## State of New Mexico Energy, Minerals and Natural Resources Department

Michelle Lujan-Grisham Governor

Melanie A. Kenderdine Cabinet Secretary-Designate

Ben Shelton Deputy Secretary (Acting)

Amy Barnhill Chevron Corporation PO Box 4324 Houston, TX 77210

09/27/2024

Gerasimos "Gerry" Razatos Division Director (Acting) Oil Conservation Division



RE: Determination of Administratively Complete Stage 1 & Stage 2 Abatement Plan & Public Notice and Participation for the <a href="Cooper Jal Unit South Injection Station">Cooper Jal Unit South Injection Station</a> (Incident #nAUTOfAB000105)

Ms. Barnhill,

The Oil Conservation Division (OCD) received a Stage 1 & 2 Abatement Plan as well as a Proposed Public Notice and Participation submittal prepared on Chevron Environmental Management Company's behalf by Arcadis, LLC. OCD has reviewed the plan and determined it to be administratively complete. In addition, OCD also approves the proposed draft of the Public Notice and Participation Proposal. The required public notice and participation should now proceed under the provisions of Subsections A and B of 19.15.30.15 NMAC. Proof of Public Notice must be provided to the OCD.

Additionally, both abatement plans are approved under the following conditions of approval:

- 1. Distribute Public Notice to all contacts, including surface owners, county commissioner, city and tribal officials who have been identified, and submit proof of distribution to OCD within fifteen (15) days from the approval date of this letter.
- 2. Provide OCD with an update within future groundwater monitoring reports of all ancillary remediation system and construction designs within six months of this approval letter date.
- 3. Include facility update after construction is complete or after one year from this approval date.

The division shall distribute notice of an abatement plan's filing with the next division and commission hearing docket following the plan's receipt.

OCD's approval of the Stage 1 & 2 Abatement Plans does not relieve Chevron, Inc of any other requirements imposed by any other regulatory agencies.

If you have any questions, please contact Mike Buchanan of the Environmental Incident Group at (505) 490-0798 or by email at *michael.buchanan@emnrd.nm.gov*.

Respectfully,

Rosa Romero

Environmental Bureau Chief

RosaM Romaro

RR/mb

1220 South St. Francis Drive, 3<sup>rd</sup> Floor • Santa Fe, New Mexico 87505 Phone (505) 476-3441 • <u>www.emnrd.state.nm.us/ocd</u>



# Pace Analytical® ANALYTICAL REPORT

September 13, 2022

















## Arcadis - Chevron - NM

Sample Delivery Group: L1529273

Samples Received: 08/25/2022

Project Number: 30144968 TASK 0002

Description: POD 2 - UEM4822 Cooper Jal

Site: **COOPER JAL** 

Report To: Russell Grant

10205 Westheimer Rd.

Project Manager

#800

Houston, TX 77042

Entire Report Reviewed By:

Chris McCord

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

		Collected by Daniel McGee	Collected date/time 08/24/22 10:50		
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
WG1919199 WG1917315	1 20	08/31/22 12:01 08/28/22 21:27	08/31/22 16:34 08/28/22 21:27	AEC GEB	Mt. Juliet, TN Mt. Juliet, TN
		Collected by	Collected date/time	Received da	te/time
		Daniel McGee	08/24/22 10:55	08/25/22 10:	15
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
WG1918454	1	08/30/22 11:35	08/30/22 15:14	SLP	Mt. Juliet, TN
WG1917315	5	08/28/22 21:40	08/28/22 21:40	GEB	Mt. Juliet, TN
		Collected by Daniel McGee	Collected date/time 08/24/22 11:15		
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
WG1919199	1	08/31/22 12:01	08/31/22 16:34	AEC	Mt. Juliet, TN
WG1917315	1	08/28/22 21:52	08/28/22 21:52	GEB	Mt. Juliet, TN
		Collected by Daniel McGee	Collected date/time 08/24/22 11:25		
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
WG1919199	1	08/31/22 12:01	08/31/22 16:34	AEC	Mt. Juliet, TN
WG1917315	1	08/28/22 22:05	08/28/22 22:05	GEB	Mt. Juliet, TN
		Collected by Daniel McGee	Collected date/time 08/24/22 11:50		
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
WG1919199	1	08/31/22 12:01	08/31/22 16:34	AEC	Mt. Juliet, TN
WG1917315	1	08/28/22 22:17	08/28/22 22:17	GEB	Mt. Juliet, TN
		Collected by Daniel McGee	Collected date/time 08/24/22 12:25		
Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
	WG1919199 WG1917315  Batch  WG1918454 WG1917315  Batch  WG1919199 WG1917315  Batch  WG1919199 WG1917315	WG1919199       1         WG1917315       20         Batch       Dilution         WG1918454       1         WG1917315       5         Batch       Dilution         WG1919199       1         WG1919199       1         WG1917315       1         Batch       Dilution         WG1919199       1         WG1917315       1	Batch   Dilution   Preparation date/time	Daniel McGee   O8/24/22 10:50	Batch   Dilution   Preparation   date/time   date/ti



















Gravimetric Analysis by Method 2540 C-2011

Wet Chemistry by Method 300.0

WG1919199

WG1917315

1

10

08/31/22 12:01

08/28/22 22:42

08/31/22 16:34

08/28/22 22:42

AEC

GEB

Mt. Juliet, TN

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.



















Chris McCord Project Manager

## SAMPLE RESULTS - 01

## Gravimetric Analysis by Method 2540 C-2011

Collected date/time: 08/24/22 10:50

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2320		50.0	1	08/31/2022 16:34	WG1919199

# Wet Chemistry by Method 300.0

3
55

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1040		7.58	20.0	20	08/28/2022 21:27	WG1917315













Collected date/time: 08/24/22 10:55

## Page 7 of 136

## SAMPLE RESULTS - 02

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	773		13.3	1	08/30/2022 15:14	WG1918454



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	239		1.90	5.00	5	08/28/2022 21:40	WG1917315

## Page 8 of 136

## SAMPLE RESULTS - 03

Collected date/time: 08/24/22 11:15

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	410		10.0	1	08/31/2022 16:34	WG1919199



## Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	35.7		0.379	1.00	1	08/28/2022 21:52	WG1917315



Ss











Collected date/time: 08/24/22 11:25

### Page 9 of 136

## SAMPLE RESULTS - 04

## Gravimetric Analysis by Method 2540 C-2011

Wet Chemistry by Method 300.0

Analyte

Chloride

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	371		10.0	1	08/31/2022 16:34	WG1919199

Dilution

1

Analysis

date / time

08/28/2022 22:05

Batch

WG1917315





# Ss













Result

mg/l

32.0

Qualifier

MDL

mg/l

0.379

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	371		10.0	1	08/31/2022 16:34	WG1919199

RDL

mg/l

1.00

# Released to Imaging: 9/27/2024 10:52:32 AM Arcadis - Chevron - NM

### Page 10 of 136

## SAMPLE RESULTS - 05

## Collected date/time: 08/24/22 11:50

Wet Chemistry by Method 300.0

Analyte

Chloride

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

43.1

Qualifier

MDL

mg/l

0.379

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	417		10.0	1	08/31/2022 16:34	WG1919199

Dilution

1

Analysis

date / time

08/28/2022 22:17

Batch

WG1917315

RDL

mg/l

1.00





















Collected date/time: 08/24/22 12:25

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## SAMPLE RESULTS - 06

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1040		20.0	1	08/31/2022 16:34	WG1919199







⁴Cn
•











	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	489		3.79	10.0	10	08/28/2022 22:42	WG1917315

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L1529273-02

### Method Blank (MB)

(MB) R3835448-1 08/30/22 15:14 MB Result MB Qualifier Analyte mq/l

U

mq/l

625

mq/l

1130

mg/l

%

2.11

%

3.66

MB RDL

Dissolved Solids

Analyte

Analyte

Dissolved Solids

Dissolved Solids

MB MDL mg/l 10.0 10.0

Ss

Cn

L1528414-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1528414-02 08/30/22 15:14 • (DUP) R3835448-3 08/30/22 15:14

Original Result DUP Result Dilution DUP RPD

mg/l

639

mg/l

1170

**DUP Qualifier** Limits

**DUP RPD** 

% 5

L1528459-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1528459-01 08/30/22 15:14 • (DUP) R3835448-4 08/30/22 15:14

Original Result DUP Result Dilution DUP RPD

**DUP RPD DUP Qualifier** Limits

%

LCS Qualifier

5

Gl

Sc

Laboratory Control Sample (LCS)

(LCS) R3835448-2 08/30/22 15:14

Spike Amount LCS Result LCS Rec. Rec. Limits % % Analyte mg/l mg/l Dissolved Solids 8800 8220 93.4 77.3-123

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L1529273-01,03,04,05,06

### M (1 1 D) (MD)

Method Blank (MB)

(MB) R3836317-1 08/31/22 16:34

MB Result MB Qualifier MB MDL MB RDL

 MB Result
 MB Qualifier
 MB MDL
 MB RD

 Analyte
 mg/l
 mg/l
 mg/l

 Dissolved Solids
 U
 10.0
 10.0



<sup>2</sup>Tc

<sup>3</sup>Ss

## L1529217-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1529217-02 08/31/22 16:34 • (DUP) R3836317-3 08/31/22 16:34

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/I	mg/l		%		%
Dissolved Solids	212	225	1	6.05	J3	5

# <sup>†</sup>Cn

<sup>5</sup>Sr



## L1529224-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1529224-02 08/31/22 16:34 • (DUP) R3836317-4 08/31/22 16:34

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	252	243	1	3.55		5





### Laboratory Control Sample (LCS)

(LCS) R3836317-2 08/31/22 16:34

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8040	91.4	77 3-123	

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Wet Chemistry by Method 300.0

L1529273-01,02,03,04,05,06

### Method Blank (MB)

(MB) R3831890-1 08/28/	22 18:29			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.379	1.00

# Ср





### L1528869-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1528869-01 08/28/22 19:23 • (DUP) R3831890-3 08/28/22 19:35

,	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	81.1	81.0	1	0.109		20







### L1529273-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1529273-05 08/28/22 22:17 • (DUP) R3831890-5 08/28/22 22:30

(OS) E1323273-OS O6/26/	Original Result	•		DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	43.1	42.1	1	2.50		20



## <sup>9</sup>Sc

## Laboratory Control Sample (LCS)

(LCS) R3831890-2 08/28/22 18:41

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	40.2	100	90.0-110	

## L1528869-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1528869-01 08/28/22 19:23 • (MS) R3831890-4 08/28/22 19:48

(03) 11320003 01 00/20/	03) E1320003 01 00/20/22 13:23 - (M3) N3031030 + 00/20/22 13:40												
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits							
Analyte	mg/l	mg/l	mg/l	%		%							
Chloride	50.0	81.1	129	95.5	1	80.0-120							

### L1529363-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1529363-03 08/28/22 23:45 • (MS) R3831890-6 08/28/22 23:57 • (MSD) R3831890-7 08/29/22 00:09

(03) 11323303-03 00/20/	Spike Amount			, ,	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	755	765	774	20.6	38.4	100	80.0-120	V	V	1.16	20

### 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

Appleviations and	a Deminions
MDL	Method Detection Limit.
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.

0 1:0	D
Qualifier	Description
Qualifici	DESCHIDITOLI

J3	The associated batch QC was outside the established quality control range for precision.
V	The sample concentration is too high to evaluate accurate spike recoveries





















Pace Analy	utical National	12065 Lebanon	Rd Mount Julia	t TN 37122
race Allai	yticai Nationai		i Ku Mourit Julie	l, IIN 3/122

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 <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina 1	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	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	LAO00356
Kentucky 16	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	Al30792	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234



<sup>\*</sup> Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto



















 $<sup>^* \, \</sup>text{Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.} \\$ 

Company Name/Address:			Billing Info	rmation:			4 15 16 16 16 16 16 16 16 16 16 16 16 16 16		Analys	is / Containe	r / Preservative	I Description	Chain of Custo	dy Page Lo
Arcadis - Chevron - NM  10205 Westheimer Rd. #800 Houston, TX 77042		401 East Suite 40	Accounts Payable 401 East Main Street Suite 400 El Paso, TX 79901									- FEOR	7 ace° ale advancing science	
Report to: Russell Grant			Email To: lydia.velez	gonzalez@arcad	is.com;russell	l.grant@	es						12065 Lebanon Rd I	Mount Juliet, TN 37122 via this chain of custody
Project Description: POD 2 - UEM4822 Cooper Jal		City/State Collected:	Jal,	NM.	Please (		E-NoPr						Pace Terms and Con https://info.pacelab	edgment and acceptance
Phone: <b>916-786-5246</b>	Client Project <b>30144968</b>	# TASK 0002		Lab Project # CHEVARCNI	M-COOPER	JAL	HDPE-						SDG #	519173
Collected by (print):  Daniel Milliage	Site/Facility II			P.O. #			125mlHDP	oPres						A030
Collected by (signature):		Lab MUST Be		Quote #			(300.0)	DPE-N					Template: <b>T2</b>	00378
Immediately Packed on Ice NYX	Next Da	sy 5 Day y 10 Da	(Rad Only)	Date Resul		No.	E0000000101	50mIHDPE-NoPres					Prelogin: P9 PM: 526 - Chi PB:	
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	CHLORIDE	TDS 2					Shipped Via:	Sample # (lab
MW-9-W-20220824	6	GW		8-24-22	1050	7	X	+				TO STATE OF THE PARTY OF THE PA		1-01
4w-94-w-2022	8	GW		8-24-22	1055	2	X	X						1-02
MW-11-W-20220824	8	GW		8-24-22	1115	2	X	X						-03
MW-8-W-2022-	6	GW		8-24-22	1125	2	X	X						-04
8-01-W-2022- MW-3-W-ZOZZOBZY	6	GW		8-24-22	1150	2	¥	X						-05
MW-12-W-70220824	8	6W		8-24-27	1225	2	X	人				PARTIE .		-06
									>					
					8-	24-	25							
	-				1	au							4	
Matrix: S - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater	emarks:								pl- Flo		Temp	COC Seal COC Signe Bottles a	nple Receipt C Present/Intact d/Accurate: rrive intact:	hecklist : NP Y
OW - Drinking Water OT - Other	amples returned UPS FedEx			Tracki	ng#							Sufficien	ottles used: t volume sent:	
Relinquished by : (Signature)		te: 8-74-22	Time:	OO Receiv	ved by: (Signa	ture)			Trip Bl	ank Received	HCL / MeoH	Preservat	ion Correct/Ch n <0.5 mR/hr:	ecked:
Relinquished by : (Signature)		te:	Time:	Receiv	ved by: (Signa	ture)			Temp:		Bottles Received:	If preservati	on required by Lo	gin: Date/Time
Relinquished by : (Signature)	Da	te. 10	Time:		ved for lab by	(Signatu	ire)	/	5.9. Date:	10-59	Time:	Hold:		Condition
sed to Imaging: 9/27/2024 10::			1	Incoes.	Malle	1	h	5	10/	25/20	10/5	liola.		NCF A O



# Pace Analytical® ANALYTICAL REPORT

January 05, 2023

### Arcadis - Chevron - NM

L1570115 Sample Delivery Group:

Samples Received: 12/22/2022

Project Number: 30144968 TASK 0002

Description: POD 2 - UEM4822 Cooper Jal

Site: **COOPER JAL** 

Report To: Russell Grant

10205 Westheimer Rd.

#800

Houston, TX 77042

Gl

Ss

Cn

Sr

<sup>°</sup>Qc

Αl



Entire Report Reviewed By:

Chris McCord

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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Sc: Sample Chain of Custody

23

## SAMPLE SUMMARY

MW-12-W-221221 L1570115-01 GW			Collected by Daniel McGee	Collected date/time 12/21/22 10:20	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 10	12/28/22 01:59 12/23/22 16:44	12/28/22 06:31 12/23/22 16:44	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
MW-1-W-221221 L1570115-02 GW			Collected by Daniel McGee	Collected date/time 12/21/22 10:28	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 20	12/28/22 01:59 12/23/22 16:58	12/28/22 06:31 12/23/22 16:58	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
MW-2-W-221221 L1570115-03 GW			Collected by Daniel McGee	Collected date/time 12/21/22 10:40	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 5	12/28/22 01:59 12/23/22 17:11	12/28/22 06:31 12/23/22 17:11	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
MW-5-W-221221 L1570115-04 GW			Collected by Daniel McGee	Collected date/time 12/21/22 10:50	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 20	12/28/22 01:59 12/23/22 17:25	12/28/22 06:31 12/23/22 17:25	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
MW-4-W-221221 L1570115-05 GW			Collected by Daniel McGee	Collected date/time 12/21/22 11:05	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 100	12/28/22 01:59 12/23/22 17:39	12/28/22 06:31 12/23/22 17:39	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
RW-1-W-221221 L1570115-06 GW			Collected by Daniel McGee	Collected date/time 12/21/22 11:15	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG1980011 WG1979147	1 100	12/28/22 01:59 12/23/22 17:52	12/28/22 06:31 12/23/22 17:52	AS GEB	Mt. Juliet, TN Mt. Juliet, TN
RW-2R-W-221221 L1570115-07 GW			Collected by Daniel McGee	Collected date/time 12/21/22 11:48	Received da 12/22/22 08	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1980011	1	12/28/22 01:59	12/28/22 06:31	AS	Mt. Juliet, TN



















Wet Chemistry by Method 300.0

WG1979147

100

12/23/22 18:06

12/23/22 18:06

GEB

Mt. Juliet, TN

## SAMPLE SUMMARY

			Collected by	Collected date/time	Received da	te/time
RW-2-W-221221 L1570115-08 GW			Daniel McGee	12/21/22 12:04	12/22/22 08:	30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1980011	1	12/28/22 01:59	12/28/22 06:31	AS	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG1979147	10	12/23/22 18:20	12/23/22 18:20	GEB	Mt. Juliet, TN
MW-10-W-221221 L1570115-09 GW			Collected by Daniel McGee	Collected date/time 12/21/22 12:25	Received da 12/22/22 08:	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1980011	1	12/28/22 01:59	12/28/22 06:31	AS	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG1979147	10	12/23/22 18:33	12/23/22 18:33	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-7-W-221221 L1570115-10 GW			Daniel McGee	12/21/22 12:40	12/22/22 08:	30
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG1980012	1	12/28/22 02:22	12/28/22 07:46	AS	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG1979147	100	12/23/22 18:47	12/23/22 18:47	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-9-W-221221 L1570115-11 GW			Daniel McGee	12/21/22 12:55	12/22/22 08:	30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1980012	1	12/28/22 02:22	12/28/22 07:46	AS	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG1979147	20	12/23/22 19:28	12/23/22 19:28	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
DUP-1-W-221221 L1570115-12 GW			Daniel McGee	12/21/22 00:00	12/22/22 08:	30
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		

WG1980012

WG1979147

1

10



















Gravimetric Analysis by Method 2540 C-2011

Wet Chemistry by Method 300.0

12/28/22 02:22

12/23/22 19:42

12/28/22 07:46

12/23/22 19:42

AS

GEB

Mt. Juliet, TN

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.



















Chris McCord Project Manager

## SAMPLE RESULTS - 01

Collected date/time: 12/21/22 10:20

Wet Chemistry by Method 300.0

Analyte

Chloride

Dilution

10

Analysis

date / time

12/23/2022 16:44

Batch

WG1979147

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

482

Qualifier

MDL

mg/l

3.79

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1280		13.3	1	12/28/2022 06:31	WG1980011

RDL

mg/l

10.0

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Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

960

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## SAMPLE RESULTS - 02

Collected date/time: 12/21/22 10:28

Wet Chemistry by Method 300.0

Analyte

Chloride

MDL

mg/l

7.58

Qualifier

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1240		50.0	1	12/28/2022 06:31	WG1980011

Dilution

20

Analysis

date / time

12/23/2022 16:58

Batch

WG1979147

RDL

mg/l

20.0





# Ss

<sup>4</sup> Cn











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## SAMPLE RESULTS - 03

Dilution

5

Analysis

date / time

12/23/2022 17:11

Batch

WG1979147

## Collected date/time: 12/21/22 10:40

Wet Chemistry by Method 300.0

Analyte

Chloride

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

239

Qualifier

MDL

mg/l

1.90

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	494		10.0	1	12/28/2022 06:31	WG1980011

RDL

mg/l

5.00



















Collected date/time: 12/21/22 10:50

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## SAMPLE RESULTS - 04

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2230		50.0	1	12/28/2022 06:31	WG1980011



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1150		7.58	20.0	20	12/23/2022 17:25	WG1979147

### Page 27 of 136

## SAMPLE RESULTS - 05

## Collected date/time: 12/21/22 11:05

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	16400		400	1	12/28/2022 06:31	WG1980011



















Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	13600		37.9	100	100	12/23/2022 17:39	WG1979147

Collected date/time: 12/21/22 11:15

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## SAMPLE RESULTS - 06

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier RD	Dilutio	n Analysis	<u>Batch</u>
Analyte	mg/l	mg	Ί	date / time	
Dissolved Solids	3940	100	1	12/28/2022 06:31	WG1980011



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	5070		37.9	100	100	12/23/2022 17:52	WG1979147	

Collected date/time: 12/21/22 11:48

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## SAMPLE RESULTS - 07

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	14600		400	1	12/28/2022 06:31	WG1980011





















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	7480		37.9	100	100	12/23/2022 18:06	WG1979147	

Collected date/time: 12/21/22 12:04

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## SAMPLE RESULTS - 08

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	824	<u>J3</u>	20.0	1	12/28/2022 06:31	WG1980011



Ss

## Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	232		3.79	10.0	10	12/23/2022 18:20	WG1979147













Collected date/time: 12/21/22 12:25

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## SAMPLE RESULTS - 09

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1120	<u>J3</u>	20.0	1	12/28/2022 06:31	WG1980011





















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	406		3.79	10.0	10	12/23/2022 18:33	WG1979147	

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## SAMPLE RESULTS - 10

12/28/2022 07:46

Analysis

date / time

12/23/2022 18:47

Dilution

100

WG1980012

Batch

WG1979147

Wet Chemistry by Method 300.0

Collected date/time: 12/21/22 12:40

Dissolved Solids

Analyte

Chloride

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>				
Analyte	mg/l		mg/l		date / time					

200

RDL

mg/l

100

MDL

mg/l

37.9



<sup>⁴</sup> Cn
-----------------











Result

mg/l

5280

11700

Qualifier

## SAMPLE RESULTS - 11

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Collected date/time: 12/21/22 12:55

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2530		50.0	1	12/28/2022 07:46	WG1980012





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1040		7.58	20.0	20	12/23/2022 19:28	WG1979147



Ss











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## SAMPLE RESULTS - 12

Wet Chemistry by Method 300.0

Analyte

Chloride

Collected date/time: 12/21/22 00:00

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	828		20.0	1	12/28/2022 07:46	WG1980012



# Ss













Result

mg/l

218

Qualifier

MDL

mg/l

3.79

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	828		20.0	1	12/28/2022 07:46	WG1980012

Dilution

10

Analysis

date / time

12/23/2022 19:42

Batch

WG1979147

RDL

mg/l

10.0

# Released to Imaging: 9/27/2024 10:52:32 AM Arcadis - Chevron - NM

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Gravimetric Analysis by Method 2540 C-2011

L1570115-01,02,03,04,05,06,07,08,09

### Method Blank (MB)

(MB) R3877023-1 12/28/22 06:31										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/l		mg/l	mg/l						
Dissolved Solids	U		10.0	10.0						



## Ss

## L1570115-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1570115-08 12/28/22 06:31 • (DUP) R3877023-3 12/28/22 06:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/I	mg/l		%		%
Dissolved Solids	824	888	1	7.48	J3	5





## L1570115-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1570115-09 12/28/22 06:31 • (DUP) R3877023-4 12/28/22 06:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1120	1200	1	7.42	<u>J3</u>	5





## Laboratory Control Sample (LCS)

(LCS) R3877023-2 12/28/22 06:31

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	7780	88.4	77.3-123	

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Gravimetric Analysis by Method 2540 C-2011

L1570115-10,11,12

### Method Blank (MB)

(MB) R3877024-1 12/28/22 07:46										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/l		mg/l	mg/l						
Dissolved Solids	П		10.0	10.0						





## L1569982-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1569982-13 12/28/22 07:46 • (DUP) R3877024-3 12/28/22 07:46

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	ND	ND	1	0.000		5





## L1570086-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1570086-01 12/28/22 07:46 • (DUP) R3877024-4 12/28/22 07:46

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1150	1410	1	20.3	<u>J3</u>	5



## Sc

### Laboratory Control Sample (LCS)

(LCS) R3877024-2 12/28/22 07:46

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	7650	86.9	77.3-123	

## QUALITY CONTROL SUMMARY

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Wet Chemistry by Method 300.0

L1570115-01,02,03,04,05,06,07,08,09,10,11,12

### Method Blank (MB)

(MB) R3876123-1 12/23/22 10:32										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/l		mg/l	mg/l						
Chloride	U		0.379	1.00						

# Ср



# <sup>3</sup>Ss

## L1570075-01 Original Sample (OS) • Duplicate (DUP)

(0.0)   4570.075.04	10/00/00 11 51	/n	50070400	10/00/00 15 00
(OS) L1570075-01	12/23/22 14:54 • 1	(DUP	1 R38/6123-3	12/23/22 15:08

,	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	151	151	1	0.111		20





### L1570437-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1570437-04 12/23/22 20:37 • (DUP) R3876123-6 12/23/22 20:50

(O3) L1370437-04 12/23/22 20.37 • (DOP) R3870123-0 12/23/22 20.30											
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits					
Analyte	mg/l	mg/l		%		%					
Chloride	56.6	58.2	1	2.77		20					



# <sup>9</sup>Sc

### Laboratory Control Sample (LCS)

(LCS) R3876123-2 12/2	3/22 10:46
-----------------------	------------

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	41.9	105	90.0-110	

## L1570075-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L15/00/5-01 12/23/22 14:54 • (M	MS) R38/6123-4 12/23/22 15:22 • (	(MSD) R38/6123-5 12/23/22 15:35
--------------------------------------	-----------------------------------	---------------------------------

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	151	195	191	89.2	81.5	1	80.0-120			1.99	20

## L1570437-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L1570437-04 12/23/22 20:37 • (MS) R3876123-7 12/23/2	/23/22 21:04
---	--------------

(03) 113/043/-04 12/23/2	22 20.37 • (1013)	K30/0123-/ 12	1/23/22 21.04				
	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	56.6	107	101	1	80.0-120	

### 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

Appleviations and	d 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

The associated batch QC was outside the established quality control range for precision.





















J3

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Pace Analy	yticai Nationai	12065 Lebanor	1 Ka Mount	. Juliet,	IIN 3/122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
	AZ0612	New Hampshire	2975
Arizona			
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	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	LA000356
Kentucky 16	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	Al30792	Tennessee 1 4	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234



<sup>\*</sup> Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto



















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

Company Name/Address:			Billing Info	rmation:		Т			Analys	is / Con	tainer / Prese	ervative			Chain of Custody	Page 1 of 2		
Arcadis - Chevron - NM  10205 Westheimer Rd. #800 Houston, TX 77042			401 East Suite 40	s Payable Main Street 0 TX 79901		Pres Chk									PEOPLE	ICC° ADVANCING SCIENCE		
Report to: Russell Grant			Email To: lydia.velez	gonzalez@arcadi	s.com;russel	l.grant@	es								MT JU 12065 Lebanon Rd Mo Submitting a sample via			
Project Description: POD 2 - UEM4822 Cooper Jal		City/State Collected:	Eunice .	vn.	Please (	Circle:	NoPre									ment and acceptance of the ons found at:		
Phone: 916-786-5246	Client Project	# 2		Lab Project # CHEVARCNI			125mlHDPE-NoPr				A A STATE OF THE S				SDG# U	570115		
Collected by (print): Ocnirel Miliae				Site/Facility ID #		P.O.#				VoPres							Acctnum; CHE	
Collected by (signature):  Immediately Packed on Ice N Y		y 10 D		Quote #  Date Resul		No.	ORIDE (300.0)	50mlHDPE-N				7-6			Template: <b>T20</b> Prelogin: <b>P96</b> PM: <b>526</b> - Chris PB:	9075		
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	CHLOR	TDS 25							Shipped Via:	Sample # (lab only)		
MW-12-W-271721	6	GW	1.5.5	12-21-22	1070	7	X	X	Service -							-01		
MW-1-W-771771	6	GW		17-71-77	1028	7	X	X	7							-02		
MW-Z-M-221221	6	GW	2	17-71-71	1040	2	X	X	FW.							-03		
MW5-W-ZZIZZI	6	GW		17-21-27	1050	7	V	X								-04		
MW-41-6-221221	4	GW		17-21-22	1105	7	X	V		20						- 95		
RW-1-W-771771	B	GW	Gui	17-21-22	1115	7	V	X								- 66		
RW-2R-W-221221	6	GW		17-71-77	1148	7	X	Y								*0		
RW-2-W-22124	G	GW	4	17-21-27	1704	7	X	·χ								-04		
MW-10-W-221271	6	GW	19 15	17-71-77	1775	7	X	χ		201			x [4]			10		
NW-7-W-721771	0	GW		17-71-2	1740	2	X	X								170		
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Oi Other Sa	ups returned			Track	ing 2	6	829	29.	2444	2					volume sent: If Applicable eadspace:	Le Y N		
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Relinquished by: (Signature)		te:	Time		Jed foolab by	Signat	ure)		Date: 12-	220	71me:	5830	Hold:			Condition: NCF / ØR		

Company Name/Address: Arcadis - Chevron - NI  10205 Westheimer Rd. #800	VI		Accounts 401 East Suite 400	Accounts Payable O1 East Main Street Guite 400 El Paso, TX 79901				Entry (	Analy	sis / Conta	iner / Pre	eservativ	P		Chain of Custo	dy Page <u>2</u> 2 ace* PLE ADVANCING SCIE																												
Report to: Russell Grant	- :		Email To: lydia.velezgonzalez@arcadis.com;russell.gr			!!.grant(	a s								12065 Lebanon Rd	Mount Juliet, TN 3712																												
Project Description: POD 2 - UEM4822 Cooper Jal		City/State Collected:	Eunice,	* (# 1 d	Please Circle:		NoPre								Pace Terms and Cor https://info.pacelab	MT JULIET, TN  12065 Lebanon Rd Mount Juliet, TN 37122 Submitting a sample via this chain of custo constitutes acknowledgment and acceptan Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-stancterms.pdf  SDG # JS7015  Table #  Acctnum: CHEVARCNM Template: T200378 Prelogin: P969075 PM: 526 - Chris McCord PB: Shipped Via: Remarks Sample # (la																												
Phone: <b>916-786-5246</b>	Client Projec 30144968	48.5		Lab Project # CHEVARCNI			125mlHDPE-NoPres									457015																												
Collected by (print):  Daniel Miles	Site/Facility I			P.O.#		P.O. #		P.O.#				),#						#		.#								).#								loPres								IEVARCNIV
Collected by (signature):	Rush? (Lab MU Same Day				vulled,					•		uote#		Quote #		(300.0)	DPE-N					Template:T2	00378																					
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Sample ID And Andrew	Comp/Grab	Matrix *	Depth	Date	Time	Cntr	CHLORIDE	TDS 2	we'r							Sample # (																												
NW-9-W-221221 DUP-1-W-221221	G	GW		12-21-22	1255	TZ	1000000	X																																				
DUP-1-W-22 1771	6	GW	4. 14.	12-21-72		. 7	X	X			the state of																																	
	and the same of th	GW	2-	226									4																															
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* Matrix:  SS - Soil AIR - Air F - Filter  GW - Groundwater B - Bioassay  WW - WasteWater	Remarks:									H	Temp			COC Sea COC Sign Bottles	Sample Receipt ( l Present/Intac ned/Accurate: arrive intact: bottles used:	Checklist t: NP																												
DW - Drinking Water OT - Other	Samples returned UPS FedEx			Track	ing # 5	260	8	289	34	40				Suffici	ent volume sent  If Applica o Headspace:																													
Relinquished by (Signature)	Da	- ite: 12-21-2	Time:	AS Recei	ved by: (Sign	ature)	~			Blank Rece	1	es No HCL/ Meo	6.60	Preserva	ation Correct/C een <0.5 mR/hr:	necked:																												
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# Pace Analytical® ANALYTICAL REPORT

August 01, 2023



# Ss

Cn











### Arcadis - Chevron - NM

Sample Delivery Group: L1638368

Samples Received: 07/22/2023

Project Number: 30183400 task 0002 Description: UEM4822 - Cooper Jal

Site: **COOPER JAL** 

Report To: Russell Grant

10205 Westheimer Rd.

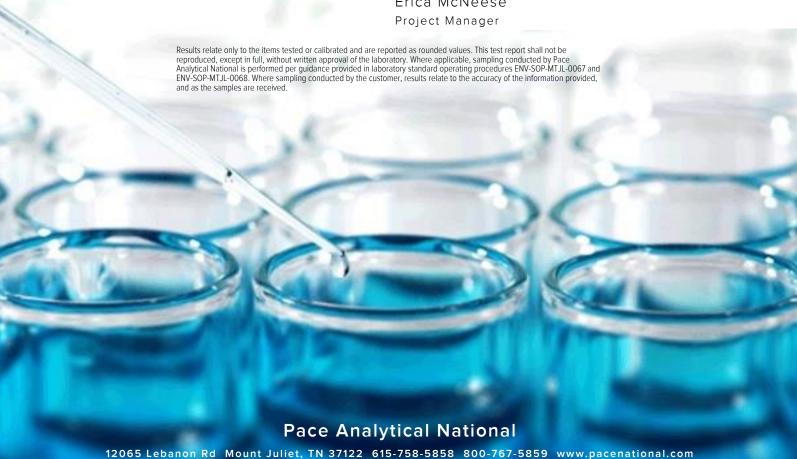
#800

Houston, TX 77042

Entire Report Reviewed By:

Enica Mc Neese

Erica McNeese Project Manager



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DUP-2-W-20230720 L1638368-14	21
MW-14-W-20230720 L1638368-15	22
MW-7-W-20230720 L1638368-16	23
MW-8-W-20230720 L1638368-17	24
MW-9-W-20230721 L1638368-18	25
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Sc: Sample Chain of Custody

39

MW-1-W-20230720 L1638368-01 GW			Collected by Daniel McGee	Collected date/time 07/20/23 11:15	Received da 07/22/23 15:	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Cravimatria Analysis by Mathad 2E40 C 2011	WC2101214	1	07/25/23 15:11		ADD	Mt Juliat TN
Gravimetric Analysis by Method 2540 C-2011	WG2101214 WG2100017	1	07/24/23 15:11	07/25/23 16:12	ARD GEB	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	10	07/24/23 12:19	07/24/23 12:19	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-2-W-20230720 L1638368-02 GW			Daniel McGee	07/20/23 11:25	07/22/23 15:	45
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2101214	1	07/25/23 15:11	07/25/23 16:12	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	1	07/24/23 12:33	07/24/23 12:33	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-2A-W-20230720 L1638368-03 GW			Daniel McGee	07/20/23 11:35	07/22/23 15:	45
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	1	07/24/23 13:34	07/24/23 13:34	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-6R-W-20230720 L1638368-04 GW			Daniel McGee	07/20/23 11:50	07/22/23 15:	
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	1	07/24/23 13:49	07/24/23 13:49	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-5-W-20230720 L1638368-05 GW			Daniel McGee	07/20/23 12:05	07/22/23 15:	45
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	20	07/24/23 14:33	07/24/23 14:33	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-5A-W-20230720 L1638368-06 GW			Daniel McGee	07/20/23 12:15	07/22/23 15:	45
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2102116	1	07/26/23 15:27	07/26/23 16:19	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	1	07/24/23 14:48	07/24/23 14:48	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-4-W-20230720 L1638368-07 GW			Daniel McGee	07/20/23 12:35	07/22/23 15:	45
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		



















Wet Chemistry by Method 300.0

WG2100017

100

07/24/23 15:03

07/24/23 15:03

GEB

Mt. Juliet, TN

MW-4A-W-20230720 L1638368-08 WW			Collected by Daniel McGee	Collected date/time 07/20/23 12:45	Received da 07/22/23 15:	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	1	07/24/23 15:18	07/24/23 15:18	GEB	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	5	07/24/23 15:33	07/24/23 15:33	GEB	Mt. Juliet, TN
RW-1-W-20230720 L1638368-09 GW			Collected by Daniel McGee	Collected date/time 07/20/23 12:55	Received da 07/22/23 15:	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101214	1	07/25/23 15:11	07/25/23 16:12	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	100	07/24/23 15:48	07/24/23 15:48	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	
DUP-1-W-20230720 L1638368-10 GW			Daniel McGee	07/20/23 00:00	07/22/23 15:	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	100	07/24/23 16:02	07/24/23 16:02	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
RW-2R-W-20230720 L1638368-11 WW			Daniel McGee	07/20/23 13:40	07/22/23 15:	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	10	07/24/23 16:17	07/24/23 16:17	GEB	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	100	07/24/23 16:32	07/24/23 16:32	GEB	Mt. Juliet, TN
			Collected by Daniel McGee	Collected date/time 07/20/23 13:50	Received da 07/22/23 15:	
RW-2-W-20230720 L1638368-12 GW	D	Dil ii				
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	100	07/24/23 16:47	07/24/23 16:47	GEB	Mt. Juliet, TN
			Collected by	Collected date/time		
MW-10-W-20230720 L1638368-13 GW			Daniel McGee	07/20/23 14:05	07/22/23 15:	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	5	07/24/23 17:32	07/24/23 17:32	GEB	Mt. Juliet, TN
			Collected by	Collected date/time		
DUP-2-W-20230720 L1638368-14 GW			Daniel McGee	07/20/23 00:00	07/22/23 15:	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101214	1	07/25/23 15:11	07/25/23 16:12	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100017	100	07/24/23 17:46	07/24/23 17:46	GEB	Mt. Juliet, TN



















			Collected by	Collected date/time	Received da	te/time
MW-14-W-20230720 L1638368-15 GW			Daniel McGee	07/20/23 14:15	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101214	1	07/25/23 15:11	07/25/23 16:12	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	1	07/24/23 14:00	07/24/23 14:00	GEB	Mt. Juliet, TN
			Collected by	Collected date/time		
MW-7-W-20230720 L1638368-16 GW			Daniel McGee	07/20/23 14:40	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101214	1	07/25/23 15:11	07/25/23 16:12	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	100	07/24/23 15:20	07/24/23 15:20	GEB	Mt. Juliet, TN
			Collected by	Collected date/time		
MW-8-W-20230720 L1638368-17 GW			Daniel McGee	07/20/23 15:00	07/22/23 15	:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2101934	1	07/26/23 13:46	07/26/23 16:03	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	1	07/24/23 15:33	07/24/23 15:33	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-9-W-20230721 L1638368-18 GW			Daniel McGee	07/21/23 10:00	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2102700	1	07/27/23 10:50	07/27/23 12:58	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	20	07/24/23 15:46	07/24/23 15:46	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-9A-W-20230721 L1638368-19 GW			Daniel McGee	07/21/23 10:15	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2102700	1	07/27/23 10:50	07/27/23 12:58	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	5	07/24/23 16:00	07/24/23 16:00	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-11-W-20230721 L1638368-20 GW			Daniel McGee	07/21/23 10:30	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2102700	1	07/27/23 10:50	07/27/23 12:58	ARD	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	1	07/24/23 16:13	07/24/23 16:13	GEB	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	
MW-3-W-20230721 L1638368-21 GW			Daniel McGee	07/21/23 10:45	07/22/23 15	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2102700	1	07/27/23 10:50	07/27/23 12:58	ARD	Mt. Juliet, TN



















Wet Chemistry by Method 300.0

WG2100018

1

07/24/23 16:27

07/24/23 16:27

GEB

Mt. Juliet, TN

MW-12-W-20230721 L1638368-22 GW			Collected by Daniel McGee	Collected date/time 07/21/23 11:00	Received date 07/22/23 15:45	
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2102700	1	07/27/23 10:50	07/27/23 12:58	MMF	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2100018	5	07/24/23 17:08	07/24/23 17:08	GEB	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.



Erica McNeese Project Manager



















Wet Chemistry by Method 300.0

Analyte

Chloride

# SAMPLE RESULTS - 01

Batch

WG2100017

Collected date/time: 07/20/23 11:15

Dilution

10

Analysis

date / time

07/24/2023 12:19

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

736

Qualifier

MDL

mg/l

3.79

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1720		50.0	1	07/25/2023 16:12	WG2101214

RDL

mg/l

10.0

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Collected date/time: 07/20/23 11:25

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# SAMPLE RESULTS - 02

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	437		10.0	1	07/25/2023 16:12	WG2101214





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	137		0.379	1.00	1	07/24/2023 12:33	WG2100017













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# SAMPLE RESULTS - 03

# Collected date/time: 07/20/23 11:35

Wet Chemistry by Method 300.0

Analyte

Chloride

	Result	Qualifier	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l		date / time		
Dissolved Solids	551		10.0	1	07/26/2023 16:03	WG2101934	

RDL

mg/l

1.00

















Result

mg/l

102

Qualifier

MDL

mg/l

0.379

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	551		10.0	1	07/26/2023 16:03	WG2101934

Dilution

1

Analysis

date / time

07/24/2023 13:34

Batch

WG2100017

Collected date/time: 07/20/23 11:50

### Page 52 of 136

# SAMPLE RESULTS - 04

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	479		10.0	1	07/26/2023 16:03	WG2101934



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	71.5		0.379	1.00	1	07/24/2023 13:49	WG2100017	

Wet Chemistry by Method 300.0

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# SAMPLE RESULTS - 05

Collected date/time: 07/20/23 12:05

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2440		50.0	1	07/26/2023 16:03	WG2101934





















	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1050		7.58	20.0	20	07/24/2023 14:33	WG2100017

Collected date/time: 07/20/23 12:15

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# SAMPLE RESULTS - 06

L1638368

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	552		10.0	1	07/26/2023 16:19	WG2102116

# 2\_



	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	146		0.379	1.00	1	07/24/2023 14:48	WG2100017















Collected date/time: 07/20/23 12:35

# SAMPLE RESULTS - 07

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	19800		400	1	07/26/2023 16:03	WG2101934



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	13300		37.9	100	100	07/24/2023 15:03	WG2100017

Wet Chemistry by Method 300.0

Analyte

Chloride

Sulfate

Collected date/time: 07/20/23 12:45

### Page 56 of 136

# SAMPLE RESULTS - 08

Dilution

5

Analysis

date / time

07/24/2023 15:33

07/24/2023 15:18

Batch

WG2100017

WG2100017

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

424

101

Qualifier

MDL

mg/l

1.90

0.594

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1260		20.0	1	07/26/2023 16:03	WG2101934

RDL

mg/l

5.00

5.00







<sup>4</sup> Cn











Collected date/time: 07/20/23 12:55

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# SAMPLE RESULTS - 09

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2790		50.0	1	07/25/2023 16:12	WG2101214





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	3440		37.9	100	100	07/24/2023 15:48	WG2100017













# SAMPLE RESULTS - 10

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Collected date/time: 07/20/23 00:00

Wet Chemistry by Method 300.0

Analyte

Chloride

Dilution

100

Analysis

date / time

07/24/2023 16:02

Batch

WG2100017

### Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

4340

Qualifier

MDL

mg/l

37.9

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	3190		100	1	07/26/2023 16:03	WG2101934

RDL

mg/l

100



















# SAMPLE RESULTS - 11

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Collected date/time: 07/20/23 13:40

Wet Chemistry by Method 300.0

Analyte

Chloride

Sulfate

### Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

8290

904

Qualifier

MDL

mg/l

37.9

5.94

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	17100		200	1	07/26/2023 16:03	WG2101934

Dilution

100

10

Analysis

date / time

07/24/2023 16:32

07/24/2023 16:17

Batch

WG2100017 WG2100017

RDL

mg/l

100

50.0



















### Page 60 of 136 SAMPLE RESULTS - 12

Batch

WG2100017

Collected date/time: 07/20/23 13:50

Wet Chemistry by Method 300.0

Analyte

Chloride

Dilution

100

Analysis

date / time

07/24/2023 16:47

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

2910

Qualifier

MDL

mg/l

37.9

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	4950		100	1	07/26/2023 16:03	WG2101934

RDL

mg/l

100















# SAMPLE RESULTS - 13 Page 61 of 136

Collected date/time: 07/20/23 14:05

11638368

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1210		20.0	1	07/26/2023 16:03	WG2101934

# <sup>2</sup>TC

## Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	364		1.90	5.00	5	07/24/2023 17:32	WG2100017













# SAMPLE RESULTS - 14

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Collected date/time: 07/20/23 00:00

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	4310		100	1	07/25/2023 16:12	WG2101214





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	2840		37.9	100	100	07/24/2023 17:46	WG2100017















Wet Chemistry by Method 300.0

Analyte

Chloride

Collected date/time: 07/20/23 14:15

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# SAMPLE RESULTS - 15

## Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

57.5

Qualifier

MDL

mg/l

0.379

	Result	Qualifier RDL	Dilution	Analysis	Batch
Analyte	mg/l	mg/l		date / time	
Dissolved Solids	471	10.0	1	07/25/2023 16:12	WG2101214

Dilution

1

Analysis

date / time

07/24/2023 14:00

Batch

WG2100018

RDL

mg/l

1.00



















# SAMPLE RESULTS - 16

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Collected date/time: 07/20/23 14:40

Wet Chemistry by Method 300.0

Analyte

Chloride

### Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

5150

Qualifier

MDL

mg/l

37.9

	Result	Qualifier F	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l	r	ng/l		date / time	
Dissolved Solids	14500	2	200	1	07/25/2023 16:12	WG2101214

Dilution

100

Analysis

date / time

07/24/2023 15:20

Batch

WG2100018

RDL

mg/l

100



















Collected date/time: 07/20/23 15:00

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# SAMPLE RESULTS - 17

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	432		10.0	1	07/26/2023 16:03	WG2101934



## Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	36.9		0.379	1.00	1	07/24/2023 15:33	WG2100018













# SAMPLE RESULTS - 18

Collected date/time: 07/21/23 10:00

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2620		50.0	1	07/27/2023 12:58	WG2102700

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1050		7.58	20.0	20	07/24/2023 15:46	WG2100018













# SAMPLE RESULTS - 19

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Collected date/time: 07/21/23 10:15

### Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	753	<u>B</u>	13.3	1	07/27/2023 12:58	WG2102700





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	260		1.90	5.00	5	07/24/2023 16:00	WG2100018















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# SAMPLE RESULTS - 20

# Gravimetric Analysis by Method 2540 C-2011

Collected date/time: 07/21/23 10:30

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	410	<u>B</u>	10.0	1	07/27/2023 12:58	WG2102700

	1
⁴Cn	
	<sup>4</sup> Cn











Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	35.0		0.379	100	1	07/24/2023 16:13	WG2100018

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# SAMPLE RESULTS - 21

# Collected date/time: 07/21/23 10:45

## Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	430	В	10.0	1	07/27/2023 12:58	WG2102700



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	41.7		0.379	1.00	1	07/24/2023 16:27	WG2100018

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# SAMPLE RESULTS - 22

# Gravimetric Analysis by Method 2540 C-2011

Collected date/time: 07/21/23 11:00

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1300		20.0	1	07/27/2023 12:58	WG2102700





















Wet Chemistry by Method 300.0

Result

Qualifier

MDL

Dilution

Analysis

Batch

RDL

### QUALITY CONTROL SUMMARY

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L1638368-01,02,09,14,15,16

# Method Blank (MB)

(MB) R3953933-1 07/25/23 16:12

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		10.0	10.0



<sup>2</sup>Tc



### L1637951-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1637951-01 07/25/23 16:12 • (DUP) R3953933-3 07/25/23 16:12

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	2000	2090	1	4.65		5





# <sup>6</sup>Qc

## L1638066-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1638066-02 07/25/23 16:12 • (DUP) R3953933-4 07/25/23 16:12

, ,	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	24.0	20.0	1	18.2	<u>P1</u>	5



# <sup>9</sup>Sc

## Laboratory Control Sample (LCS)

(LCS) R3953933-2 07/25/23 16:12

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8780	99.8	77 3-123	

# QUALITY CONTROL SUMMARY

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Gravimetric Analysis by Method 2540 C-2011

L1638368-03,04,05,07,08,10,11,12,13,17

### Method Blank (MB)

(MB) R3953691-1 07/26/23 16:03										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	mg/l		mg/l	mg/l						
Dissolved Solids	U		10.0	10.0						





## L1633795-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1633795-02 07/26/23 16:03 • (DUP) R3953691-3 07/26/23 16:03

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1600	1600	1	0.156		5



<sup>†</sup>Cn





### L1638368-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1638368-03 07/26/23 16:03 • (DUP) R3953691-4 07/26/23 16:03

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	551	566	1	2.69		5





### Laboratory Control Sample (LCS)

(LCS) R3953691-2 07/26/23 16:03

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8710	99.0	77 3-123	

DATE/TIME:

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L1638368-06

# Method Blank (MB)

Dissolved Solids

(MB) R3954121-1 07/26/23 16:19

MB Result MB Qualifier MB MDL

Analyte mg/l mg/l

U

MB MDL	MB RDL	
ma/l	ma/l	

10.0



<sup>2</sup>Tc

<sup>3</sup>Ss

# L1638039-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1638039-01 07/26/23 16:19 • (DUP) R3954121-3 07/26/23 16:19

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/I	mg/l		%		%
Dissolved Solids	842	864	1	2.58		5

10.0



Sr

# L1638039-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1638039-02 07/26/23 16:19 • (DUP) R3954121-4 07/26/23 16:19

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	700	743	1	5.92	<u>J3</u>	5



<sup>9</sup>Sc

## Laboratory Control Sample (LCS)

(LCS) R3954121-2 07/26/23 16:19

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8340	94.8	77 3-123	

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L1638368-18,19,20,21,22

### Method Blank (MB)

(MB) R3955246-1 07/27/23 12:58

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	98.0		10.0	10.0



<sup>2</sup>Tc



# L1638366-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1638366-02 07/27/23 12:58 • (DUP) R3955246-4 07/27/23 12:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	567	577	1	1.86		5





# L1638018-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1638018-02 07/27/23 12:58 • (DUP) R3955246-3 07/27/23 12:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	262	259	1	1.15		5



# <sup>9</sup>Sc

## Laboratory Control Sample (LCS)

(LCS) R3955246-2 07/27/23 12:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8610	97.8	77.3-123	

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### QUALITY CONTROL SUMMARY

Wet Chemistry by Method 300.0

L1638368-01,02,03,04,05,06,07,08,09,10,11,12,13,14

### Method Blank (MB)

Sulfate

(MB) R3952326-1 07/24	1/23 11:25			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.379	1.00



<sup>2</sup>Tc



## L1638368-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1638368-02 07/24/23 12:33 • (DUP) R3952326-3 07/24/23 12:49

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	137	137	1	0.225		20
Sulfate	74.6	74.6	1	0.0810		20

0.594

5.00







# Gi

# L1638410-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1638410-06 07/24/23 18:46 • (DUP) R3952326-6 07/24/23 19:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	72.3	72.7	1	0.496		20
Sulfate	67.5	67.8	1	0.427		20





## Laboratory Control Sample (LCS)

(LCS) R3952326-2 07/24/23 11:40

(LC3) K3332320-2 07/2-	1/23 11.40				
	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	40.2	100	90.0-110	
Sulfate	40.0	42.4	106	90.0-110	

# L1638368-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1638368-02 07/24/23 12:33 • (MS) R3952326-4 07/24/23 13:04 • (MSD) R3952326-5 07/24/23 13:19

(03) 11030300-02 07/2	(OS) E1030300-02 OT/24/23 12:33 V (NIS) N3332320-4 OT/24/23 13:04 V (NISD) N3332320-3 OT/24/23 13:13											
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	137	179	179	85.2	84.3	1	80.0-120			0.249	20
Sulfate	50.0	74.6	128	128	107	107	1	80.0-120			0.292	20

Page 76 of 136

Wet Chemistry by Method 300.0

L1638368-01,02,03,04,05,06,07,08,09,10,11,12,13,14

## L1638410-06 Original Sample (OS) • Matrix Spike (MS)

(OS) L1638410-06 07/24/23 18:46 • (MS) R3952326-7 07/24/23 19:16

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	50.0	72.3	118	91.7	1	80.0-120	
Sulfate	50.0	67.5	117	99.3	1	80.0-120	





















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Wet Chemistry by Method 300.0

L1638368-15,16,17,18,19,20,21,22

### Method Blank (MB)

(MB) R3954445	(MB) R3954445-1 07/24/23 11:36								
	MB Result	MB Qualifier	MB MDL	MB RDL					
Analyte	mg/l		mg/l	mg/l					
Chloride	U		0.379	1.00					



# 3 C -

# L1638368-15 Original Sample (OS) • Duplicate (DUP)

(OS) L1638368-15 07	7/24/23 14:00 • (DUP)	R3954445-3	07/24/23 14:13
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(03) 21030300 13 0772472	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	57.5	57.1	1	0.672		20



# <sup>6</sup>Qc

## L1638368-21 Original Sample (OS) • Duplicate (DUP)

(OS) L1638368-21 07/24/23 16:27 • (DUP) R3954445-6 07/24/23 16:41

(03) 11036306-21 07/24/2	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
alyte	mg/l	mg/l		%		%
Chloride	41.7	41.6	1	0.128		20



# <sup>9</sup>Sc

## Laboratory Control Sample (LCS)

(LCS) R3954445-2 07/24/23 11:49

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	40.8	102	90.0-110	

PAGE:

36 of 41

# L1638368-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1638368-15 07/24/23 14:00 • (MS) R3954445-4 07/24/23 14:26 • (MSD) R3954445-5 07/24/23 15:06

, ,	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	50.0	57.5	107	108	98.9	100	1	80.0-120			0.763	20

# L1638368-21 Original Sample (OS) • Matrix Spike (MS)

(,		Original Result			Dilution	Rec. Limits
Analyte	mg/l	mg/l	mg/l	%		%
Chloride	50.0	41.7	93.1	103	1	80.0-120

### 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

Appreviations and	Definitions
MDL	Method Detection Limit.
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
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	·	
В	The same analyte is found in the associated blank.	
J3	The associated batch QC was outside the established quality control range for precision.	
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.	





















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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 <sup>1</sup>	TN00003
Colorado TN00003	New York	11742
Connecticut PH-0197	North Carolina	Env375
Florida E87487	North Carolina 1	DW21704
Georgia NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup> 923	North Dakota	R-140
ldaho TN00003	Ohio-VAP	CL0069
Illinois 200008	Oklahoma	9915
Indiana C-TN-01	Oregon	TN200002
lowa 364	Pennsylvania	68-02979
Kansas E-10277	Rhode Island	LAO00356
Kentucky <sup>1 6</sup> KY90010	South Carolina	84004002
Kentucky <sup>2</sup> 16	South Dakota	n/a
ouisiana Al30792	Tennessee 1 4	2006
ouisiana LA018	Texas	T104704245-20-18
Maine TN00003	Texas <sup>5</sup>	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 <sup>5</sup> 1461.02	DOD	1461.01
Canada 1461.01	USDA	P330-15-00234



<sup>\*</sup> Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto

















 $<sup>^* \, \</sup>text{Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.} \\$ 

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Russell Grant			lydia.velezg	gonzalez@arca	dis.com;russell.		Pres	res							Pace Terms and Cond	dgment and acceptant litions found at: .com/hubfs/pas-stand	
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MW-44-W-70730776		GW			1245	-		X	X							-0	19
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RW-ZR-W-7073072	6	_	GW		7-20	-53	1340	3	×	X	X							-	11
RW-Z-W-70730720		,   ,	GW			1	1350	5	X		X							-	12
MW-10-W-70230720			GW				1405	Z	k		Q								13
DuP-7-6-70730770			GW				_	2	k		X								14
MW-14-W-20230720			GW				1415	3	×		X							-	15
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MW-8-W-7073070			GW		7-20	-23	1500	2	X		X							-	17
MW-9-W-20230721			GW		7-7	1-23	1000	2	X		X							_	18
MW-9A-W-70730771	(		GW		1		1015	7	X		X								19
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Phone: <b>916-786-5246</b>	30183400			Lab Project # CHEVARCNM	I-COOPER	IAL	125mlHDPE-NoPres	IDPE-N							SDG#	38368
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Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	CHLO	SULFA	TDS 2						Shipped Via: Remarks	Sample # (lab only)
MW-3-W-2023G721	6	GW		7.2423	1045	7	X		X							J- 21
MW-12-W-20230721	6	GW		7-21-23	1100	2	X		V							-22
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* Matrix:	Remarks:													Sa	ample Receipt C	necklist
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# Pace Analytical® ANALYTICAL REPORT

# Arcadis - Chevron - NM

Sample Delivery Group: L1678374

Samples Received: 11/15/2023

Project Number: 30183400 task 0002 Description: UEM4822 - Cooper Jal

Site: **COOPER JAL** 

Report To: Russell Grant

10205 Westheimer Rd.

#800

Houston, TX 77042















Entire Report Reviewed By:

Enica Mc Neese

Erica McNeese 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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MW-5-W-20231113 L1678374-04	9
MW-4-W-20231113 L1678374-05	10
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RW-2-W-20231114 L1678374-08	13
RW-2R-W-20231114 L1678374-09	14
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Sc: Sample Chain of Custody

25

# SAMPLE SUMMARY

MW-12-W-20231113 L1678374-01 GW			Collected by Daniel McGee	Collected date/time 11/13/23 13:20	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2172510	1 5	11/19/23 16:03 11/20/23 07:02	11/19/23 16:57 11/20/23 07:02	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
MW-1-W-20231113 L1678374-02 GW			Collected by Daniel McGee	Collected date/time 11/13/23 13:40	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2174496	1 10	11/19/23 16:03 11/24/23 17:21	11/19/23 16:57 11/24/23 17:21	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
MW-2-W-20231113 L1678374-03 GW			Collected by Daniel McGee	Collected date/time 11/13/23 14:15	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2174496	1 1	11/19/23 16:03 11/24/23 17:31	11/19/23 16:57 11/24/23 17:31	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
MW-5-W-20231113 L1678374-04 GW			Collected by Daniel McGee	Collected date/time 11/13/23 14:45	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2174496	1 10	11/19/23 16:03 11/24/23 17:40	11/19/23 16:57 11/24/23 17:40	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
MW-4-W-20231113 L1678374-05 GW			Collected by Daniel McGee	Collected date/time 11/13/23 15:10	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2174496	1 100	11/19/23 16:03 11/24/23 17:50	11/19/23 16:57 11/24/23 17:50	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
RW-1-W-20231113 L1678374-06 GW			Collected by Daniel McGee	Collected date/time 11/13/23 15:35	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011 Wet Chemistry by Method 300.0	WG2174182 WG2174496	1 100	11/19/23 16:03 11/24/23 18:00	11/19/23 16:57 11/24/23 18:00	CAT HMM	Mt. Juliet, TN Mt. Juliet, TN
DUP-1-W-20231113 L1678374-07 GW			Collected by Daniel McGee	Collected date/time 11/13/23 00:00	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2174182	1	11/19/23 16:03	11/19/23 16:57	CAT	Mt. Juliet, TN



















Wet Chemistry by Method 300.0

WG2174496

100

11/24/23 18:09

11/24/23 18:09

HMM

Mt. Juliet, TN

# SAMPLE SUMMARY

RW-2-W-20231114 L1678374-08 GW			Collected by Daniel McGee	Collected date/time 11/14/23 09:55	Received da 11/15/23 09:0	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2174557	1	11/20/23 12:59	11/20/23 19:19	JAC	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2174496	10	11/24/23 18:19	11/24/23 18:19	НММ	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
RW-2R-W-20231114 L1678374-09 GW			Daniel McGee	11/14/23 10:10	11/15/23 09:0	00
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2174557	1	11/20/23 12:59	11/20/23 19:19	JAC	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2174496	100	11/24/23 18:28	11/24/23 18:28	НММ	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-10-W-20231114 L1678374-10 GW			Daniel McGee	11/14/23 10:30	11/15/23 09:0	00
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2174557	1	11/20/23 12:59	11/20/23 19:19	JAC	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2174496	5	11/24/23 18:57	11/24/23 18:57	НММ	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-7-W-20231114 L1678374-11 GW			Daniel McGee	11/14/23 10:55	11/15/23 09:0	00
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Gravimetric Analysis by Method 2540 C-2011	WG2174557	1	11/20/23 12:59	11/20/23 19:19	JAC	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG2174496	100	11/24/23 19:06	11/24/23 19:06	НММ	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
MW-9-W-20231114 L1678374-12 GW			Daniel McGee	11/14/23 11:15	11/15/23 09:0	00
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		

WG2174563

WG2174496

1

100

11/20/23 13:07

11/24/23 19:16



















Gravimetric Analysis by Method 2540 C-2011

Wet Chemistry by Method 300.0

11/20/23 17:54

11/24/23 19:16

JAC

HMM

Mt. Juliet, TN

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.



Erica McNeese Project Manager



















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# SAMPLE RESULTS - 01

L1678374

# Collected date/time: 11/13/23 13:20 Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1470		20.0	1	11/19/2023 16:57	WG2174182

# <sup>2</sup>—-



	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	447		1.90	5.00	5	11/20/2023 07:02	WG2172510



Cn











Collected date/time: 11/13/23 13:40

# SAMPLE RESULTS - 02

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1840		50.0	1	11/19/2023 16:57	WG2174182



# Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	857		3.79	10.0	10	11/24/2023 17:21	WG2174496













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# SAMPLE RESULTS - 03

Collected date/time: 11/13/23 14:15

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	546		10.0	1	11/19/2023 16:57	WG2174182



















	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	194		0.379	1.00	1	11/24/2023 17:31	WG2174496	

Wet Chemistry by Method 300.0

Analyte

Chloride

Collected date/time: 11/13/23 14:45

## Page 91 of 136

# SAMPLE RESULTS - 04

# Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

991

Qualifier

MDL

mg/l

3.79

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2420		50.0	1	11/19/2023 16:57	WG2174182

Dilution

10

Analysis

date / time

11/24/2023 17:40

Batch

WG2174496





<sup>3</sup> Ss













	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2420		50.0	1	11/19/2023 16:57	WG2174182

RDL

mg/l

10.0

# Released to Imaging: 9/27/2024 10:52:32 AM Arcadis - Chevron - NM

Collected date/time: 11/13/23 15:10

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# SAMPLE RESULTS - 05

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l	mg/l		date / time	
Dissolved Solids	23800	400	1	11/19/2023 16:57	WG2174182

















		Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
ıA	nalyte	mg/l		mg/l	mg/l		date / time	
Cl	nloride	13700		37.9	100	100	11/24/2023 17:50	WG2174496

Wet Chemistry by Method 300.0

Collected date/time: 11/13/23 15:35

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# SAMPLE RESULTS - 06

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	6540		200	1	11/19/2023 16:57	WG2174182

















	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>	
Analyte	mg/l		mg/l	mg/l		date / time		
Chloride	2160		37.9	100	100	11/24/2023 18:00	WG2174496	

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# SAMPLE RESULTS - 07

Collected date/time: 11/13/23 00:00

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	3530		100	1	11/19/2023 16:57	WG2174182





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1810		37.9	100	100	11/24/2023 18:09	WG2174496













### Page 95 of 136 SAMPLE RESULTS - 08

Collected date/time: 11/14/23 09:55

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2640		50.0	1	11/20/2023 19:19	WG2174557



# Wet Chemistry by Method 300.0

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	890		3.79	10.0	10	11/24/2023 18:19	WG2174496













Wet Chemistry by Method 300.0

Analyte

Chloride

Collected date/time: 11/14/23 10:10

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# SAMPLE RESULTS - 09

# Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

8300

Qualifier

MDL

mg/l

37.9

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	13500		200	1	11/20/2023 19:19	WG2174557

Dilution

100

Analysis

date / time

11/24/2023 18:28

Batch

WG2174496

RDL

mg/l

100













Collected date/time: 11/14/23 10:30

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# SAMPLE RESULTS - 10

L1678374

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	1180		20.0	1	11/20/2023 19:19	WG2174557

# <u>Cp</u>





	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	364		1.90	5.00	5	11/24/2023 18:57	WG2174496













Wet Chemistry by Method 300.0

Analyte

Chloride

# SAMPLE RESULTS - 11

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Collected date/time: 11/14/23 10:55

Dilution

100

Analysis

date / time

11/24/2023 19:06

Batch

WG2174496

# Gravimetric Analysis by Method 2540 C-2011

Result

mg/l

5350

Qualifier

MDL

mg/l

37.9

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	11600		200	1	11/20/2023 19:19	WG2174557

RDL

mg/l

100



















# SAMPLE RESULTS - 12

Collected date/time: 11/14/23 11:15

# Gravimetric Analysis by Method 2540 C-2011

	Result	Qualifier	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	mg/l		mg/l		date / time	
Dissolved Solids	2930		50.0	1	11/20/2023 17:54	WG2174563

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	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	mg/l		mg/l	mg/l		date / time	
Chloride	1100		37.9	100	100	11/24/2023 19:16	WG2174496













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L1678374-01,02,03,04,05,06,07

### Method Blank (MB)

(MB) R4002954-1 11/19/23 16:57

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		10.0	10.0



2



# ³Ss

# L1677485-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1677485-03 11/19/23 16:57 • (DUP) R4002954-3 11/19/23 16:57

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	882	974	1	9.91	J3	5





# <sup>6</sup>Qc

# L1677485-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1677485-04 11/19/23 16:57 • (DUP) R4002954-4 11/19/23 16:57

(00)	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1060	1120	1	5.15	<u>J3</u>	5



# <sup>9</sup>Sc

# Laboratory Control Sample (LCS)

(LCS) R4002954-2 11/19/23 16:57

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8690	98.8	85 0-115	

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L1678374-08,09,10,11

# Gravimetric Analysis by Method 2540 C-2011

# Method Blank (MB)

(MB) R4003143-1 11/20/23 19:19	
MB Result	MB Q

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		10.0	10.0



<sup>2</sup>Tc



## L1678022-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1678022-02 11/20/23 19:19 • (DUP) R4003143-3 11/20/23 19:19

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	594	611	1	2.82		5





# <sup>6</sup>Qc

# L1678371-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1678371-01 11/20/23 19:19 • (DUP) R4003143-4 11/20/23 19:19

, ,	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	906	962	1	6.00	<u>J3</u>	5





# Laboratory Control Sample (LCS)

(LCS) R4003143-2 11/20/23 19:19

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8640	98.2	85 0-115	

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L1678374-12

# Gravimetric Analysis by Method 2540 C-2011

U

mg/l

668

Methoc	Blank	(MB)
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Dissolved Solids

Analyte

Dissolved Solids

(IVIB) R4003147-1 11/20/23 17:54								
	MB Result	MB Qualifier	MB MDL					
Analyte	mg/l		mg/l					

MDL	MB RDL
	mg/l

%

4.25

10.0

10.0





# L1677929-02 Original Sample (OS) • Duplicate (DUP)

(OS) L16//929-02	11/20/23 1/:54 • (DUP)	R4003147-3	11/20/23 1/	:54
	Original Result	DUP Result	Dilution	DUP RPD

mg/l

697

DUP Qualifier	DUP RP Limits
	%

D



<sup>†</sup>Cn



# L1678027-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1678027-05 11/20/23 17:54 • (DUP) R4003147-4 11/20/23 17:54

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1020	1050	1	2.71		5



## Laboratory Control Sample (LCS)

Arcadis - Chevron - NM

(LCS) R4003147-2 11/20/23 17:54

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8430	95.8	85.0-115	



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Wet Chemistry by Method 300.0

L1678374-01

### Method Blank (MB)

(MB) R4002233-1 11/19/2	23 22:53			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	П		0.379	1.00





## L1678182-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1678182-02 11/20/23 01:12 • (DUP) R4002233-5 11/20/23 02:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	6.74	6.76	1	0.228		15







### L1678182-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1678182-11 11/20/23 04:23 • (DLIP) R4002233-6 11/20/23 05:11

(03) 21070102 11 11/20/23	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	63.5	63.5	1	0.0313		15





# Laboratory Control Sample (LCS)

(LCS) R4002233-2 11/19/23 23:08

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	39.9	99.7	90.0-110	

# L1678182-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1678182-01 11/20/23 00:25 • (MS) R4002233-3 11/20/23 00:41 • (MSD) R4002233-4 11/20/23 00:56

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	40.0	95.4	116	116	50.9	51.3	1	80.0-120	<u>J6</u>	<u>J6</u>	0.135	15

# L1678182-11 Original Sample (OS) • Matrix Spike (MS)

(OS) L1678182-11 11/20/23 04:23 •	(MS) R4002233-7 11/20/23 05:27
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	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	40.0	63.5	89.9	66.0	1	80.0-120	<u>J6</u>

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Wet Chemistry by Method 300.0

L1678374-02,03,04,05,06,07,08,09,10,11,12

### Method Blank (MB)

(MB) R4004236-1 11/24/2	23 09:52			
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.379	1.00





# L1678029-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1678029-01 11/24/23 15:37 • (DUP) R4004236-3 11/24/23 15:46

,	Original Result DUP Result		Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	126	126	1	0.00150		15





# L1678378-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1678378-01 11/24/23 19:25 • (DLIP) R4004236-6 11/24/23 19:35

(03) 21070370-01 11/24/2	Original Result			DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	76.9	77.1	1	0.347		15





## Laboratory Control Sample (LCS)

(LCS) R4004236-2 11/24/23 10:01

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	39.3	98.3	80.0-120	

# L1678029-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1678029-01 11/24/23 15:37 • (MS) P4004236-4 11/24/23 15:56 • (MSD) P4004236-5 11/24/23 16:05

(03) 110/8029-01 11/	(O3) E1076023-01 11/24/23 13.37 • (M3) K4004230-4 11/24/23 13.30 • (M3D) K4004230-3 11/24/23 10.03											
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Chloride	40.0	126	140	140	34.5	34.3	1	80.0-120	J6	J6	0.0545	15

# L1678378-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1678378-01 11/24/23 19:25 • (MS) R4004236-7 11/24/23 19:44

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Chloride	40.0	76.9	102	61.6	1	80.0-120	<u>J6</u>

### 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

Appleviations and	d Definitions
MDL	Method Detection Limit.
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.

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<sup>\*</sup> Not all certifications held by the laboratory are applicable to the results reported in the attached report.

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 $<sup>^* \, \</sup>text{Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.} \\$ 

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## **APPENDIX G**

**Cooper Jal Groundwater Model Memo** 



To:

Copies:

Bradford G. Billings

File

EMNRD/OCD

5200 Oakland, NE, Suite 100

Albuquerque, NM 87113

From:

Khandaker Ashfaque

Jack Wang

Date:

Arcadis Project No.:

August 10, 2020

30045941.0003A

Subject:

Cooper-Jal Groundwater Model Chevron Environmental Management Company Lea County, New Mexico Arcadis of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747

Tel 631 249 7600 Fax 631 249 7610

#### **BACKGROUND**

This technical memorandum summarizes the work conducted by Arcadis for the Chevron Environmental Management Company to assess the potential effectiveness of a chloride plume containment system at the Cooper-Jal Unit South Injection Station (Site), approximately 5.5 miles northeast of Jal, New Mexico, in Section 24, Township 24 South, Range 36 East, Lea County, New Mexico. The location of the Site is shown on **Figure 1**.

Chloride is presented at elevated concentrations in groundwater beneath the Site as a result of historic operations; in 2019 chloride concentrations exceeded 9,300 milligrams per Liter (mg/L) at RW-1.

GHD previously developed a Site-specific three-dimensional groundwater flow and transport model for the Site to assess potential future chloride migration in groundwater and evaluate potential options to remediate the chloride plume. Review of GHD supplied modeling files suggest four remedial alternative scenarios were evaluated with varying number of extraction / injection wells and pumping rates. A closer look at simulation results indicate it will take approximately 90 to 95 years for complete attenuation of the chloride plume under a proposed 21-gallons per minute (gpm) system consisting of 3 extraction and 1 injection wells.

A brief summary of the Site Setting and Hydrogeologic Conditions can be found in 2016 Annual Groundwater Monitoring Report (GHD 2016).

#### **SCOPE OF WORK**

Arcadis has been tasked with reviewing the original model design and construction, revising, and recalibrating the groundwater model, and applying the model to evaluate chloride plume transport under three scenarios:

- Scenario 1 Monitored Natural Attenuation (non-pumping condition),
- Scenario 2 Five (5) recovery wells with time-varying strategic pumping conditions, and
- Scenario 3 Seven (7) recovery wells with time-varying strategic pumping conditions.

#### **CONCEPTUAL SITE MODEL**

The uppermost groundwater bearing zone underlying the Site is the Tertiary Ogallala Aquifer (Ogallala) formation which reportedly spans from approximately 165 feet to 175 feet below ground surface (bgs) across the Site. Based on Site boring logs, the average saturated aquifer thickness noted below the Site is approximately 40 feet and is generally encountered between 130 feet bgs and 175 feet bgs. "Red beds" consisting of fine-grained materials like shale, silt, or clay were encountered at approximately 171 feet bgs in several borings.

Hydraulic properties of the Ogallala formation were characterized through a pumping test performed on October 2, 2013 on recovery well RW-2R, and several slug tests carried out on 10 monitoring wells on March 21 and 23, 2017. Evaluation of the pumping test data resulted in a calculated aquifer transmissivity of 25.62 square feet per day and a hydraulic conductivity of 0.73 feet per day [ft/day]. However, hydraulic conductivity values obtained from slug test analysis ranged from 0.23 to 3.76 ft/d, with a geometric mean of 1.79 ft/d.

#### **GROUNDWATER FLOW MODEL DEVELOPMENT**

#### Flow Model Code Selection and Description

The groundwater flow model was developed using MODFLOW, a publicly-available groundwater flow simulation program developed by the USGS (McDonald and Harbaugh, 1988). MODFLOW is thoroughly documented; widely used by consultants, government agencies, and researchers; and is consistently accepted in regulatory environments. MODFLOW uses the method of finite differences to approximate groundwater flow equations. Spatial discretization consists of subdividing the entire model domain into a grid or mesh or blocks or cells. In the discretized system, hydraulic heads are computed at the center of each grid block. In general, computational accuracy increases as the number of rows and columns in the grid increases (the grid cells become smaller). MODFLOW allows the use of variable mesh spacing to enhance model accuracy in the area of concern — in this case, the Site area, within the chloride plume, and in the vicinity of existing and proposed groundwater pumping.

The hydrogeologic framework and the dynamics of the flow system require a code capable of simulating three-dimensional flow with dipping layers. The unconfined nature of the aquifer necessitates a code option for simulating a free-water surface. Simulation of various boundary conditions (specified flux and

free-surface) is required, as is the ability to simulate the distribution of various aquifer and hydrologic parameters. MODFLOW meets all of these requirements.

#### **Model Domain and Grid**

The numerical model domain for the Site covers an aerial extent of approximately 7,100 feet by 3,800 feet (**Figure 2**). The model domain has been extended to better represent regional hydrogeologic boundaries. The finite-difference grid spacing ranges from 10 feet by 10 feet near the Site to 110 feet by 110 feet along the model extents. Vertically, the model consists of one layer, and represents the Tertiary Ogallala Aquifer formation.

#### **Boundary Conditions**

The numerical model is bounded by regional water level contours on the south-east and north-west, and no-flow boundary representing inferred regional groundwater flow line to the north-east and south-west (**Figure 2**). The boundary conditions align with the regional groundwater levels and extends a sufficient distance from the area of concern to minimize potential for boundary effects.

Head-dependent flux boundaries (i.e., general head boundaries) were utilized at the upgradient and downgradient model bounds based on 2019 gauged water levels from on-Site monitoring wells (i.e. MW-13 and MW-11). During flow model calibration, the stage and hydraulic conductance of flux boundaries were adjusted to better match observed flow conditions.

#### **Hydraulic Parameters**

The following sections discuss hydraulic parameter assignments in the model.

#### **Hydraulic Conductivity**

Initially, the groundwater model utilized a uniform hydraulic conductivity of 2.79 ft/day. During flow model calibration, the hydraulic conductivity value was adjusted to 1.4 ft/day – a value comparable to the calculated geomean of 1.79 ft/day from slug test analyses.

#### Recharge

Even though the annual evaporation rate likely exceeds annual precipitation, small amount of recharge likely occurs in months when evaporation rates are the lowest. As such, aerial recharge was applied uniformly over the model domain and was modified during model calibration. The rate of aerial recharge assigned in the calibrated model was estimated to be 0.06 inches per year, which is consistent with values obtained at nearby McKnight and Erwin facilities.

#### **GROUNDWATER FLOW MODEL CALIBRATION**

Calibration of a groundwater flow model refers to the process of adjusting model parameters to obtain a reasonable match between observed and simulated water levels. Model calibration is an iterative procedure that involves adjustment of hydraulic properties and/or boundary conditions to achieve the best match between observed and simulated water levels. During model calibration, model parameters are varied over a narrow range set by Site-specific data using the conceptual Site model as a guide.

The use of point data (targets) during calibration eliminates the potential for interpretive bias that may result from attempting to match a contoured potentiometric surface (Konikow, 1978; Anderson and

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Woessner, 1992). The steady-state flow model was calibrated to average water level elevations between 2017 and 2019 collected at 19 water-level targets and distributed across the Site (**Figure 3**).

Simulated groundwater elevations and calibration target residuals for the Site area are shown on **Figure 3**. Residuals are defined as the difference between the model-simulated heads and the observed values. Positive residual values indicate that the model-simulated values are lower than the target values, and negative residual values indicate that the model-simulated values are higher than the target values. The residuals shown on **Figure 3** suggest measured water levels match reasonably well with model-simulated water levels in the Site area. Additionally, over-predictions in water levels are generally balanced with under-predicted water levels across the Site area which suggest minimal spatial bias in residuals.

The quality of the model calibration can be determined by a statistical analysis of the residuals, as shown in **Table 1**. Residual statistics (**Table 1**) for the calibrated groundwater flow model indicate an acceptable agreement between simulated and measured groundwater elevations. The residual mean, residual standard deviation, and sum of squared residuals (SSR) were calculated to be -0.07 feet, 0.43 feet, and 3.56 square feet, respectively. The scaled standard deviation (standard deviation divided by the range in observed water levels) is 4.6%. Ideally, the scaled standard deviation should be less than 10% to ensure the model accurately predicts groundwater flow direction and rates. These statistics indicate a good fit between the observed and simulated water levels. A plot of observed vs. simulated groundwater elevations for the 19 calibration targets is presented on **Figure 4**, which indicates that all simulated water levels are within 10% of the observed target levels.

#### SOLUTE TRANSPORT MODEL DEVELOPMENT

#### **Transport Model Code Selection and Description**

The solute transport modeling was performed using the modular three-dimensional transport model referred to as MT3DMS which was originally developed by Zheng and Wang (1999) for the United States Army Corps of Engineers. The MT3DMS code uses the flows computed by MODFLOW in its transport calculations and the same finite-difference grid structure and boundary conditions as MODFLOW, simplifying the effort to construct the solute transport model. MT3DMS has a comprehensive set of options and capabilities for simulating advection, dispersion/diffusion, and chemical reactions of contaminants in groundwater flow systems under a range of hydrogeologic conditions.

#### **Solute Transport Parameters**

The solute transport model was simulated using a single domain with an average porosity of 20%. No sorption, dispersion, or decay were simulated which is appropriate for evaluating chloride transport. However, the model included numerical dispersion, which is typical on the order of one half the grid cell spacing or about 5 feet. Plume dilution is represented by the groundwater recharge in the flow model and the dilution effect is expected to be minimal on the simulated chloride concentration.

#### CHLORIDE TRANSPORT ASSESSMENT

Solute transport modeling was performed to evaluate the migration and fate of the chloride plume detected in groundwater beneath the Site. Initial chloride plume was delineated based on observed chloride concentrations from June 2019 and November 2019 sampling events (**Figure 5**). To add conservatism in simulation results, maximum concentrations of the two sampling events at the monitoring wells were utilized. The solute transport model used the output from the calibrated flow model to simulate chloride transport under current average ambient groundwater flow conditions. The solute transport model was

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used to assess the effectiveness of various remedial alternatives in reducing chloride concentrations in groundwater.

Chloride plume transport was assessed under three scenarios:

- Scenario 1 Monitored Natural Attenuation (non-pumping condition),
- Scenario 2 Five (5) recovery wells with time-varying strategic pumping conditions, and
- Scenario 3 Seven (7) recovery wells with time-varying strategic pumping conditions.

The following sections describe the results of transport simulations for each scenario. Each transport scenario began with the initial chloride plume distribution shown on **Figure 5**. Transport model output are shown on **Figures 6**, **8**, and **10**. Recovery well configurations for Scenarios 2 and 3 are presented on **Figures 7** and **9**.

#### Scenario 1. Monitored Natural Attenuation (MNA)

This scenario simulated the movement of the chloride plume under non-pumping conditions (i.e., RW-1 and RW-2R were not pumped). **Figure 6** depicts chloride plume distributions after 5, 10, 20, 30, and 50 years of simulated transport. The figure indicates that the extent of the highest concentration portion of the plume (>5,000 mg/L) remains generally unchanged from the start of the simulation. Also, the leading edge of the plume slowly migrates downgradient with minimal spreading and attenuation suggesting chloride mass is expected to remain fairly unchanged under MNA scenario.

#### Scenario 2. Five (5) Recovery Wells with Time-Varying Strategic Pumping

This scenario simulated the fate and transport of the chloride plume under the influence of pumping from select recovery wells. Note that there are currently two non-operational recovery wells, RW-1 and RW-2 at the Site (**Figure 7**). Based on preliminary modeling evaluation, three additional recovery wells (RW-3, RW-4, and RW-5) were proposed at strategic locations with respect to the chloride plume footprint. Recovery wells RW-3 and RW-5 are located along the centerline and adjacent to the highest concentration of the plume; whereas, recovery well RW-4 is placed further downgradient along plume centerline to prevent downgradient migration as well as to provide contaminant mass recovery. The configuration of recovery wells with respect to initial chloride plume distribution is presented on **Figure 7**.

**Figure 8** illustrates chloride plume distributions after 10, 15, 18, 19, and 25 years of simulated transport. The transport simulation was performed in phases, where operation of various recovery wells was adjusted and individual well flow rates were optimized (i.e., reduced pumping rates, turning on and off recovery wells) to achieve chloride plume attenuation within a reasonable timeframe. The following table lists the different phases of modeling simulation along with active recovery wells and total pumping rates corresponding to individual phases:

Modeling Phase	Simulation Time Period (Years)	Total Pumping Rate (gpm)	Total Number of Operational Wells	Operating Recovery Wells
Phase 1	0 to 10	6.2	5	RW-1 through RW-5
Phase 2	10 to 15	6.0	4	RW-2 through RW-5
Phase 3	15 to 18	5.0	3	RW-3 through RW-5
Phase 4	18 to 19	3.6	2	RW-3 and RW-4
Phase 5	19 to 25	2.9	1	RW-4

As the table suggests, the total pumping rate for the recovery wells vary from 2.9 to 6.2 gpm across various phases. The table further indicates that the number of active recovery wells becomes less over time as the extent of the chloride plume decreases and the total chloride mass reduces, which are depicted on **Figure 8**. Modeling results (**Figure 8**) indicate that under the proposed five recovery well pumping configuration, chloride plume is expected to be completely attenuated below 250 mg/L in approximately 25 years.

#### Scenario 3. Seven (7) Recovery Wells with Time-Varying Strategic Pumping

The purpose of this scenario was to evaluate a pump-only remedy configuration that would achieve chloride plume attenuation in approximately 15 years. Based on review of Scenario 2 modeling results, two more recovery wells (RW-6 and RW-7) were added to the proposed five recovery wells from Scenario 2. **Figure 9** portrays the configuration of the seven recovery wells under Scenario 3 along with the initial chloride footprint. Besides existing recovery wells RW-1 and RW-2R, proposed locations of recovery wells RW-3 through RW-5 are generally consistent with those from Scenario-2. Additional recovery well RW-6 was proposed between RW-1 and RW-2R, and within the highest concentration (>5,000 mg/L) footprint of the chloride plume to enhance mass removal; whereas RW-7 was positioned between RW-3 and RW-4 to accelerate plume attenuation.

**Figure 10** illustrates chloride plume distributions after 10, 13, and 15 years of simulated transport. Similar to Scenario 2, the transport simulation was performed in phases, where operation of various recovery wells was adjusted, and individual well flow rates were optimized to achieve chloride plume attenuation within a shorter timeframe. The following table lists the total pumping rates along with the number of recovery wells corresponding to each transport simulation phases:

Modeling Phase	Simulation Time Period (Years)	Total Pumping Rate (gpm)	Total Number of Operational Wells	Operating Recovery Wells
Phase 1	0 to 10	7.1	7	RW-1 through RW-7
Phase 2	10 to 13	5.9	5	RW-3 through RW-7
Phase 3	13 to 15	5.1	3	RW-3 through RW-5

As the table suggests, the total pumping rate for the recovery wells vary from 5.1 to 7.1 gpm across various phases. The table further indicates that the number of active recovery wells becomes less over time as the extent of the chloride plume decreases and chloride mass reduces, which are depicted on

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**Figure 10**. Modeling results (**Figure 10**) indicate that under the proposed seven recovery well pumping configuration, chloride plume is expected to be completely attenuated below 250 mg/L in approximately 15 years.

#### **CONCLUSIONS**

A Site-specific, three-dimensional groundwater flow and solute transport model was used to assess potential approaches to mitigate the migration of a chloride plume beneath the Site. Using an initial chloride distribution based on 2019 groundwater quality samples, three scenarios were evaluated including MNA, time-varying strategic pumping with five recovery wells (two existing and three proposed wells), and time-varying strategic pumping with seven recovery wells (two existing and five proposed wells). The transport simulation predicted that chloride plume is expected to be completely attenuated below 250 mg/L in approximately 25 and 15 years under the five recovery well and seven recovery well scenarios, respectively.

#### REFERENCES

- Anderson, M. P. and W. W. Woessner. 1992. Applied Groundwater Modeling: Simulation of Flow and Advective Transport, Academic Press, Inc., New York, 381 p.
- GHD. 2016. 2016 Annual Groundwater Monitoring Report, Cooper-Jal Unit South Injection Station Case No. 1R289, OGRID No. 4323, Section 24, Township 24 South, Range 36 East, Lea County, New Mexico. Chevron Environmental Management Company. 039123. Report No. 16. February 6, 2017.
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- McDonald, Michael G. and Arlen W. Harbaugh. 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model. Techniques of Water-Resources Investigations of the United States Geological Survey, Chapter A1.
- Zheng, Chunmiao and P. Patrick Wang. 1999. MT3DMS: A Modular Three-Dimensional Multispecies Transport Model for Simulation of Advection, Dispersion, and Chemical Reactions of Contaminants in Groundwater Systems; Documentation and User's Guide Strategic Environmental Research and Development Program. Prepared for U.S. Army Corps of Engineers, Washington, DC. Contract Report SERDP-99-1. December.

Table 1
Groundwater Flow Model Steady-State Calibration Targets
Cooper-Jal Groundwater Model
Lea County, New Mexico



Well ID	Model Layer	Observed Groundwater Elevation (feet msl)	Simulated Groundwater Elevation (feet msl)	Residual (observed - simulated, feet)
MW-1	1	3187.11	3186.98	0.13
MW-10	1	3185.54	3184.61	0.93
MW-11	1	3181.16	3181.55	-0.39
MW-12	1	3190.35	3190.38	-0.03
MW-14	1	3184.33	3183.95	0.38
MW-2	1	3186.83	3186.57	0.26
MW-2A	1	3186.73	3186.60	0.13
MW-3	1	3187.50	3187.48	0.02
MW-4	1	3185.89	3186.13	-0.24
MW-4A	1	3186.07	3186.11	-0.04
MW-5	1	3186.00	3185.93	0.07
MW-6R	1	3186.65	3186.45	0.20
MW-7	1	3184.44	3184.66	-0.22
MW-8	1	3184.92	3185.13	-0.21
MW-9	1	3182.44	3182.98	-0.55
MW-9A	1	3182.47	3182.98	-0.51
RW-1	1	3186.32	3186.22	0.10
RW-2	1	3184.94	3185.05	-0.11
RW-2R	1	3183.86	3185.09	-1.23

Total targets: 19

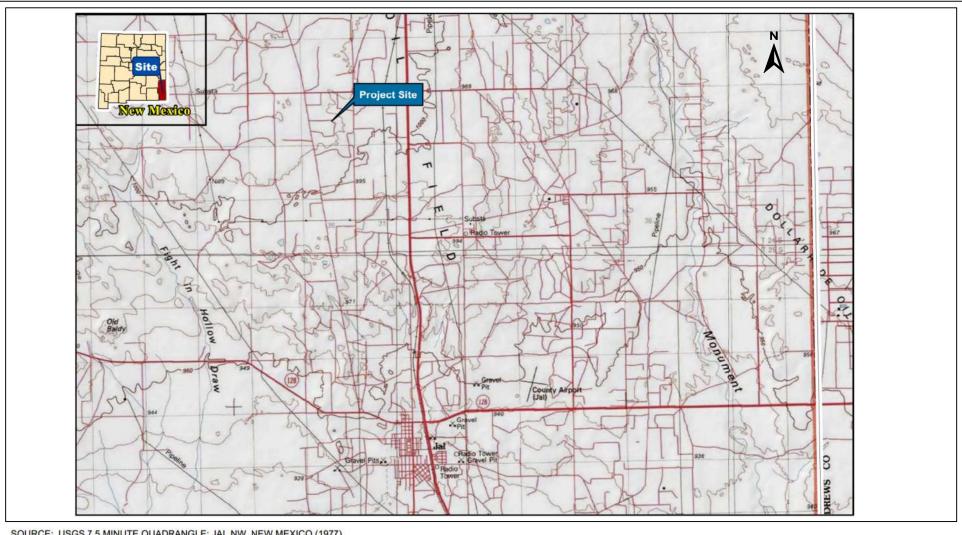
Mean residual: -0.07 feet

Residual standard deviation: 0.43 feet Observed target range: 9.20 feet Residual sum-of-squares: 3.56 ft<sup>2</sup>

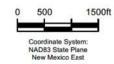
#### Notes:

Average water-level measurements from 2019.

ft<sup>2</sup> = square feet msl = mean sea level



SOURCE: USGS 7.5 MINUTE QUADRANGLE; JAL NW, NEW MEXICO (1977)



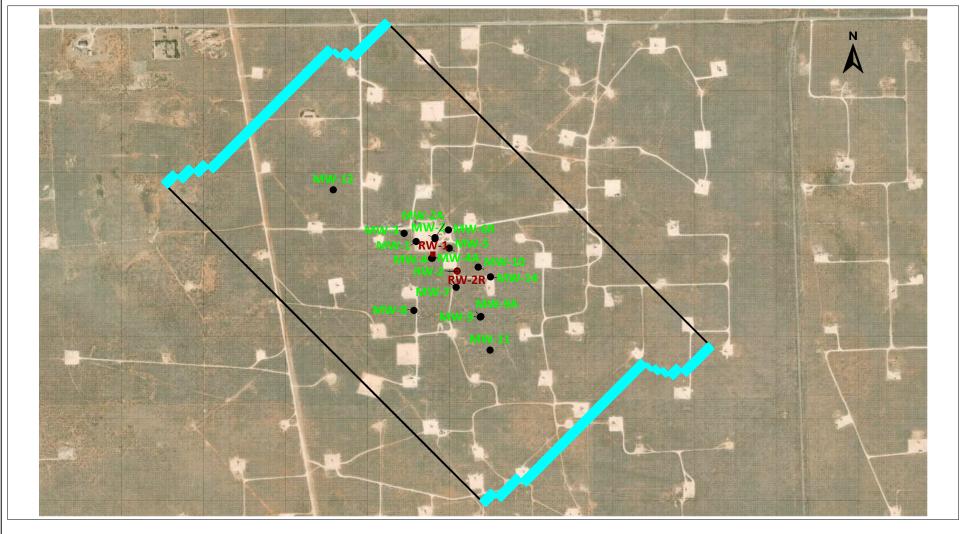
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SITE LOCATION



**FIGURE** 



General Head Boundary

MW-2 Monitoring Wells

RW-1 Extraction Wells

SCALE IN FEET

0 1000 2000 3000

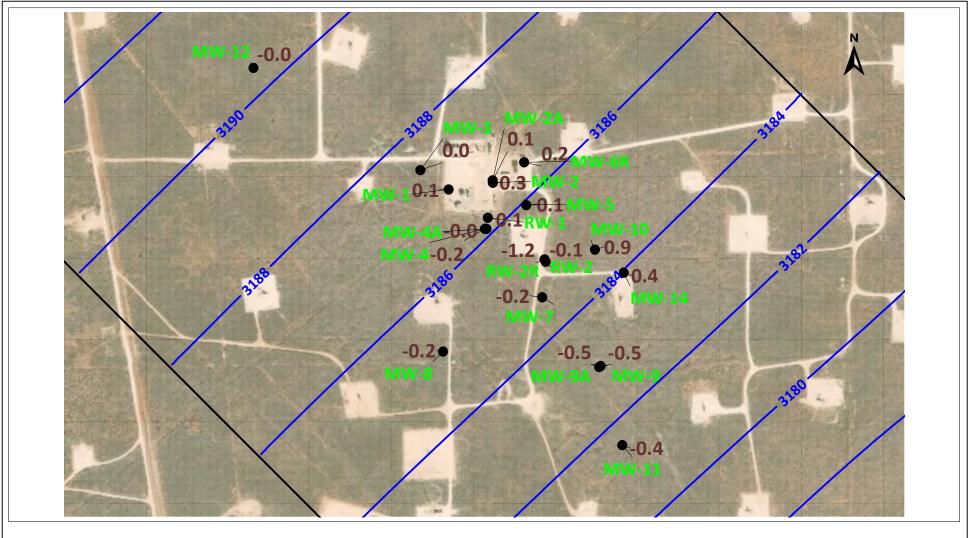
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

GROUNDWATER MODEL EXTENT AND BOUNDARY CONDITIONS



**FIGURE** 



**SCALE IN FEET**0 500 1000

--3190-- Simulated Water Level Contours (feet msl) (contour interval: 2 feet); msl = mean sea level

-0.2 ● MW-2

Simulated Residuals (feet)
[Observed minus Modeled Water Levels]

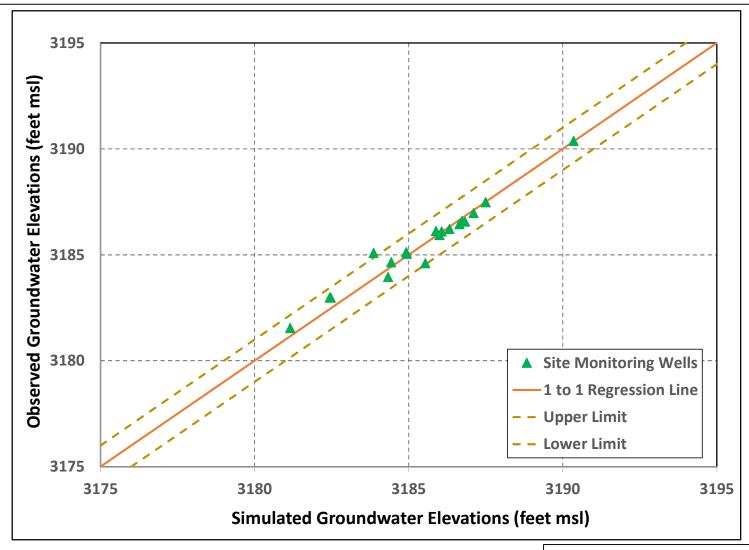
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SIMULATED NON-PUMPING WATER LEVEL AND RESIDUAL DISTRIBUTIONS



FIGURE



Steady-State calibration statistics:

- 1. Residual Mean is -0.07 feet.
- 2. Redisual Standard Deviation is 0.43 feet.
- 3. Sum of Square is 3.56 feet<sup>2</sup>.

Note: msl = mean sea level

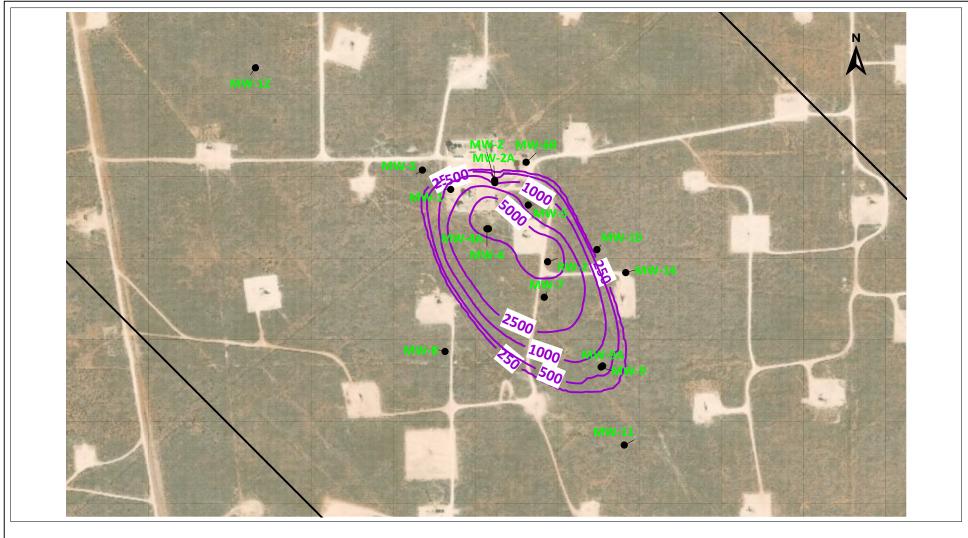
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

STEADY-STATE MODEL CALIBRATION TARGETS: OBSERVED VS SIMULATED GROUNDWATER ELEVATIONS



**FIGURE** 





--500-- Simulated Chloride Concentration Contours (mg/L) mg/L = milligrams per liter

MW-2

Monitoring Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
LEA COUNTY, NEW MEXICO

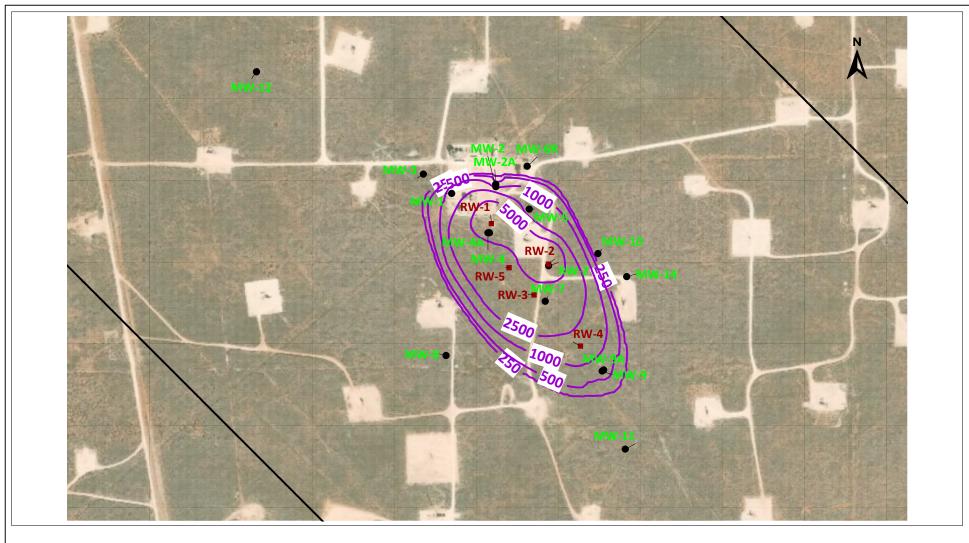
COOPER-JAL GROUNDWATER MODEL

INITIAL CHLORIDE PLUME DISTRIBUTION



FIGURE







--500-- Simulated Chloride Concentration Contours (mg/L) mg/L = milligrams per liter

RW-1

Recovery Wells

/IW-2

Monitoring Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

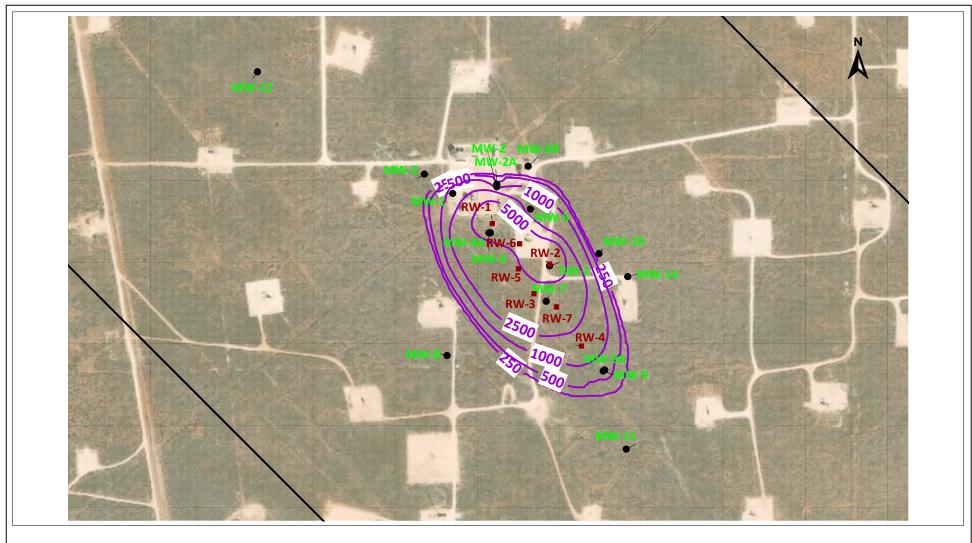
COOPER-JAL GROUNDWATER MODEL

INITIAL CHLORIDE PLUME DISTRIBUTION AND RECOVERY WELL CONFIGURATION FOR SCENARIO-2 (5 RWs)



**FIGURE** 







--500-- Simulated Chloride Concentration Contours (mg/L) mg/L = milligrams per liter

RW-1

Recovery Wells

√W-2

Monitoring Wells

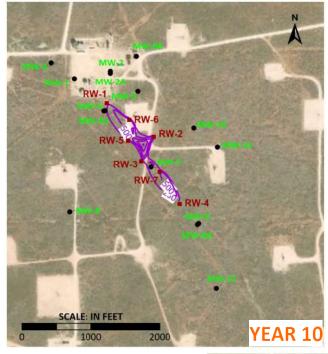
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

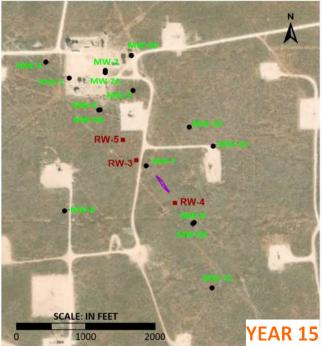
COOPER-JAL GROUNDWATER MODEL

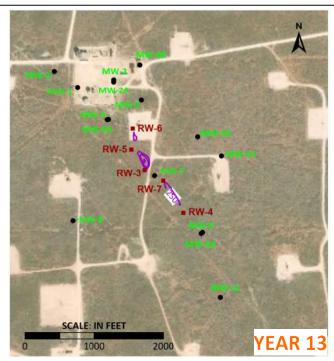
INITIAL CHLORIDE PLUME DISTRIBUTION AND RECOVERY WELL CONFIGURATION FOR SCENARIO-3 (7 RWs)



**FIGURE** 







—250 — Simulated Chloride Concentration Contours (miligram per liter)

MW-2 Monitoring Wells

RW-1 Recovery Wells

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO

COOPER-JAL GROUNDWATER MODEL

SIMULATED CHLORIDE PLUME DISTRIBUTIONS AFTER 10, 13, AND 15 YEARS UNDER SCENARIO-3 (7 RWs)

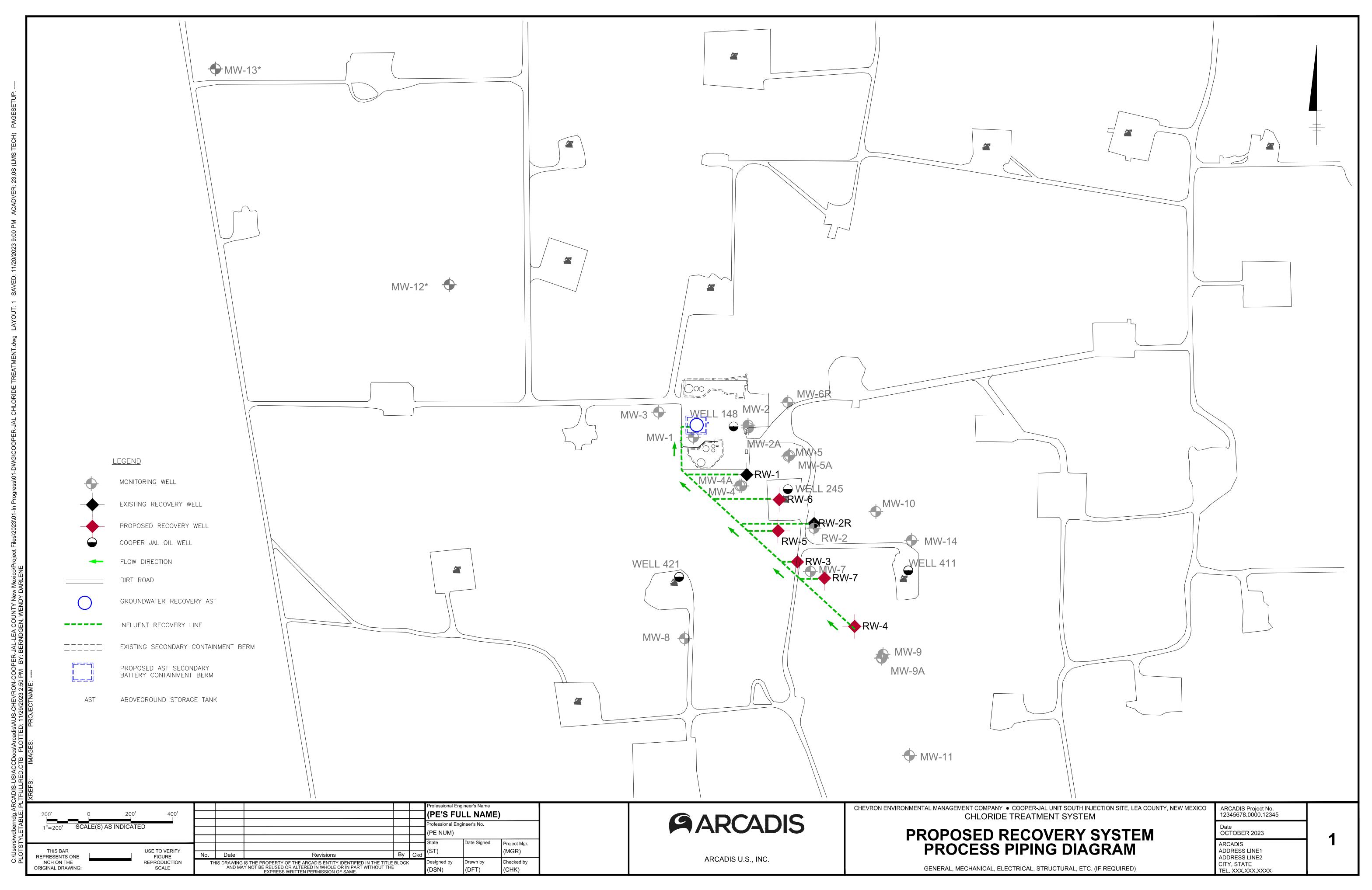


FIGURE

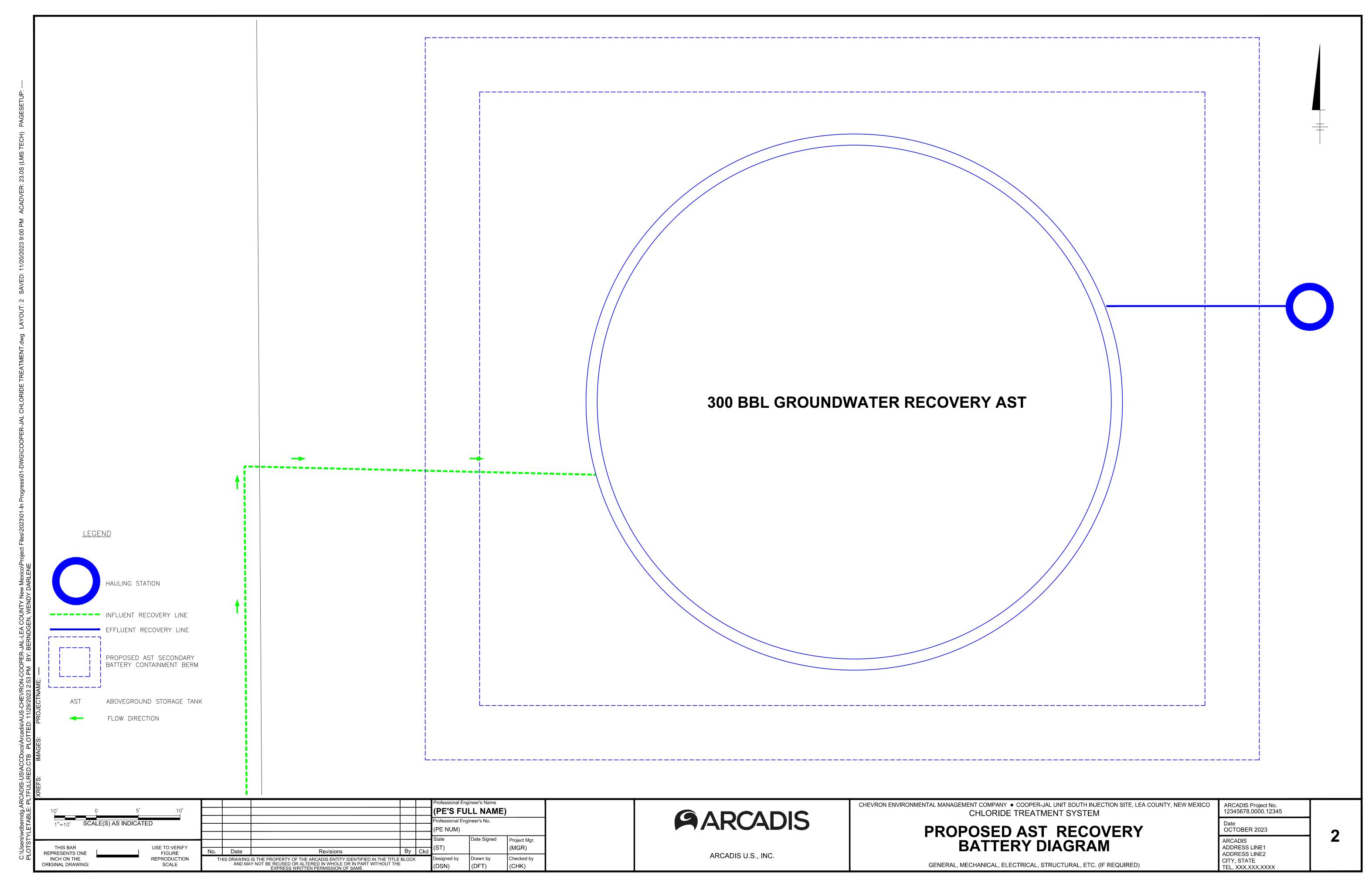
## **APPENDIX H**

**Proposed Groundwater Recovery System Design** 

Received by OCD: 5/30/2024 1:25:16 PM



Received by OCD: 5/30/2024 1:25:16 PM



## **APPENDIX I**

Written Notice to Landowner and Public Notice Newspaper Ad



#### Dear Neighbor,

Chevron Environmental Management Company has issued for public comment a Stage 1 and Stage 2 Abatement Plan for the Cooper-Jal Unit South Injection Station (Station) in Lea County, New Mexico. Impacted groundwater from a historical earthen produced waterflow pit were investigated by the New Mexico Oil Conservation Division (NMOCD) beginning in 1993. The Stage 1 and Stage 2 Abatement Plan summarizes environmental monitoring and investigations at the Station (including data and maps of the extent), describes current conditions and need for abatement, and presents the proposed abatement plan, engineering design, and implementation details.



The NMOCD Director has reviewed the Stage 1 and Stage 2 Abatement Plan and determined that the Plan is administratively complete. The NMOCD Director has complied with Subsection B of 19.15.30.15 of the New Mexico Administrative Code by reviewing the document and concluding that it satisfies the requirements of Subsection C of 19.15.30.13.

www.arcadis.com



NMOCD is accepting written comments and requests for public hearing that include reasons why a hearing should be held. Before approving the Stage 1 and Stage 2 Abatement Plan, NMOCD will consider comments and requests if received within 30 days after publication of this public notice.

Please submit written comments by XXX, 2024 to Mike Buchanan, Environmental Specialist, New Mexico Oil Conservation Division, 8801 Horizon Blvd. NE, Suite 260, Albuquerque, NM 87113 or via email at <a href="michael.buchanan@emnrd.nm.gov">michael.buchanan@emnrd.nm.gov</a>. The responsible party's address is Chevron Environmental Management Company, Armando Martinez, P.O. Box 469, Questa, NM, 87564

# PUBLIC NOTICE OF 30-DAY PUBLIC COMMENT PERIOD FOR STAGE 1 and Stage 2 ABATEMENT PLAN FOR THE COOPER-JAL SOUTH INJECTION STATION

Chevron Environmental Management Company has issued for public comment a Stage 1 and Stage 2 Abatement Plan for the Cooper-Jal Unit South Injection Station (Station) in Lea County, New Mexico. Impacted groundwater from a historical earthen produced waterflow pit were investigated by the New Mexico Oil Conservation Division (NMOCD) beginning in 1993. The Stage 1 and Stage 2 Abatement Plan summarizes environmental monitoring and investigations at the Station (including data and maps of the extent), describes current conditions and need for abatement, and presents the proposed abatement plan, engineering design, and implementation details.

The NMOCD Director has reviewed the Stage 1 and Stage 2 Abatement Plan and determined that the Plan is administratively complete. The NMOCD Director has complied with Subsection B of 19.15.30.15 of the New Mexico Administrative Code by reviewing the document and concluding that it satisfies the requirements of Subsection C of 19.15.30.13.

The public may view the Stage 1 and Stage 2 Abatement Plan electronically on the NMOCD public database at <a href="https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Data/Incidents/Incidents.aspx">https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Data/Incidents/Incidents.aspx</a>. Enter nAUTOfAB000105 in the Incident ID box, then scroll to the bottom of the page and click on Continue. To find the Stage 2 Abatement Plan, click on Item XXX dated XXX. The Stage 2 Abatement Plan can also be viewed by contacting the NMOCD office listed below.

NMOCD is accepting written comments and requests for public hearing that include reasons why a hearing should be held. Before approving the Stage 1 and Stage 2 Abatement Plan, NMOCD will consider comments and requests if received within 30 days after publication of this public notice.

Please submit written comments by (insert Date), 2024 to Mike Buchanan, Environmental Specialist, New Mexico Oil Conservation Division, 8801 Horizon Blvd. NE, Suite 260, Albuquerque, NM 87113 or via email at <a href="mailto:michael.buchanan@emnrd.nm.gov">michael.buchanan@emnrd.nm.gov</a>. The responsible party's address is Chevron Environmental Management Company, Armando Martinez, P.O. Box 469, Questa, NM, 87564.

This notice was published on or near February 13, 2023, in the Albuquerque Journal, Hobbs News-Sun, and Jal Record newspapers.



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District III 1000 Rio Brazos Rd., Aztec, NM 87410 Phone:(505) 334-6178 Fax:(505) 334-6170

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 349484

#### CONDITIONS

Operator:	OGRID:
CHEVRON U S A INC	4323
6301 Deauville Blvd	Action Number:
Midland, TX 79706	349484
	Action Type:
	[UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

#### CONDITIONS

Created By		Condition Date
michael.buchanan	Letter of approval has been electronically submitted 09/27/2024, for the stage 1 and stage 2 abatement plans, as well as the draft public notice for distribution. App ID: 349484.	9/27/2024