BACKGROUND INFORMATION FOR REVIEW OF RADIOACTIVE TRACER SURVEYS FOR CEMENT INTEGRITY

Facility Name Romulus Facility			Operator Environmental Geo-Technologies, LLC		
Well Name Well #1-12			USEPA Permit Numbe MI-163-1W-C010	Witness	
State Michigan	Test Date July 7, 2018		Logging Company Michigan Wireline Services		

Well and Operational Information

Long StringCsg Materi Steel and Hastelloy	Long String Casing OD 7	Casing weight, #/ft 26	Casing ID, ins.	Long String Casing Length, ft 4080	
Tubing Material Fiberglass	Tubing OD, ins 4.5	0	Tubing ID, ins. #N/A	Tubing Length, ft 4050	
Tail Pipe Material 0	Tail Pipe OD, ins 0	Tail Pipe, weight#/ft. 0	Tail Pipe ID, ins. 0.0000	Tail Pipe Length, ft 0	Tail Pipe Depth 4055
	OpenHole diameter, in 8.75	TD, ft 4645	PBTD, ft 4246	Top of Open Interval, ft 4080	
Packer Model GPS	Packer Type 0	Top of Packer, ft 4050	Bottom of Packer, ft 4055		

Geological Information

Lowermost USDW Name Dundee Limestone	Fms in Arrestment Interval Utica, Trenton and Upper Black River	Fms in Injection Intervalt Franconia Fm, Galesville Ss, Eau Claire Fm, Mt. Simon Ss
Base of USDW, ft 387	Depth to top of Arrestment Interval, ft 2409	Injection Interval Top, ft 4045

TOOL INFORMATION

Ejector, ft above BDET 7 ft	TDET, ft above BDET 6 ft	MDET, ft above BDET			

CALIBRATION INFORMATION

Depth BDET, ft	Depth TDET, ft	BDET CPSPI	Shaly zone	Maximum Reading, LD	Minimum Reading, LD
Depth BDET, ft	Depth TDET, ft	BDET CPSPI	Clean zone	Maximum Reading, LD	Minimum Reading, LD

BACKGROUND LOG (BDET) BEFORE TESTS

Appearance of Log, lithology discernible, extremely suppressed, noisy, etc. Is calibration the same as for statistical checks?

FIRST SLUG TRACKING SEQUENCE

Flow Rate, gpm 32 gpm	Velocity in tubing, fps 1.12 fps	Depth of deflection on 3,223 ft	Deflection on 1st pass 250	Deflection/Background <20	Passes Through Slug 13
Slug Split? yes or no No	Depth of Split, ft	Moved up, yes or no No	Minimum Slug Depth,	Distance above shoe,	Maximum Slug Depth, ft 4,310 ft

FIRST STATIONARY TEST

Depth of BDET, ft 4,080 ft	Depth of TDET, ft 4,074 ft	BDET to open interval 0 ft	Time at station, mins 30 min	Injection Rate, gpm 32 gpm	Log Divisions per Minute 60
Depth at Injection, ft 4,080 ft		BDET above end of tubing or casing, ft 0 ft	Reached BDET up, LD No	Reach UDET up, LD	Velocity Up, ft/min N/A
2nd Setting Depth, ft	Time of reset	Slug already passed BDET?	Reached BDET up, LD	Slug arrival time	
3rd Setting Depth	Time of reset	Slug already passed BDET?	Reached BDET up, LD	Slug arrivel time	
4th setting depth, ft	Time of reset	Slug already passed BDET?	Reached BDET up, LD	Slug arrival time	Upper Limit of Movement, ft

REMEMBER

1. Inject at highest practicable rate to maximize pressure differentials, but at low enough velocity during slug tracking so the slug can be followed effectively.

2. Leave the scaling at the same level for all phases. 40 counts per second per inch is usually effective. We need to see evidence of variation due to lithology.

3. Use big slugs. The height of the deflection caused by the slug should be at least 50 times the difference of the high and low levels measured during logging the initial log.

4. If you record times of arrival, that should be the arrival of the leading edge.

5. The purpose is to determine the shallowest depth at which tracer material leaves the well.

6. When slug tracking, logging through the slug while the last part of the slug is leaving the deeper of the tailpipe or casing is the best way to identify a split. **If there is a split, always follow the upper portion to determine the limit of its upward movement.**

7. When running the stationary test, set the tool with the bottom detector five (5) feet above the end of the deeper of the tail pipe or casing. If the slug reaches it, move it up in steps to find the shallowest extent of movement.

8. The stationary test must be run long enough to be able to detect upward motion of 2 ft/min.
9. Superimpose the traces of the initial and final base logs.

10. Please submit both the merged and unmerged records unless the traces are coded so they can be identified when necessary (they don't need to be identified when they are all superimposed).

11. Please compare data in your records to that in the cells above. If there is a difference, be sure the correct information is noted. Please fill in the information in the other cells.
12. Please submit the digital logging data on a CD.

13. Please submit an up-to-date well schematic

BACKGROUND INFORMATION FOR REVIEW OF TEMPERATURE LOGS

Facility Name Romulus Facility		Operator Environmental Geo-Technologies, LLC	
Well Name Well #1-12		USEPA Permit Number MI-163-1W-C010	State Permit Number M-452
County Wayne	State Michigan	Test Date July 17, 2018	

Well and Operational Information

Top of Open Interval, ft 4080	Tubing Depth, ft 4050	Date of Last Injection July 11, 2018	Is This a Multi-Zone Facility? No
Depth to Base of USDW, ft. 387	Name of lowermost USDW Dundee Limestone	Hour of Last Injection	Other Zones Used at Facility
Depth to Top of Permitted Int, ft 3467	Name of Injection Interval Franconia Fm, Galesville Ss, Eau Claire Fm, Mt. Simon Ss	Volume Injected in Past Year, gal	Name of Shallower Injection Zone
Plugged Back Depth, ft. N/A	Total Depth, ft 4645	Injectate Temperature Variance, °F	Depth to Shallower Injection Zone, ft

Calibration Information		Logging Information	
Low Gauge Temperature, °F 81.6 deg. F.	High Gauge Temperature, °F 107.7 deg. F.	Time of Start of Logging 09:39	
Low Thermometer Temperature, °F	High Thermometer Temperature, °F	Days Since Last Injection 6 days	Maximum Log Depth, ft. 4,250 ft
Were Log Readings Adjusted? No	Gauge Calibration Date Feb 24, 2018	Multiple Log Runs? No	Maximum Logging Speed, ft/min 25 ft/min

REMEMBER

1. Well should have been shut in for at least 36 hours.
2. If well cannot be shut in for 36 hours, shut in as long as possible and run two logs at least six (6) hours
3. Calibrate the temperature tool at two different temperatures.
4. Record log data at one measurement per foot.
5. Record natural gamma ray activity log with temperature.
6. Log top to bottom. Keep logging speed below 30 feet per minute.
7. Log quality in air-filled holes can be improved by logging at a slower speed. Please reduce logging speed to less than 20 feet per minute in the top 1000 feet of air-filled holes.
8. Please compare data in your records to that in the cells above. If there is a difference, be sure the correct information is noted. Please fill in the other cells.
9. Submit digital logging data on a CD in .las or .asc format
10. Please submit an up-to-date well schematic

Appendix 2
Annulus Pressure Test Report

Petrotek

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
STANDARD ANNULAR PRESSURE TEST

Operator Environmental Geo-Technologies, Inc.
Address 28470 Citrin Drive
Romulus, MO 48174
Well Name EDS 1-12

State Permit No. M452
USEPA Permit No. MI-163-1W-C010
Date of Test 07/17/2018
Well Type 1-W

LOCATION INFORMATION SW Quarter of the NW Quarter of the SE Quarter of Section 12; Range 09E; Township 03S; County Wayne;

Company Representative Rich Schildhouse; Field Inspector Jack Lanigan / MDEQ;

Type of Pressure Gauge Digital Fluke inch face; 3,000 psi full scale; 0.1 Digital psi increments;

New Gauge? Yes ☐ No ☒ If no, date of calibration 07/16/2018 Calibration certification submitted? Yes ☒ No ☐

TEST RESULTS	
Readings must be taken at least every 10 minutes for a minimum of 30 minutes for Class II, III and V wells and 60 minutes for Class I wells. For Class II wells, annulus pressue should be at least 300 psig. For Class I wells, annulus pressure should be the greater of 300 psig or 100 psi above maximum permitted injection pressure. Original chart recordings must be submitted with this form.	5-year or annual test on time? Yes ☒ No ☐ 2-year test for TA'd wells on time? Yes ☐ No ☒ After rework? Yes ☐ No ☒ Newly permitted well? Yes ☐ No ☒

Time	Pressure (in psig) Annulus	Tubing
8:25	970.0	71
8:35	968	71
8:45	968	71
8:55	967	71
9:05	967	71
9:15	967	71
9:25	967	71

Casing size 7-inch
Tubing size 4 1/2-inch Fiberglass
Packer type GPS Model - 12
Packer set @ 4,050 feet
Top of Permitted Injection Zone 3,369 feet
Is packer 100 ft or less above top of Injection Zone ? Yes ☒ No ☐
If not, please submit a justification.
Fluid return (gal.) 9.3 gallon tank increase
Comments: for pressure bleed 967 to 530 psi

Test Pressures: Max. Allowable Pressure Change: Initial test pressure x 0.03 29.1 psi
Test Period Pressure change - 3.0 psi

Test Passed ☒ Test Failed ☐

If failed test, well must be shut in, no injection can occur, and USEPA must be contacted within 24 hours. Corrective action needs to occur, the well retested, and written authorization received before injection can recommence.

I certify under penalty of law that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (See 40 CFR 144.32(d))

Rich Schildhouse, Petrotek — Printed Name of Company Representative
Signature of Company Representative
7/17/2018 — Date

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – OFFICE OF GEOLOGICAL SURVEY

ANNULAR PRESSURE TEST

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

Permit Number: M452 MI-163-1W-C0007

Well name & No.: EDS 1-12

Surface location: SW 1/4 of NW 1/4 of SE 1/4, Section 12 T 03S R 09E

Name and address of permittee:
Environmental Geo-Technologies, LLC
28470 Citrin Drive
Romulus, MI 48174

Township: Romulus
County: Wayne

Well type:
Part 615 ☐ Secondary recovery ☐ Brine disposal
Part 625 ☒ Waste disposal ☐ Solution mining

Date of test: 17 July 2018

Casing: 7" at 4080 feet

Tubing: 4 1/2 Alum Ins

Type of gauge: Digital Gauge

inch face: psi range: 0 - 2000

Packer type/model: GPS Model 12

Packer depth: 4066 ft

New gauge ☐ Yes ☒ No

if no, enter date of test calibration: 12 July 2018

Type of non-corrosive liquid in the annulus: Diesel Fuel & Brine

Average rate during injection: N/A

Maximum allowed injection pressure: 765 psi

TEST DATA

Pressure readings (psig)

Time	Annulus	tubing	Time	Annulus	tubing
8:25 AM	970 psi	71 psi			
8:35	968	71			
8:45	968	71			
8:55	967	71			
9:05	967	71			
9:15	967	71			
9:25	967	71			

Comments:
Well demonstrated mechanical integrity
Pressure released & returned to 970 psi
Chart retrieved 9:35 gallery

Certification if witnessed by DEQ representative:

Signature of DEQ employee: [signature] Date: 17 July 2018

Certification if not witnessed by DEQ representative: "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Signature: Date:

MAIL TO: OFFICE OF GEOLOGICAL SURVEY
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30256
LANSING MI 48909-7756

EQP 7606 (rev. 9/2001)

Appendix 3
Annulus Pressure Gauge Certification

Petrotek

Table of Contents
Job #ENGT008050-2

Customer Environmental Geo Technologies
User Environmental Geo Technologies
Plant 28470 Citrin Drive

Substation	Position	Equipment	Page
Well	Annulus 1 Pressure	ISO-81235D1-ISO CERT 2015 (5)	1
Well	Annulus 2 Pressure	ISO-81235D1-ISO CERT 2015 (4)	2
Well	Injection 1 Well Pressure	ISO-81235D1-ISO CERT 2015 (3)	3
Well	Well 1 Flow	ISO-81235D1-ISO CERT 2015	4
Well	Well 2 Flow	ISO-81235D1-ISO CERT 2015 (2)	5

CALIBRATION CERTIFICATE

UIS SCADA
3290 Bishop Circle E.
Dexter, MI 48130
734-424-1200

CUSTOMER: Environmental Geo Technologies
CERTIFICATE #: ENGT008050-2, 1 of 5
ADDRESS: 28470 Citrin Drive; Romulus MI US 48174
JOB #: ENGT008050-2
USER: Environmental Geo Technologies; 28470 Citrin Drive; Romulus MI US 48174
PAGE: 1 of 5
OWNER REPRESENTATIVE: John Frost
TELEPHONE: 734-946-1000
Date: 7/16/2018 Temp: 80 °F Humidity: 55 %RH Equip Location: Plant
Sub/Parent: Well Position/Child: Annulus 1 Pressure

NAMEPLATE

Item Tested: Pressure Transmitter
Manufacturer: Rosemount Model Number: 3051
Serial Number: 10000096 Tag Number: PIT
Operating Range: 0-2000 psig (cal 0-1000 psig) Procedure/Method: Fluke 754:75x_umeng0000 rev Jul 2011

Line	%	INPUT psig Applied	OUTPUT psig As Found	OOT	As Left	OOT
1		0	1.0	☐	0.0	☐
2		250	250.8	☐	250.0	☐
3		500	500.7	☐	500.1	☐
4		750	750.8	☐	750.1	☐
5		1000	1001.0	☐	1000.1	☐
6				☐		☐

Communicator: Fieldbus Totalizer As Found: NA Totalizer As Left: NA Gal

#	Manufacturer	Model	Serial / ID Number	Calibration Date	Calibration Due
1	Fluke	750PD5 (0-1000 psig)	SHOP-1054	3/28/2018	3/28/2019
2	Fluke	754	GCM-752	4/3/2018	4/23/2019
3	Extech	RH300(ambient)	GCM-687	3/13/2017	3/30/2019

Comments:

use customer PC to access fieldbus parameters (no mA out, uses comms)
verified display on unit and in PLC

Deficiencies:

Traceability at UIS, Inc. is achieved through an unbroken chain of measurements with known uncertainties, to the International Systems of Units (SI) thru NIST or another Metrology Institute.
The results contained within relate only to the item(s) calibrated. Pass/Fail or In/Out of tolerance statements are the opinions of UIS, Inc., decisions are based on data from measurements made, procedure utilized, professional experience. The uncertainty associated with this calibration has been excluded from any determination.
It is the responsibility of the user of this equipment to determine if the results identified meet specific requirements for accuracy and its intended use.
Due dates appearing on the certificate of calibration and label are determined by client for administrative purposes without the written approval of UIS, Inc., and do not imply continued conformance to specifications. The Confidence Factor is K=2 approx. 95% Confidence Level.
All Certificates are page 1 of 1 unless otherwise specified. Page numbers at the top refer to the overall Job.
This certificate shall not be reproduced except in full, without the written approval of UIS, Inc.

Tech 1: D. Moot Tech 2: JS ISO-61523D-ISO Cert 2015; Rev Sep 2016

CALIBRATION CERTIFICATE

UIS SCADA
2290 Bishop Circle E.
Dexter, MI 48130
734-424-1200

CUSTOMER: Environmental Geo Technologies
CERTIFICATE #: ENGT008050-2, 2 of 5
ADDRESS: 28470 Citrin Drive; Romulus MI US 48174
JOB #: ENGT008050-2
USER: Environmental Geo Technologies; 28470 Citrin Drive; Romulus MI US 48174
PAGE: 2 of 5
OWNER REPRESENTATIVE: John Frost
TELEPHONE: 734-946-1000
Date: 7/16/2018 Temp: 80 °F Humidity: 55 %RH Equip Location: Plant
Sub/Parent: Well Position/Child: Annulus 2 Pressure

NAMEPLATE

Item Tested: Pressure Transmitter
Manufacturer: Rosemount Model Number: 3051
Serial Number: 620406 Tag Number: PIT
Operating Range: 0-2000 psig (cal 0-1000 psig) Procedure/Method: Fluke 754:75x_umeng0000 rev Jul 2011

INPUT psig OUTPUT psig

Line	%	Applied	As Found	OOT	As Left	OOT
1		0	0.8	☐	0.0	☐
2		250	250.7	☐	250.2	☐
3		500	500.5	☐	500.1	☐
4		750	750.6	☐	750.1	☐
5		1000	1001.0	☐	1000.1	☐
6				☐		☐

Communicator: Fieldbus Totalizer As Found: NA Totalizer As Left: NA Gal

#	Manufacturer	Model	Serial / ID Number	Calibration Date	Calibration Due
1	Fluke	750PD5 (0-1000 psig)	SHOP-1054	3/28/2018	3/28/2019
2	Fluke	754	GCM-752	4/3/2018	4/23/2019
3	Extech	RH300(ambient)	GCM-687	3/13/2017	3/30/2019

Comments:

use customer PC to access fieldbus parameters (no mA out, uses comms)
verified display on unit and in PLC

Deficiencies:

Traceability at UIS, Inc. is achieved through an unbroken chain of measurements with known uncertainties, to the International Systems of Units (SI) thru NIST or another Metrology Institute.
The results contained within relate only to the item(s) calibrated. Pass/Fail or In/Out of tolerance statements are the opinions of UIS, Inc., decisions are based on data from measurements made, procedure utilized, professional experience. The uncertainty associated with this calibration has been excluded from any determination.
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Tech 1: C. Moot Tech 2: na ISO-81523D-ISO Ccrt 2015; Rev Sep 2016

CALIBRATION CERTIFICATE

UIS SCADA
2290 Bishop Circle E.
Dexter, MI 48130
734-424-1200

CUSTOMER: Environmental Geo Technologies
CERTIFICATE #: ENGT008050-2, 3 of 5
ADDRESS: 28470 Citrin Drive; Romulus MI US 48174
JOB #: ENGT008050-2
USER: Environmental Geo Technologies; 28470 Citrin Drive; Romulus MI US 48174
PAGE: 3 of 5
OWNER REPRESENTATIVE: John Frost
TELEPHONE: 734-946-1000
Date: 7/16/2018 Temp: 80 °F Humidity: 55 %RH Equip Location: Plant
Sub/Parent: Well Position/Child: Injection 1 Well Pressure

NAMEPLATE

Item Tested: Pressure Transmitter

Manufacturer: Rosemount Model Number: 3051

Serial Number: 761305 Tag Number: PIT

Operating Range: 0-2000 psig (cal 0-1000 psig) Procedure/Method: Fluke 754:75x_umeng0000 rev Jul 2011

INPUT psig OUTPUT psig

Line	%	Applied	As Found	OOT	As Left	OOT
1		0	0.4	☐	0.0	☐
2		250	250.3	☐	249.9	☐
3		500	500.5	☐	500.1	☐
4		750	750.6	☐	750.1	☐
5		1000	1000.8	☐	1000.1	☐
6				☐		☐

Communicator: Fieldbus Totalizer As Found: NA Totalizer As Left: NA Gal

#	Manufacturer	Model	Serial / ID Number	Calibration Date	Calibration Due
1	Fluke	750PD5 (0-1000 psig)	SHOP-1054	3/28/2018	3/28/2019
2	Fluke	754	GCM-752	4/3/2018	4/23/2019
3	Extech	RH300(ambient)	GCM-667	3/13/2017	3/30/2019

Comments:

use customer PC to access fieldbus parameters (no mA out, uses comms)
verified display on unit and in PLC

Deficiencies:

Traceability at UIS, Inc. is achieved through an unbroken chain of measurements with known uncertainties, to the International System of Units (SI) thru NIST or another Metrology Institute.
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Tech 1: S. Hood Tech 2: JS ISO-81523D-ISO Cert 2015; Rev Sep 2016

CALIBRATION CERTIFICATE

UIS SCADA
2290 Bishop Circle E.
Dexter, MI 48130
734-424-1200

CUSTOMER: Environmental Geo Technologies
CERTIFICATE #: ENGT008050-2, 4 of 5
ADDRESS: 28470 Citrin Drive; Romulus MI US 48174
JOB #: ENGT008050-2
USER: Environmental Geo Technologies; 28470 Citrin Drive; Romulus MI US 48174
PAGE: 4 of 5
OWNER REPRESENTATIVE: John Frost
TELEPHONE: 734-946-1000
Date: 7/16/2018 Temp: 80 °F Humidity: 55 %RH Equip Location: Plant
Sub/Parent: Well Position/Child: Well 1 Flow

NAMEPLATE

Item Tested: Magnetic Flow Transmitter
Manufacturer: Rosemount Model Number: 8732E
Serial Number: 0860253579 Tag Number: FIT3832
Operating Range: GPM Procedure/Method: Ros 8700: 00821-0100-4764 Rev 1997

INPUT ft/sec OUTPUT ft/sec

Line	%	Applied	As Found	OOT	As Left	OOT
1		0	0.0	☐	0.0	☐
2		3	3.0	☐	3.0	☐
3		10	10.0	☐	10.0	☐
4		30	30.0	☐	30.0	☐
5				☐		☐

Communicator: Fieldbus Totalizer As Found: NA Totalizer As Left: NA Gal

#	Manufacturer	Model	Serial / ID Number	Calibration Date	Calibration Due
1	Rosemount	8714	SHOP-644	3/2/2016	3/31/2019
2	Extech	RH300(ambient)	GCM-687	3/13/2017	3/30/2019

Comments:
tube cal#1066705710642005, 3 in tube, density 62.4, 5 Hz
use customer PC to access fieldbus parameters (no mA out, uses comms)
verified display on unit and in PLC

Deficiencies:
wiring connections have corrosion. recommend cleaning and putting cover back on wire wire grips to minimize future issues

Traceability at UIS, Inc. is achieved through an unbroken chain of measurements with known uncertainties, to the International Systems of Units (SI) thru NIST or another Metrology Institute.
The results contained within relate only to the item(s) calibrated. Pass/Fail or In/Out of tolerance statements are the opinions of UIS, Inc., decisions are based on data from measurements made, procedure utilized, professional experience. The uncertainty associated with this calibration has been excluded from any determination.
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All Certificates are page 1 of 1 unless otherwise specified. Page numbers at the top refer to the overall Job.
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Tech 1: G. Moo Tech 2: N ISO-81323D-ISO Cert 2015; Rev Sep 2016

CALIBRATION CERTIFICATE

UIS SCADA
2290 Bishop Circle E.
Dexter, MI 48130
734-424-1200

CUSTOMER: Environmental Geo Technologies
CERTIFICATE #: ENGT008050-2, 5 of 5
ADDRESS: 28470 Citrin Drive; Romulus MI US 48174
JOB #: ENGT008050-2
USER: Environmental Geo Technologies; 28470 Citrin Drive; Romulus MI US 48174
PAGE: 5 of 5
OWNER REPRESENTATIVE: John Frost
TELEPHONE: 734-946-1000
Date: 7/16/2018 Temp: 80 °F Humidity: 55 %RH Equip Location: Plant
Sub/Parent: Well Position/Child: Well 2 Flow

NAMEPLATE

Item Tested: Magnetic Flow Transmitter

Manufacturer: Rosemount Model Number: 8732E

Serial Number: 04123344 Tag Number: FIT3932

Operating Range: GPM Procedure/Method: Ros 8700: 00821-0100-4764 Rev 1997

INPUT ft/sec OUTPUT ft/sec

Line	%	Applied	As Found	OOT	As Left	OOT
1		0	0.0	☐	0.0	☐
2		3	3.0	☐	3.0	☐
3		10	10.0	☐	10.0	☐
4		30	30.0	☐	30.0	☐
5				☐		☐

Communicator: Fieldbus Totalizer As Found: NA Totalizer As Left: NA Gal

#	Manufacturer	Model	Serial / ID Number	Calibration Date	Calibration Due
1	Rosemount	8714	SHOP-644	3/2/2016	3/31/2019
2	Extech	RH300(ambient)	GCM-687	3/13/2017	3/30/2019

Comments:
tube cal#1030905310284005, 3 in tube, density 62.4, 5 Hz
use customer PC to access fieldbus parameters (no mA out, uses comms)
verified display on unit and in PLC

Deficiencies:
wiring connections have corrosion. recommend cleaning and putting cover back on wire wire grips to minimize future issues

Traceability at UIS, Inc. is achieved through an unbroken chain of measurements with known uncertainties, to the International Systems of Units (SI) thru NIST or another Metrology Institute.
The results contained within relate only to the item(s) calibrated. Pass/Fail or In/Out of tolerance statements are the opinions of UIS, Inc., decisions are based on data from measurements made, procedure utilized, professional experience. The uncertainty associated with this calibration has been excluded from any determination.
It is the responsibility of the user of this equipment to determine if the results identified meet specific requirements for accuracy and its intended use.
Due dates appearing on the certificate of calibration and label are determined by client for administrative purposes without the written approval of UIS, Inc., and do not imply continued conformance to specifications. The Confidence Factor is K=2 approx. 95% Confidence Level.
All Certificates are page 1 of 1 unless otherwise specified. Page numbers at the top refer to the overall Job.
This certificate shall not be reproduced except in full, without the written approval of UIS, Inc.

Tech 1: G. Moot Tech 2: na ISO-81523D-ISO Cert 2015; Rev Sep 2016

Appendix 4
Downhole Pressure Gauge Certification

Petrotek

Feb. 24/2018
10:50:13 AM

Probe AKS
1132 Everman Pkwy.
Fort Worth, Texas 76140
Office:(281)-987-2244
Fax: (281)-987-7677
Toll: +1 (888)-942-2244

aks technologies
a Probe company

Calibration Certificate

AKS Technologies

Model: PR625 **Cal. Date:** Feb. 24/2018

Serial #: 9847 **Certificate #:** 4537

Specifications

Pressure Range: 6,000 PSI Pressure Accuracy: (1.44 PSI (0.024) %FS)

Temperature Range: 0 to 150 Celsius Temperature Accuracy: (0.23) %FS)

Calibration Summary

Channel 1:

Pressure Accuracy (Maximum Error): -1.35 PSI (-0.0225) %FS

Traceability Statement

All working standards are traceable to national or internationally recognized standards.

Calibrated with AKS Technologies DWG #3 SN:6465

Calibrated By: _____
Ian Potter

0000000045377

Feb. 20/2018
08:08:33 AM

Probe AKS
1132 Everman Pkwy.
Fort Worth, Texas 76140
Office:(281)-987-2244
Fax: (281)-987-7677
Toll: +1 (888)-942-2244

aks technologies
a Probe company

Calibration Certificate

AKS Technologies

Model: PR625 **Cal. Date:** Feb. 20/2018

Serial #: 40010 **Certificate #:** 536

Specifications

Pressure Range: 10,000 PSI Pressure Accuracy: (2.40 PSI (0.024) %FS)

Temperature Range: 0 to 150 Celsius Temperature Accuracy: (0.23) %FS)

Calibration Summary

Channel 1:

Pressure Accuracy (Maximum Error): 1.10 PSI (0.0110) %FS

Traceability Statement

All working standards are traceable to national or internationally recognized standards.

Calibrated with AKS Technologies DWG #3 SN:6465

Calibrated By: _____
Ian Potter

0000000045360

Pressure Test Report

COMPANY INFORMATION

Company Name	Environmental Geo-Technologies
Representative	Rich Schildhouse with Petrotek
Phone	303-290-9414
Fax	303-290-9580
Address	Petrotek Engineering Corporation 5935 South Zang Street, Suite #200 Littleton, CO 80127-4646
E-Mail Address	
Service Company	J.O. Well Service & Testing, Inc.

WELL INFORMATION

Well Name	EGT Well #1-12
Well Location	Romulus, Michigan
Field and Pool	
Status (Oil, Gas, Water, Injection)	
Perforated Intervals	
Mid-point of Perforated Intervals (MPP)	
Drilling Rig Number	
Elevations	
Kelly Bushing (KB)	13 feet above ground level
Casing Flange (CF)	
KB-CF	
Ground Level	
Plug Back Total Depth	4649
Total Depth	
Production Casing	
Production Tubing	E.O.T. at 4055 feet

TEST INFORMATION

Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018
Dead-weight Gauge Tubing Pressure	
Dead-weight Gauge Casing Pressure	
Shut-in Date (Duration)	July 18, 2018 at 04:25:29
Date / Time on Bottom	July 17, 2018 at 20:48:22
Date / Time off Bottom	July 18, 2018 at 13:33:00
Probe Serial Number	40010
Probe Offset from End of Tool String	
Run Depth at Probe Pressure Port	

PRESSURE TEST RESULTS

Maximum Recorded Probe Pressure	2365.9 psig
Maximum Recorded Probe Temperature	103.9 deg F
Final Buildup Pressure	
Gradient Survey Information	
Extrapolated Pressure to MPP	
Final Gradient at Depth	
Job Number	

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

PROBE INFORMATION

Probe Serial Number	40010
Model	PR625
Pressure	
Calibrated Pressure Range	0.0 - 10,000.0 psig
Accuracy	2.40 psig (0.024% FS)
Resolution	0.1500 psig (0.0015% FS)
Temperature	
Calibrated Temperature Range	0.00 - 150.00 deg C
Accuracy	0.345 deg C (0.23% FS)
Resolution	0.003 deg C (0.002% FS)
Calibration File Used for Reports	February 20, 2018

PROGRAMMING DETAILS

Step	Sample Mode	Period	Duration	Comment

Program Start Time
Program End Time
Total Samples Taken
Usage for this Test
Generic Data File Name

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

COMMENTS

Reported By Tim Auker

Zeroed bottom gauge in reference to Kelly Bushing Measurements.

We used measured depths and not true vertical depths.

Top Gauge: 9847 two feet above bottom gauge
Bottom Gauge: 40010

The bottom gauge (40010) was used for this report.

R.I.H. with gauges while injecting into well. Hang bottom gauge at 3950 feet for Build-Up/Fall-Off Test.
P.O.O.H. with gauges making gradient stops.

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Pressure vs. Depth

Probe Serial Number 40010

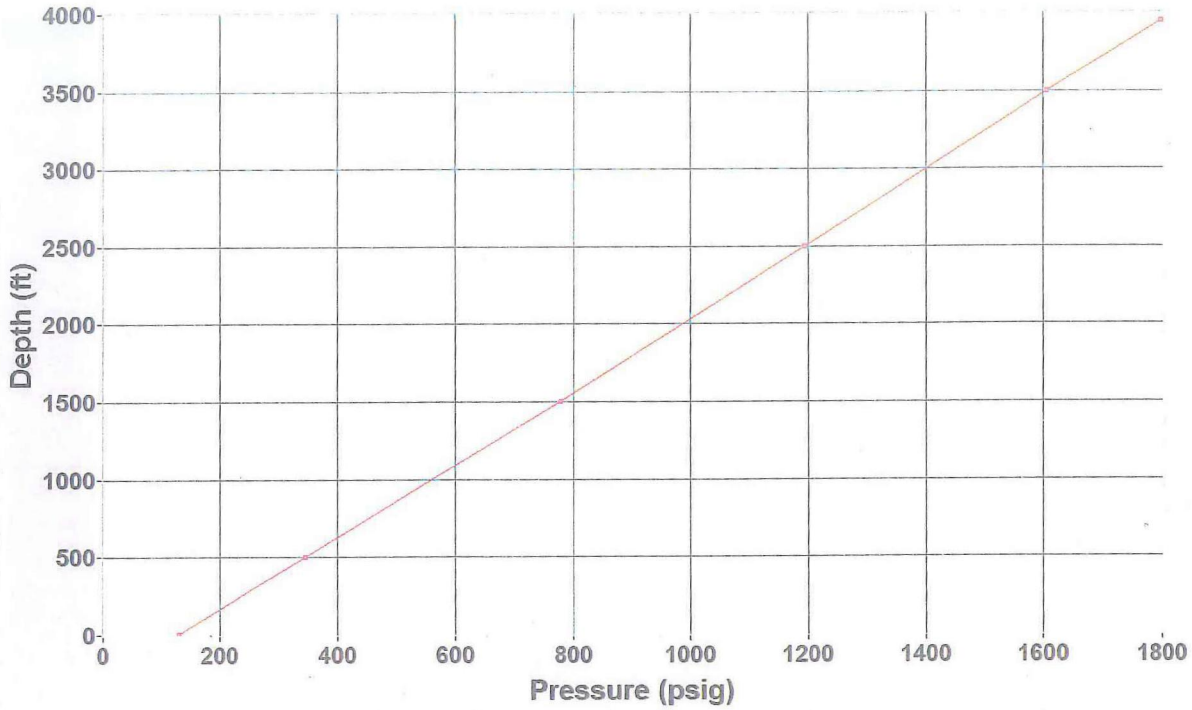
		(ft)	(psig)	(psi/ft)	(deg F)	(deg F/ft)
12:57	13:00	3950.000	1796.854	-	78.908	-
13:05	13:08	3500.000	1605.645	0.4249	75.830	0.0068
13:11	13:14	2500.000	1193.753	0.4119	65.840	0.0100
13:16	13:19	1500.000	777.910	0.4158	60.764	0.0051
13:22	13:25	500.000	345.483	0.4324	57.182	0.0036
13:28	13:31	7.000	130.047	0.4370	77.486	-0.0412

Extrapolated to MPP:	(ft)	(psig)	(deg F)
	0.000		

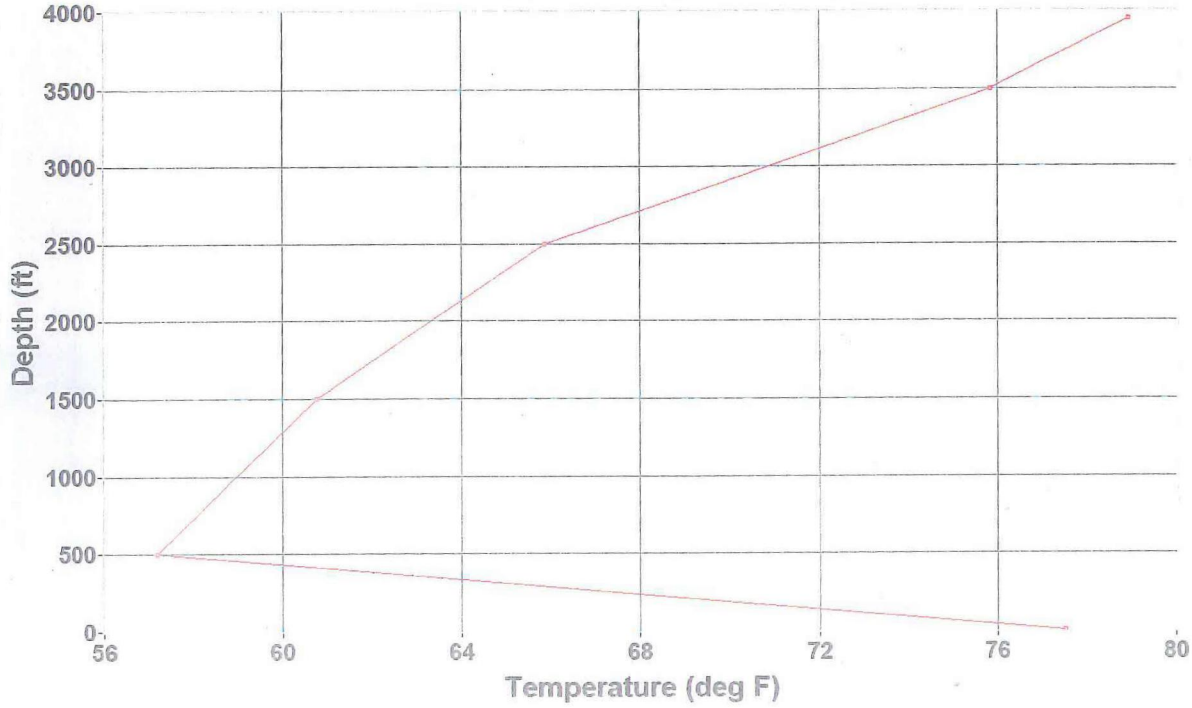
Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Probe Serial Number 40010

Static Pressure Gradients

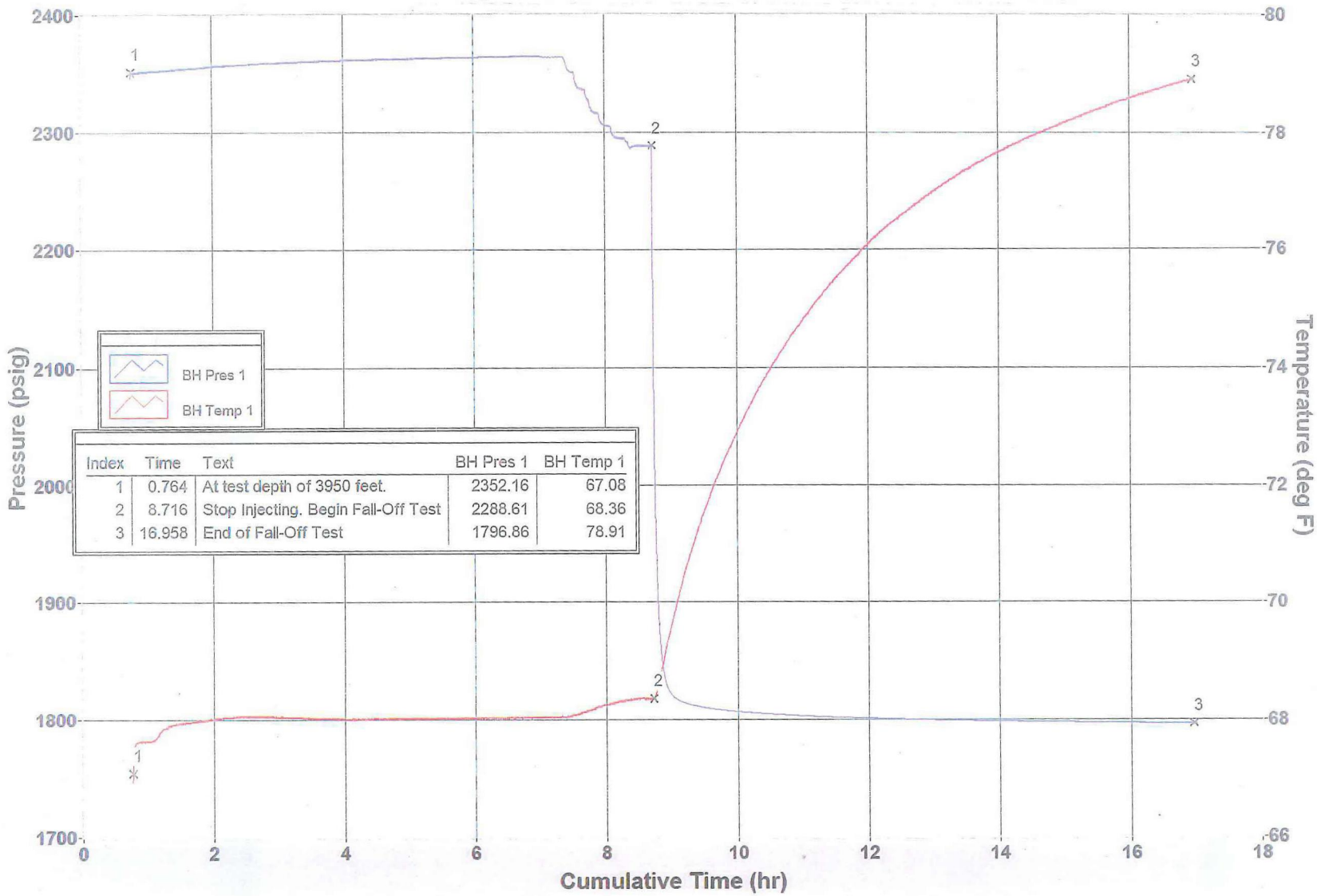


Static Temperature Gradients



Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Injection/Fall-Off Test



Index	Time	Text	BH Pres 1	BH Temp 1
1	0.764	At test depth of 3950 feet.	2352.16	67.08
2	8.716	Stop Injecting. Begin Fall-Off Test	2288.61	68.36
3	16.958	End of Fall-Off Test	1796.86	78.91

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
Gauges on surface				
2018/07/17	20:02:33	0.0000	0.921	76.082
2018/07/17	20:05:32	0.0497	0.821	76.586
2018/07/17	20:08:32	0.0997	0.793	77.018
2018/07/17	20:11:32	0.1497	0.712	77.504
2018/07/17	20:14:32	0.1997	0.699	77.864
2018/07/17	20:17:32	0.2497	0.715	78.134
2018/07/17	20:20:32	0.2997	0.666	78.386
2018/07/17	20:23:32	0.3497	0.645	78.602
2018/07/17	20:26:32	0.3997	0.653	78.818
2018/07/17	20:29:32	0.4497	0.596	78.620
2018/07/17	20:32:32	0.4997	0.571	78.692
Begin equalizing lubricator				
2018/07/17	20:33:22	0.5136	0.544	78.692
Bleed-Off Lubricator to fix leak.				
2018/07/17	20:35:12	0.5442	677.210	73.670
2018/07/17	20:35:32	0.5497	15.431	73.508
Begin equalizing lubricator				
2018/07/17	20:36:42	0.5692	1.081	73.382
2018/07/17	20:38:32	0.5997	681.853	71.528
R.I.H. with gauges				
2018/07/17	20:40:32	0.6331	682.555	71.150
2018/07/17	20:41:32	0.6497	821.814	69.548
2018/07/17	20:44:32	0.6997	1592.960	65.858
2018/07/17	20:47:32	0.7497	2252.049	66.110
At test depth of 3950 feet.				
2018/07/17	20:48:22	0.7636	2352.155	67.082
2018/07/17	20:50:32	0.7997	2351.231	67.586
2018/07/17	20:53:32	0.8497	2351.417	67.622
2018/07/17	20:56:32	0.8997	2351.873	67.622
2018/07/17	20:59:32	0.9497	2352.335	67.622
2018/07/17	21:02:32	0.9997	2352.717	67.622
2018/07/17	21:05:32	1.0497	2352.920	67.640
2018/07/17	21:08:32	1.0997	2352.660	67.658
2018/07/17	21:11:32	1.1497	2352.601	67.730
2018/07/17	21:14:32	1.1997	2352.688	67.820
2018/07/17	21:17:32	1.2497	2353.012	67.856
2018/07/17	21:20:32	1.2997	2353.556	67.892
2018/07/17	21:23:32	1.3497	2354.001	67.910
2018/07/17	21:26:32	1.3997	2354.093	67.928
2018/07/17	21:29:32	1.4497	2354.124	67.928
2018/07/17	21:32:32	1.4997	2354.238	67.928
2018/07/17	21:35:32	1.5497	2354.417	67.946
2018/07/17	21:38:32	1.5997	2355.131	67.946
2018/07/17	21:41:32	1.6497	2355.133	67.964
2018/07/17	21:44:32	1.6997	2354.939	67.982
2018/07/17	21:47:32	1.7497	2355.113	67.982
2018/07/17	21:50:32	1.7997	2355.709	68.000
2018/07/17	21:53:32	1.8497	2356.347	68.000
2018/07/17	21:56:32	1.8997	2356.537	68.000

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/17	21:59:32	1.9497	2356.635	68.036
2018/07/17	22:02:32	1.9997	2356.976	68.018
2018/07/17	22:05:32	2.0497	2357.094	68.018
2018/07/17	22:08:32	2.0997	2357.419	68.018
2018/07/17	22:11:32	2.1497	2357.578	68.054
2018/07/17	22:14:32	2.1997	2357.603	68.036
2018/07/17	22:17:32	2.2497	2357.570	68.036
2018/07/17	22:20:32	2.2997	2357.468	68.072
2018/07/17	22:23:32	2.3497	2357.636	68.054
2018/07/17	22:26:32	2.3997	2357.883	68.072
2018/07/17	22:29:32	2.4497	2358.364	68.072
2018/07/17	22:32:32	2.4997	2358.836	68.054
2018/07/17	22:35:32	2.5497	2359.142	68.072
2018/07/17	22:38:32	2.5997	2358.946	68.072
2018/07/17	22:41:32	2.6497	2358.701	68.072
2018/07/17	22:44:32	2.6997	2359.240	68.072
2018/07/17	22:47:32	2.7497	2359.469	68.054
2018/07/17	22:50:32	2.7997	2359.387	68.054
2018/07/17	22:53:32	2.8497	2359.736	68.054
2018/07/17	22:56:32	2.8997	2360.054	68.054
2018/07/17	22:59:32	2.9497	2359.857	68.054
2018/07/17	23:02:32	2.9997	2359.615	68.054
2018/07/17	23:05:32	3.0497	2359.622	68.054
2018/07/17	23:08:32	3.0997	2360.051	68.054
2018/07/17	23:11:32	3.1497	2360.302	68.054
2018/07/17	23:14:32	3.1997	2360.563	68.036
2018/07/17	23:17:32	3.2497	2360.711	68.036
2018/07/17	23:20:32	3.2997	2360.663	68.036
2018/07/17	23:23:32	3.3497	2360.625	68.054
2018/07/17	23:26:32	3.3997	2360.398	68.018
2018/07/17	23:29:32	3.4497	2360.940	68.036
2018/07/17	23:32:32	3.4997	2361.053	68.036
2018/07/17	23:35:32	3.5497	2361.338	68.018
2018/07/17	23:38:32	3.5997	2361.506	68.036
2018/07/17	23:41:32	3.6497	2361.448	68.018
2018/07/17	23:44:32	3.6997	2361.647	68.018
2018/07/17	23:47:32	3.7497	2361.745	68.018
2018/07/17	23:50:32	3.7997	2361.725	68.018
2018/07/17	23:53:32	3.8497	2361.793	68.018
2018/07/17	23:56:32	3.8997	2361.201	68.000
2018/07/17	23:59:32	3.9497	2361.515	68.018
2018/07/18	00:02:32	3.9997	2361.480	68.018
2018/07/18	00:05:32	4.0497	2361.660	68.018
2018/07/18	00:08:32	4.0997	2361.702	68.018
2018/07/18	00:11:32	4.1497	2361.760	68.018
2018/07/18	00:14:32	4.1997	2362.116	68.018
2018/07/18	00:17:32	4.2497	2362.370	68.000
2018/07/18	00:20:32	4.2997	2362.090	68.018
2018/07/18	00:23:32	4.3497	2362.018	68.018
2018/07/18	00:26:32	4.3997	2362.060	68.036

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	00:29:32	4.4497	2362.424	68.018
2018/07/18	00:32:32	4.4997	2362.865	68.036
2018/07/18	00:35:32	4.5497	2362.818	68.018
2018/07/18	00:38:32	4.5997	2362.177	68.018
2018/07/18	00:41:32	4.6497	2362.469	68.018
2018/07/18	00:44:32	4.6997	2363.042	68.018
2018/07/18	00:47:32	4.7497	2362.881	68.036
2018/07/18	00:50:32	4.7997	2362.647	68.018
2018/07/18	00:53:32	4.8497	2362.811	68.018
2018/07/18	00:56:32	4.8997	2362.998	68.036
2018/07/18	00:59:32	4.9497	2362.669	68.018
2018/07/18	01:02:32	4.9997	2363.312	68.018
2018/07/18	01:05:32	5.0497	2363.087	68.018
2018/07/18	01:08:32	5.0997	2363.152	68.018
2018/07/18	01:11:32	5.1497	2363.610	68.018
2018/07/18	01:14:32	5.1997	2362.903	68.018
2018/07/18	01:17:32	5.2497	2363.619	68.036
2018/07/18	01:20:32	5.2997	2363.251	68.036
2018/07/18	01:23:32	5.3497	2363.625	68.036
2018/07/18	01:26:32	5.3997	2363.167	68.018
2018/07/18	01:29:32	5.4497	2363.854	68.018
2018/07/18	01:32:32	5.4997	2363.458	68.036
2018/07/18	01:35:32	5.5497	2364.019	68.036
2018/07/18	01:38:32	5.5997	2363.509	68.036
2018/07/18	01:41:32	5.6497	2364.124	68.018
2018/07/18	01:44:32	5.6997	2363.538	68.018
2018/07/18	01:47:32	5.7497	2364.269	68.036
2018/07/18	01:50:32	5.7997	2363.699	68.036
2018/07/18	01:53:32	5.8497	2364.421	68.036
2018/07/18	01:56:32	5.8997	2363.622	68.036
2018/07/18	01:59:32	5.9497	2364.318	68.018
2018/07/18	02:02:32	5.9997	2363.985	68.018
2018/07/18	02:05:32	6.0497	2364.156	68.036
2018/07/18	02:08:32	6.0997	2364.536	68.036
2018/07/18	02:11:32	6.1497	2364.646	68.054
2018/07/18	02:14:32	6.1997	2364.291	68.036
2018/07/18	02:17:32	6.2497	2364.882	68.036
2018/07/18	02:20:32	6.2997	2364.492	68.036
2018/07/18	02:23:32	6.3497	2364.927	68.036
2018/07/18	02:26:32	6.3997	2364.807	68.036
2018/07/18	02:29:32	6.4497	2364.768	68.036
2018/07/18	02:32:32	6.4997	2365.087	68.036
2018/07/18	02:35:32	6.5497	2365.097	68.036
2018/07/18	02:38:32	6.5997	2364.737	68.036
2018/07/18	02:41:32	6.6497	2364.972	68.036
2018/07/18	02:44:32	6.6997	2365.544	68.054
2018/07/18	02:47:32	6.7497	2365.255	68.054
2018/07/18	02:50:32	6.7997	2365.000	68.036
2018/07/18	02:53:32	6.8497	2364.977	68.036
2018/07/18	02:56:32	6.8997	2365.635	68.036

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	02:59:32	6.9497	2365.710	68.036
2018/07/18	03:02:32	6.9997	2365.731	68.054
2018/07/18	03:05:32	7.0497	2364.904	68.036
2018/07/18	03:08:32	7.0997	2364.746	68.054
2018/07/18	03:11:32	7.1497	2364.733	68.054
2018/07/18	03:14:32	7.1997	2364.563	68.036
2018/07/18	03:17:32	7.2497	2364.627	68.036
2018/07/18	03:20:32	7.2997	2364.681	68.036
2018/07/18	03:23:32	7.3497	2364.772	68.054
2018/07/18	03:26:32	7.3997	2360.917	68.072
2018/07/18	03:29:32	7.4497	2352.750	68.072
2018/07/18	03:32:32	7.4997	2351.149	68.072
2018/07/18	03:35:32	7.5497	2345.307	68.090
2018/07/18	03:38:32	7.5997	2338.842	68.108
2018/07/18	03:41:32	7.6497	2337.541	68.126
2018/07/18	03:44:32	7.6997	2335.653	68.144
2018/07/18	03:47:32	7.7497	2327.886	68.162
2018/07/18	03:50:32	7.7997	2320.035	68.180
2018/07/18	03:53:32	7.8497	2316.704	68.198
2018/07/18	03:56:32	7.8997	2315.509	68.216
2018/07/18	03:59:32	7.9497	2308.580	68.252
2018/07/18	04:02:32	7.9997	2306.156	68.252
2018/07/18	04:05:34	8.0503	2305.939	68.288
2018/07/18	04:08:34	8.1003	2301.965	68.270
2018/07/18	04:11:34	8.1503	2296.394	68.288
2018/07/18	04:14:34	8.2003	2294.272	68.306
2018/07/18	04:17:34	8.2503	2295.044	68.306
2018/07/18	04:20:34	8.3003	2295.409	68.324
2018/07/18	04:23:34	8.3503	2290.712	68.342
2018/07/18	04:26:34	8.4003	2285.969	68.342
2018/07/18	04:29:34	8.4503	2287.422	68.342
2018/07/18	04:32:34	8.5003	2287.924	68.342
2018/07/18	04:35:34	8.5503	2288.205	68.360
2018/07/18	04:38:34	8.6003	2288.305	68.342
2018/07/18	04:41:34	8.6503	2288.536	68.360
2018/07/18	04:44:34	8.7003	2288.563	68.360
Stop Injecting. Begin Fall-Off Test				
2018/07/18	04:45:29	8.7156	2288.610	68.360
2018/07/18	04:47:34	8.7503	1999.441	68.432
2018/07/18	04:50:34	8.8003	1886.876	68.666
2018/07/18	04:53:34	8.8503	1848.359	68.900
2018/07/18	04:56:34	8.9003	1832.402	69.170
2018/07/18	04:59:34	8.9503	1824.713	69.404
2018/07/18	05:02:34	9.0003	1820.673	69.638
2018/07/18	05:05:34	9.0503	1818.170	69.854
2018/07/18	05:08:34	9.1003	1816.431	70.070
2018/07/18	05:11:34	9.1503	1815.152	70.304
2018/07/18	05:14:34	9.2003	1814.113	70.520
2018/07/18	05:17:34	9.2503	1813.252	70.700
2018/07/18	05:20:34	9.3003	1812.531	70.880

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	05:23:34	9.3503	1811.907	71.060
2018/07/18	05:26:34	9.4003	1811.310	71.222
2018/07/18	05:29:34	9.4503	1810.770	71.402
2018/07/18	05:32:34	9.5003	1810.325	71.564
2018/07/18	05:35:34	9.5503	1809.913	71.708
2018/07/18	05:38:34	9.6003	1809.468	71.852
2018/07/18	05:41:34	9.6503	1809.088	72.014
2018/07/18	05:44:34	9.7003	1808.783	72.140
2018/07/18	05:47:34	9.7503	1808.410	72.284
2018/07/18	05:50:34	9.8003	1808.141	72.428
2018/07/18	05:53:34	9.8503	1807.801	72.536
2018/07/18	05:56:34	9.9003	1807.527	72.662
2018/07/18	05:59:34	9.9503	1807.240	72.770
2018/07/18	06:02:34	10.0003	1806.992	72.896
2018/07/18	06:05:34	10.0503	1806.748	73.022
2018/07/18	06:08:34	10.1003	1806.480	73.130
2018/07/18	06:11:34	10.1503	1806.264	73.256
2018/07/18	06:14:34	10.2003	1805.998	73.346
2018/07/18	06:17:34	10.2503	1805.866	73.472
2018/07/18	06:20:34	10.3003	1805.640	73.580
2018/07/18	06:23:34	10.3503	1805.444	73.688
2018/07/18	06:26:34	10.4003	1805.246	73.778
2018/07/18	06:29:34	10.4503	1805.031	73.850
2018/07/18	06:32:34	10.5003	1804.829	73.958
2018/07/18	06:35:34	10.5503	1804.681	74.048
2018/07/18	06:38:34	10.6003	1804.558	74.138
2018/07/18	06:41:34	10.6503	1804.375	74.228
2018/07/18	06:44:34	10.7003	1804.182	74.300
2018/07/18	06:47:34	10.7503	1804.011	74.390
2018/07/18	06:50:34	10.8003	1803.889	74.480
2018/07/18	06:53:34	10.8503	1803.733	74.552
2018/07/18	06:56:34	10.9003	1803.621	74.642
2018/07/18	06:59:34	10.9503	1803.438	74.714
2018/07/18	07:02:34	11.0003	1803.303	74.786
2018/07/18	07:05:34	11.0503	1803.211	74.876
2018/07/18	07:08:34	11.1003	1803.039	74.930
2018/07/18	07:11:34	11.1503	1802.918	75.038
2018/07/18	07:14:34	11.2003	1802.789	75.092
2018/07/18	07:17:34	11.2503	1802.702	75.164
2018/07/18	07:20:34	11.3003	1802.578	75.236
2018/07/18	07:23:34	11.3503	1802.478	75.308
2018/07/18	07:26:34	11.4003	1802.300	75.362
2018/07/18	07:29:34	11.4503	1802.205	75.434
2018/07/18	07:32:34	11.5003	1802.107	75.488
2018/07/18	07:35:34	11.5503	1802.039	75.560
2018/07/18	07:38:34	11.6003	1801.933	75.614
2018/07/18	07:41:34	11.6503	1801.831	75.686
2018/07/18	07:44:34	11.7003	1801.740	75.740
2018/07/18	07:47:34	11.7503	1801.639	75.794
2018/07/18	07:50:34	11.8003	1801.533	75.848

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	07:53:34	11.8503	1801.434	75.902
2018/07/18	07:56:34	11.9003	1801.350	75.956
2018/07/18	07:59:34	11.9503	1801.264	76.028
2018/07/18	08:02:34	12.0003	1801.208	76.082
2018/07/18	08:05:34	12.0503	1801.092	76.118
2018/07/18	08:08:34	12.1003	1801.008	76.190
2018/07/18	08:11:34	12.1503	1800.922	76.226
2018/07/18	08:14:34	12.2003	1800.855	76.280
2018/07/18	08:17:34	12.2503	1800.768	76.334
2018/07/18	08:20:34	12.3003	1800.681	76.370
2018/07/18	08:23:34	12.3503	1800.632	76.424
2018/07/18	08:26:34	12.4003	1800.571	76.478
2018/07/18	08:29:34	12.4503	1800.491	76.514
2018/07/18	08:32:34	12.5003	1800.438	76.568
2018/07/18	08:35:34	12.5503	1800.332	76.604
2018/07/18	08:38:34	12.6003	1800.290	76.658
2018/07/18	08:41:34	12.6503	1800.201	76.694
2018/07/18	08:44:34	12.7003	1800.120	76.730
2018/07/18	08:47:34	12.7503	1800.065	76.766
2018/07/18	08:50:34	12.8003	1800.061	76.820
2018/07/18	08:53:34	12.8503	1799.947	76.874
2018/07/18	08:56:34	12.9003	1799.889	76.892
2018/07/18	08:59:34	12.9503	1799.831	76.928
2018/07/18	09:02:34	13.0003	1799.789	76.982
2018/07/18	09:05:34	13.0503	1799.757	77.036
2018/07/18	09:08:34	13.1003	1799.679	77.072
2018/07/18	09:11:34	13.1503	1799.635	77.108
2018/07/18	09:14:34	13.2003	1799.543	77.144
2018/07/18	09:17:34	13.2503	1799.524	77.180
2018/07/18	09:20:34	13.3003	1799.447	77.216
2018/07/18	09:23:34	13.3503	1799.403	77.234
2018/07/18	09:26:34	13.4003	1799.337	77.270
2018/07/18	09:29:34	13.4503	1799.280	77.306
2018/07/18	09:32:34	13.5003	1799.271	77.342
2018/07/18	09:35:34	13.5503	1799.183	77.378
2018/07/18	09:38:34	13.6003	1799.147	77.414
2018/07/18	09:41:34	13.6503	1799.100	77.450
2018/07/18	09:44:34	13.7003	1799.045	77.468
2018/07/18	09:47:34	13.7503	1799.002	77.504
2018/07/18	09:50:34	13.8003	1798.973	77.540
2018/07/18	09:53:34	13.8503	1798.896	77.558
2018/07/18	09:56:34	13.9003	1798.867	77.594
2018/07/18	09:59:34	13.9503	1798.783	77.612
2018/07/18	10:02:34	14.0003	1798.768	77.648
2018/07/18	10:05:34	14.0503	1798.738	77.684
2018/07/18	10:08:34	14.1003	1798.700	77.720
2018/07/18	10:11:34	14.1503	1798.633	77.738
2018/07/18	10:14:34	14.2003	1798.583	77.774
2018/07/18	10:17:34	14.2503	1798.565	77.792
2018/07/18	10:20:34	14.3003	1798.493	77.810

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	10:23:34	14.3503	1798.456	77.846
2018/07/18	10:26:34	14.4003	1798.449	77.882
2018/07/18	10:29:34	14.4503	1798.406	77.918
2018/07/18	10:32:34	14.5003	1798.355	77.936
2018/07/18	10:35:34	14.5503	1798.313	77.954
2018/07/18	10:38:34	14.6003	1798.291	77.990
2018/07/18	10:41:34	14.6503	1798.287	78.026
2018/07/18	10:44:34	14.7003	1798.181	78.026
2018/07/18	10:47:34	14.7503	1798.177	78.062
2018/07/18	10:50:34	14.8003	1798.149	78.080
2018/07/18	10:53:34	14.8503	1798.110	78.098
2018/07/18	10:56:34	14.9003	1798.091	78.134
2018/07/18	10:59:34	14.9503	1798.050	78.152
2018/07/18	11:02:34	15.0003	1798.044	78.188
2018/07/18	11:05:34	15.0503	1797.950	78.206
2018/07/18	11:08:34	15.1003	1797.936	78.224
2018/07/18	11:11:34	15.1503	1797.885	78.242
2018/07/18	11:14:34	15.2003	1797.872	78.260
2018/07/18	11:17:34	15.2503	1797.812	78.296
2018/07/18	11:20:34	15.3003	1797.802	78.296
2018/07/18	11:23:34	15.3503	1797.773	78.332
2018/07/18	11:26:34	15.4003	1797.733	78.350
2018/07/18	11:29:34	15.4503	1797.679	78.350
2018/07/18	11:32:34	15.5003	1797.689	78.386
2018/07/18	11:35:34	15.5503	1797.622	78.404
2018/07/18	11:38:34	15.6003	1797.593	78.422
2018/07/18	11:41:34	15.6503	1797.573	78.440
2018/07/18	11:44:34	15.7003	1797.572	78.476
2018/07/18	11:47:34	15.7503	1797.509	78.494
2018/07/18	11:50:34	15.8003	1797.463	78.494
2018/07/18	11:53:34	15.8503	1797.473	78.530
2018/07/18	11:56:34	15.9003	1797.419	78.548
2018/07/18	11:59:34	15.9503	1797.416	78.566
2018/07/18	12:02:34	16.0003	1797.363	78.584
2018/07/18	12:05:36	16.0508	1797.353	78.602
2018/07/18	12:08:36	16.1008	1797.324	78.620
2018/07/18	12:11:36	16.1508	1797.257	78.638
2018/07/18	12:14:36	16.2008	1797.282	78.656
2018/07/18	12:17:36	16.2508	1797.242	78.692
2018/07/18	12:20:36	16.3008	1797.193	78.692
2018/07/18	12:23:36	16.3508	1797.168	78.710
2018/07/18	12:26:36	16.4008	1797.141	78.746
2018/07/18	12:29:36	16.4508	1797.124	78.746
2018/07/18	12:32:36	16.5008	1797.073	78.746
2018/07/18	12:35:36	16.5508	1797.078	78.782
2018/07/18	12:38:36	16.6008	1797.058	78.800
2018/07/18	12:41:36	16.6508	1797.049	78.818
2018/07/18	12:44:36	16.7008	1796.980	78.836
2018/07/18	12:47:36	16.7508	1796.961	78.836
2018/07/18	12:50:36	16.8008	1796.917	78.854

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	12:53:36	16.8508	1796.913	78.872
2018/07/18	12:56:36	16.9008	1796.910	78.890
2018/07/18	12:59:36	16.9508	1796.854	78.908
End of Fall-Off Test				
2018/07/18	13:00:01	16.9578	1796.857	78.908
POOH Gradient: 3950.000 ft				
2018/07/18	13:00:06	16.9592	1796.854	78.908
Prepare to P.O.O.H.				
2018/07/18	13:00:11	16.9606	1796.816	78.908
2018/07/18	13:02:36	17.0008	1796.764	78.926
P.O.O.H. making gradient stops				
2018/07/18	13:03:01	17.0078	1796.755	78.926
Stop at 3500 feet				
2018/07/18	13:05:06	17.0425	1605.608	76.676
2018/07/18	13:05:36	17.0508	1605.701	76.208
POOH Gradient: 3500.000 ft				
2018/07/18	13:08:06	17.0925	1605.645	75.830
2018/07/18	13:08:36	17.1008	1605.613	75.794
Stop at 2500 feet				
2018/07/18	13:11:06	17.1425	1193.765	67.910
2018/07/18	13:11:36	17.1508	1193.871	66.776
POOH Gradient: 2500.000 ft				
2018/07/18	13:14:06	17.1925	1193.753	65.840
2018/07/18	13:14:36	17.2008	1193.772	65.768
Stop at 1500 feet				
2018/07/18	13:16:41	17.2356	777.221	61.484
2018/07/18	13:17:36	17.2508	777.732	60.962
POOH Gradient: 1500.000 ft				
2018/07/18	13:19:46	17.2869	777.910	60.764
2018/07/18	13:20:36	17.3008	766.960	60.728
Stop at 500 feet				
2018/07/18	13:22:36	17.3342	344.636	57.920
2018/07/18	13:23:36	17.3508	345.284	57.362
POOH Gradient: 500.000 ft				
2018/07/18	13:25:36	17.3842	345.483	57.182
2018/07/18	13:26:36	17.4008	289.774	57.074
Stop in lubricator				
2018/07/18	13:28:01	17.4244	130.379	62.186
2018/07/18	13:29:36	17.4508	129.974	74.624
POOH Gradient: 7.000 ft				
2018/07/18	13:30:56	17.4731	130.047	77.486
2018/07/18	13:32:36	17.5008	130.596	79.574
Bleed-Off Lubricator				
2018/07/18	13:33:26	17.5147	130.714	80.348
2018/07/18	13:35:36	17.5508	0.042	82.508
2018/07/18	13:38:36	17.6008	0.033	83.390
2018/07/18	13:41:36	17.6508	0.013	84.038
2018/07/18	13:44:36	17.7008	-0.490	84.362
2018/07/18	13:47:36	17.7508	-0.439	85.874
2018/07/18	13:50:36	17.8008	-0.426	85.640

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 17, 2018 thru July 18, 2018

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2018/07/18	13:53:36	17.8508	-0.409	85.406
2018/07/18	13:56:36	17.9008	-0.360	84.218
2018/07/18	13:59:36	17.9508	-0.431	86.522
2018/07/18	14:02:36	18.0008	-0.490	90.050
2018/07/18	14:05:36	18.0508	-0.397	93.596
2018/07/18	14:08:36	18.1008	-0.352	96.962
2018/07/18	14:11:36	18.1508	-0.251	98.636
2018/07/18	14:14:36	18.2008	-0.487	102.002
2018/07/18	14:17:36	18.2508	-0.560	103.640

Water Well Test - Falloff

Radial Flow Analysis

Analysis Results

low Capacity (kh)	9488.3469 md.ft
ffective Permeability (k)	71.3410 md
ffective Gas Permeability (k_g)	md
ffective Oil Permeability (k_o)	md
ffective Water Permeability (k_w)	71.3410 md
otal Fluid Rate (in situ) ($(q\beta)_t$)	-915.4 rbbl/d
otal Mobility ($(k/\mu)_t$)	89.40 md/cP
otal Transmissivity ($(kh/\mu)_t$)	11890.16 mdft/cP
lope (m)	12.52 psi/cycle

Total Skin (s')	37.779
Skin Due to Damage (s_d)	37.779
Skin Due To Inclination (s_{Inc})	
Skin Due To Partial Penetration (s_{PP})	
Pressure Drop Due to Total Skin (Δp_{skin})	411.0 psi(a)
Damage Ratio (DR)	5.118
Flow Efficiency (FE)	0.195

Reservoir Parameters

Net Pay (h)	133.000 ft
Total Porosity (ϕ_t)	11.00 %
Gas Saturation (S_g)	0.00 %
Oil Saturation (S_o)	0.00 %
Water Saturation (S_w)	100.00 %
Formation Compressibility (c_f)	4.6737e-06 1/psi
Total Compressibility (c_t)	7.7136e-06 1/psi
Wellbore Radius (r_w)	0.365 ft

Pressures

Extrapolated Pressure (p^*)	1804.2 psi(a)
Final Flowing Pressure (p_{wfo})	2300.8 psi(a)
Final Measured Pressure (p_{last})	1809.3 psi(a)

Fluid Properties

Reservoir Temperature (T_{resv})	93.0 °F
Reservoir Pressure (p_{resv})	1790.0 psi(a)
Water Specific Gravity (γ_w)	1.000
Water Viscosity (μ_w)	0.7980 cP
Water Compressibility (c_w)	3.04e-06 1/psi
Water Formation Volume Factor (B_w)	1.000 bbl/stb
Solution Gas Ratio (R_{sw})	0.0 scf/bbl

Production and Times

Corrected Time (t_c)	15.07 h
Total Cumulative Production Water (Cum_{water})	-0.57 Mbbl
Final Water Rate ($q_{w\ final}$)	-915.4 bbl/d

Water Model - Vertical 1

Analysis Results

tive Water Permeability (k_w)	70.6353 md
Mobility ($(k/\mu)_t$)	88.52 md/cP
Transmissivity ($(kh/\mu)_t$)	11772.55 mdft/cP
Skin (s')	37.209
Due to Damage (s_d)	37.209
ɔore Volume (V_w)	1516 bbl
Apparent Wellbore Storage Constant (C_{aD})	124.448
Wellbore Storage Constant (C_D)	273.967
Wellbore Storage Pressure Parameter (C_{pD})	12.152

Reservoir Parameters

Pay (h)	133.000 ft
ıl Porosity (ϕ_t)	11.00 %
Saturation (S_g)	0.00 %
Saturation (S_o)	0.00 %
ter Saturation (S_w)	100.00 %
mation Compressibility (c_f)	4.6737e-06 1/psi
al Compressibility (c_t)	7.7136e-06 1/psi
llbore Radius (r_w)	0.365 ft

Production and Pressures

Total Fluid Rate (in situ) ($(q\beta)_t$)	-915.4 rbbl/d
Final Gas Rate ($q_{g\ final}$)	0.000 MMscfd
Final Water Rate ($q_{w\ final}$)	-915.4 bbl/d
Total Cumulative Production Water (Cum_{water})	-0.57 Mbbl
Final Flowing Pressure (p_{wfo})	2300.8 psi(a)
Final Measured Pressure (p_{last})	1809.3 psi(a)

Fluid Properties

servoir Temperature (T_{resv})	93.0 °F
servoir Pressure (p_{resv})	1790.0 psi(a)
ater Specific Gravity (γ_w)	1.000
ater Viscosity (μ_w)	0.7980 cP
ater Compressibility (c_w)	3.04e-06 1/psi
ater Formation Volume Factor (B_w)	1.000 bbl/stb
ɔlution Gas Ratio (R_{sw})	0.0 scf/bbl

Synthesis Results

Synthetic Initial Pressure (p_i (syn))	1803.6 psi(a)
Extrapolated Model Pressure (p^*_{model})	1803.6 psi(a)
Pressure Drop Due to Total Skin (Δp_{skin})	408.6 psi(a)
Flow Efficiency (FE)	0.178
Damage Ratio (DR)	5.614