

35 (E)

29 (E)

34 (E)

28 (E)

33

T2N,R6W
T1N,R6W

MED 9018

66083

23946

29382 DOH 1A

64496 10
64493 7
64492 6
64491 4
64494 8
64488 3
64489 8
64490 4

64198 24
64196 15
64195 14
64194 11
64193 10
21164
21101

64424 MIN 1

27703
29398 2CR 3-A
29408 2CR 3-A

29393
381 OH 2A
29410 BE CR 8A

29396 2CR 4A
27752 2CR 5
29409 2CR 9A

27316 DOH 3
25614 DOH 3
22516 BE 3
22458 BE 2
23970
23363 DOH 5
66357
66358
66364
66352

27492 (DCD) DOR 17
23143
23186 BE 16

27706 DOH 2

24758 DOH 1

24777 DOH 1

27071 DOH 2

25736 DOH 1

24774 DCD 1

26523 DOH 1

27751 5

28010 2

24955 2

28011 3

26720 1-34
27899 2

27704 BE 1

25715 2
64605 BE

24776 DOH 1

24775 (DCD) BE 1

27971 DOH 1

27076 DOH 1

25714 2

21463 2
21293 1

25295 DCD 3

64574 1A
64576 8
64575 7-A

25803 DOH 4

24754 DOH 1

25295 DCD 3

64574 1A
64576 8
64575 7-A

25803 DOH 4

64485 10
64483 14
64482 13
64477 13
64478 10
64479 10
64478 9
21036 9
64473 3
64472 2

DC

64

28588 MKE

1 DOH 2

64603 BE 1

222 MKE F-1

64604 1

26523 DOH 1

24754 DOH 1

25295 DCD 3

64574 1A

64576 8

64575 7-A

25803 DOH 4

64485 10

64483 14

64482 13

64477 13

64478 10

64479 10

64478 9

21036 9

64473 3

64472 2

OPERATOR Trind Hunter

COUNTY Washington

TOWNSHIP Warrenton

P & A	FM	Permit Number	Casing Program / Comment	Well Log and/or Method of Plug
<input type="checkbox"/>	<u>CY/ME</u>	<u>9018</u>		<u>8 5/8" - 1797' - cement to surface Perfs</u> <u>4 1/2" - 7451' - cement w/ 200 sacks = 7346'</u> <u>Calculated fill-up = 1554' (TDC = 5897') 7354'</u>
<input type="checkbox"/>	<u>BE</u>	<u>7899</u>	<u>Not drilled</u>	
<input type="checkbox"/>	<u>BE</u>	<u>6720</u>	<u>Not drilled</u>	
<input type="checkbox"/>	<u>BE</u>	<u>7704</u>	<u>Not drilled</u>	
<input type="checkbox"/>	<u>BE</u>	<u>5715</u>		
<input type="checkbox"/>	<u>BE</u>	<u>7900</u>	<u>Berea well - shallow</u>	
<input type="checkbox"/>	<u>DOH</u>	<u>4776</u>	<u>Ohio State well - shallow</u>	
<input checked="" type="checkbox"/>	<u>BE</u>	<u>4775</u>	<u>Plugged Berea well - shallow</u>	

NOTE: Proposed injection well should be circumscribed with appropriate radius and all wells clearly labeled and identified. A legend depicting color code is required.

Casing Ticket

API Well Number

34-167-2-9618-00-00

JAN 17 2007

Record of Casing, Cementing and Mudding

Well Owner:	TRIAD RESOURCES INC		Permit Issued:	
Lease Name:	GREENWOOD UNIT 2	Well No. 2	Date Spudded	01/02/2007
County:	WASHINGTON	Township. NEWPORT	Date Completed:	
Driller:	WARREN DRLG	Tool Air Rotar	Inspector	VAN DYKE CYNTHIA
Refer Top	Ground Level	Lat: 0.000000	Long: 0.000000	<input type="checkbox"/> AD Meets Requirements
				<input type="checkbox"/> AD on Permit

Comments: Had a lot of trouble getting surface set. Rig got casing to 752 and could not get deeper, removed casing, took centralizers off and were able to get to bottom. 100 bbl. Cow Run oil at 562', circulated in pit.

FLD	*Hole 1 Field Entry	CONDITION
Bot 104 Diam 14.75	Top 0 LENGTH	Set Dt
String Comments Casing Condition, Weight and Cement Basket		

BOC 0	TOC 0	DT_CM	WITNESSED
CMT_CON	INSPECTOR	VAN DYKE CYNTHIA	
CLASS_CMT:	SACKS	YIELD	WEIGHT
Cement 1			
CLASS_CMT2:	SACKS2	YIELD	WEIGHT
Cement 2			

RECEIVED

JAN 18 2007

DIVISION OF MINERAL
 RESOURCES MANAGEMENT

FLD

*Conductor Pipe Field Entry

CONDITION

Bot 104 Diam 11.75 Top 0 LENGTH Set Dt 1/2/2007

String Comments Casing Condition, Weight and Cement Basket

BOC 104 TOC 0 DT_CM 1/2/2007 WITNESSED

CMT_CON INSPECTOR VAN DYKE CYNTHIA

CLASS_CMT: SACKS YIELD WEIGHT

Cement 1

CLASS_CMT2: SACKS2 YIELD WEIGHT

Cement 2

FLD

*Hole 2 Field Entry

CONDITION

Bot 1840 Diam 11 Top 104 LENGTH Set Dt

String Comments Casing Condition, Weight and Cement Basket

BOC 0 TOC 0 DT_CM WITNESSED

CMT_CON INSPECTOR VAN DYKE CYNTHIA

CLASS_CMT: SACKS YIELD WEIGHT

Cement 1

CLASS_CMT2: SACKS2 YIELD WEIGHT

Cement 2

FLD

*Surface Casing Field Entry

CONDITION

New

Bot 1797 Diam 8.62 Top 0 LENGTH Set Dt 1/5/2005

String Comments Casing Condition, Weight and Cement Basket

New, 24#

BOC 1797 TOC 0 DT_CM 1/5/2007 WITNESSED

CMT_CON B.J. HUGHES INSPECTOR VAN DYKE CYNTHIA

CLASS_CMT: Class A Cement SACKS 522 YIELD 1.39 WEIGHT 14.6

Cement 1 Ran gel ahead, only guide shoe on bottom, 1 basket

CLASS_CMT2: SACKS2 YIELD WEIGHT

Cement 2

Formation	TOP	BOT METH_	Producing	NonStandard	CMMNT
1ST COW RUN SANDSTONE	557	595 I	No		Circulated 100 bbl oil

CEMENT JOB REPORT



CUSTOMER Triad Energy Corp of WVA , In		DATE 05-JAN 07	F.R. # 225039284	SERV. SUPV. BENJAMIN D HARTLEY							
LEASE & WELL NAME GREENWOOD #2 - API 34167096180000		LOCATION NEWPORT		COUNTY-PARISH-BLOCK Washington Ohio							
DISTRICT Clarksburg		DRILLING CONTRACTOR RIG # WARREN		TYPE OF JOB Surface							
SIZE & TYPE OF PLUGS		LIST-CSG-HARDWARE			PHYSICAL SLURRY PROPERTIES						
Cement Plug, Rubber, Top 8-5/8 in		Guide Shoe, Cement Nose, 8-5/8 in			SACKS OF CEMENT	SLURRY WGT PPG	SLURRY YLD FT ³	WATER GPS	PUMP TIME HR:MIN	Bbl SLURRY	Bbl MIX WATER
MATERIALS FURNISHED BY BJ											
CLAYMASTER						8.34				100	
GEL					500	8.34				25	
SURFLITE 1/4#FLAKE					522	14.6	1.39	6.7	02:30	129.2	83
H2O						8.34				114.5	
Available Mix Water 300 Bbl.		Available Displ. Fluid 300 Bbl.		TOTAL					368.7	83	
HOLE			TBG-CSG-D.P.				COLLAR DEPTHS				
SIZE	% EXCESS	DEPTH	SIZE	WGT.	TYPE	DEPTH	GRADE	SHOE	FLOAT	STAGE	
11		1875	8.625	24	CSG	1797	J-55	1797	1797		
LAST CASING			PKR-CMT RET-BR PL-LINER			PERF. DEPTH		TOP CONN		WELL FLUID	
SIZE	WGT	TYPE	DEPTH	BRAND & TYPE		DEPTH	TOP	BTM	SIZE	THREAD	TYPE
11 75	42	CSG	130				0	0	8 625	8RD	OTHER
DISPL. VOLUME		DISPL. FLUID		CAL. PSI	CAL. MAX PSI	OP. MAX	MAX TBG PSI		MAX CSG PSI		MIX WATER
VOLUME	UOM	TYPE	WGT.	BUMP PLUG	TO REV.	SQ. PSI	RATED	Operator	RATED	Operator	
114.5	BBLs	H2O	8.34	585	0	0	0	0	2900	1500	TANK

EXPLANATION: TROUBLE SETTING TOOL, RUNNING CSG, ETC. PRIOR TO CEMENTING:

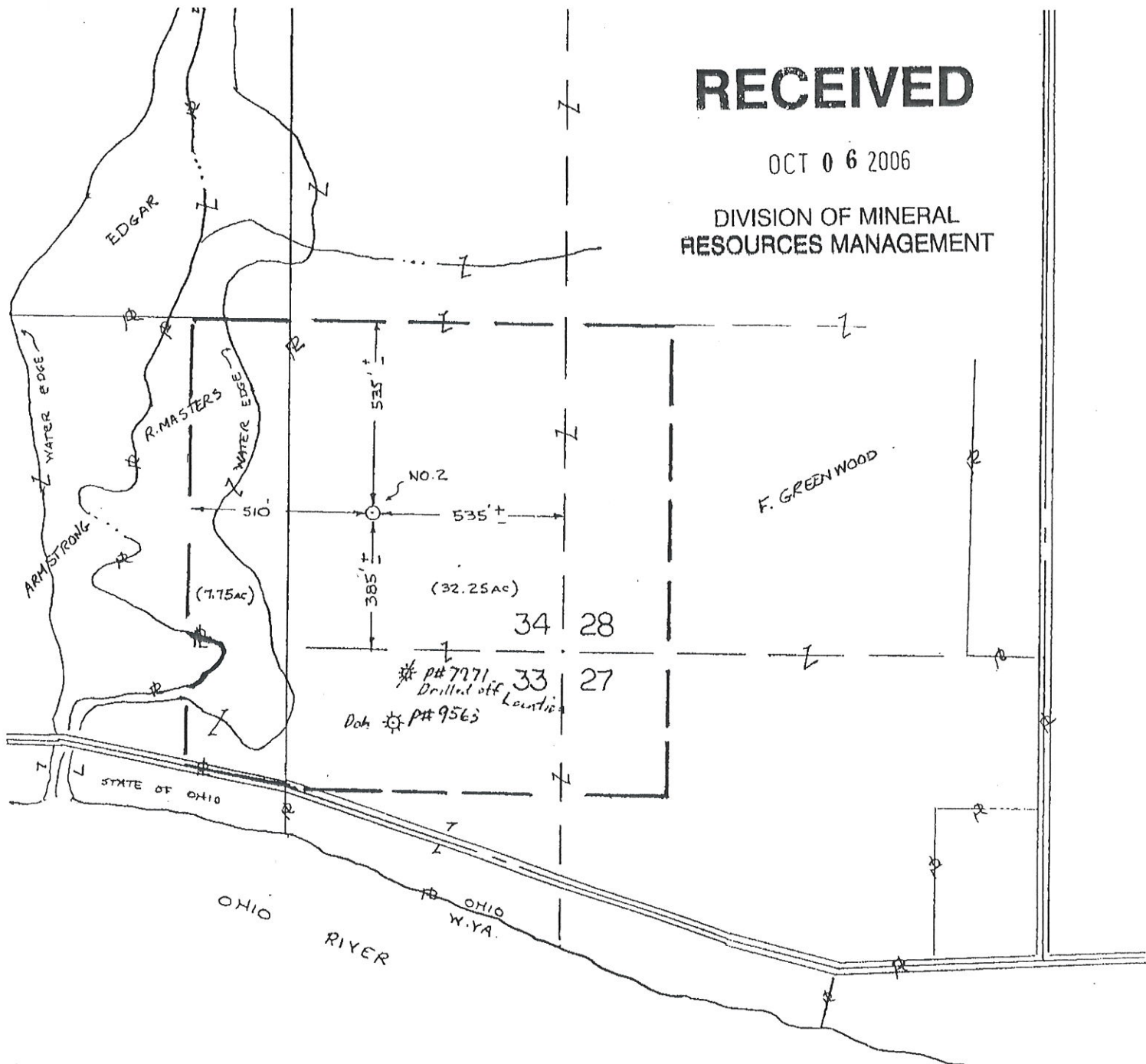
PRESSURE/RATE DETAIL						EXPLANATION	
TIME HR:MIN.	PRESSURE - PSI		RATE BPM	Bbl. FLUID PUMPED	FLUID TYPE	SAFETY MEETING: BJ CREW <input checked="" type="checkbox"/> CO. REP. <input type="checkbox"/>	
	PIPE	ANNULUS				TEST LINES	2500 PSI
						CIRCULATING WELL - RIG	BJ <input checked="" type="checkbox"/>
20:22	150	0	7	215	H2O W/CL	AHEAD- WASHDOWN	
20:52	0	0	0	0		SHUTDOWN	
02:15	200	0	7	25	GELLED H	PRE-FLUSH	
02:19	200	0	7	5	H2O	SPACER	
02:20	300	0	7	128	SLURRY	14.6#	
02:38	0	0	0	0		SHUTDOWN/ RELEASE PLUG	
02:40	500	0	7	114.5	H2O	DISPLACEMENT	
02:55	575	0	0	0		SHUT DOWN	

BUMPED PLUG	PSI TO BUMP PLUG	TEST FLOAT EQUIP.	BBL.CMT RETURNS/ REVERSED	TOTAL BBL. PUMPED	PSI LEFT ON CSG	SPOT TOP OUT CEMENT	SERVICE SUPERVISOR SIGNATURE:
[Y] N	585	Y [N]	5	372.5	590	Y [N]	<i>Ben Hartley</i>

RECEIVED

OCT 06 2006

DIVISION OF MINERAL
RESOURCES MANAGEMENT



385' SL & 535' EL of Sec 34 (E)

40Ac

Marcellus then Medina - DPUK-R

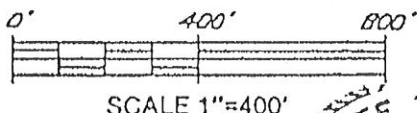
I hereby certify that all drilling or producing wells within 1000 feet and all buildings and streams within 200 feet have been shown, there are no drilling unit lines nearer than 500 feet, that this plat is true and correct and was prepared according to the current State of Ohio, Department of Natural Resources, Division of Oil and Gas Regulations.

Joseph J. Spilke S-5862
REG. SURVEYOR

OPERATOR TRIAD RESOURCES, INC.
ADDRESS P.O. Box 430 RENO, OHIO 45773
SURFACE GREENWOOD UNIT

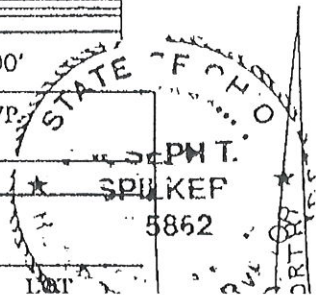
LANDOWNER
MINERALS GREENWOOD UNIT

WELL NO. 2 DRILLING UNIT AC. 40



SCALE 1"=400'

SUBDIVISION CIVIL TWP. _____
TWP. 1N
RANGE 6W
QUARTER TWP. _____
SECTION 34



Tomastik, Tom

From: Tomastik, Tom
Sent: Thursday, October 20, 2011 7:31 AM
To: 'Kirk Trosclair'
Subject: Preliminary AOR - Greenwood unit #2 well

Kirk:

Just finished doing the preliminary area of review for the proposed conversion of the Greenwood Unit #2, Permit #9618, Washington County, Newport Twp. to saltwater disposal. It is allowable to be able to inject into the Clinton/Medina sandstones in this well at volumes greater than 200 barrels per day (1/2 mile AOR).

Thanks,
Tom Tomastik, Geologist 4
Division of Oil and Gas Resources Management
2045 Morse Road, H-3
Columbus, Ohio 43229-6693
(614) 265-1032

From: Kirk Trosclair [mailto:ktrosclair@triadhunter.com]
Sent: Wednesday, October 19, 2011 5:21 PM
To: Tomastik, Tom
Subject: RE: RE:

Tom,

Hope things have settled down for you a bit. I know with all the Utica hype it has to be overwhelming for you and your staff.

Just wanted to follow up and check in with you concerning the preliminary review for the Greenwood No.2 well in Newport, Ohio.

Best regards,

Kirk J. Trosclair
Executive Vice President
GreenHunter Energy Inc.
A NYSE Amex Company: "GRH"

1048 Texan Trail
Grapevine, TX 76051

985.859.8328 (cell)

10/20/2011

From: Tomastik, Tom [mailto:Tom.Tomastik@dnr.state.oh.us]
Sent: Monday, October 03, 2011 11:58 AM
To: Kirk Trosclair
Subject: RE: RE:

Kirk:

Right now I am swamped. I have seven applications on my desk and a media frenzy with the seismic activity in Youngstown claiming it's related to an injection well. Hopefully, I can look at it back next week, if not sooner.

Tom Tomastik, Geologist 4
Division of Oil and Gas Resources Management
2045 Morse Road, H-3
Columbus, Ohio 43229-6693
(614) 265-1032

From: Kirk Trosclair [mailto:ktrosclair@triadhunter.com]
Sent: Monday, October 03, 2011 11:39 AM
To: Tomastik, Tom
Subject: Re: RE:

Tom

Any idea how long this preliminary review will take?

Best regards,
Kirk

Sent from my iPad

On Sep 30, 2011, at 6:58 AM, "Tomastik, Tom" <Tom.Tomastik@dnr.state.oh.us> wrote:

Kirk:

I need to know the county, township, and proposed injection zone or zones.

Thanks,
Tom Tomastik, Geologist 4
Division of Mineral Resources Management
2045 Morse Road, H-3
Columbus, Ohio 43229-6693
(614) 265-1032

From: Kirk Trosclair [mailto:ktrosclair@triadhunter.com]
Sent: Wednesday, September 28, 2011 10:32 AM
To: Tomastik, Tom

10/20/2011

Subject: Fwd:

Tom

Jonathan Hoopes mentioned that your group would perform a preliminary review of the proposed well to convert to an injection well. Please let me know if you need additional information or if there is a form I should fill out.

Thanks again and look forward to working with you and your group.

Best regards,

Kirk Trosclair

Begin forwarded message:

From: Allison Brown <ABrown@magnumhunterresources.com>

Date: September 28, 2011 9:01:07 AM CDT

To: "mjohnston@greenhunterenergy.com"
<mjohnston@greenhunterenergy.com>, Kirk Trosclair
<ktrosclair@triadhunter.com>

10/20/2011

**INTERIM GUIDLINE – NEW FEE LEVIED PURSUANT TO SENATE BILL 165
EFFECTIVE 06/30/2010**

SCOPE AND OBJECTIVE

- The guideline applies to all saltwater injection well owners having been issued a permit under ORC 1509.22 and for registered brine haulers.
- Provides the injection well owners and brine haulers interim guidance on how new fees are to be calculated, records to be maintained and when the new fees are to be forwarded to the Division of Oil and Gas Resources Management (DOGRM).
- This Interim Guideline dated 06/10/2010 will be in effect until such time it is replaced or new rules are in effect.
- The specific statutory language for changes relating to the new fees can be found at: <http://www.legislature.state.oh.us/>

Under Current Legislation, select the Senate and enter 165, see 1509.22(D) for the new permit fee and 1509.221 (B)(1) through (4) for the new fee on each substance delivered to an injection well.

Or, go to LAWriter at <http://codes.ohio.gov/orc/15> and select Chapter 1509, then select 1509.22 or 1509.221 and review the respective portions referenced above.

DEFINITIONS

- *“Division of Oil and Gas Resources Management Regulatory District”*: See www.ohiodnr.com/mineral/inspectors/tabid/10355/Default.aspx for the boundaries of the Oil and Gas Resources Management Districts. **The Districts are our North Region, South Region and West Region.**
- *“Not produced within the Division of Oil and Gas Resources Management Regulatory District in which the well is located or in an adjoining Regulatory District”*: **The substance delivered is not produced in the Division of Oil and Gas Resources Management North, South or West Regions.**

GUIDLINE

Effective 06/30/2010 there is levied on the owner of a saltwater injection well who has been issued a permit under division (D) of section 1509.22 of the Ohio Revised Code the following fees:

1. Five cents (\$0.05) per barrel of substance delivered to a saltwater injection well when the substance is produced within or adjoining to a (DOGRM) regulatory district where the well is located.

ODNR Division of Oil and Gas Resources Management
Underground Injection Control (UIC) Section

2. Twenty cents (\$0.20) per barrel of substance delivered to a saltwater injection well when the substance is not produced within the DOGRM regulatory district where the injection well is located or within an adjoining DOGRM district.
3. The new fee is **first** levied on all substances **not produced within or adjoining a DOGRM district**.
4. The maximum number of barrels of substance delivered per saltwater injection well in a calendar year where the new fee is levied is 500,000 barrels.
5. The owner of the saltwater injection well must collect the fee and submit the fees to DOGRM on a quarterly basis, to be received by DOGRM no later than 30 days after the end of the calendar quarter. The first quarter the fee is to be collected commences July 1, 2010 and ends September 30, 2010. Collection and remittance of the new fee to DOGRM will continue under this schedule until this Interim Guideline is replaced/amended or rules are in effect replacing the need for the Interim Guideline.
6. The owner of the saltwater injection well is permitted to retain up to three percent (3%) of the fee collected.
7. The saltwater injection well owner must use the form attached to this Interim Guideline for filing of the quarterly remittance of the new fees.
8. One form must be submitted for each saltwater injection well owned, each quarter.
9. If there were no substances delivered during a calendar quarter, the form will need to be submitted reflecting 0 barrels delivered.
10. The owner of the saltwater injection well where each substance is delivered must maintain the following records:
 1. Date of Delivery
 2. Delivery Company Name
 3. UIC Brine Hauler Registration #
 4. Volume of Fluid Delivered (in barrels)
 5. Record if the substance delivered to the saltwater injection well was generated in or adjacent to the DOGRM regulatory district where the injection well is located **or** if the substance delivered **was not** generated in or adjacent to the DOGRM regulatory district where the injection well is located.

These records must be readily available to DOGRM staff on request (within 48 hours) and be maintained and reconciled pursuant to the quarterly schedule under Item 5 listed above.

Questions concerning this Interim Guideline should be directed to Tom Tomastik at 614-265-1032.

DISPOSAL FEE
(ORC 1509.221(B)(1)-(4))

Ohio Department of Natural Resources
Division of Oil and Gas Resources Management
2045 Morse Road, Bldg. H-3, Columbus, OH 43229-6693

COMPANY NAME: _____

SALTWATER INJECTION WELL(API #): _____

LEASE NAME: _____ SWIW #(s) _____

VOLUME OF OUT-OF-DISTRICT SUBSTANCE DELIVERED BBL

VOLUME OF IN-DISTRICT SUBSTANCE DELIVERED BBL

FEE*

Out-of-District Substances BBL At \$.20/bbl =

In-District Substances BBL At \$.05/bbl =

Less Retained by Injection Owner (up to 3% of amount collected)

Total Fee Remitted to the Division ***

Delivery Quarter (Check Appropriate Box)

- | | | |
|---|---|--------------------------|
| 1 | (January 1 - March 31) (Fee due at DOGRM May 2nd) | <input type="checkbox"/> |
| 2 | (April 1 - June 30) (Fee due at DOGRM August 1st) | <input type="checkbox"/> |
| 3 | (July 1 - September 30) (Fee due at DOGRM November 1st) | <input type="checkbox"/> |
| 4 | (October 1 - December 31) (Fee due at DOGRM January 31st) | <input type="checkbox"/> |

SIGNATURE _____ DATE _____

* Note, the fee remittance to the Division is **first** calculated on the **Out of District** Substances delivered and the maximum number of barrels of substance delivered per saltwater injection well on which a fee may be levied under division (B) of 1509.221 is 500,000 bbl.

** The Owner of an injection well who collects the fee may retain up to 3% of the amount collected.

*** Checks are to be made out to the Ohio Department of Natural Resources, Division of Oil and Gas Resources Management and forwarded to the address at the top of the form referencing "Disposal Fee". Include a copy of the completed form with the check.

One form must be used for each injection well owned.

Saltwater Injection / Enhanced Recovery Injection
Well Line Test Form

COMPANY _____ COUNTY _____
PERMIT NUMBER _____ TOWNSHIP _____
LEASE NAME _____ SWIW _____ ERP _____
DATE OF LAST INPECTION _____ SMP _____ OTHER _____
COMPANY REPRESENTATIVE PRESENT _____ PROJECT # _____
PRESSURE TEST ON FOLLOWING LINE(S) _____ DATE _____
INJECTION LINE _____ OTHER _____
TYPE _____ SIZE _____ WEIGHT _____ GRADE _____
LINE(S) BURIED: YES NO REMARKS _____
PROJECT MAXIMUM AUTHORIZED INJECTION PRESSURE _____ psi.
LINE(S) TESTED AT _____ psi. _____ psi. AFTER _____ MINUTES
_____ psi. AFTER _____ MINUTES
LINE(S) PASSED: YES NO REMEDY _____
INSPECTOR(S) SIGNATURE _____

ANNUAL REPORT

SALTWATER INJECTION WELLS - ENHANCED RECOVERY PROJECT
 OHIO DEPARTMENT OF NATURAL RESOURCES, DIVISION OF MINERAL RESOURCES MANAGEMENT
 2045 MORSE ROAD, BLDG. H-3, COLUMBUS, OHIO 43229-6693
 (614) 265-1032

THIS REPORT MUST BE SUBMITTED FOR EACH INJECTION/INPUT WELL NO LATER THAN 45 DAYS AFTER THE LAST DAY OF EACH CALENDAR YEAR.

OWNER #	FORM 204: Rev. 8/2000			
1. OWNER NAME, ADDRESS AND TELEPHONE #	4. SWIW OR ERP NUMBER:			
	5. COUNTY:			
	6. CIVIL TOWNSHIP:			
2. API NUMBER: 34 ___ 2 ___ **14				
3. LEASE NAME:				
7. TYPE OF REPORT:				
SALTWATER INJECTION WELL (SWIW) <input type="checkbox"/> <input type="checkbox"/> OTHER (SPECIFY): _____ ENHANCED RECOVERY PROJECT (ERP) <input type="checkbox"/> _____				
8. TYPE OF REPORT:				
<input type="checkbox"/> FRESHWATER <input type="checkbox"/> SALTWATER <input type="checkbox"/> GAS-SPECIFY <input type="checkbox"/> OTHER:				
9. CALENDAR YEAR REPORTING FOR:				
10. INJECTION PRESSURE (PSI) AND VOLUMES (BBL or MCF):				
MONTH	DAYS IN OPERATION FOR FOR THE MONTH	TOTAL VOLUME INJECTED	MAXIMUM INJECTION PRESSURE	AVERAGE DAILY INJECTION PRESSURE
JANUARY				
FEBRUARY				
MARCH				
APRIL				
MAY				
JUNE				
JULY				
AUGUST				
SEPTEMBER				
OCTOBER				
NOVEMBER				
DECEMBER				

Mechanical Integrity Test Report

Casing or Annulus Pressure Test

State Inspector: _____ Date: ____ / ____ / ____ Start Time: _____ am/pm
 Owner Representative(s): _____
 Others Presents: _____

General Well Data and Previous MIT information				
API Well No.:	Location:	Sec.	Township	Range
Owner Name/Number: _____				
Well Name/Number: _____				
Field name: _____		County: _____		
Date Last MIT: _____	Last Test Result: _____	Type of Test Used: _____	Reason: _____	
Corrective Action Due: _____		Dt CA Complete: _____		
Cause of Failure (Last Test): _____		Type of Failure (Last Test): _____		
Well Status at Last Test: _____	Inj. Rate and Pressure During Last Test: _____ bpd and _____ psig			
Required Minimum Test Pressure: _____ psig				
Pkr Depth: _____ feet GL	Top of Perfs: _____ feet GL			

Casing/Annulus Pressure Test Results			
Time (minutes)	TEST # 1 (psig)	Time (minutes)	TEST #2 (psig)
Result (circle)	PASS/FAIL	Result (circle)	PASS/FAIL
Tubing Pressure		Tubing Pressure	

Current Well Data and Information for Testing	
Type of Test Used: _____	Reason For Test: _____
Cause of Failure (this test): _____	Type of Failure (this test): _____
Well Status During Test: Injection / Shut-in	
Injection Rate During Test: _____ bpd	Injection Pressure During Test: _____ psig
Pkr Depth: _____ feet GL	

Signature of State Inspector/Representative:
Signature of Owner Representative:

See back of page for any additional comments
 Side 1 of 2

Tomastik, Tom

From: Rocky Roberts [rroberts@triadhunter.com]
Sent: Monday, April 16, 2012 4:23 PM
To: Tomastik, Tom
Cc: Kirk Trosclair
Subject: Greenwood Unit #2
Importance: High

Tom,

Per the ODNR's request I am providing you with some additional formation and stimulation information on the Greenwood Unit #2 well located in Newport Township Washington County, Ohio. This well is subject to a permit application with Green Hunter to convert to a salt water disposal well.

The Greenwood Unit #2 well was drilled in January 2007 by Triad Resources. The total depth of the wells was 7,451 (driller's depth), 7452' (loggers depth). The deepest formation penetrated was the Queenston Shale which the top of the Queenston was encountered at a depth of 7,360'. Production casing, 4 1/2", N-80 11.6 ppf, was run to a depth of 7,422.65' and cemented with 200 sacks of 35/65 blend cement and 100 sacks of Premium NE blend cement. BJ Services pumped the cement blends. During the cement job circulation was maintained throughout the cement job with the plug landing at 12:30 P.M. on January 27, 2007. The Medina Sand was selected as the reservoir to be perforated and fractured. The Medina was encountered between the depths of 7,331' - 7,360' for a total thickness of 29 feet. The Medina exhibit good porosity development in the top 23 feet. The average porosity in this interval was 10 percent. The bottom 6 feet of the Medina had excellent porosity, over 25 percent. Since this well bore had been dusted a good gas show was encountered at 7,350'. On the open hole log the temperature differential was 12 degrees. The Medina was perforated between 7,345' - 7,353' (depth between cased hole and open hole were different, these depths are tied back to the open hole log) with a total of 32 shots using hollow steel carriers. The Medina was fractured on February 9, 2007 with 10,200 barrels of fresh water and 100,00 pounds of 30/50 sand. The well was broke down at 2,200 psig with an average treating pressure of 4,200 psig and average rate of 48 barrels per minute. The I.S.I.P. was 2,100 psig and the 5 minute S.I.P was 2,100 psig. The well was opened to flow-back and in 8 hours the well flowed 5,600 barrels. The well was then shut in and had 1700 psig. After being shut in for 4 days the well had 1,800 psig at this time the well was opened to flow. The flowing pressure dropped throughout the day to 500 psig and recovered an additional 2,000 barrels of water. Overall the well flowed approximately 9,000 barrels of water after the fracture treatment. Finally the well was placed in production on March 6, 2007 with 2,750 psig casing pressure at a gas volume rate of 225 mcfpd. The Greenwood Unit #2 well produced sporadically with production water always being an issue. The Medina exhibited good reservoir qualities although being down-dip to known producing Medina fields such as the Sharon Consolidated Fields further to the west in Washington and Noble Counties may attribute to the reason for the reservoir producing salt water.

Rocky Roberts
 SR VP of Appalachian Operations
 Triad Hunter, LLC
 740-374-2940 ext 113

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4/17/2012

Geologic Review for Class II Wells

Application No. aPATT020239

SWIW: (Salt Water Injection Well)

Proposed Well Depth: 7,452 feet

Proposed Injection Zone: Medina

Washington County, Newport Twp.

Study area investigated ~ 15 mile radius centered on the proposed well location for all maps except the gravity and magnetic maps, which used 30 mile radius.

Gravity Bouguer Anomaly

- Nothing of note.

Gravity Free Air

- Nothing of note.

Magnetic First Derivative

- There is a northeast-southwest trend located about 8 miles to the northwest of the permit application.

Magnetic Second Derivative

- There is a northeast-southwest trend located about 8 miles to the northwest of the permit application.

Magnetic Reduce Dipole

- There is a northeast-southwest trend located about 8 miles to the northwest of the permit application.

Precambrian Structure from PG-23

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles from the permit application.
- An unnamed east-west trending fault that terminates against the Cambridge CSSD is approximately 6 miles from the permit application.
- An unnamed north-south trending fault that is a northern extension of the Burning Springs feature is present approximately 1/2 mile east of the permit application.
- A northeast-southwest trending fault (western bounding fault of the Rome Trough) underlies the permit application.

Knox Structure

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles from the permit application.
- An unnamed east-west trending fault that terminates against the Cambridge CSSD approximately 6 miles from the permit application.
- An unnamed north-south trending fault that is a northern extension of the Burning Springs feature is present approximately 1/2 mile east of the permit application.

Trenton Structure

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles northwest of the permit application.
- An unnamed east-west trending fault that terminates against the Cambridge CSSD approximately 6 miles from the permit application.
- An unnamed north-south trending fault that is a northern extension of the Burning Springs feature is present approximately 1/2 mile east of the permit application.

EGSP Onondaga Structure

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles northwest of the permit application.

MRCSP Onondaga Structure

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles northwest of the permit application.

EGSP Berea Structure

- The northwest-southeast trending Cambridge CSSD is present approximately 13 miles northwest of the permit application.

Mississippian/Pennsylvanian Unconformity Surface

- The Mississippian-Pennsylvanian unconformity surface indicates a structure parallel to the Cambridge CSSD.

Middle Kittanning Coal Structure

- The Middle Kittanning coal structure indicates a structure parallel to the Cambridge CSSD.

Pittsburgh Coal Structure

- The Pittsburgh coal structure indicates a structure parallel to the Cambridge CSSD.

Bedrock Geology

- The top of bedrock for the permit application is the Upper Pennsylvanian Conemaugh group.

Bedrock Topography

- The bedrock topography map indicates a topographic high to the east-northeast adjacent to the permit application.

EGSP Aerial Photo Lineament

- Numerous lineaments generally less than 1 mile in length have been interpreted from aerial photos by Gray and others (1982) over and in the immediate vicinity of the permit application with 2 dominant directions oriented northwest-southeast and northeast-southwest.

EGSP LANDSAT Lineament

- A north-south lineament is present about 1 mile to the north northeast. This lineament map also shows a much larger (approximately 9 miles) northeast-southwest trending lineament approximately 4 miles to the northwest trending northeast-southwest.

Mason Lineament

- A lineament approximately 13 miles to the west-northwest of the permit application coincides with the Cambridge CSSD (Cross-Strike Structural Discontinuity) on the structure maps. Another north-south lineament is present approximately 10 miles away.

Oil and gas fields

- Production in the study area is in the Pennsylvanian, Berea, Devonian Shale, and Clinton. The nearest "Clinton" producing field is approximately 12 miles to the northwest.

Earthquakes

- There have been 4 earthquake epicenters that have occurred within the 30 mile study area, the nearest being about 2 miles and the furthest about 14 miles away. All four of these earthquake epicenters have occurred since 2010. The three closest epicenters are all within 7 miles and were 2.8, 3.0, and 2.6 in magnitude. The most distant fourth epicenter was 3.1 in magnitude.

Injection Wells

- There are 5 SWD (active salt water disposal) wells within the 30 mile study area that are injecting in the "Clinton" sandstone. The nearest injection well is a SWD well approximately 2 miles to the west-northwest of the permit application.

To summarize, this injection well is a concern because of proximity to 2 intersecting fault systems evident on the Precambrian structure within ½ mile of the permit application. A north-south trending unnamed fault system that is an extension of the Burning Springs feature is approximately ½ mile east of the permit application, and the western bounding fault of the Rome Trough underlies the permit application. The north-south trending unnamed fault is also shown on the Knox and Trenton structure maps. Four earthquakes have occurred within the study area since 2010, two of which are within a 3 mile radius. There are currently 5 SWD wells injecting in the "Clinton" sandstone in the study area. The nearest "Clinton" producing field is approximately 12 miles to the northwest. It is uncertain if the

“Clinton” and deeper formations in this area possess sufficient porosity and permeability to accommodate additional injection wells.

Interoffice Memo

To: Thomas Tugand, Deputy Chief, ODNR - DOGRM
From: Michael Baker, Chief, Ohio EPA - DDAGW
Date: February 22, 2012
Re: Class II Permit Reviews

Ohio EPA Division of Drinking and Ground Waters has completed its review of four Class II underground injection well permits:

- Washington Co., Newport Twp., Ohio Oil Gathering, #1 Sawmill Run Disposal Well;
- Athens Co., Troy Twp., K&H Partners, #1 K&H Partners;
- Portage Co., Deerfield Twp., Fortis Energy Partners #1 Washington SWD
- Washington Co. existing permit number: 34-167-2-9618-00-00

Our review of the permits focused on well construction relative to the protection of underground sources of drinking water (USDW). More specifically, our review assessed the placement of surface casing and cement relative to the lowest most USDW and location of the surface facilities relative to public water system source water protection areas and other sensitive hydrogeologic settings.

We saw nothing during our review that should cause delay in approving the permits, however, we do have a couple overarching comments. None of the permits reviewed specify the type of cement being used or the use of centralizers. Ohio EPA would recommend that a class A cement with appropriate additives be specified as well as the use of centralizers when placing cement.

Please call me or Chuck Lowe at 614-644-2752 if you have any questions or need additional information.

aPATT020239

Class II Injection Well Permit Review Package

- Overview
 - Basic Permit Review
 - Bedrock Topography Layer
 - Water Well Layer
 - Underground Coal Mine Layer
 - Surface Water Layer
 - Surface Topography layer
 - Quaternary Geology Layer
 - Oil and gas Layer
 - Groundwater-Source Water Protection Layer
 - Groundwater-Pollution Potential Layer
 - Coal Layer
 - Extended Class II Injection Permit Review
 - Bedrock Topography
 - Bedrock Geology
 - EGSP Aerial Photo Lineament
 - EGSP LANDSAT Lineament
 - Mason Lineament
 - Gravity Bouguer Anomaly
 - Gravity Free Air
 - Magnetic First Derivative
 - Magnetic Second Derivative
 - Magnetic Reduce Dipole
 - Pittsburgh Coal Structure
 - Upper Freeport Coal Structure
 - Middle Kittanning Coal Structure
 - Mississippian/Pennsylvanian Unconformity Surface
 - EGSP Berea Structure
 - EGSP Onondaga Structure
 - Fine Onondaga Structure
 - Trenton Structure
 - Knox Structure
 - Precambrian Structure from PG-23
 - Precambrian Structure
 - Disclaimer
 - References
-

Fault and Lineament Review for Class II Wells

Application No. aPATT020239
SWIW: (Salt Water Injection Well)
Proposed Well Depth: 7,452 feet
Proposed Injection Zone: Medina

Faults and lineaments were reviewed in a 30 mile study area for the permit application. Gravity and magnetic maps were examined in a 60 mile study area for possible deep-seated Precambrian faults. The presence of mapped subsurface faults were examined from published studies and include the following structure maps in ascending stratigraphic order: top of Precambrian, top of Knox unconformity, top of Trenton Limestone, top of Onondaga Limestone, top of Berea Sandstone, Mississippian-Pennsylvanian unconformity, top of Middle Kittanning coal, top of Upper Freeport coal, and top of Pittsburgh coal. Bedrock topography, bedrock geology maps and published studies using surface topography were examined for lineaments that may reflect possible subsurface faulting. Published studies of interpreted surface lineaments also were included that were based on LANDSAT and aerial photos. All active and inactive class II wells and all known earthquake epicenters are shown within the study area on all maps.

The top of bedrock for the permit application is the Upper Pennsylvanian Conemaugh group. The bedrock topography map indicates a topographic high to the east-northeast adjacent to the permit application.

A network of surface lineaments is interpreted within the 30 mile study area. Based on Mason (1999) one of these north-northeast trending lineaments, approximately 10 miles to the west-northwest of the permit application, coincides with the Cambridge CSSD (Cross-Strike Structural Discontinuity) on the structure maps. Numerous lineaments generally less than 1 mile in length have been interpreted from aerial photos by Gray and others (1982) over and in the immediate vicinity of the permit application. There are 2 dominant directions which are oriented northwest-southeast and northeast-southwest. The LANDSAT lineament map of Gray and others (1982) indicates a north-south lineament about 1 mile to the north northeast. This lineament map also shows a much larger (approximately 9 miles) northeast-southwest trending lineament approximately 4 miles to the northwest trending northeast-southwest.

The gravity Bouguer Anomaly and Free Air maps do not show any major trends in this region. However the magnetic maps do show some regional trends, the most dominant of which is a northeast-southwest trend located about 8 miles to the northwest of the permit application. This trend can be seen on the first derivative, second derivative, and reduce dipole maps. There are also two parallel north-south trends on the first derivative and the reduce dipole maps that are outside of the mapped area. These two trends are parallel with an unnamed fault which is an extension of the Burning Springs Anticline.

The Precambrian structure map indicates the following fault systems in the study area: the northwest-southeast trending Cambridge CSSD, an unnamed east-west trending fault that terminates against the Cambridge CSSD, an unnamed north-south trending fault that is a northern extension of the Burning Springs feature, and a northeast-southwest trending fault that is thought to be the western bounding fault of the Rome Trough. Approximately ½ mile northeast of the application well, the unnamed north-south fault

intersects the bounding fault of the Rome Trough. The unnamed north-south fault is also recognized on structure maps on the top of Knox unconformity and top of Trenton. The Mississippian-Pennsylvanian unconformity surface, the Pittsburgh Coal, and the Middle Kittanning coal structure indicate a structure parallel to the Cambridge CSSD.

Based on the RBDMS database, there are 5 SWD (active salt water disposal) wells within the 30 mile study area that are injecting in the "Clinton" sandstone. The nearest injection well is a SWD well approximately 2 miles to the west northwest of the permit application. There have been 4 earthquake epicenters that have occurred within the 30 mile study area, the nearest being about 2 miles and the furthest about 14 miles away. All four of these earthquake epicenters have occurred since 2010. The three closest epicenters are all within 7 miles and were 2.8, 3.0, and 2.6 in magnitude. The most distant fourth epicenter was 3.1 in magnitude.

To summarize, there are 2 intersecting fault systems evident on the Precambrian structure within ½ mile of the permit application. The north-south trending unnamed fault is also shown on the Knox and Trenton structure maps. Four earthquakes have occurred within the study area since 2010, three of which are within a 7 mile radius. There are currently 5 SWD wells injecting in the "Clinton" sandstone. The oil and gas fields map indicates the nearest "Clinton" producing field is approximately 12 miles to the northwest.

Disclaimer

The products of the Ohio Department of Natural Resources, Division of Geological Survey, both digital maps and printed maps and any other associated documents are intended to provide general geologic information only and should not be used for any other purpose. It is not intended for resale or to replace site-specific investigations. These data were compiled by the Ohio Division of Geological Survey, which reserves the publication rights to this material. If these data are used in the compilation of other data sets or maps for distribution or publication, this source must be referenced.

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- Ohio Division of Geological Survey, 2003, Structure map of the Mississippian-Pennsylvanian unconformity, unpublished digital (GIS) map.
- Ohio Division of Geological Survey, 2003, Structure map of the Pittsburgh coal, unpublished digital (GIS) map.