Report To: Jackie Bolte
4901 Hawkins NE
Albuquerque, NM 87109

Entire Report Reviewed By:

John Hawkins
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

2104821-001B SWMU 1 OCMPOSITE L1341121-01 Solid

Collected by	Collected date/time	Received date/time
	04/14/21 12:00	04/20/21 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012 B	WG1660441	1	04/29/21 09:55	04/29/21 16:23	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9034-9030B	WG1656056	1	04/21/21 21:00	04/21/21 21:00	LDT	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1658421	1	04/26/21 02:31	04/26/21 08:00	ARD	Mt. Juliet, TN
Wet Chemistry by Method D93/1010A	WG1657481	1	04/23/21 19:00	04/23/21 19:00	LRP	Mt. Juliet, TN

2104821-002B BORROW PIT COMPOSITE L1341121-02 Solid

Collected by	Collected date/time	Received date/time
	04/15/21 12:00	04/20/21 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012 B	WG1660441	1	04/29/21 09:55	04/29/21 16:24	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9034-9030B	WG1656056	1	04/21/21 21:00	04/21/21 21:00	LDT	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1658421	1	04/26/21 02:31	04/26/21 08:00	ARD	Mt. Juliet, TN
Wet Chemistry by Method D93/1010A	WG1657481	1	04/23/21 19:00	04/23/21 19:00	LRP	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Project Manager

Project Narrative

All Reactive Cyanide results reported in the attached report were determined as totals using method 9012B.
All Reactive Sulfide results reported in the attached report were determined as totals using method 9034/9030B.

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	04/29/2021 16:23	WG1660441

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	04/21/2021 21:00	WG1656056

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.01	T8	1	04/26/2021 08:00	WG1658421

Sample Narrative:

L1341121-01 WG1658421: 9.01 at 21.6C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	04/23/2021 19:00	WG1657481

Method Blank (MB)

(MB) R3648401-1 04/29/21 16:18

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

Laboratory Control Sample (LCS)

(LCS) R3648401-2 04/29/21 16:19

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.42	96.7	85.0-115	

Method Blank (MB)

(MB) R3644845-1 04/21/21 21:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

Laboratory Control Sample (LCS)

(LCS) R3644845-2 04/21/21 21:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	84.0	84.0	70.0-130	

L1340187-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1340187-03 04/21/21 21:00 • (MS) R3644845-3 04/21/21 21:00 • (MSD) R3644845-4 04/21/21 21:00

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Sulfide	100	ND	87.6	87.8	87.6	87.8	1	70.0-130			0.209	20

Laboratory Control Sample (LCS)

(LCS) R3646486-1 04/26/21 08:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 19.9C

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

(LCS) R3645953-1 04/23/21 19:00 • (LCSD) R3645953-2 04/23/21 19:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	Deg. F	Deg. F	Deg. F	%	%	%			%	%
Ignitability	126	127	125	101	99.0	95.6-104			1.59	10

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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	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).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, 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.
Limits	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 duplicated within these ranges.
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.
Qualifier	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.
Result	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” (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.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	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.
Quality Control Summary (Qc)	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 being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This 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.
Sample Results (Sr)	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 Summary (Ss)	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.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

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

SUB CONTRATOR: Pace TN	COMPANY: PACE TN	PHONE: (800) 767-5859	FAX: (615) 758-5859
ADDRESS: 12065 Lebanon Rd		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Mt. Juliet, TN 37122			

U341121

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2104821-001B	SWMU 1 Composite	4OZGU	Soil	4/14/2021 12:00:00 PM	1	RCI -01
2	2104821-002B	Borrow Pit Composite	4OZGU	Soil	4/15/2021 12:00:00 PM	1	RCI -02

B067

Sample Receipt Checklist

COC Seal Present/Intact: Y N — If Applicable
COC Signed/Accurate: Y N — VOA Zero Headspace: Y N
Bottles arrive intact: Y N — Pres.Correct/Check: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
RAD Screen <0.5 mR/hr: Y N

A2 1.57 1-16 COOL1

SPECIAL INSTRUCTIONS / COMMENTS: 1749 9998 3896

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By: SGL	Date: 4/19/2021	Time: 10:24 AM	Received By: B. Barnes	Date: 4/20/21	Time: 0845
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☑ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples _____ °C Attempt to Cool ? _____
Comments: _____

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **lcs-59501** SampType: **LCS** TestCode: **EPA Method 8260B: TCLP Compounds**
Client ID: **LCSS** Batch ID: **59501** RunNo: **76828**
Prep Date: **4/19/2021** Analysis Date: **4/20/2021** SeqNo: **2723024** Units: **ppm**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.050	1.000	0	98.2	70	130			
Chlorobenzene	ND	10	1.000	0	101	70	130			
1,1-Dichloroethene	1.1	0.070	1.000	0	106	70	130			
Trichloroethene (TCE)	0.91	0.050	1.000	0	91.3	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.3	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.7	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.48		0.5000		96.7	70	130			

Sample ID: **mb-59501** SampType: **MBLK** TestCode: **EPA Method 8260B: TCLP Compounds**
Client ID: **PBS** Batch ID: **59501** RunNo: **76828**
Prep Date: **4/19/2021** Analysis Date: **4/20/2021** SeqNo: **2723025** Units: **ppm**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
2-Butanone	ND	20								
Carbon tetrachloride	ND	0.050								
Chlorobenzene	ND	10								
Chloroform	ND	0.60								
1,4-Dichlorobenzene	ND	0.75								
1,1-Dichloroethene	ND	0.070								
Tetrachloroethene (PCE)	ND	0.070								
Trichloroethene (TCE)	ND	0.050								
Vinyl chloride	ND	0.020								
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.0	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.3	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		105	70	130			
Surr: Toluene-d8	0.52		0.5000		103	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 Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **2104821-002ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**
Client ID: **Borrow Pit Composi** Batch ID: **59588** RunNo: **76961**
Prep Date: **4/22/2021** Analysis Date: **4/27/2021** SeqNo: **2727780** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.3	0.50	0.4000	0.8365	111	60.2	138			
Chlorobenzene	0.37	0.30	0.4000	0	92.6	70	130			
1,1-Dichloroethene	ND	0.70	0.4000	0	93.1	70	130			
Trichloroethene (TCE)	0.40	0.20	0.4000	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		107	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		97.6	70	130			
Surr: Dibromofluoromethane	0.22		0.2000		110	70	130			
Surr: Toluene-d8	0.20		0.2000		102	70	130			

Sample ID: **2104821-002amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**
Client ID: **Borrow Pit Composi** Batch ID: **59588** RunNo: **76961**
Prep Date: **4/22/2021** Analysis Date: **4/27/2021** SeqNo: **2727781** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.50	0.4000	0.8365	94.8	60.2	138	5.18	20	
Chlorobenzene	0.36	0.20	0.4000	0	89.1	70	130	3.81	20	
1,1-Dichloroethene	0.36	0.20	0.4000	0	89.8	70	130	3.63	20	
Trichloroethene (TCE)	0.39	0.20	0.4000	0	97.7	70	130	3.46	20	
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		107	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		100	70	130	0	0	
Surr: Dibromofluoromethane	0.22		0.2000		108	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		97.3	70	130	0	0	

Sample ID: **lcs-59588** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS** Batch ID: **59588** RunNo: **76961**
Prep Date: **4/22/2021** Analysis Date: **4/26/2021** SeqNo: **2727783** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50	0.4000	0	115	70	130			
Chlorobenzene	ND	100	0.4000	0	94.0	70	130			
1,1-Dichloroethene	ND	0.70	0.4000	0	98.8	70	130			
Trichloroethene (TCE)	ND	0.50	0.4000	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		112	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	70	130			
Surr: Dibromofluoromethane	0.24		0.2000		118	70	130			
Surr: Toluene-d8	0.20		0.2000		99.8	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 Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **mb-59588** SampType: **MBLK** TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS** Batch ID: **59588** RunNo: **76961**
Prep Date: **4/22/2021** Analysis Date: **4/26/2021** SeqNo: **2727784** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	70	130			
Surr: Dibromofluoromethane	0.23		0.2000		114	70	130			
Surr: Toluene-d8	0.20		0.2000		102	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 Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **mb-59621** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS** Batch ID: **59621** RunNo: **76998**
Prep Date: **4/26/2021** Analysis Date: **4/27/2021** SeqNo: **2729143** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.095		0.2000		47.6	15	97.5			
Surr: Phenol-d5	0.076		0.2000		37.8	15	77.3			
Surr: 2,4,6-Tribromophenol	0.11		0.2000		54.5	15	112			
Surr: Nitrobenzene-d5	0.057		0.1000		57.3	15	119			
Surr: 2-Fluorobiphenyl	0.058		0.1000		58.1	15	89.2			
Surr: 4-Terphenyl-d14	0.069		0.1000		69.1	15	137			

Sample ID: **lcs-59621** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS** Batch ID: **59621** RunNo: **76998**
Prep Date: **4/26/2021** Analysis Date: **4/27/2021** SeqNo: **2729144** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.053	0.0010	0.1000	0	52.6	18.9	104			
3+4-Methylphenol	0.11	0.0010	0.2000	0	53.1	11.8	115			
2,4-Dinitrotoluene	0.041	0.0010	0.1000	0	41.4	16.6	95.5			
Hexachlorobenzene	0.057	0.0010	0.1000	0	56.7	42.6	112			
Hexachlorobutadiene	0.049	0.0010	0.1000	0	49.3	11.5	87.7			
Hexachloroethane	0.045	0.0010	0.1000	0	45.2	14.3	71.4			
Nitrobenzene	0.054	0.0010	0.1000	0	54.4	23.2	109			
Pentachlorophenol	0.059	0.0010	0.1000	0	59.2	29.4	102			
Pyridine	0.037	0.0010	0.1000	0	37.2	0	62.1			
2,4,5-Trichlorophenol	0.056	0.0010	0.1000	0	55.8	32.7	112			
2,4,6-Trichlorophenol	0.055	0.0010	0.1000	0	55.3	33.9	111			
Cresols, Total	0.16	0.0010	0.3000	0	52.9	5.83	117			
Surr: 2-Fluorophenol	0.072		0.2000		35.9	15	97.5			
Surr: Phenol-d5	0.056		0.2000		28.1	15	77.3			
Surr: 2,4,6-Tribromophenol	0.079		0.2000		39.5	15	112			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **lcs-59621** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS** Batch ID: **59621** RunNo: **76998**
Prep Date: **4/26/2021** Analysis Date: **4/27/2021** SeqNo: **2729144** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.045		0.1000		45.1	15	119			
Surr: 2-Fluorobiphenyl	0.044		0.1000		44.5	15	89.2			
Surr: 4-Terphenyl-d14	0.045		0.1000		45.0	15	137			

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 Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**

03-May-21

Client: Marathon

Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **MB-59582** SampType: **MBLK** TestCode: **MERCURY, TCLP**
Client ID: **PBW** Batch ID: **59582** RunNo: **76907**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725636** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LLLCS-59582** SampType: **LCSLL** TestCode: **MERCURY, TCLP**
Client ID: **BatchQC** Batch ID: **59582** RunNo: **76907**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725637** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.0001500	0	111	50	150			

Sample ID: **LCS-59582** SampType: **LCS** TestCode: **MERCURY, TCLP**
Client ID: **LCSW** Batch ID: **59582** RunNo: **76907**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725638** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	104	80	120			

Sample ID: **2104821-001AMS** SampType: **MS** TestCode: **MERCURY, TCLP**
Client ID: **SWMV 1 Composite** Batch ID: **59582** RunNo: **76907**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	75	125			

Sample ID: **2104821-001AMSD** SampType: **MSD** TestCode: **MERCURY, TCLP**
Client ID: **SWMV 1 Composite** Batch ID: **59582** RunNo: **76907**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725642** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.9	75	125	0	20	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2104821**
03-May-21

Client: Marathon
Project: SWMU 1 Test Pits Borrow Pit Sump

Sample ID: **MB-59584** SampType: **MBLK** TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW** Batch ID: **59584** RunNo: **76909**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725679** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-59584** SampType: **LCS** TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW** Batch ID: **59584** RunNo: **76909**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725681** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	112	80	120			
Barium	ND	100	0.5000	0	103	80	120			
Cadmium	ND	1.0	0.5000	0	103	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	113	80	120			
Silver	ND	5.0	0.1000	0	114	80	120			

Sample ID: **MB-59584** SampType: **MBLK** TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW** Batch ID: **59584** RunNo: **76909**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725775** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0								

Sample ID: **LCS-59584** SampType: **LCS** TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW** Batch ID: **59584** RunNo: **76909**
Prep Date: **4/22/2021** Analysis Date: **4/23/2021** SeqNo: **2725777** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	104	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Marathon** Work Order Number: **2104821** RcptNo: **1**

Received By: **Isaiah Ortiz** **4/16/2021 4:17:00 PM** I-Ox

Completed By: **Sean Livingston** **4/19/2021 10:13:26 AM** S-Lyst

Reviewed By: JR 4/19/21

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☐ No ☐ NA ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by CM 4/19/21

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.5	Good				

Chain-of-Custody Record

Client: Marathon Petroleum Company, Gallup Refinery

Mailing Address:

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: SWMU 1 Test Pits / Borrow Pit Sump

Project #:

Project Manager: John Pietz, Trihydro

Sampler: M. Swift, J. Pietz

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 5.6°C -0.1 CF (5.5°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2104821	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals TCLP	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA) TCLP	8270 (Semi-VOA) TCLP	Total Coliform (Present/Absent)	RCI
4/14/21	1200	Soil	SWMU 1 Composite	Jar / 3		001						X		X	X		X
4/15/21	1200	Soil	Borrow Pit Composite	↓	|	002						X		X	X		X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
4/16/21	1617			client	4/16/21	1617
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
characterize drill cuttings ~~from~~ for disposal from borrow pit borings, composite

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.

Attachment C Yield Test Data and Analyses

TP-2 Yield Test 4/16/2021

Time	Elapsed (hr:min)	Elapsed (min)	GPM	DTW'	TD'	Thickness'	Comment
9:41			0.00	11.52	16.89	5.37	time=0
9:42	0:01	1.00	<.5	12			
9:43	0:02	2.00	0.05	12.5			Flow meter not registering, too low. Bucket test 0.05 gpm
9:44	0:03	3.00		12.12			
9:45	0:04	4.00		12.16			
9:47	0:06	5.00		12.28			
9:52	0:11	11.00		12.41			
9:59	0:18	18.00		12.5			
10:04	0:23	23.00		12.5			
10:07	0:26	26.00		12.49			
10:15	0:34	34.00		12.55			
10:37	0:56	56.00	0.50	12.82			Increase flow rate to .5 gpm
10:42	1:01	61.00		13.55			
10:43	1:02	62.00		13.85			
10:44	1:03	63.00		14.21			
10:45	1:04	64.00		14.51			
10:47	1:06	66.00		14.57			
10:49	1:08	68.00		15.62			Stop 12.0 mins from increased flow rate to .5 gpm
10:51	1:10	70.00		15.4			Recovery
10:52	1:11	71.00		15.41			
10:53	1:12	72.00		15.39			
10:55	1:14	74.00		15.44			
10:58	1:17	77.00		15.37			
11:05	1:24	84.00		15.3			
11:15	1:34	94.00		15.25			
11:29	1:48	108.00		15.17			Stop 40.0 mins from stop recovery

Observation well OAPSIS-1 located 18'6" from TP-2

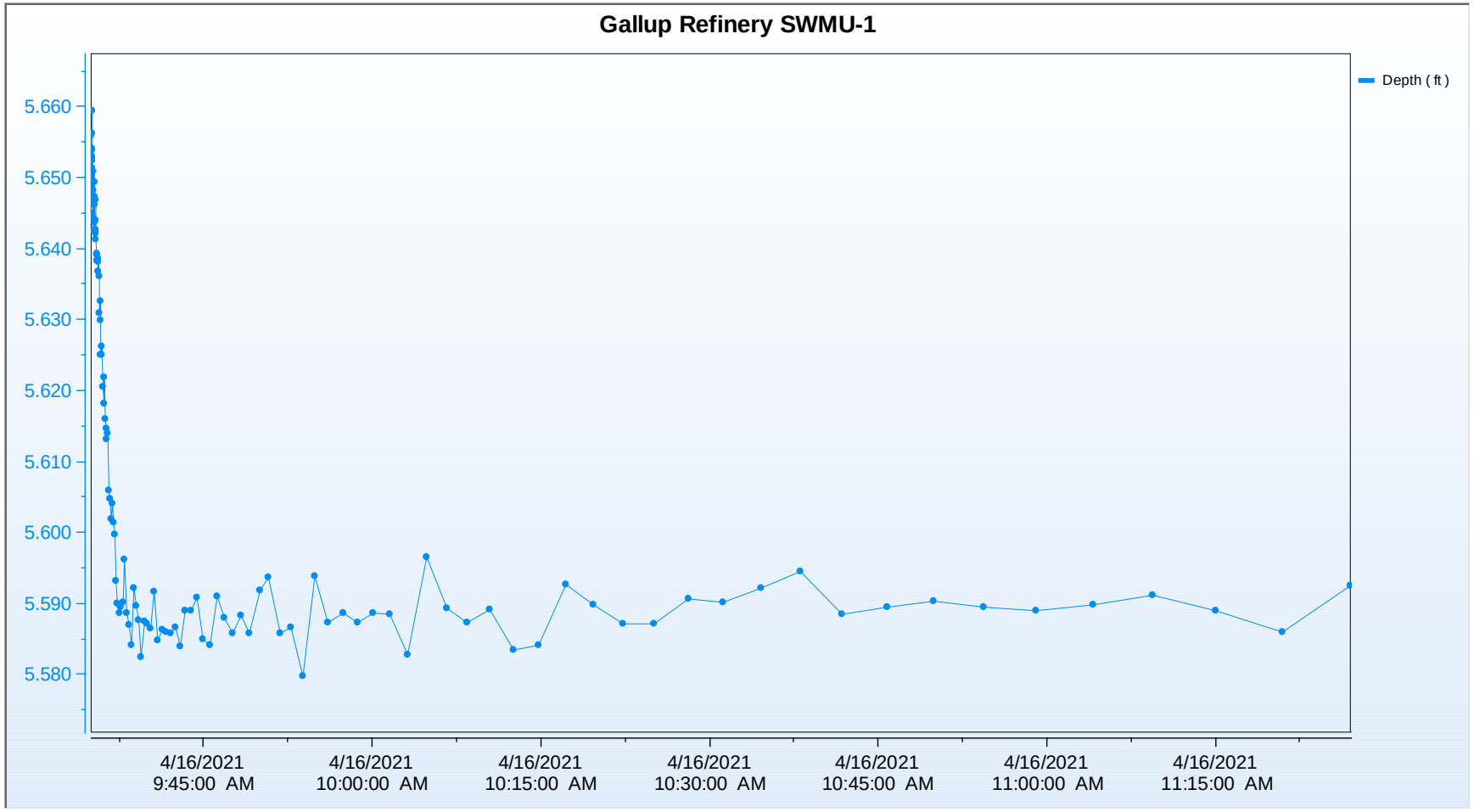
Time	Elapsed Time	Elapsed Min	Drawdown	GPM	DTW'	TD'	Thickness'	Comment
2:32				0:00	11.35	15.7	4.35	Time=0
2:34	0:02	2.00	0.26	0.8	11.61			Flow meter problem, bucket timed flow rate
2:41	0:09	9.00	1.39		12.74			
2:42	0:10	10.00	1.87		13.22			
2:46	0:14	14.00	3		14.35			
2:54	0:22	22.00	3.2		14.55			
2:56	0:24	24.00	3.43		14.78			
3:00	0:28	28.00	3.63	0.12	14.98			Bucket timed
3:02	0:30	30.00	3.72		15.07			
3:08	0:36	36.00	4.42		15.77			Stop, DTW at pump intake
3:38	1:06	66.00	3.98		15.33			Recovery
3:53	1:21	81.00	3.88		15.23			Recovery
4:15	1:43	103.00	3.74		15.09			Recovery

Observations wells NAPIS-2 and NAPIS-3, located 22'10" and 45'5" from TP-3

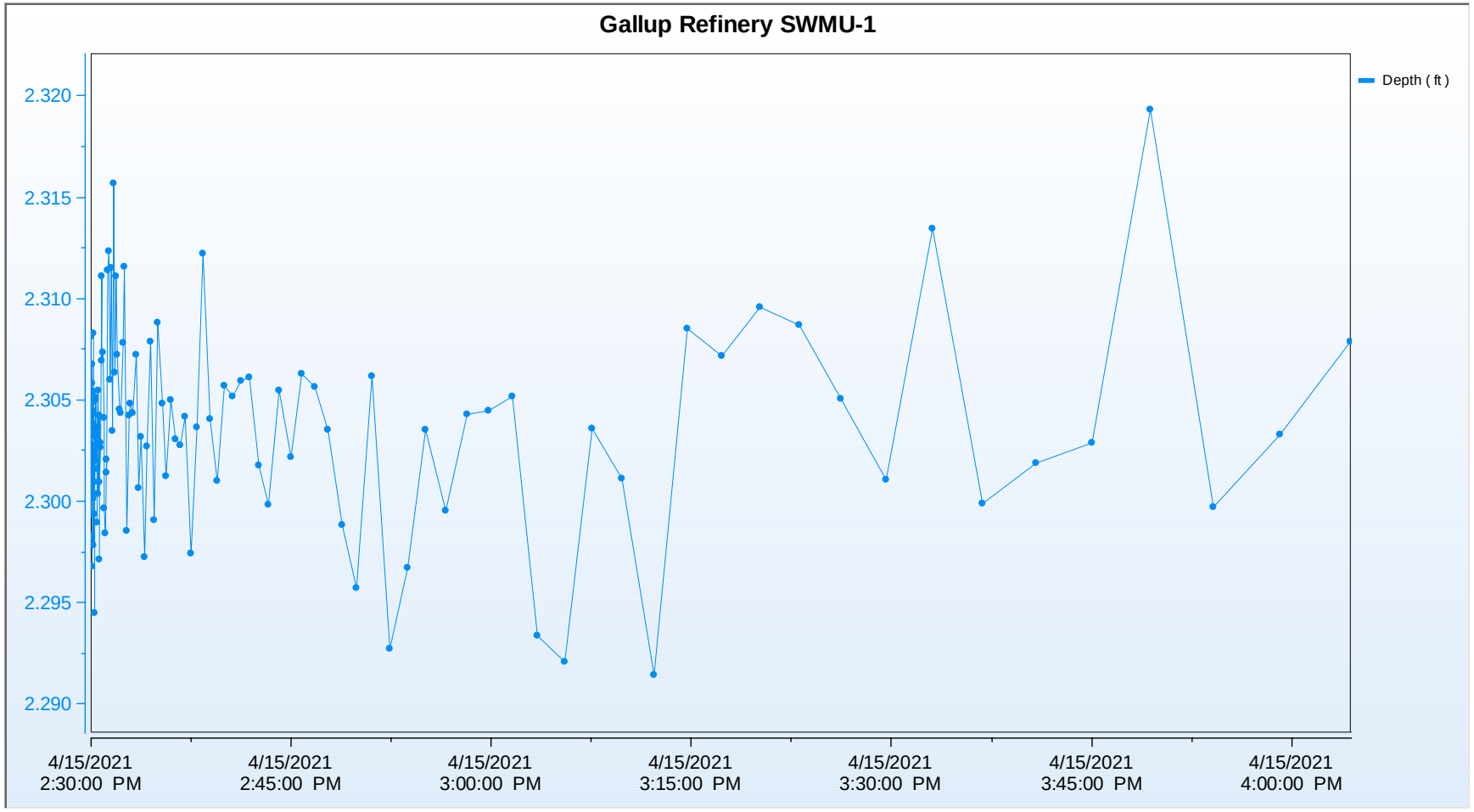
TP-4 Yield Test 4/15/2021

Time	Elapsed Time	Elapsed Min	GPM	DTW'	DD'	TD'	Thickness	Comment
12:00	0:00		0:00	9.66		15.6	5.89	Time-0
12:01	01:00	1.0	0.8	10.16	0.5			
12:09	09:00	9.0	0.86	10.93	1.27			
12:10	10:00	10.0	0.87	11.06	1.4			
12:11	11:00	11.0	0.82	11.15	1.49			
12:15	15:00	15.0	1	11.65	1.99			
12:25	25:00	25.0	1.01	11.92	2.26			
12:33	33:00	33.0	1.2	12.14	2.48			
12:46	46:00	46.0	3	14.14	4.48			Stop, DTW at pump intake

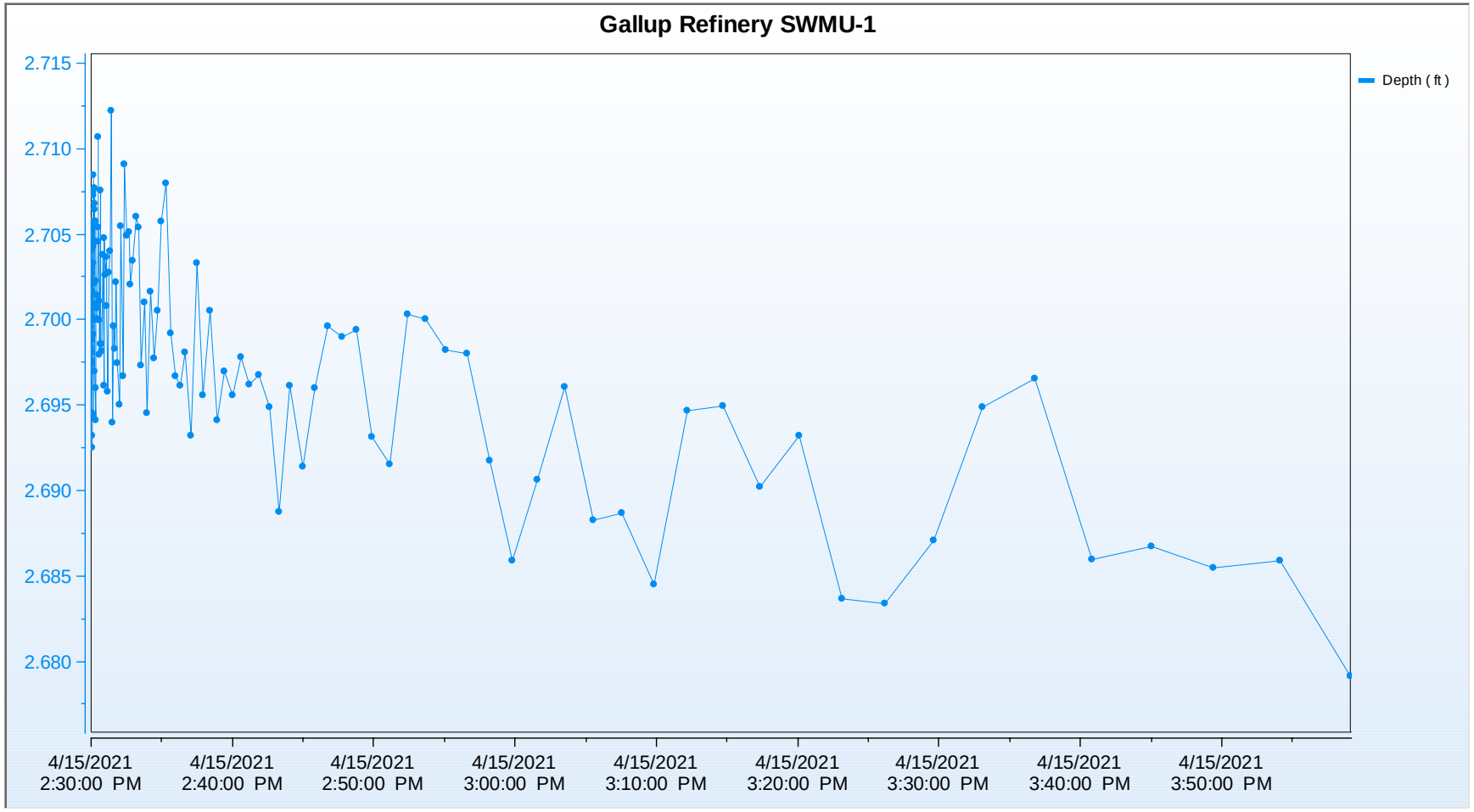
OAPSIS-1 Observation Well
TP-2 Yield Test



NAPIS-2 Observation Well
TP-3 Yield Test

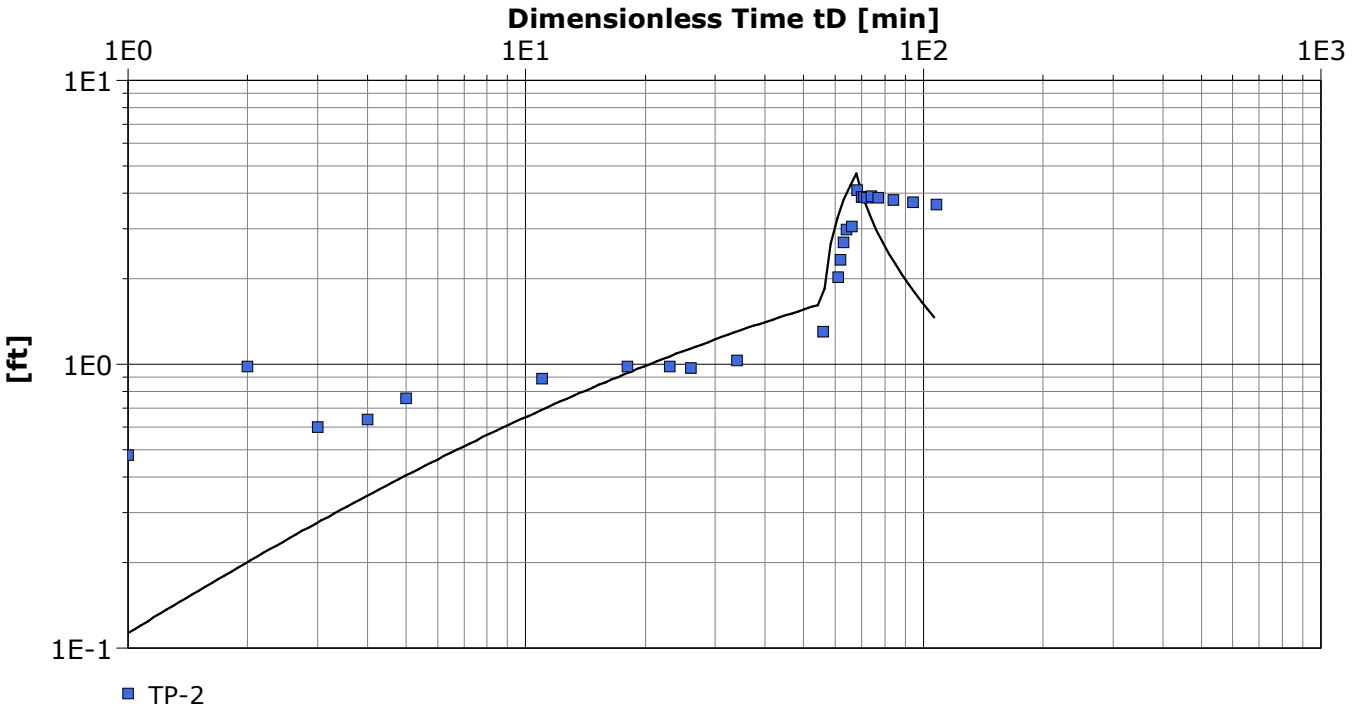


NAPIS-3 Observation Well
TP-3 Yield Test



	Pumping Test Analysis Report
	Project: Gallup SWMU-1
	Number:
	Client:

Location:	Pumping Test:	Pumping Well: TP-2
Test Conducted by:		Test Date: 6/30/2021
Analysis Performed by:	New analysis 6	Analysis Date: 6/30/2021
Aquifer Thickness:	Discharge: variable, average rate 0.17059 [U.S. gal/min]	

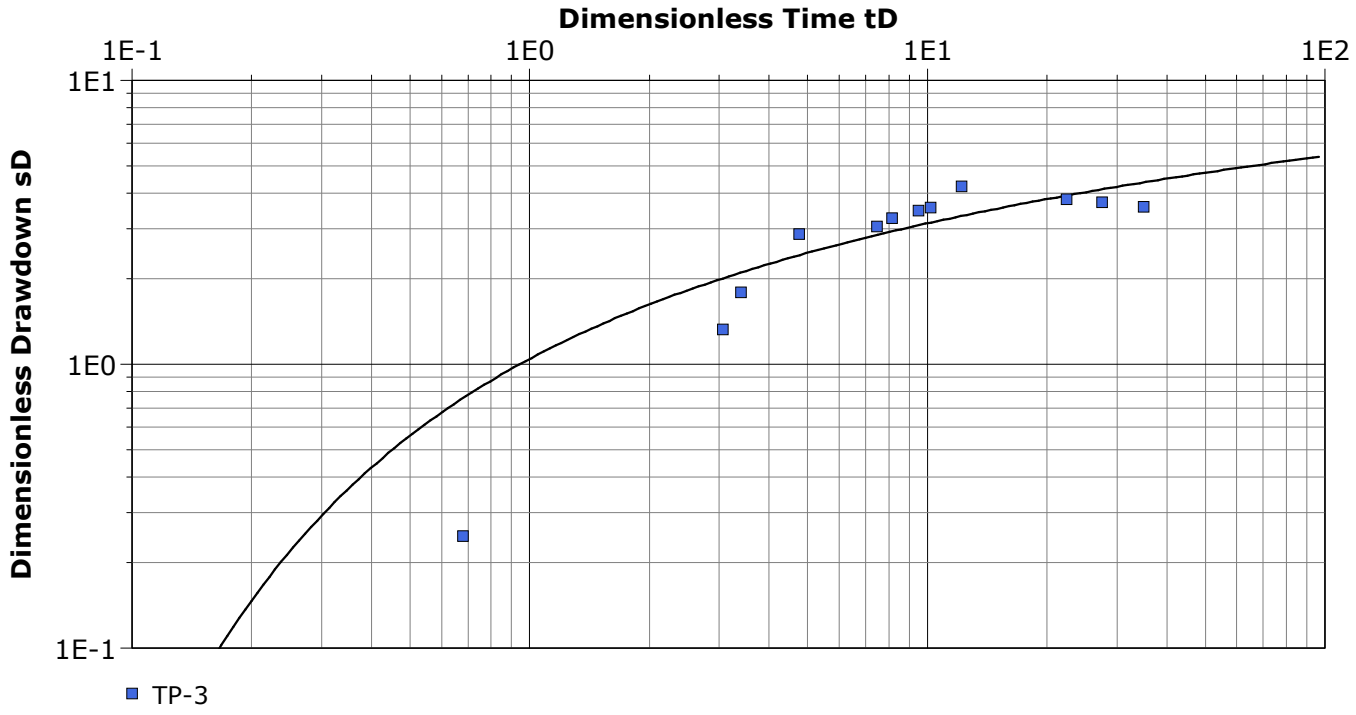


Calculation using Papadopulos & Cooper

Observation Well	Transmissivity [ft²/d]	Well-bore storage coefficient	Radial Distance to PW [ft]	
TP-2	1.80×10^{0}	9.90×10^{-1}	0.17	

	Pumping Test Analysis Report
	Project: Gallup SWMU-1
	Number:
	Client:

Location:	Pumping Test: Pumping Test 1	Pumping Well: TP-3
Test Conducted by:		Test Date: 6/30/2021
Analysis Performed by:	New analysis 2	Analysis Date: 6/30/2021
Aquifer Thickness:	Discharge Rate: 0.15 [U.S. gal/min]	

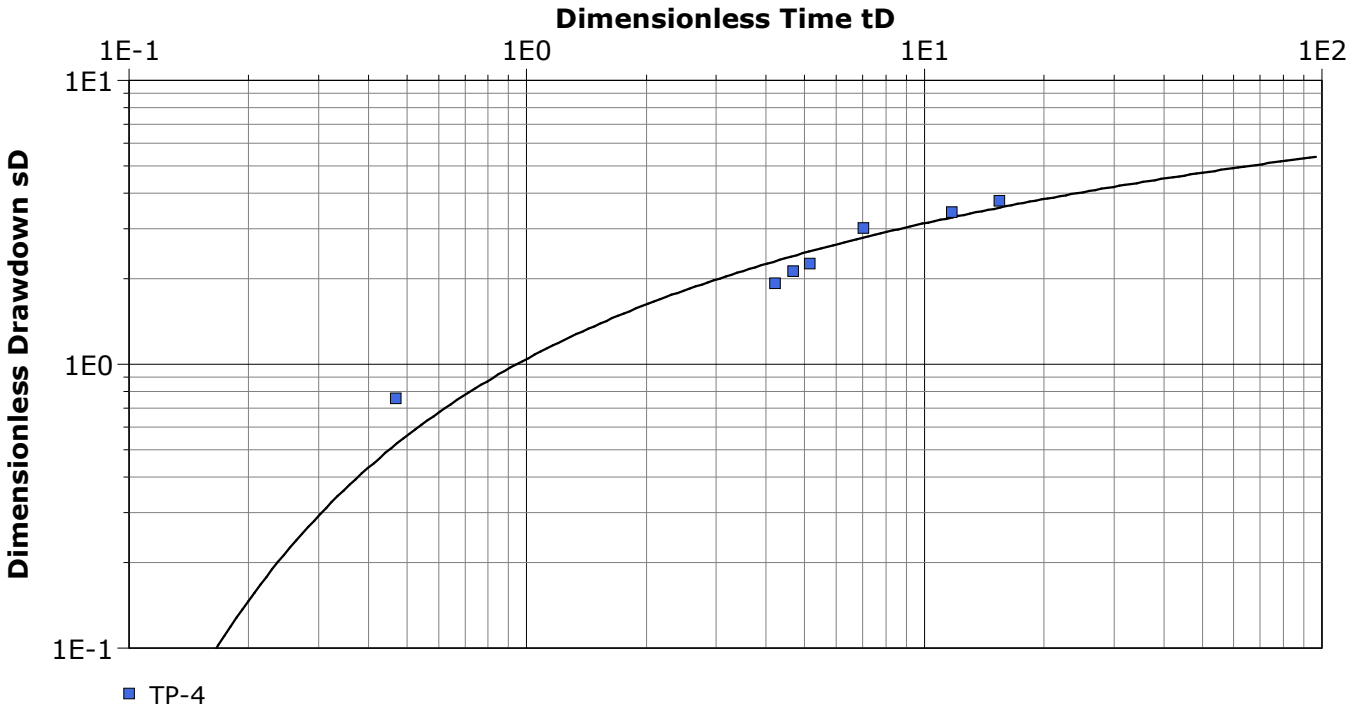


Calculation using Theis

Observation Well	Transmissivity [ft²/d]	Storage coefficient	Radial Distance to PW [ft]	
TP-3	2.20×10^{0}	1.61×10^{-1}	0.17	

	Pumping Test Analysis Report
	Project: Gallup SWMU-1
	Number:
	Client:

Location:	Pumping Test: TP-4	Pumping Well: TP-4
Test Conducted by:		Test Date: 6/30/2021
Analysis Performed by:	New analysis 3	Analysis Date: 7/14/2021
Aquifer Thickness:	Discharge Rate: 0.8 [U.S. gal/min]	



Calculation using Theis

Observation Well	Transmissivity [ft²/d]	Storage coefficient	Radial Distance to PW [ft]	
TP-4	1.86×10^{1}	9.90×10^{-1}	0.17	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 58161

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 58161
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
scwells	Accepted for Record Retention Purposes-Only	11/22/2022