

STATE OF OHIO  
DEPARTMENT OF NATURAL  
RESOURCES

Division of Oil and Gas  
Resources Management  
WELL PERMIT

API WELL NUMBER  
34-155-2-4099-00-00

OWNER NAME, ADDRESS

HIGHLAND FIELD SERVICES LLC  
5800 CORPORATE DRIVE SUITE 300  
PITTSBURGH PA 15237

DATE ISSUED

6/21/2017

PERMIT EXPIRES

6/21/2018

TELEPHONE NUMBER

(412) 548-2533

IS HEREBY GRANTED PERMISSION TO: Salt Water Injection Well New Well

AND ABANDON WELL IF UNPRODUCTIVE

PURPOSE OF WELL: Water Injection - Disposal

COMPLETION DATE IF PERMIT TO PLUG:

DESIGNATION AND LOCATION:

LEASE NAME HIGHLAND BROOKFIELD (SWIW #37)  
WELL NUMBER 5  
COUNTY TRUMBULL  
CIVIL TOWNSHIP BROOKFIELD  
TRACT OR ALLOTMENT  
SURFACE FOOTAGE LOCATION 163'SL &1501'EL OF LOT 33  
TARGET FOOTAGE LOCATION

SURFACE NAD27

X: 2527058  
Y: 580517  
LAT: 41.2442013003214  
LONG: -80.5833005735412

TARGET NAD27

TYPE OF TOOLS: Air Rotary/Fluid Rotary

PROPOSED TOTAL DEPTH 8550 FEET  
GROUND LEVEL ELEVATION 1098 FEET

GEOLOGICAL FORMATION(S):

KNOX THRU ROME

SPECIAL PERMIT CONDITIONS: Permit is subject to the attached terms and/or conditions  
Salt Water Injection Well (Class II) Construction Conditions  
Urbanized Area/Pre-Permitting Site Conditions  
Water Well Sampling Results must be Submitted Prior to Drilling

CASING PROGRAM (CASING MUST BE CENTRALIZED AND IS SUBJECT TO APPROVAL OF THE OIL AND GAS INSPECTOR):

20 " APPROX. 220 ' WITH CEMENT CIRCULATED TO SURFACE  
ABANDONED MINE AREA: MINE STRING MAY BE NECESSARY  
13-3/8" SURFACE CASING 50' BELOW BEREA, APPROX. 535' CEMENTED TO SURFACE  
9-5/8 " INTERMEDIATE APPROX. 700' AND CEMENTED TO AT LEAST 500 TRUE VERTICAL FEET ABOVE THE CASING SEAT  
7" CASING 7600' CEMENTED TO A MINIMUM OF 300' ABOVE INJECTION ZONE  
3-1/2" TUBING SET ON A PACKER APPROX. 50' ABOVE INJECTION ZONE

This permit is NOT TRANSFERABLE. This permit, or an exact copy thereof, must be displayed in a conspicuous and easily accessible place at the well site before permitted activity commences and remain until the well is completed. Ample notification to inspector is necessary.

OIL AND GAS WELL INSPECTOR:

STEPHEN OCHS (330) 933-2090  
ANDREW ADGATE - Supervisor (614) 265-6673  
DISTRICT #: (330) 896-0616

INSPECTOR NOTIFICATION

- The oil and gas inspector must be notified at least 24 hours prior to:
1. Commencement of site construction
  2. Pit excavation and closure
  3. Commencement of drilling, reopening, converting or plugback operations
  4. Installation and cementing of all casing strings
  5. BOP testing
  6. Well stimulation
  7. Plugging operations
  8. Well pad construction

The oil and gas inspector must be notified immediately upon:

1. Discovery of defective well construction
2. Detection of any natural gas or H2S gas during drilling in urban areas
3. Discovery of defective well construction during well stimulation
4. Determination that a well is a lost hole
5. Determination that a well is a dry hole

FLARING NOTIFICATION

The oil and gas inspector and local fire authority must be notified prior to flaring.

FIRE AND EMERGENCY NUMBERS

FIRE: (330) 448-1000  
MEDICAL SERVICE (330) 448-0500

**Richard J. Simmers**

CHIEF, Division of Oil and Gas Resources  
Management

STATE OF OHIO  
DEPARTMENT OF NATURAL  
RESOURCES

Division of Oil and Gas  
Resources Management  
WELL PERMIT

API WELL NUMBER  
34-155-2-4099-00-00

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HIGHLAND FIELD SERVICES LLC  
5800 CORPORATE DRIVE SUITE 300  
PITTSBURGH, PA 15237

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## **PERMIT CONDITIONS – CLASS II SALTWATER INJECTION WELL – DRILL NEW WELL**

**RE: Permit # 2-4099, SWIW #37, Highland Brookfield No. 5, Brookfield  
Township, Trumbull County, Ohio**

### **Constructional conditions:**

1. The 7" casing must be enclosed with **Class A cement** from the total depth to approximately **7300 feet** (minimum of 300 feet above the top of the injection zone). A **cement bond log** shall be run to ensure adequate cement coverage. The **Cement Bond Log** shall be centralized and have a combination **Amplitude – VDL – Travel Time** bond curve and shall be submitted to the **Division** for review.
2. **Bow-spring or rigid centralizers** must be used to provide sufficient casing stand off and foster effective circulation of cement to isolate critical zones including aquifers, flow zones, voids, lost circulation zones, and hydrocarbon-bearing zones.
3. The proposed location is an abandoned mine area. In accordance with **OAC 1501:9-1-08(M)(2)**, a mine string may be necessary.
4. No drilling into the **Precambrian basement** is allowed on **Class II** injection wells.
5. **Highland Field Services, LLC** shall run at minimum, a gamma ray, compensated density-neutron, and resistivity geophysical log. A copy of this geophysical log must be submitted to the **UIC Section** within 48 hours after the geophysical logging has been accomplished.
6. Prior to setting the tubing and packer, **Highland Field Services, LLC** shall run a radioactive tracer test or spinner survey to demonstrate that the injection fluids are going into the permitted injection zones. Copies of these logs shall be submitted to the **Division** within 48 hours after the geophysical logging has been accomplished.
7. After completion of the well and setting of the tubing and packer, **Highland Field Services, LLC** shall run two downhole digital pressure gauges to record original reservoir pressure and perform a pressure fall-off test. The results must be submitted to the **Division** for review.
8. Injection tubing must be set on a packer at approximately **7550 feet**. A **¼"**, female, threaded fitting with a stop valve must be installed on the tubing and accessible at the surface.
9. The annular space between the injection tubing and the 7" production casing must be filled with a fluid (e.g., freshwater with a corrosion

inhibitor additive), pressure tested to at least 1750 psi, and monitored for at least 15 minutes with no more than a five percent decline in pressure. **Additionally, the injection line must also be tested to 1750 psi for 15 minutes with no more than a five percent decline.**

10. The UIC Section and the Oil and Gas Resources Inspector must be notified at a minimum of 48 hours in advance of the time of cementing, placing and removing of casing, installation of the tubing and packer, testing of the casing, construction of the surface facilities, pressure testing of the injection line, and initial injection so that a representative of the Division can be present to witness the operations. The Division must also be notified in advance of any subsequent removal of the injection tubing or resetting the packer. A pressure test will also be required.
11. Surface facilities as proposed in the application are satisfactory and must be constructed under the supervision of a representative of the Division. A concrete pad with drain must be constructed so as to contain any spillage of saltwater during unloading from the trucks. Any proposed changes in the surface facilities must be submitted in writing and must have prior approval of the UIC Section.
12. **If an unloading pad is to be constructed, the underground concrete vault associated with the catch basin on the unloading pad shall be of one-piece construction and if the concrete vault has a detached lid, the lid must be exposed above the ground level. Additionally, the inside walls of the concrete vault shall be sealed with a salt-corrosion type material such as an asphalt-based coating to prevent deterioration of the vault from the brine water.**
13. A Well Construction Record (Form 8) must be submitted within 30 days after completion describing how the well was completed for injection operations. This report should include the amount and grade of tubing, type and depth of packer, treatment of the injection formation, testing of the system integrity, method used to monitor pressure in the annulus and injection tubing, and method used to monitor volumes of injected fluid.
14. **A Murphy Switch or other cut-off switch device must be in-line with the injection pump and set at the maximum allowable surface injection pressure of 1750 psi, so that the pump will automatically shut-down upon exceeding the maximum allowable surface injection pressure.**
15. The owner or operator of the Highland Brookfield No. 5 saltwater injection well lawfully shall dispose of all wastes resulting from the operations, including all filter media, and maintain records of any required testing for disposal or transport for disposal and manifests of final disposition of the wastes. The owner or operator shall provide the Division the records upon request of the Division.
16. Highland Field Services, LLC shall notify the Division in writing prior to the initiation of injection operations and injection operations shall not commence until the Division provides Highland Field Services, LLC with written approval that authorizes injection. Operational conditions to the permit shall be issued with the written approval.

17. **The owner or operator of the Highland Brookfield No. 5 shall monitor for microseismicity in at least three locations approved by the Division in the area of the proposed wellsite for a minimum of 60 days prior to beginning injection operations. The equipment and locations shall be agreed upon by the owner or operator of the Highland Brookfield No. 5 and the Division. The monitoring will be required to continue in accordance with the written approval that authorizes injection.**
18. The owner or operator of the Highland Brookfield No. 5 saltwater injection well immediately shall suspend operations at the well upon receipt of a notification from the Chief that the Chief has determined that the well may be related to seismic activity or pose a risk of creating or increasing seismic activity.



Ohio Department of Natural Resources  
 Division of Oil and Gas Resources Management  
 2045 Morse Rd. Bldg. F-2 - Columbus OH 43229-6693

### *Urbanized Area Permit Conditions*

<b>Application Number</b>	APATTO 30238	<b>Permit Number</b>		<b>Inspection Date</b>	2/14/17	<b>Modification Date (if applicable)</b>	
<b>Company</b>	Highland Field Services, LLC		<b>Lease Name/Well #</b>	Highland Brookfield #5			
<b>County</b>	Trumbull		<b>Township</b>	Brookfield			
<b>Section/Lot</b>	Lot 33		<b>Urban Area</b>	Brookfield Township			
<b>Inspected By</b>	Stephen Ochs and Rick Skidmore						
<b>Accompanied By</b>							

<b>Directions to Location</b>	Just under five miles north of Hubbard (Interstate 80 exit 234), on State Route 7, location is 1.2 miles north of State Route 82. Access road is on the west side of SR 7, next to a storage building.
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ITEM	LEASE ROAD, WELL SITE CONSTRUCTION	Comments:
1	<b>Tree/Brush Removal/Disposition</b>	Some remaining trees may need to be cut down.
2	<b>Topsoil Removal/Stockpiles/Placement</b>	Topsoil will be stockpiled on location.
3	<b>Erosion/Sediment Control (Silt Fence, Berms)</b>	Erosion/sediment controls will be used as needed.
4	<b>Drainage Controls (Diversion Ditches, Culverts, Waterways, Crossings)</b>	Drainage controls will be used as needed.
5	<b>Signage</b>	As required by 1501:9-3-06 (J) (K)
6	<b>Apron/Culverts/Road Material</b>	Access will need to be widened to allow ingress and egress of drilling equipment and tractor trailers. Low hanging utility lines will need to be addressed.
7	<b>Pull Off Area</b>	On location.
8	<b>Parking</b>	On location.
9	<b>GPS - Access Road</b>	41.24651° -80.56828°
10	<b>GPS - Well Stake</b>	41.24610° -80.58124°
11	<b>GPS - Tank Battery</b>	41.24703° -80.58010°

ITEM	DRILLING CONSIDERATIONS	Comments:		
12	<b>Noise Mitigation (Mufflers, Extra Frac Tanks, Tarps)</b>	All equipment will have appropriate mufflers.		
13	<b>Rig Type</b>	Rotary.		
14	<b>Is a Blow-out Preventer required?</b>	<input checked="" type="checkbox"/> X	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<b>If No, explain:</b>			
15	<b>Equipment Placement/ Orientation (Rig/ Frac Tanks/ etc.)</b>	Drilling equipment will be placed in such a manner as to mitigate noise.		
16	<b>Drilling Pits (Placement/Orientation)</b>	No site specific consideration needed.		
17	<b>Fencing (Pits/Entire Location)</b>	Entire location will be fenced.		
18	<b>Flood Plain</b>	None.		
19	<b>Mine Voids</b>	Unknown.		
20	<b>Verify Water Wells Within 300'</b>	None.		
21	<b>Verify Structures Within 500'</b>	None.		
22	<b>Verify Streams and Drainage</b>	Little Yankee Run is a mile to the west.		

ITEM	RESTORATION	Comments:		
23	<b>Pit Closure - (Standard/ Solidification/ Off-Site Disposal - state time frame)</b>	As required by 1509:072.		
24	<b>Site Specific Time Frame For Restoration</b>	As required by 1509:072.		
25	<b>Erosion/Sediment Control</b>	Maintain until preliminary restoration is completed.		
26	<b>Drainage Control</b>	Maintain until final restoration is completed.		

ITEM	PRODUCTION	Comments:		
27	<b>Is the Access Road Gate required?</b>	<input checked="" type="checkbox"/> X	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<b>If No, explain:</b>			
28	<b>Landscaping/Screening (Wellhead, Tank Battery) (Waiver Attached if applicable)</b>	Landscaping and screening will be required at wellhead, surface facility and north side of access.		
29	<b>Fencing (Wellhead, Tank Battery) (Waiver Attached if applicable)</b>	Fencing will be required around wellhead and surface facility.		

WAIVERS	Comments:		
<b>Is the Company required to submit a waiver?</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> X	<input type="checkbox"/> No
<b>If yes, submit the following waiver requests:</b>			

**Is the Company required to submit revised drawings?**  Yes  X  No

**THE FOLLOWING ITEMS HAVE BEEN CHANGED FROM THE ORIGINAL APPLICATION:**

# DAILY ROUTE SLIP

APPLICATION NO: aPATT030238 TYPE: Salt Water Injection Well (Convert or New Well)

API: 341552-4099-0000 CO. NAME: HIGHLAND FIELD SERVICES LLC

WELL NAME/NO.: HIGHLAND BROOKFIELD / 5

COUNTY/ TOWNSHIP: TRUMBULL / BROOKFIELD

PERMIT FEE, CHECK NO., REF NO.	<u>\$1,000.00</u>	<u>185758</u>	<u>01292757</u>
RUSH AMOUNT, CHECK NO., REF NO.	<u>\$0.00</u>	<u>0</u>	<u></u>
MANDATORY POOL FEE, CHECK NO., REF NO.	<u>\$0.00</u>	<u>0</u>	<u></u>

	<u>INITIALS</u>	<u>DATE</u>
DATE APPLICATION REC'D:	<u>pn</u>	<u>1-19-17</u>
APPLICATION ENTERED:	<u>pn</u>	<u>1-19-17</u>
STATE LAND: YES NO	<u></u>	<u></u>
COAL BEARING TOWNSHIP: YES NO	<u></u>	<u></u>
APPLICATION AND PLAT SENT FOR MINE APPROVAL:	<u></u>	<u></u>
MINE APPROVAL REC'D:	<u></u>	<u></u>
FEE SIMPLE AFFIDAVIT REC'D:	<u></u>	<u></u>
URBANIZED AREA: <u>YES</u> NO	<u>pn</u>	<u>1-19-17</u>
URBANIZED AREA NOTIFICATION SENT:	<u>pn</u>	<u>1-20-17</u>
URBANIZED AREA MAP REVIEW:	<u></u>	<u></u>
PRE-SITE REVIEW SENT TO INSPECTOR/REC'D BACK:	<u></u>	<u></u>
SAMPLES REQUIRED: YES	<u></u>	<u></u>
COMMUNICATION WITH APPLICANT:	<u></u>	<u></u>

GEOLOGIST APPROVAL:	<u>KB</u>	<u>6/21/17</u>
SECOND APPROVAL:	<u></u>	<u></u>
GIS VERIFICATION:	<u></u>	<u></u>
FINAL APPROVAL:	<u></u>	<u></u>
DATE ENTRY/ISSUED:	<u>JG</u>	<u>6/21/17</u>
PERMIT TAKEN: _____ MAILED: <u>X</u>	<u></u>	<u></u>
FAXED/EMAILED: <u>X</u>	<u>KB</u>	<u>6/22/17</u>

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Proof Sheet

APPL NUMBER	aPATT030238
OWNER NUMBER	9681
OWNER NAME	HIGHLAND FIELD SERVICES LLC
EXISTING WELL	0
API PERMIT NO	
APPL TYPE	SWIW
TYPE OF WELL	SWD
VARIANCE REQUEST	
WELL NAME	HIGHLAND BROOKFIEL (SWIW #37)
WELL NUMBER	5
PREV/PROPOSED TD	8750
DRILL UNIT ACRES	0
TYPE OF TOOL	RTAF
WELL CLASS	SWIW
FIRE PHONE	(330) 448-1000
MEDICAL PHONE	(330) 448-0500
COUNTY CODE	155
COUNTY NAME	TRUMBULL
COAL (Y=-1/N=0)	0
CIVIL TOWNSHIP	BROOKFIELD
SURF QUAD	SHARON WEST
Nad 27 SURF ORIG X	2,527,058
Nad 27 SURF ORIG Y	580,517
GROUND ELEVATION	1098
SURF SEC	
SURF LOT	33
SURF QTR TWP	
SURF ALLOT	
SURF TRACT	
SURF FRACTION	

URBANIZED AREA ?

NAME

STATE LAND ?

MP Check #

PROPOSED FORMATIONS

KNOX THRU ROME

UTICA/PT PLEASANT

MARCELLUS

TAKE POINT ORIG X

TAKE POINT ORIG Y

TARG COUNTY CODE

TARG COUNTY NAME

TARG CIVIL TWP

TARG QUAD

Nad 27 TARG ORIG X

Nad 27 TARG ORIG Y

TARG ELEV

TARG SECTION

TARG LOT

TARG QTR TWP

TARG ALLOT

TARG TRACT

TARG FRACTION

# Proof Sheet

**SURFACE FOOTAGE**

163' SL & 1501' EL of Lot 33

**TAKE POINT FOOTAGE**

NA

**TARGET FOOTAGE**

NA

**CASING PROGRAM**

09	20	220
92		
31	13 3/8	535
13	9 5/8	700
32	7	7600
40	3 1/2	50

**SPECIAL CONDITIONS/COMMENTS**

Class II drilling & construction conditions

- PER

VASC

VWSR

P# 2-1187

EL: 1117

BQ: 465'

+ 19

---

484

+ 50

---

534

1098

- 1117

---

+ 19

Drift = 3

COMPLETION DT

MINES APPROVAL

AFFIDAVIT APPROV

SOURCES OF WATER MUNICIPAL WATER

WATERSHED LAKE ERIE  OHIO RIVER

RUMA ATTACHED

EST WITHDRAWAL RATE (GAL/DAY) 10000

NON AGREEMENT AFFIDAVIT ATTACHED

EST TOTAL VOLUME (GALLONS) 100000

WATER WELL SAMPLING RESULTS

RECYCLED WATER EST TOTAL VOLUME (GALLONS)  

DATE SUBMITTED

# 185758  
\$ 1000<sup>00</sup>



OHIO DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL AND GAS RESOURCES MANAGEMENT

2045 MORSE RD., BLDG. F-2, COLUMBUS, OH 43229-6693  
Phone: (614) 265-6922 • Fax: (614) 265-6910



APPLICATION FOR A PERMIT (Form 1)

(REVISED 0915)

2 PA 4030238

SEE INSTRUCTIONS ON BACK

1. We (applicant) HIGHLAND FIELD SERVICES, LLC 2. OWNER NUMBER: 9681  
Address: 5800 CORPORATE DRIVE SUITE 300, PITTSBURGH, PA 15237 Phone Number: ( 412 ) 548 - 2500  
hereby apply this date \_\_\_\_\_, 20 17 for a permit to:

Drill Vertical Well  Revised Location  Convert  
 Drill Horizontally  Plug Back  Deepen  
 Drill Directionally  Plug and Abandon  Reopen  
 Reissue  Temporary Inactive: @ 1<sup>st</sup> year @ 2<sup>nd</sup> year @ 3<sup>rd</sup> year \_\_\_\_\_<sup>th</sup> year

3. TYPE OF WELL:  Oil & Gas  Annular Disposal  Saltwater Injection  
 Stratigraphic Test  Gas Storage  Other (explain):  
 Solution Mining\*  Enhanced Recovery\* (\*if checked, select appropriate box below)  
 Input/Injection  Water Supply  Observation  Production/Extraction

4. Is the well location or production facility(s) within an urbanized area as defined by ORC 1509.01 (Y)?  Yes  No

20. TYPE OF TOOLS:  Cable  Rotary (@ Air @ Fluid)  
 Cable/Rotary  Service Rig

5. MAIL PERMIT TO: HIGHLAND FIELD SERVICES, LLC  
5800 CORPORATE DRIVE SUITE 300  
PITTSBURGH PA 15237

21. SOURCE(S) OF GROUND AND/OR SURFACE WATER USED IN PRODUCTION OPERATION:  
MUNICIPAL WATER  
Watershed:  Lake Erie  Ohio River  
Estimated Withdrawal Rate (gal/day): 10,000  
Estimated Total Volume (gal): 100,000  
If Recycled Water – Estimated Total Volume (gal): \_\_\_\_\_

6. COUNTY: TRUMBULL

7. CIVIL TOWNSHIP: BROOKFIELD

8. SECTION: \_\_\_\_\_ 9. LOT: 33

10. FRACTION: \_\_\_\_\_ 11. QTR TWP: \_\_\_\_\_

12. TRACT/ALLOT: \_\_\_\_\_

13. WELL NUMBER: 5

22. EMERGENCY TELEPHONE NUMBERS (closest to well site):  
Fire: (330) 448-1000  
Medical: (330) 448-0500

14. LEASE NAME: HIGHLAND BROOKFIELD

23. MEANS OF INGRESS AND EGRESS:  
Road: STATE ROUTE 7

15. PROPOSED TOTAL DEPTH: 8,750

24. ROAD USE FOR HORIZONTAL WELL:  
 Maintenance Agreement Attached  
 Non-agreement Affidavit Attached  
 State Route (Not Required)

16. PROPOSED GEOLOGICAL FORMATION(S):  
KNOX THROUGH ROME

25. ARE THE SURFACE RIGHTS OWNED BY THE STATE OF OHIO?  
Agency Name: N/A

17. DRILLING UNIT ACRES: \_\_\_\_\_

18. ATTACH LANDOWNER ROYALTY LISTING: \_\_\_\_\_

19. IF PERMITTED PREVIOUSLY:  
API Number: \_\_\_\_\_

26. FOR PLUGGING APPLICATIONS: Date of Last Production: \_\_\_\_\_  
Amount of Oil: \_\_\_\_\_ (bbl) Gas: \_\_\_\_\_ (mcf)

**RECEIVED**  
JAN 19 2017

27. PROPOSED CASING AND CEMENTING PROGRAM

Type Casing	Borehole Diameter (in)	Borehole Depth (ft)	Casing Diameter (in)	Casing Depth (ft)	Cement Volume (sacks)	Formation	Zone Tested (✓ if Yes)	Hydraulic Fracturing (✓ if Yes)
Drive Pipe	24"	220'	20"	220'	360 sks			
Conductor								
Mine String								
Surface	17-1/2"	325'	13-3/8"	325'	290 sks			
1 <sup>st</sup> Intermediate	12-1/4"	700'	9-5/8"	700'	280 sks	BELOW BASE OF USDW		
2 <sup>nd</sup> Intermediate								
Production	8-3/4"	7600'	7"	7600'	1270 sks	ABOVE KNOX TOP (2 STAGE)		
Liner								
Tubing			3-1/2"	7550'		SET ON PACKER		

I, the undersigned, being first duly sworn, depose and state under penalties of law, that I am authorized to make this application, that this application was prepared by me or under my supervision and direction, and that the facts stated herein are true, correct, and complete, to the best of my knowledge.

I, the undersigned, further depose and state that I am the person who has the right to drill on the tract or drilling unit and to drill into and produce from a pool and to appropriate the oil or gas that I produce therefrom either for myself or others as described in this application. And furthermore, I the undersigned, being duly sworn, depose and state at this time that I am not liable for any final nonappealable order of a court for damage to streets, roads, highways, bridges, culverts, or drainage ways pursuant to Section 5577.12 of the Ohio Revised Code (ORC). I, the undersigned, further depose and state that all notices required by 1509.06 (A) (9) ORC for this application have been duly provided by me. If applying for a permit to plug and abandon a well, I hereby certify that the written notices, as required in Section 1509.13, ORC, have been given. That I hereby agree to conform with all provisions of Chapter 1509, ORC, and Chapter 1501, OAC, and all orders and conditions issued by the Chief, Division of Oil and Gas Resources Management.

Signature of Owner/Authorized Agent: [Signature]  
Name (Type or Print): DOUGLAS KEPLER Title: PRESIDENT

\_\_\_\_\_ if signed by Authorized Agent, a certificate of appointment of agent must be on file.

Sworn to and subscribed before me this the 18<sup>th</sup> day of January, 20 17.

**COMMONWEALTH OF PENNSYLVANIA**  
**NOTARIAL SEAL**  
Adam J. Krug, Notary Public  
City of St. Marys, Elk County  
My Commission Expires Aug. 26, 2018  
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

[Signature]  
(Notary Public)  
Aug. 26 2018  
(Date Commission Expires)



**SUPPLEMENT TO APPLICATION  
PERMIT FOR A SALTWATER INJECTION WELL (Form 210)**

(REVISED 0515)

**AREA OF REVIEW:** An application for a saltwater injection well (SWIW) will be evaluated on the basis of an "area of review" surrounding the proposed well. The area of review for wells, in which injection of greater than two hundred (200) barrels per day is proposed, shall be the area circumscribed by a circle with the center point at the location of the injection well and a radius of one-half mile. The area of review for wells, in which a maximum injection of two hundred (200) barrels per day or less is proposed, shall be the area circumscribed by a circle with the center point at the location of the injection well and a radius of one-quarter mile.

**31. PROPOSED INJECTION ZONE:**

Geological Formation: KNOX THROUGH ROME

Injection Well Interval: FROM 7,600.00 FEET TO 8,750.00 FEET

Geologic description of injection zone: DOLOMITES & SANDSTONES OF THE KNOX GROUP & ROME FORMATION

Composition of Proposed Fluids to be Injected: (CHECK ALL THAT APPLY)

Brine                       Flow-Back Drilling                       Fluids                       Other Approved Fluids

**32. WELL CONSTRUCTION AND OPERATION:**

A. Description of the proposed casing and cement program for new wells, or of the casing, cementing or sealing with prepared clay for existing wells to be converted:

20" DRIVE PIPE / CONDUCTOR CEMENTED TO SURFACE

13-3/8" SURFACE CEMENTED TO SURFACE

9-5/8" INTERMEDIATE CEMENTED TO SURFACE

7" PRODUCTION CEMENTED BACK 300' MINIMUM INTO INTERMEDIATE SHOE, TWO-STAGE CEMENT TOOL @ ±5200'

B. Proposed method for testing the casing:

CONDUCT MAXIMUM PRESSURE TEST TO 1800 PSI, HOLD FOR 15 MINUTES WITH NO MORE THAN 5% PRESSURE DECLINE.

C. Description of the proposed method for completion and operation of the injection well:

3-1/2" INJECTION TUBING SET INSIDE 7" CASING ON PACKER AT 7550'

D. Description of the proposed unloading, surface storage, and spill containment facilities:

THE PROPOSED UNLOADING AREA WILL BE CONSTRUCTED OF CONCRETE WITH DRAINAGE TRENCH, WHICH SLOPES TO A SUMP.

SUMP HAS A SUMP PUMP WITH LEVEL DETECTION FLOATS FOR AUTOMATIC ON/OFF PUMPING INTO STORAGE TANKS.

UNLOADING PAD SUMP WILL GATHER SPILLED FLUID AND STORMWATER.

STORAGE TANKS WILL BE CONSTRUCTED TO API SPECIFICATIONS.

TANK CONTAINMENT WILL BE SIZED TO HOLD 110% OF THE COMBINED TANK VOLUME AND WILL BE CONSTRUCTED OF CONCRETE.

TANK CONTAINMENT WILL HAVE AN HDPE LINER WITH SAMPLE PORTS FOR LEAK DETECTION.

SEE ATTACHED DRAWINGS FOR ADDITIONAL DETAILS.

**RECEIVED**

**JAN 19 2017**

**33. PROPOSED INJECTION VOLUMES**

A. Indicate the estimated amount of saltwater to be injected into the proposed injection well per day:

AVERAGE: 5,000 MAXIMUM: 10,000

B. Indicate the method to be used to measure the actual daily injection pressure:

PRESSURE GAUGES & CHART RECORDER

**34. PROPOSED INJECTION PRESSURES**

A. Indicate the estimated pressure to be used for injection of saltwater into the proposed injection well:

AVERAGE: 1736 PSI MAXIMUM: 1736 PSI

**35. PROPOSED CORRECTIVE ACTION**

Explain any corrective action proposed for wells penetrating the proposed injection formation or zone within the area of review:

THERE ARE NOT ANY WELLS PENETRATING THE PROPOSED INJECTION ZONE WITHIN THE AREA OF REVIEW.

**SUPPLEMENT TO APPLICATION  
PERMIT FOR A SALTWATER INJECTION WELL (Form 210)**

(REVISED 0515)

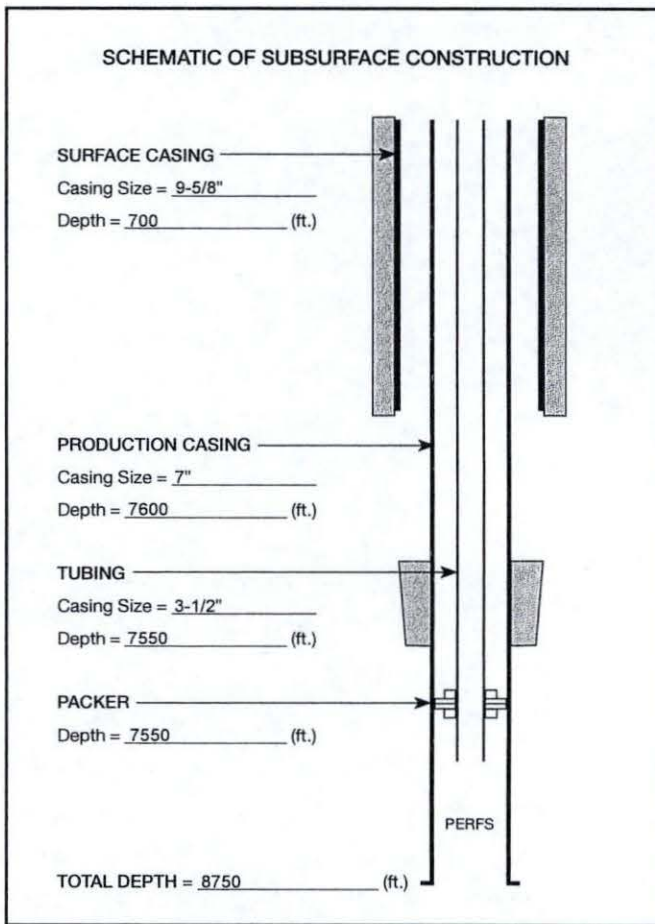
**36. MAP**

Each application for a permit shall be accompanied by a map or maps showing and containing the following information:

- A. The subject tract of land on which the proposed injection well is to be located.
- B. The location of the proposed injection well on the subject tract established by an Ohio registered surveyor showing the distances in feet from the proposed well site to the boundary lines on the subject tract;
- C. The geographic location of all wells, penetrating the formation proposed for injection regardless of status, within the area of review;
- D. All holders of the land owner's royalty interest of record, or holders of the severed oil and gas mineral estates of record in the subject tract;
- E. All owners or operators of wells producing from or injecting into the same formation proposed as the injection formation.

**37. SCHEMATIC DRAWING OF SUBSURFACE CONSTRUCTION**

Label the schematic drawing below indicating size and setting depth of surface casing, intermediate (if any) and production casings; amount of cement used, measured or calculated tops of cement; size and setting depth of tubing; type and setting depth of packer; geologic name of injection zone showing top and bottom of injection interval. If the proposed input well design is substantially different from the schematic below, attach on a separate sheet a schematic of your proposal labeled with the above information.



**38. PUBLIC NOTICE OF A SALTWATER INJECTION WELL**

Public notice of an application for a saltwater injection well is required by law. In addition, the applicant must submit, on an attached sheet, a list of the names and address(es) of those persons required to receive personal notice in accordance with Rule 1501:9-3-06(H), of the Ohio Administrative Code.

After submitting the application, and after a determination by the Division that it is complete as required by the rules of the Division, a legal notice must be published by the applicant in a newspaper of general circulation in the area of review. The legal notice must contain the information described in Rule 1501:9-3-06(H) of the Ohio Administrative Code. A copy of the notice must be delivered to all owners or operators of wells within the area of review producing from or injecting into the same formation proposed as the injection formation. Proof of publication, publication date, and an oath as to the delivery to those entitled to receive personal notice under this method must be filed with the Division within thirty (30) days after the Division determines that the application is complete.

In addition, notice of all applications for saltwater injection wells will be published in the Division's weekly circular.

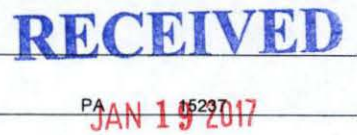
The undersigned hereby agrees to comply with all provisions for a saltwater injection well as required by Chapter 1501:9-3 of the Ohio Administrative Code. In addition, the undersigned deposes and says that s/he shall conform to all provisions of Section 1509.072 of the Ohio Revised Code, and to all orders and rules issued by the Chief, Division of Oil and Gas Resources Management.

Owner/Authorized Agent (Type or Print): HIGHLAND FIELD SERVICES, LLC; DOUGLAS KEPLER

Signature of Owner/Authorized Agent: [Signature] Title: PRESIDENT

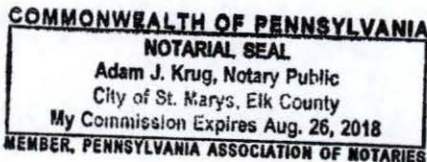
Permanent Address of Home Office: 5800 CORPORATE DRIVE SUITE 300

PITTSBURGH PA 15237



If signed by Authorized Agent, a certified copy of appointment of agent must be on file with the Division.

SWORN to and subscribed to me this 18th day of January, 20 17



[Signature]  
Notary Public

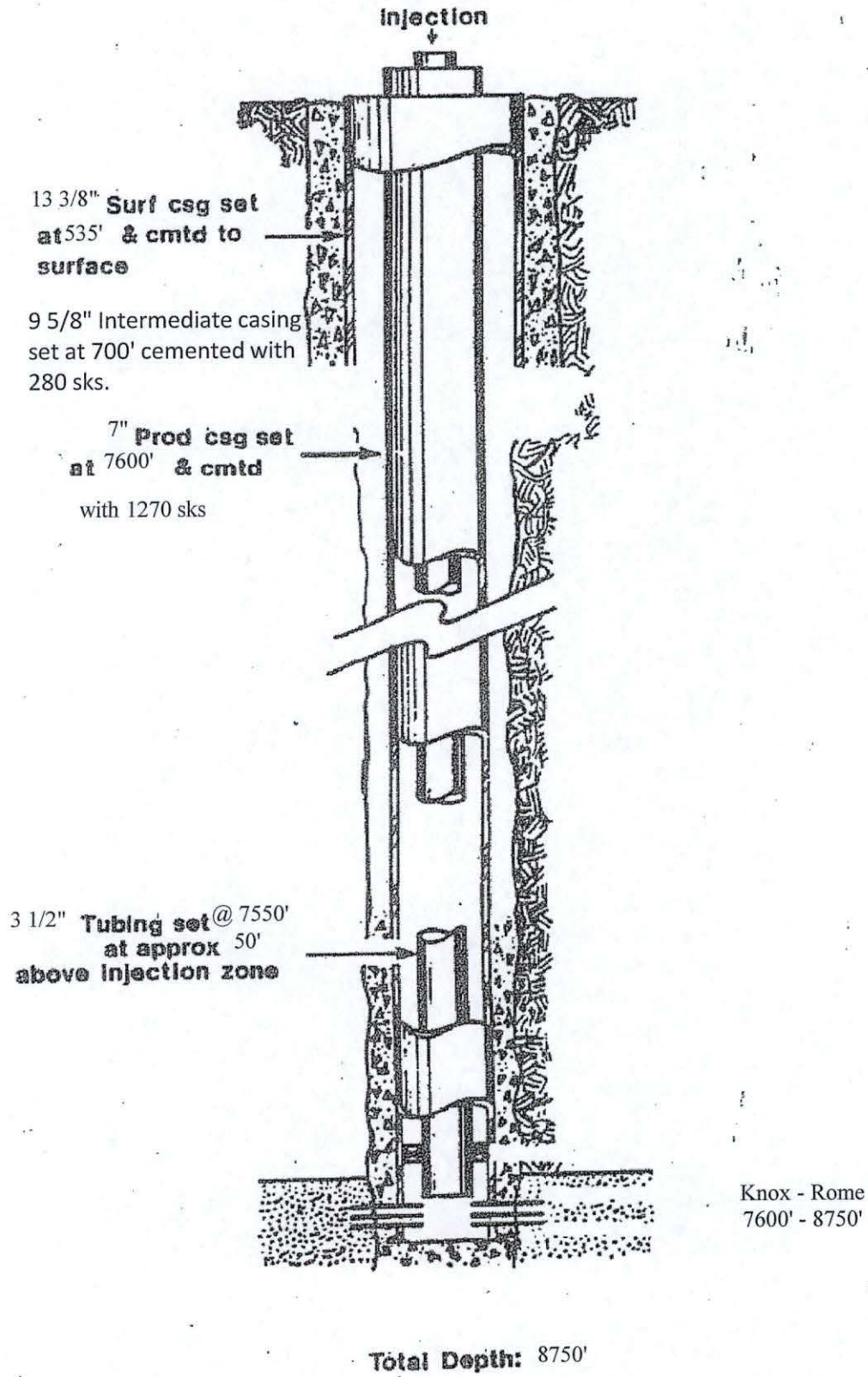
August 26, 2018  
Date Commission Expires

Highland County, Brookfield Twp.,  
SWIW # 37 Highland Brookfield #5

P # 2-4099

### Subsurface Construction For Injection Well

Maximum Injection Pressure: 1750 psi



**RESTORATION PLAN (Form 4)**

Ohio Department of Natural Resources

Division of Oil and Gas Resources Management, 2045 Morse Road, Bldg. F-2, Columbus OH 43229-6693

1. DATE OF APPLICATION:		3. API #:	
2. OWNER NAME, ADDRESS, & TELEPHONE NO.: HIGHLAND FIELD SERVICES, LLC 5800 CORPORATE DRIVE SUITE 300 PITTSBURGH, PA 15237		4. WELL #: 5	
		5. LEASE NAME: HIGHLAND BROOKFIELD	
		6. PROPERTY OWNER: HIGHLAND FIELD SERVICES, LLC	
		7. COUNTY: TRUMBULL	
		8. CIVIL TOWNSHIP: BROOKFIELD	
		9. SECTION: _____ 10. LOT: 33	
11. CURRENT LAND USE: <input type="checkbox"/> Cropland <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture <input checked="" type="checkbox"/> Idle Land <input checked="" type="checkbox"/> Wetlands <input type="checkbox"/> Recreational <input type="checkbox"/> Residential <input type="checkbox"/> Industrial <input type="checkbox"/> Unreclaimed strip mine <input checked="" type="checkbox"/> Woodland: <input checked="" type="checkbox"/> Broadleaf <input type="checkbox"/> Needlelike		17. TYPE OF WELL: <input type="checkbox"/> Oil <input type="checkbox"/> Gas <input checked="" type="checkbox"/> Other	
12. SLOPE GRADIENT & LENGTH DETERMINED FROM: <input checked="" type="checkbox"/> Ground Measurement <input type="checkbox"/> U.S. Geological Survey Topographical Maps <input type="checkbox"/> Other: (explain) _____		18. STEEPEST SLOPE GRADIENT CROSSING SITE: <input checked="" type="checkbox"/> 0 to 2% <input type="checkbox"/> 2.1 to 8% <input type="checkbox"/> 8.1 to 10% <input type="checkbox"/> greater than 24% <input type="checkbox"/> 10.1 to 24%	
13. TYPE OF FALL VEGETAL COVER: <input type="checkbox"/> Little or no vegetal cover <input type="checkbox"/> Short grasses <input type="checkbox"/> Tall weeds or short brush (1 to 2 ft.) <input checked="" type="checkbox"/> Brush or bushes (2 to 6 ft.) <input type="checkbox"/> Agricultural crops <input checked="" type="checkbox"/> Trees with sparse low brush <input type="checkbox"/> Trees with dense low brush		19. LENGTH OF STEEPEST SLOPE CROSSING SITE: <input checked="" type="checkbox"/> 1 to 100 ft. <input type="checkbox"/> 101 to 200 ft. <input type="checkbox"/> 201 to 400 ft. <input type="checkbox"/> greater than 400 ft.	
14. SOIL & RESOILING MATERIAL AT WELLSITE: <input checked="" type="checkbox"/> Stockpile and protect topsoil to be used when preparing seedbed <input checked="" type="checkbox"/> Use of soil additives (e.g., lime, fertilizer) <input type="checkbox"/> No resoiling planned <input type="checkbox"/> Proposed alternative _____		20. RESTORATION OF DRILLING PITS: ** <input type="checkbox"/> Haul drilling fluids and fill pits <input checked="" type="checkbox"/> Use steel circulating tanks <input type="checkbox"/> Proposed alternative _____	
15. DISPOSAL PLAN FOR TREES AND TREE STUMPS: <input type="checkbox"/> No trees disturbed <input checked="" type="checkbox"/> Haul to landfill <input type="checkbox"/> Cut into firewood <input type="checkbox"/> Sell to lumber company <input type="checkbox"/> Bury with landowner's approval <input checked="" type="checkbox"/> Mulch small trees and branches, erosion control <input type="checkbox"/> Use for wildlife habitat with landowner approval <input type="checkbox"/> Proposed alternative _____		21. BACKFILLING AND GRADING AT SITE: <input type="checkbox"/> Construct diversions channeled to naturally established drainage systems <input type="checkbox"/> Construct terraces across slopes <input checked="" type="checkbox"/> Grade to approximate original contour <input checked="" type="checkbox"/> Grade to minimize erosion & control offsite runoff <input type="checkbox"/> Proposed alternative _____	
16. SURFACE AND SUBSURFACE DRAINAGE FACILITIES: <input checked="" type="checkbox"/> No existing drainage facilities for removal of surface and/or subsurface water <input type="checkbox"/> Tile drainage system underlying land to be disturbed <input type="checkbox"/> Drain pipe(s) underlying land to be disturbed <input type="checkbox"/> Surface drainage facilities on land to be disturbed		22. VEGETATIVE COVER TO BE ESTABLISHED AT SITE: <input checked="" type="checkbox"/> Seeding plan <input checked="" type="checkbox"/> Sod <input type="checkbox"/> Agricultural crops <input type="checkbox"/> Trees and/or Bushes <input type="checkbox"/> Proposed alternative _____	
		23. ADDITIONAL HOLES: <input checked="" type="checkbox"/> Rat/Mouse, if used, will be plugged	
		24. PROPOSED OR CURRENT LENGTH OF ACCESS ROAD: <input type="checkbox"/> 100 ft. or less <input type="checkbox"/> 101 to 500 ft. <input type="checkbox"/> 501 to 1500 ft. <input checked="" type="checkbox"/> greater than 1500 ft.	
16. SURFACE AND SUBSURFACE DRAINAGE FACILITIES:		25. CURRENT LAND USE OF PATH OF ACCESS ROAD: <input type="checkbox"/> Cropland <input type="checkbox"/> Pasture <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Idle land <input checked="" type="checkbox"/> Wetlands <input type="checkbox"/> Recreational <input type="checkbox"/> Industrial <input type="checkbox"/> Residential <input type="checkbox"/> Unreclaimed strip mine <input checked="" type="checkbox"/> Woodland: <input checked="" type="checkbox"/> Broadleaf <input type="checkbox"/> Needlelike	

\*\*PITS MUST BE FILLED WITHIN TWO MONTHS AFTER COMMENCEMENT OF THE WELL AND WITHIN FOURTEEN DAYS AFTER COMMENCEMENT OF THE WELL IN AN URBANIZED AREA.

REQUIRED BY SECTION 1509.06 (A)(10), OHIO REVISED CODE -- FAILED TO SUBMIT MAY RESULT IN AN ASSESSMENT OF CRIMINAL FINES NOT LESS THAN \$100.00 NOR MORE THAN \$2,000.00 OR CIVIL PENALTIES NOT LESS THAN \$4,000.00.



JAN 19 2017

<p>26. SURFACING MATERIAL FOR ACCESS ROAD:</p> <input checked="" type="checkbox"/> Gravel <input type="checkbox"/> Brick and/or tile waste <input type="checkbox"/> Slag <input type="checkbox"/> Crushed stone <input type="checkbox"/> No surfacing material to be used <input type="checkbox"/> Proposed alternative _____	<p>29. STEEPEST SLOPE GRADIENT ON ACCESS ROAD:</p> <input checked="" type="checkbox"/> 0 to 5% <input type="checkbox"/> 6 to 10% <input type="checkbox"/> greater than 10%
<p>27. PATH OF ACCESS ROAD TO BE DETERMINED BY:</p> <input checked="" type="checkbox"/> Landowner <input type="checkbox"/> Contractor <input checked="" type="checkbox"/> Existing access road <input type="checkbox"/> Operator	<p>30. APPROXIMATE LENGTH OF STEEPEST SLOPE ON ROAD:</p> <input checked="" type="checkbox"/> 0 to 100 ft. <input type="checkbox"/> 101 to 200 ft. <input type="checkbox"/> 201 to 400 ft. <input type="checkbox"/> greater than 400 ft.
<p>28. GRADING AND EROSION CONTROL PRACTICE ON ROAD:</p> <input checked="" type="checkbox"/> Diversions <input checked="" type="checkbox"/> Filter strips <input checked="" type="checkbox"/> Drains <input type="checkbox"/> Riprap <input type="checkbox"/> Open top culverts <input type="checkbox"/> Water breaks <input checked="" type="checkbox"/> Outsloping of road <input type="checkbox"/> Pipe culverts <input type="checkbox"/> Proposed alternative _____	<p>31. HAS LANDOWNER RECEIVED A COPY OF THIS RESTORATION PLAN?</p> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

The undersigned hereby agrees to implement all restoration operations identified on this form, and conform to all provisions of Section 1509.072 of the Ohio Revised Code, and to all Orders and rules issued by the Chief, Division of Oil and Gas Resources Management.

Signature of Owner/Authorized Agent DA Kepler

Name (Typed or Printed) Douglas A. Kepler Date 01/18/17

RESTORATION PLAN MUST BE SUBMITTED TO THE DIVISION IN DUPLICATE.