UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 30 2017

REPLY TO THE ATTENTION OF:
WU-16J

CERTIFIED MAIL 7015 0640 0002 0679 6946
RETURN RECEIPT REQUESTED

Richard J. Powals, P.E.
Environmental GEO-Technologies, LLC
28470 Citrin Drive
Romulus, Michigan 48174

Subject: Approval of Proposed Procedures for Fall-off Tests and Radioactive Tracer Surveys in Environmental GEO-Technologies, LLC Well #1-12 and Well #2-12, U.S. Environmental Protection Agency Underground Injection Control Permits #MI-163-1W-C010 and -C011, July 2017

Dear Mr. Powals:

EPA has reviewed and hereby approves the procedures proposed in your letter of June 15, 2017 for the testing referenced above. We wish to remind you of the concerns with the 2016 testing discussed in our letter of February 9, 2017. The 2016 tests were conducted properly (though some were late) but the reports you submitted did not adequately analyze the results, particularly of the temperature logs and the fall-off tests. Please be sure that the tests are analyzed carefully and any anomalies are explained. In addition, the 2016 reports were not submitted within the time period specified in your permits (30 days after the activity, Part II(D)(3)).

Please verify the data in the prepopulated cells and fill in the blank cells on the enclosed information sheets and return the completed information sheets with the test results and interpretation when you submit your report. Please note all the items listed under "Remember" at the bottom of the information sheets. These items will help ensure that the tests are run well and that all the information we require for interpretation of each test will be included in your submission. If a test does not provide definitive information concerning the conditions which it is designed to ascertain, or approved procedures are not followed, you will be required to rerun the test.

It is our practice that testing be witnessed by our contract field inspector to the extent possible. If you have not already done so, please contact Jeff McDonald at (312) 353-6288 to schedule the witnessing of this test. Unwitnessed tests are only acceptable if it is impossible for the field inspector to be present.

If you have any questions or if you find during the test that you are unable to follow the approved procedures, please contact Stephen Roy at (312) 886-6556 or roy.stephen@epa.gov.

Sincerely,

for Stephen M. Jann, Chief
Underground Injection Control Branch

Enclosures

BACKGROUND INFORMATION FOR ANALYSIS OF PRESSURE FALL-OFF TEST

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
TEST START DATE 07/19/17	TEST END DATE 07/20/17		

GEOLOGICAL DATA

POROSITY, decimal 0.11	NET PERMEABLE THICKNESS, ft. 133	VISCOSITY, cp. 0.738	COMPRESSIBILITY, per psi 304e-06

WELL AND OPERATION DATA

LONGSTRING CASING DIAMETER, ins 7.000	FINAL PRETEST FLOW RATE, gpm	INJECTATE TEMPERATURE, deg.F	KB ELEVATION, ft 626.6
OPEN HOLE DIAMTER, ins 8.75	PRETEST FLOW TIME, hrs. SEE BELOW	INJECTATE SPECIFIC GRAVITY	TEST DEPTH FOR COMPARISON, ft
GAUGE DEPTH, ft 3950' KB		CUMULATIVE VOLUME INJECTED SINCE LAST PRESSURE EQUALIZATION,	

TEST DATA

GAUGE CALIBRATION DATE 10/20/2016			
FLOW RATE, gpm avg = 25.9	PRESSURE AT BEGINNING OF FALL-OFF, psi 2079.9 (psig)	PRESSURE AT END OF FALL-OFF, psi 1794.4 (psig)	TO SUPPORT FULL COLUMN, psi
TEST LENGTH, hrs. PUMP = 11.0 FALLOFF = 10.4	INITIAL GRADIENT, psi/ft.	FINAL GRADIENT, psi/ft.	FINAL FLUID LEVEL, ft.

REMEMBER

"Pre-test flow time" is the time since the reservoir was last in equilibrium. This may be the time since the well was last shut-in but only if the well was shut-in long enough for the pressure in the reservoir to approach equilibrium pressure.

1. Injection of normal injectate at normal rate is preferred.
2. 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.
3. Please submit an up-to-date well schematic
4. Data should be collected at the maximum rate for at least the first five minutes; between five and thirty minutes at no less than one reading every 30 seconds. After thirty minutes, the operator can reduce frequency as required.
5. Submit a copy of the calibration certificate for the gauge used for pressure measurements.

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: 07/17/12		Logging Company: Michigan Wireline		

Well and Operational Information

Long String Csg 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: 10	TDET, ft above BDET: 5	MDET, ft above BDET: NA			

CALIBRATION INFORMATION

Depth BDET, ft: 3955	Depth TDET, ft: 3950	BDET CPSPI	Shaly zone	Maximum Reading, LD	Minimum Reading, LD
Depth BDET, ft: 3802	Depth TDET, ft: 3797	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?

Base log appearance is similar to Sand & Shale stat checks

FIRST SLUG TRACKING SEQUENCE

Flow Rate, gpm: 30	Velocity in tubing, fps: 0.77	Depth of deflection on	Deflection on 1st pass	Deflection/Backgroun	Passes Through Slug
Slug Split? yes or no: NO	Depth of Split, ft: NA	Moved up, yes or no	Minimum Slug Depth, f	Distance above shoe,	Maximum Slug Depth, ft

FIRST STATIONARY TEST

Depth of BDET, ft: 4080	Depth of TDET, ft: 4075	BDET to open interval	Time at station, mins: 37.3	Injection Rate, gpm: 30	Log Divisions per Minute: 30
Depth at Injection, ft: 3750		BDET above end of tubing or casing, ft	Reached BDET up, LD	Reach UDET up, LD	Velocity Up, ft/min
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 arrival 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.

Appendix 2
Annulus Pressure Test Report

Petrotek

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
STANDARD ANNULAR PRESSURE TEST

Operator Environmental Geo-Technologies, Inc.

State Permit No. M452

Address 28470 Citrin Drive

USEPA Permit No. MI-163-1W-C010

Romulus, MO 48174

Date of Test 07/17/2017

Well Name EDS 1-12

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 03/24/2017 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
9:10	967.7	55
9:20	967.7	55
9:30	967.6	55
9:40	967.4	55
9:50	967.3	55
10:00	967.2	55
10:10	967.1	55

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.) 3 gallon tank increase
Comments: for pressure bleed 967 to 714 psi

Test Pressures: Max. Allowable Pressure Change: Initial test pressure x 0.03 29.0 psi
Test Period Pressure change - 0.6 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

7/17/2017 — 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 2017

Casing: 7" at 4080 feet

Tubing: 4 1/2 fiberglass

Type of gauge: Digital Pulse

inch face psi range: 0 - 3000

Packer type/model: GPS model 12

Packer depth: 4066 feet

New gauge ☐ Yes ☒ No

if no, enter date of test calibration: March 2017

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
9:10 am	967.7	55			
9:20	967.7	55			
9:30	967.6	55			
9:40	967.4	55			
9:50	967.3	55			
10:00	967.2	55			
10:10	967.1	55			

Comments:
Well demonstrated mechanical integrity
Fluid returned when pressure released - 2.99 gal
Pressure returned to 714 psi @ 10:38 AM

Certification if witnessed by DEQ representative:

Signature of DEQ employee: [signature] Date: 17 July 2017

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. 8/2004)

Appendix 3
Annulus Pressure Gauge Certification

JMC INSTRUMENTS INC
9829 E. Easter Ave. • Centennial, CO 80112
303.794.8833 • Fax 303.730.1220
Toll Free 1.800.327.7257
www.jmcinstruments.com

CERTIFIED CALIBRATION

CUSTOMER Petrotek ORDER NO. _____

ITEM Digital Gauge RANGE 0/3000 PSIG ITEM NO. 44497

TRUE VALUE	INDICATED VALUE	
PSIG	INCREASING READINGS	DECREASING READINGS
0.	0	0
300.	298.6	298.9
600.	598.4	598.5
900.	898.0	898.5
1200.	1197.3	1197.6
1500.	1497.2	1497.6
1800.	1797.0	1797.4
2100.	2097.1	2097.4
2400.	2397.1	2397.2
2700.	2697.1	2696.2
3000.	2995.9	2995.9

Tested on ☒ Deadweight Tester S/N 1GA44774
☐ Deadweight Tester S/N 71867

Traceable to National Institute of Standards and Technology certificate
17-043

Tested by Brian McLain Date 24 March 2017

Remarks:

Fluke 700G SN 2643157
Accuracy is ±¼ % of Full Scale or Better
Tested At 65 °F; 620 mm Hg. Atm. Pressure

Appendix 4
Downhole Pressure Gauge Certification

Jul. 14/2017
08:58:52 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:** Oct. 20/2016

Serial #: 1242 **Certificate #:** 4862

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): 1.41 PSI (0.0141) %FS

Traceability Statement

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

Calibrated with AKS Technologies DWG #1 SN:6465

Calibrated By: Ian Potter

0000000043625

Jul. 14/2017
09:00:00 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:** Oct. 20/2016

Serial #: 1252 **Certificate #:** 363

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): -0.79 PSI (-0.0079) %FS

Traceability Statement

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

Calibrated with AKS Technologies DWG #1 SN:6465

Calibrated By: _____
Ian Potter

0000000043632

Attachment 2
J.O. Well Service Injection
Falloff Test Report (Well No. 1-12)

Petrotek

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 feet
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 19, 2017 thru July 20, 2017
Dead-weight Gauge Tubing Pressure	
Dead-weight Gauge Casing Pressure	
Shut-in Date (Duration)	July 19, 2017
Date / Time on Bottom	July 19, 2017 at 11:10:41
Date / Time off Bottom	July 20, 2017 at 08:05:00
Probe Serial Number	1242
Probe Offset from End of Tool String	
Run Depth at Probe Pressure Port	

PRESSURE TEST RESULTS

Maximum Recorded Probe Pressure	2150.5 psig
Maximum Recorded Probe Temperature	93.5 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 19, 2017 thru July 20, 2017

PROBE INFORMATION

Probe Serial Number	1242
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	October 20, 2016

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 19, 2017 thru July 20, 2017

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: 1252 two feet above bottom gauge
Bottom Gauge: 1242

The bottom gauge (1242) 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 19, 2017 thru July 20, 2017

Pressure vs. Depth

Probe Serial Number 1242

		(ft)	(psig)	(psi/ft)	(deg F)	(deg F/ft)
08:00	08:05	3950.000	1794.402	-	78.674	-
08:07	08:12	3500.000	1602.773	0.4258	75.686	0.0066
08:15	08:21	2500.000	1190.164	0.4126	66.866	0.0088
08:23	08:28	1500.000	773.348	0.4168	61.916	0.0050
08:31	08:36	500.000	340.248	0.4331	58.856	0.0031
08:39	08:44	5.000	125.735	0.4334	74.462	-0.0315

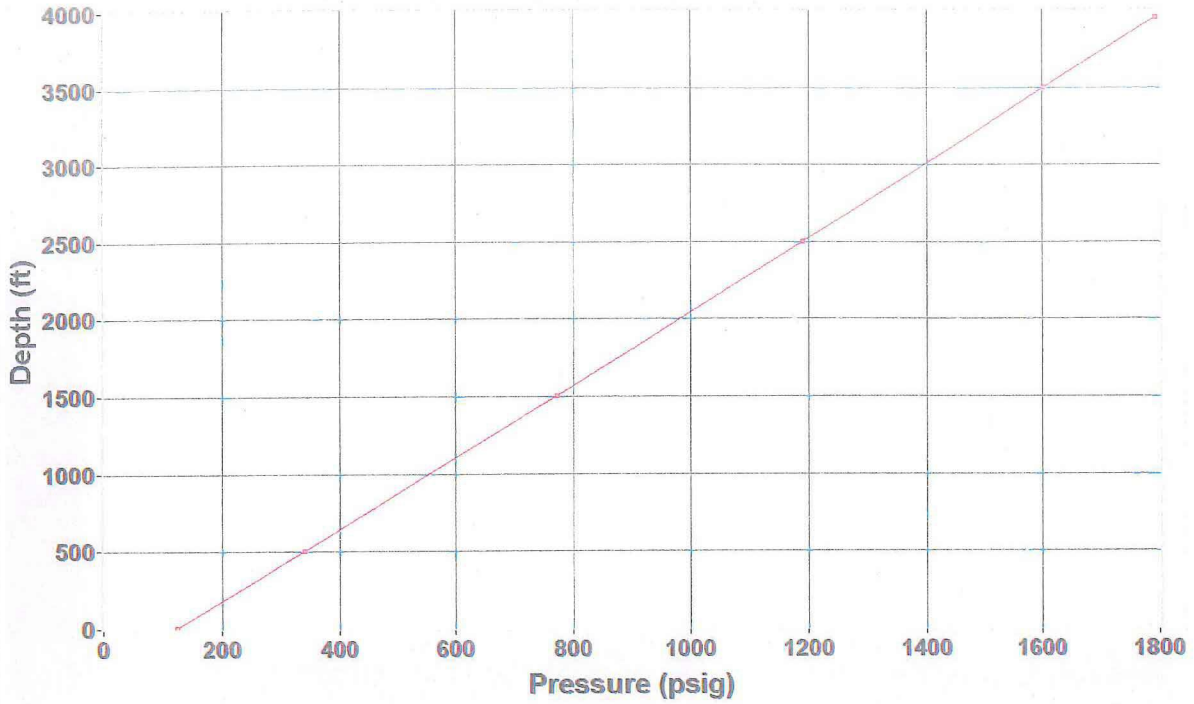
Extrapolated to MPP:

(ft)	(psig)	(deg F)
0.000		

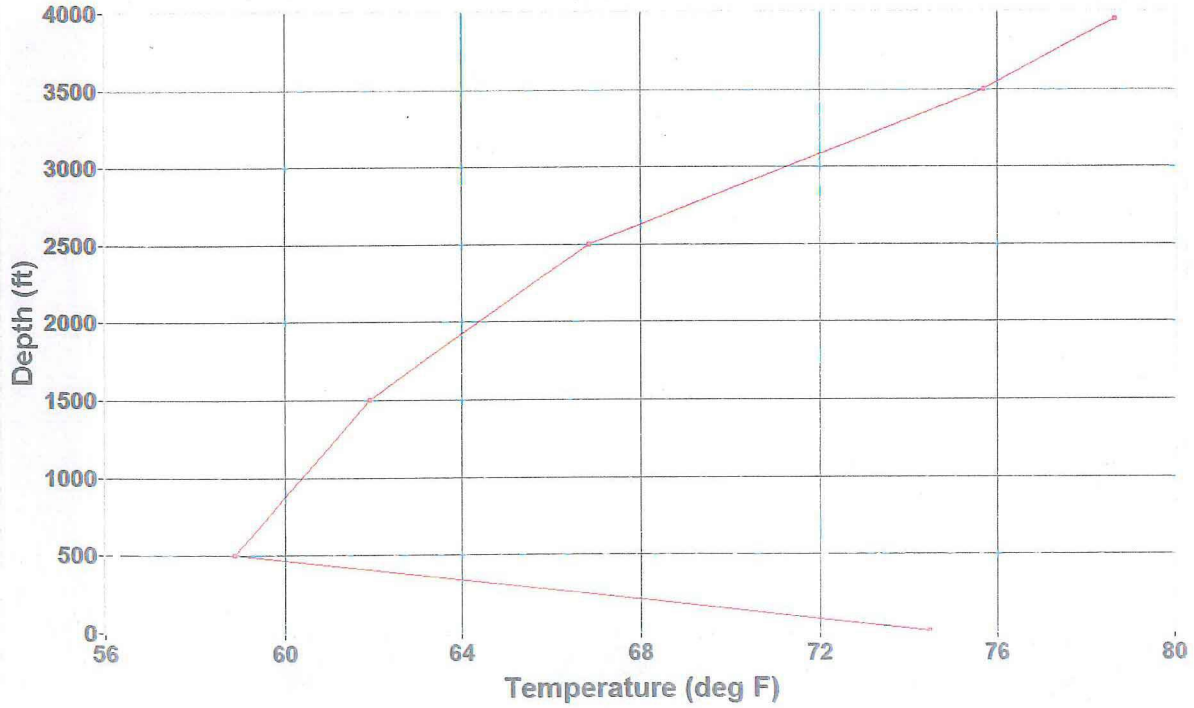
Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 19, 2017 thru July 20, 2017

Probe Serial Number 1242

Static Pressure Gradients

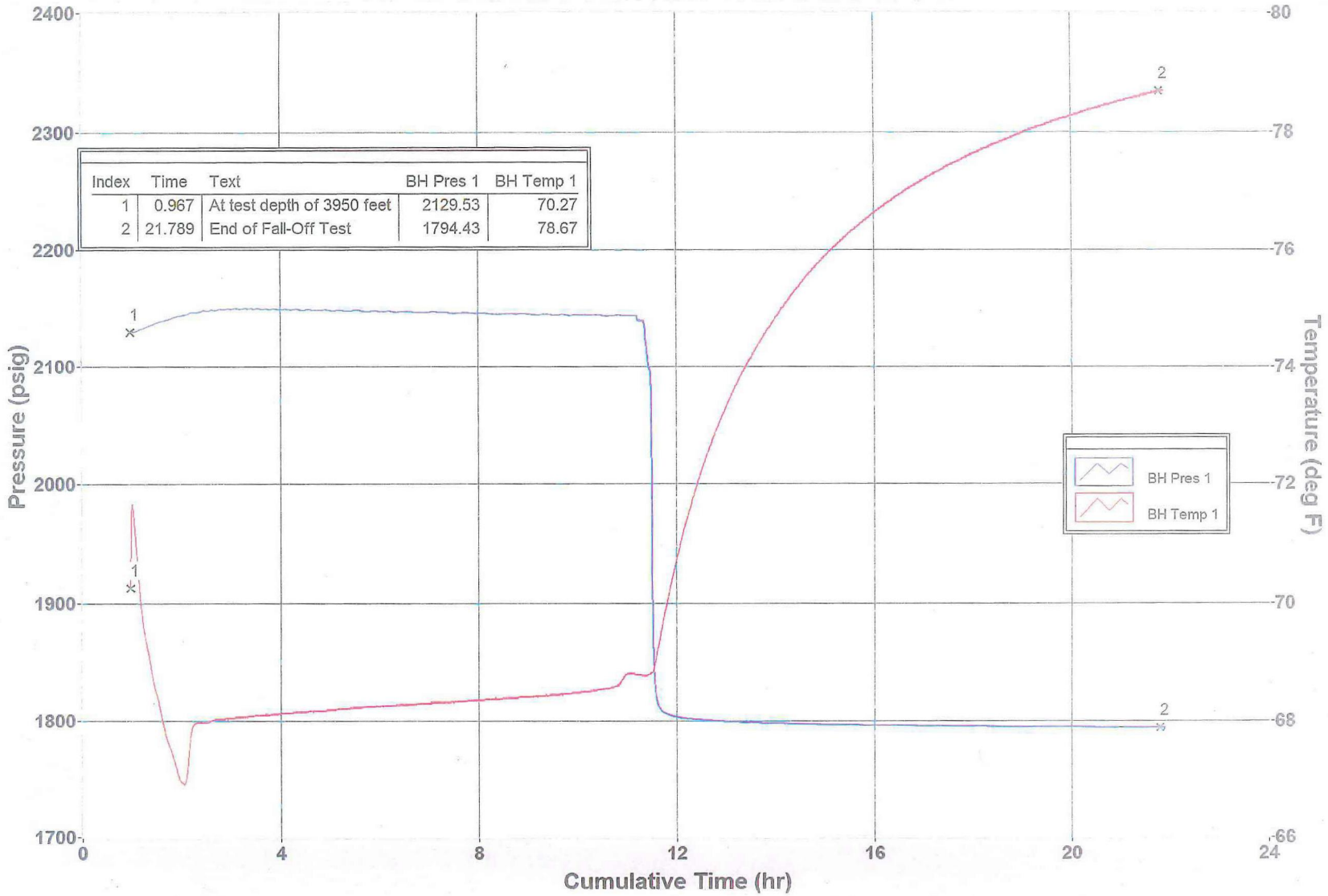


Static Temperature Gradients



Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 19, 2017 thru July 20, 2017

Injection/Fall-Off Test



Index	Time	Text	BH Pres 1	BH Temp 1
1	0.967	At test depth of 3950 feet	2129.53	70.27
2	21.789	End of Fall-Off Test	1794.43	78.67

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 19, 2017 thru July 20, 2017

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
Gauges on surface				
2017/07/19	10:12:45	0.0000	0.686	84.632
2017/07/19	10:17:45	0.0833	0.672	88.304
2017/07/19	10:22:45	0.1667	0.545	90.158
2017/07/19	10:27:45	0.2500	0.447	91.796
Gauges in lubricator				
2017/07/19	10:29:40	0.2819	0.528	92.300
Begin equalizing lubricator				
2017/07/19	10:29:45	0.2833	2.364	92.336
2017/07/19	10:32:45	0.3333	124.548	85.658
2017/07/19	10:37:45	0.4167	125.073	88.124
Start injecting into Well				
2017/07/19	10:40:10	0.4569	125.121	88.862
2017/07/19	10:42:45	0.5000	443.222	89.456
2017/07/19	10:47:45	0.5833	494.895	90.788
2017/07/19	10:52:45	0.6667	504.102	91.976
2017/07/19	10:57:45	0.7500	508.269	92.768
R.I,H. with gauges				
2017/07/19	11:01:00	0.8042	463.077	93.434
2017/07/19	11:02:45	0.8333	633.220	68.558
2017/07/19	11:07:45	0.9167	1594.786	61.952
At test depth of 3950 feet				
2017/07/19	11:10:45	0.9667	2129.532	70.268
2017/07/19	11:12:45	1.0000	2130.240	71.672
2017/07/19	11:17:45	1.0833	2130.533	70.880
2017/07/19	11:22:45	1.1667	2131.997	70.034
2017/07/19	11:27:45	1.2500	2133.383	69.458
2017/07/19	11:32:45	1.3333	2134.890	69.134
2017/07/19	11:37:45	1.4167	2136.203	68.684
2017/07/19	11:42:45	1.5000	2137.657	68.414
2017/07/19	11:47:45	1.5833	2138.879	68.090
2017/07/19	11:52:45	1.6667	2139.927	67.766
2017/07/19	11:57:45	1.7500	2140.740	67.532
2017/07/19	12:02:45	1.8333	2142.101	67.334
2017/07/19	12:07:45	1.9167	2143.182	67.064
2017/07/19	12:12:45	2.0000	2143.919	66.938
2017/07/19	12:17:45	2.0833	2144.495	67.010
2017/07/19	12:22:45	2.1667	2146.142	67.676
2017/07/19	12:27:45	2.2500	2146.496	67.946
2017/07/19	12:32:45	2.3333	2146.756	67.964
2017/07/19	12:37:45	2.4167	2147.755	67.964
2017/07/19	12:42:45	2.5000	2147.803	67.982
2017/07/19	12:47:45	2.5833	2148.321	68.000
2017/07/19	12:52:45	2.6667	2148.315	68.036
2017/07/19	12:57:45	2.7500	2149.066	68.036
2017/07/19	13:02:45	2.8333	2148.926	68.036
2017/07/19	13:07:45	2.9167	2149.797	68.018
2017/07/19	13:12:45	3.0000	2149.282	68.036
2017/07/19	13:17:45	3.0833	2150.293	68.054
2017/07/19	13:22:45	3.1667	2149.562	68.054

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/19	13:27:45	3.2500	2149.945	68.072
2017/07/19	13:32:45	3.3333	2149.739	68.072
2017/07/19	13:37:45	3.4167	2150.316	68.072
2017/07/19	13:42:45	3.5000	2149.741	68.090
2017/07/19	13:47:45	3.5833	2149.603	68.090
2017/07/19	13:52:45	3.6667	2149.401	68.108
2017/07/19	13:57:45	3.7500	2149.269	68.090
2017/07/19	14:02:45	3.8333	2149.597	68.108
2017/07/19	14:07:45	3.9167	2149.603	68.126
2017/07/19	14:12:45	4.0000	2148.953	68.126
2017/07/19	14:17:45	4.0833	2149.609	68.126
2017/07/19	14:22:45	4.1667	2149.021	68.144
2017/07/19	14:27:45	4.2500	2149.008	68.144
2017/07/19	14:32:45	4.3333	2149.573	68.144
2017/07/19	14:37:45	4.4167	2148.586	68.162
2017/07/19	14:42:45	4.5000	2148.707	68.162
2017/07/19	14:47:45	4.5833	2149.203	68.162
2017/07/19	14:52:45	4.6667	2148.389	68.162
2017/07/19	14:57:45	4.7500	2148.290	68.162
2017/07/19	15:02:45	4.8333	2148.573	68.180
2017/07/19	15:07:45	4.9167	2148.998	68.162
2017/07/19	15:12:45	5.0000	2148.284	68.180
2017/07/19	15:17:45	5.0833	2148.008	68.180
2017/07/19	15:22:45	5.1667	2148.546	68.216
2017/07/19	15:27:45	5.2500	2148.345	68.216
2017/07/19	15:32:45	5.3333	2147.752	68.216
2017/07/19	15:37:45	5.4167	2147.745	68.216
2017/07/19	15:42:45	5.5000	2148.488	68.216
2017/07/19	15:47:45	5.5833	2148.495	68.234
2017/07/19	15:52:45	5.6667	2147.593	68.234
2017/07/19	15:57:45	5.7500	2147.356	68.234
2017/07/19	16:02:45	5.8333	2147.572	68.234
2017/07/19	16:07:45	5.9167	2147.989	68.252
2017/07/19	16:12:45	6.0000	2147.333	68.270
2017/07/19	16:17:45	6.0833	2147.149	68.270
2017/07/19	16:22:45	6.1667	2147.807	68.252
2017/07/19	16:27:45	6.2500	2147.285	68.270
2017/07/19	16:32:45	6.3333	2146.943	68.288
2017/07/19	16:37:45	6.4167	2147.030	68.270
2017/07/19	16:42:45	6.5000	2147.366	68.270
2017/07/19	16:47:45	6.5833	2147.440	68.270
2017/07/19	16:52:45	6.6667	2146.943	68.288
2017/07/19	16:57:45	6.7500	2146.512	68.288
2017/07/19	17:02:45	6.8333	2146.528	68.306
2017/07/19	17:07:45	6.9167	2146.644	68.288
2017/07/19	17:12:45	7.0000	2146.831	68.306
2017/07/19	17:17:45	7.0833	2147.111	68.306
2017/07/19	17:22:45	7.1667	2146.921	68.324
2017/07/19	17:27:45	7.2500	2146.634	68.324
2017/07/19	17:32:45	7.3333	2146.448	68.324

Company Name: Environmental Geo-Technologies
Well Name: EGT Well #1-12
Type of Test: Build-Up/Fall-Off
Date(s) of Test: July 19, 2017 thru July 20, 2017

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/19	17:37:45	7.4167	2146.054	68.324
2017/07/19	17:42:45	7.5000	2145.755	68.324
2017/07/19	17:47:45	7.5833	2145.771	68.324
2017/07/19	17:52:45	7.6667	2146.337	68.342
2017/07/19	17:57:45	7.7500	2146.360	68.342
2017/07/19	18:02:45	7.8333	2146.102	68.342
2017/07/19	18:07:45	7.9167	2145.787	68.342
2017/07/19	18:12:45	8.0000	2145.590	68.360
2017/07/19	18:17:47	8.0839	2146.070	68.360
2017/07/19	18:22:47	8.1672	2145.820	68.360
2017/07/19	18:27:47	8.2506	2145.133	68.378
2017/07/19	18:32:47	8.3339	2145.073	68.378
2017/07/19	18:37:47	8.4172	2145.108	68.378
2017/07/19	18:42:47	8.5006	2145.429	68.378
2017/07/19	18:47:47	8.5839	2145.426	68.378
2017/07/19	18:52:47	8.6672	2145.394	68.396
2017/07/19	18:57:47	8.7506	2145.142	68.396
2017/07/19	19:02:47	8.8339	2145.310	68.396
2017/07/19	19:07:47	8.9172	2145.400	68.414
2017/07/19	19:12:47	9.0006	2145.042	68.396
2017/07/19	19:17:47	9.0839	2144.493	68.414
2017/07/19	19:22:47	9.1672	2144.361	68.414
2017/07/19	19:27:47	9.2506	2144.421	68.414
2017/07/19	19:32:47	9.3339	2144.962	68.432
2017/07/19	19:37:47	9.4172	2145.023	68.432
2017/07/19	19:42:47	9.5006	2144.205	68.432
2017/07/19	19:47:47	9.5839	2143.997	68.450
2017/07/19	19:52:47	9.6672	2144.767	68.450
2017/07/19	19:57:47	9.7506	2144.392	68.468
2017/07/19	20:02:47	9.8339	2143.809	68.468
2017/07/19	20:07:47	9.9172	2144.125	68.468
2017/07/19	20:12:47	10.0006	2144.051	68.468
2017/07/19	20:17:47	10.0839	2144.052	68.486
2017/07/19	20:22:47	10.1672	2144.365	68.486
2017/07/19	20:27:47	10.2506	2144.336	68.504
2017/07/19	20:32:47	10.3339	2144.239	68.504
2017/07/19	20:37:47	10.4172	2144.067	68.522
2017/07/19	20:42:47	10.5006	2143.777	68.540
2017/07/19	20:47:47	10.5839	2143.244	68.540
2017/07/19	20:52:47	10.6672	2143.353	68.576
2017/07/19	20:57:47	10.7506	2143.605	68.576
2017/07/19	21:02:47	10.8339	2143.926	68.612
2017/07/19	21:07:47	10.9172	2143.421	68.738
2017/07/19	21:12:47	11.0006	2143.395	68.792
2017/07/19	21:17:47	11.0839	2143.391	68.810
2017/07/19	21:22:47	11.1672	2143.465	68.792
2017/07/19	21:27:47	11.2506	2139.882	68.774
2017/07/19	21:32:47	11.3339	2138.551	68.774
2017/07/19	21:37:47	11.4172	2105.625	68.774
2017/07/19	21:42:47	11.5006	1964.861	68.810

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/19	21:47:47	11.5839	1820.580	69.098
2017/07/19	21:52:47	11.6672	1810.267	69.476
2017/07/19	21:57:47	11.7506	1807.072	69.836
2017/07/19	22:02:47	11.8339	1805.410	70.142
2017/07/19	22:07:47	11.9172	1804.303	70.466
2017/07/19	22:12:47	12.0006	1803.527	70.754
2017/07/19	22:17:47	12.0839	1802.928	71.060
2017/07/19	22:22:47	12.1672	1802.406	71.312
2017/07/19	22:27:47	12.2506	1801.968	71.546
2017/07/19	22:32:47	12.3339	1801.601	71.798
2017/07/19	22:37:47	12.4172	1801.308	72.014
2017/07/19	22:42:47	12.5006	1800.952	72.212
2017/07/19	22:47:47	12.5839	1800.696	72.428
2017/07/19	22:52:47	12.6672	1800.491	72.626
2017/07/19	22:57:47	12.7506	1800.265	72.824
2017/07/19	23:02:47	12.8339	1800.079	72.986
2017/07/19	23:07:47	12.9172	1799.866	73.166
2017/07/19	23:12:47	13.0006	1799.701	73.328
2017/07/19	23:17:47	13.0839	1799.496	73.472
2017/07/19	23:22:47	13.1672	1799.360	73.616
2017/07/19	23:27:47	13.2506	1799.209	73.760
2017/07/19	23:32:47	13.3339	1799.051	73.904
2017/07/19	23:37:47	13.4172	1798.925	74.030
2017/07/19	23:42:47	13.5006	1798.797	74.156
2017/07/19	23:47:47	13.5839	1798.675	74.282
2017/07/19	23:52:47	13.6672	1798.567	74.408
2017/07/19	23:57:47	13.7506	1798.458	74.534
2017/07/20	00:02:47	13.8339	1798.343	74.642
2017/07/20	00:07:47	13.9172	1798.210	74.732
2017/07/20	00:12:47	14.0006	1798.131	74.840
2017/07/20	00:17:47	14.0839	1798.040	74.948
2017/07/20	00:22:47	14.1672	1797.934	75.038
2017/07/20	00:27:47	14.2506	1797.860	75.146
2017/07/20	00:32:47	14.3339	1797.766	75.236
2017/07/20	00:37:47	14.4172	1797.692	75.326
2017/07/20	00:42:47	14.5006	1797.596	75.416
2017/07/20	00:47:47	14.5839	1797.545	75.506
2017/07/20	00:52:47	14.6672	1797.445	75.578
2017/07/20	00:57:47	14.7506	1797.347	75.650
2017/07/20	01:02:47	14.8339	1797.282	75.740
2017/07/20	01:07:47	14.9172	1797.202	75.794
2017/07/20	01:12:47	15.0006	1797.173	75.884
2017/07/20	01:17:47	15.0839	1797.077	75.956
2017/07/20	01:22:47	15.1672	1797.034	76.028
2017/07/20	01:27:47	15.2506	1796.990	76.100
2017/07/20	01:32:47	15.3339	1796.909	76.172
2017/07/20	01:37:47	15.4172	1796.859	76.226
2017/07/20	01:42:47	15.5006	1796.794	76.298
2017/07/20	01:47:47	15.5839	1796.729	76.352
2017/07/20	01:52:47	15.6672	1796.677	76.406

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 19, 2017 thru July 20, 2017

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/20	01:57:47	15.7506	1796.645	76.460
2017/07/20	02:02:47	15.8339	1796.572	76.514
2017/07/20	02:07:47	15.9172	1796.539	76.586
2017/07/20	02:12:47	16.0006	1796.455	76.622
2017/07/20	02:17:49	16.0844	1796.426	76.676
2017/07/20	02:22:49	16.1678	1796.387	76.730
2017/07/20	02:27:49	16.2511	1796.310	76.784
2017/07/20	02:32:49	16.3344	1796.294	76.838
2017/07/20	02:37:49	16.4178	1796.220	76.892
2017/07/20	02:42:49	16.5011	1796.172	76.928
2017/07/20	02:47:49	16.5844	1796.133	76.982
2017/07/20	02:52:49	16.6678	1796.111	77.018
2017/07/20	02:57:49	16.7511	1796.075	77.072
2017/07/20	03:02:49	16.8344	1796.028	77.108
2017/07/20	03:07:49	16.9178	1795.982	77.162
2017/07/20	03:12:49	17.0011	1795.937	77.198
2017/07/20	03:17:49	17.0844	1795.902	77.234
2017/07/20	03:22:49	17.1678	1795.875	77.270
2017/07/20	03:27:49	17.2511	1795.847	77.324
2017/07/20	03:32:49	17.3344	1795.772	77.342
2017/07/20	03:37:49	17.4178	1795.811	77.414
2017/07/20	03:42:49	17.5011	1795.714	77.432
2017/07/20	03:47:49	17.5844	1795.705	77.468
2017/07/20	03:52:49	17.6678	1795.643	77.504
2017/07/20	03:57:49	17.7511	1795.640	77.540
2017/07/20	04:02:49	17.8344	1795.586	77.576
2017/07/20	04:07:49	17.9178	1795.587	77.612
2017/07/20	04:12:49	18.0011	1795.547	77.630
2017/07/20	04:17:49	18.0844	1795.511	77.666
2017/07/20	04:22:49	18.1678	1795.486	77.702
2017/07/20	04:27:49	18.2511	1795.421	77.720
2017/07/20	04:32:49	18.3344	1795.416	77.774
2017/07/20	04:37:49	18.4178	1795.367	77.774
2017/07/20	04:42:49	18.5011	1795.364	77.828
2017/07/20	04:47:49	18.5844	1795.303	77.846
2017/07/20	04:52:49	18.6678	1795.284	77.864
2017/07/20	04:57:49	18.7511	1795.273	77.900
2017/07/20	05:02:49	18.8344	1795.247	77.936
2017/07/20	05:07:49	18.9178	1795.177	77.954
2017/07/20	05:12:49	19.0011	1795.148	77.972
2017/07/20	05:17:49	19.0844	1795.123	78.008
2017/07/20	05:22:49	19.1678	1795.106	78.026
2017/07/20	05:27:49	19.2511	1795.084	78.062
2017/07/20	05:32:49	19.3344	1795.065	78.080
2017/07/20	05:37:49	19.4178	1795.045	78.116
2017/07/20	05:42:49	19.5011	1795.023	78.134
2017/07/20	05:47:49	19.5844	1794.999	78.170
2017/07/20	05:52:49	19.6678	1794.957	78.170
2017/07/20	05:57:49	19.7511	1794.983	78.206
2017/07/20	06:02:49	19.8344	1794.920	78.224

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/20	06:07:49	19.9178	1794.897	78.242
2017/07/20	06:12:49	20.0011	1794.881	78.260
2017/07/20	06:17:49	20.0844	1794.842	78.278
2017/07/20	06:22:49	20.1678	1794.852	78.314
2017/07/20	06:27:49	20.2511	1794.828	78.332
2017/07/20	06:32:49	20.3344	1794.782	78.350
2017/07/20	06:37:49	20.4178	1794.752	78.368
2017/07/20	06:42:49	20.5011	1794.720	78.386
2017/07/20	06:47:49	20.5844	1794.707	78.404
2017/07/20	06:52:49	20.6678	1794.697	78.440
2017/07/20	06:57:49	20.7511	1794.672	78.440
2017/07/20	07:02:49	20.8344	1794.656	78.476
2017/07/20	07:07:49	20.9178	1794.620	78.494
2017/07/20	07:12:49	21.0011	1794.566	78.494
2017/07/20	07:17:49	21.0844	1794.580	78.512
2017/07/20	07:22:49	21.1678	1794.542	78.530
2017/07/20	07:27:49	21.2511	1794.552	78.566
2017/07/20	07:32:49	21.3344	1794.517	78.584
2017/07/20	07:37:49	21.4178	1794.498	78.584
2017/07/20	07:42:49	21.5011	1794.492	78.602
2017/07/20	07:47:49	21.5844	1794.511	78.638
2017/07/20	07:52:49	21.6678	1794.458	78.638
2017/07/20	07:57:49	21.7511	1794.458	78.656
End of Fall-Off Test				
2017/07/20	08:00:04	21.7886	1794.430	78.674
Prepare to P.O.O.H. with gauges				
2017/07/20	08:00:09	21.7900	1794.418	78.656
2017/07/20	08:02:49	21.8344	1794.406	78.674
POOH Gradient: 3950.000 ft				
2017/07/20	08:05:24	21.8775	1794.402	78.674
P.O.O.H. making gradient stops				
2017/07/20	08:05:29	21.8789	1792.448	78.674
Stop at 3500 feet				
2017/07/20	08:07:34	21.9136	1603.230	76.388
2017/07/20	08:07:49	21.9178	1603.017	76.118
POOH Gradient: 3500.000 ft				
2017/07/20	08:12:29	21.9956	1602.773	75.686
2017/07/20	08:12:49	22.0011	1602.827	75.686
Stop at 2500 feet				
2017/07/20	08:16:04	22.0553	1190.705	68.054
2017/07/20	08:17:49	22.0844	1190.119	67.100
POOH Gradient: 2500.000 ft				
2017/07/20	08:21:04	22.1386	1190.164	66.866
2017/07/20	08:22:49	22.1678	976.095	64.670
Stop at 1500 feet				
2017/07/20	08:23:49	22.1844	773.376	62.456
2017/07/20	08:27:49	22.2511	773.346	61.934
POOH Gradient: 1500.000 ft				
2017/07/20	08:28:44	22.2664	773.348	61.916
Stop at 500 feet				

Company Name	Environmental Geo-Technologies
Well Name	EGT Well #1-12
Type of Test	Build-Up/Fall-Off
Date(s) of Test	July 19, 2017 thru July 20, 2017

Date	Time	Cum.Time BH1	BH Pres 1	BH Temp 1
		hr	psig	deg F
2017/07/20	08:31:34	22.3136	339.950	59.576
2017/07/20	08:32:49	22.3344	340.142	59.018
POOH Gradient: 500.000 ft				
2017/07/20	08:36:29	22.3956	340.248	58.856
2017/07/20	08:37:49	22.4178	225.599	59.216
Stop in lubricator				
2017/07/20	08:39:04	22.4386	124.715	64.688
2017/07/20	08:42:49	22.5011	125.710	74.048
POOH Gradient: 5.000 ft				
2017/07/20	08:43:59	22.5206	125.735	74.462
Bleed-Off Lubricator				
2017/07/20	08:44:24	22.5275	125.632	74.570
2017/07/20	08:47:49	22.5844	0.682	75.848
2017/07/20	08:52:49	22.6678	0.692	77.108

Attachment 3
Falloff Test Summary

Petrotek

Attachment 3 - Falloff Test Summary

Water Well Test - Falloff

Radial Flow Analysis

Analysis Results

Flow Capacity (kh)	14160.1711 md.ft	Total Skin (s')	43.911
Effective Permeability (k)	106.4675 md	Skin Due to Damage (s_d)	43.911
Effective Gas Permeability (k_g)	md	Skin Due To Inclination (s_{inc})	
Effective Oil Permeability (k_o)	md	Skin Due To Partial Penetration (s_{pp})	
Effective Water Permeability (k_w)	106.4675 md	Pressure Drop Due to Total Skin (Δp_{skin})	242.2 psi(a)
Total Fluid Rate (in situ) ($(q\beta)_t$)	-692.6 rbbl/d	Damage Ratio (DR)	4.881
Total Mobility ($(k/\mu)_t$)	133.42 md/cP	Flow Efficiency (FE)	0.205
Total Transmissivity ($(kh/\mu)_t$)	17744.58 mdft/cP		
Slope (m)	6.35 psi/cycle		

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)	6.2000e-06 1/psi
Wellbore Radius (r_w)	0.365 ft

Pressures

Extrapolated Pressure (p*)	1807.5 psi(a)
Final Flowing Pressure (p_{wfo})	2094.6 psi(a)
Final Measured Pressure (p_{last})	1809.1 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)	14.19 h
Total Cumulative Production Water (Cum_{water})	-0.41 Mbbl
Final Water Rate ($q_{w\ final}$)	-692.6 bbl/d

Water Model - Vertical 1: No-Flow Boundary

Analysis Results

Effective Water Permeability (k_w)	101.0642 md
Total Mobility ($(k/\mu)_t$)	126.65 md/cP
Total Transmissivity ($(kh/\mu)_t$)	16844.04 mdft/cP
Total Skin (s')	39.778
Skin Due to Damage (s_d)	39.778
Wellbore Volume (V_w)	1775 bbl
Dim. Apparent Wellbore Storage Constant (C_{aD})	116.598
Dim. Wellbore Storage Constant (C_D)	400.014
Dim. Wellbore Storage Pressure Parameter (C_{pD})	25.247

Well Location X-Direction (X_w)	647.404 ft

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)	6.2000e-06 1/psi
Wellbore Radius (r_w)	0.365 ft

Production and Pressures

Total Fluid Rate (in situ) ($(q\beta)_t$)	-692.6 rbbl/d
Final Gas Rate ($q_{g\ final}$)	0.000 MMscfd
Final Water Rate ($q_{w\ final}$)	-692.6 bbl/d
Total Cumulative Production Water (Cum_{water})	-0.41 Mbbl
Final Flowing Pressure (p_{wfo})	2094.6 psi(a)
Final Measured Pressure (p_{last})	1809.1 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

Synthesis Results

Synthetic Initial Pressure (p_i (syn))	1805.2 psi(a)
Extrapolated Model Pressure (p^*_{model})	1805.2 psi(a)
Pressure Drop Due to Total Skin (Δp_{skin})	238.7 psi(a)
Flow Efficiency (FE)	0.175
Damage Ratio (DR)	5.708

2017 MECHANICAL INTEGRITY AND RESERVOIR TESTING
CLASS I HAZARDOUS DEEPWELL
Well #1-12; UIC Permit: MI-163-1W-C0007

Environmental Geo-Technologies, LLC
Romulus, Michigan

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