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west virginia department of environmental protection

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Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Wednesday, March 4, 2020  
WELL WORK PLUGGING PERMIT  
Horizontal 6A Plugging

CNX GAS COMPANY LLC  
1000 CONSOL ENERGY DR

CANONSBURG, PA 15370

Re: Permit approval for SHR38IHSM  
47-095-02648-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Upon completion of the plugging well work, the above named operator will reclaim the site according to the provisions of WV Code 22-6-30. Please be advised that form WR-38, Affidavit of Plugging and Filling Well, is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

Operator's Well Number: SHR38IHSM  
Farm Name: JAMES E. ASH ET AL  
U.S. WELL NUMBER: 47-095-02648-00-00  
Horizontal 6A Plugging  
Date Issued: 3/4/2020

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## PERMIT CONDITIONS

West Virginia Code § 22-6-11 allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

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### CONDITIONS

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1. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
2. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
3. Well work activities shall not constitute a hazard to the safety of persons.

1) Date 1/13, 2020  
2) Operator's Well No. SHR38IHSM  
3) API Well No. 47-095 - 02648-00 P

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

APPLICATION FOR A PERMIT TO PLUG AND ABANDON

4) Well Type: Oil \_\_\_ / Gas X / Liquid injection \_\_\_ / Waste disposal \_\_\_ /  
(If "Gas, Production X or Underground storage \_\_\_) Deep \_\_\_ / Shallow X

5) Location: Elevation 1011 Watershed Middle Island Creek  
District Centerville County Tyler Quadrangle West Union

6) Well Operator CNX Gas Company LLC 7) Designated Agent Anthony Kendziora  
Address 1000 Consol Energy Dr. Address 1000 Consol Energy Dr  
Canonsburg, PA 15317 Canonsburg PA 15317

8) Oil and Gas Inspector to be notified Name Cragin Blevins  
Address 1407 19th St.  
Vienna, WV 26105  
9) Plugging Contractor Name Halliburton  
Address 1000 Noble Energy Drive suite 400  
Canonsburg, PA 15317

10) Work Order: The work order for the manner of plugging this well is as follows:  
See attached PLUGGED WITH A VERBAL APPROVAL.

WELL WAS PLUGGED WITH CLASS A CEMENT  
FROM 6175' TO 32.5'  
ABANDONED WELL BEFORE STARTING DIRECTIONAL WORK.

SEE SCHEMATIC

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Notification must be given to the district oil and gas inspector 24 hours before permitted work can commence.

Work order approved by inspector J Cragin Blevins Date 1/10/2020

**McLaughlin, Jeffrey W**

**From:** Schilling, John <JohnSchilling@cnx.com>  
**Sent:** Tuesday, March 3, 2020 3:33 PM  
**To:** Samuel Yates; McLaughlin, Jeffrey W  
**Cc:** Zofchak, Gregory M.  
**Subject:** RE: CNX SHR 381 HSM Plugging to Abandon  
**Attachments:** CNX SHR 381 HSM Plugs to Abandon - PJR.pdf

Jeff,

I've attached the PJR from the P&A job here. Below is a screen grab showing the schematic we currently have on that well. Let n

MD (ftKE)	Incl (°)	TYD (ftKE)	
-554.5	0.3	-554.5	<p>Horizontal, Original Hole,</p> <p>Des: Plug and Abandon; Depth MD:32.5-1,550.0 ftKE; Date:1/9/2020</p> <p>Des: Surface Casing Cement; Depth MD:34.1-629.0 ftKE; Date:1/1/2020</p> <p>Des: Intermediate Casing Cement; Depth MD:29.0-2,627.0 ftKE; Date:1/9/2020</p> <p>Des: Plug and Abandon; Depth MD:1,550.0-2,475.0 ftKE; Date:1/9/2020</p> <p>Des: Plug and Abandon; Depth MD:2,475.0-3,400.0 ftKE; Date:1/9/2020</p> <p>Des: Plug and Abandon; Depth MD:3,400.0-4,325.0 ftKE; Date:1/9/2020</p> <p>Des: Plug and Abandon; Depth MD:4,325.0-5,250.0 ftKE; Date:1/9/2020</p> <p>Des: Plug and Abandon; Depth MD:5,250.0-6,175.0 ftKE; Date:1/9/2020</p> <p>Des: Cement Squeeze; Depth MD:5,192.0-5,897.0 ftKE; Date:1/7/2020</p>
-521.0	0.3	-521.0	
-3.3	0.3	-3.3	
0.0	0.3	0.0	
28.9	0.3	28.9	
32.5	0.3	32.5	
34.1	0.3	34.1	
36.7	0.3	36.7	
40.4	0.3	40.4	
45.3	0.3	45.3	
616.1	0.4	616.1	
617.8	0.4	617.8	
628.0	0.4	627.9	
628.9	0.4	628.9	
629.6	0.4	629.6	
1,549.9	11.5	1,540.9	
2,475.1	11.8	2,445.7	
2,613.8	9.2	2,582.2	
2,615.8	9.2	2,584.2	
2,625.0	9.1	2,593.2	
2,627.0	9.1	2,595.2	
3,399.9	26.4	3,334.6	
4,325.1	26.5	4,162.2	
5,191.9	29.8	4,933.3	
5,250.0	30.1	4,983.6	
5,657.8	27.0	5,340.6	
5,669.3	27.0	5,350.9	
5,890.4	25.5	5,549.7	
5,897.0	25.5	5,555.6	
5,901.2	25.5	5,559.5	
6,174.9	28.1	5,804.9	

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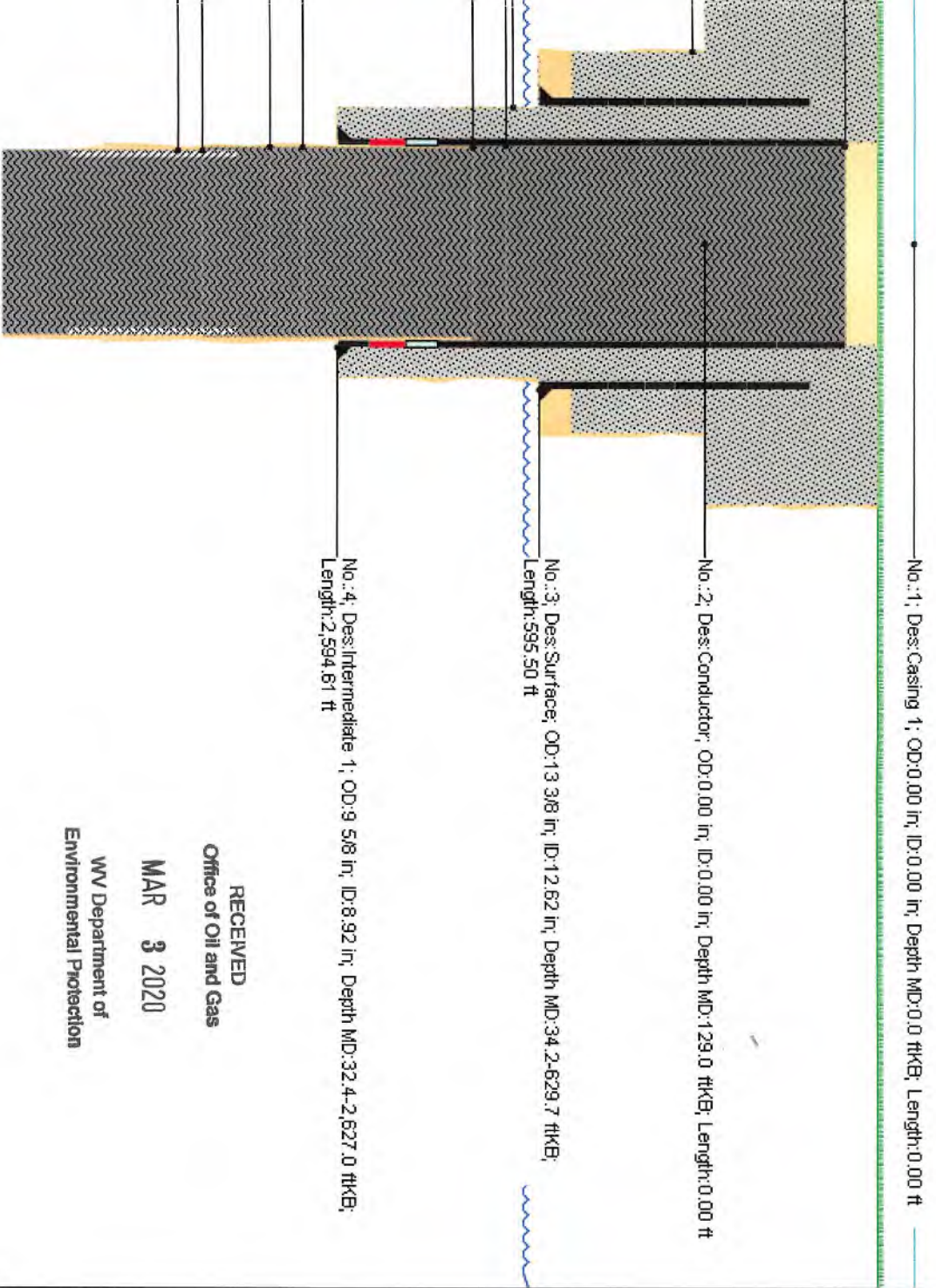
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we know exactly what it is we lack, and I'll work to make sure it's submitted.

3/3/2020 3:30:40 PM

Vertical schematic (actual)



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CNX



<b>Borehole:</b> Original Borehole	<b>Well:</b> SHR-381-HSM	<b>Field:</b> WV Tyler County (NAD 27)	<b>Structure:</b> Patterson 563
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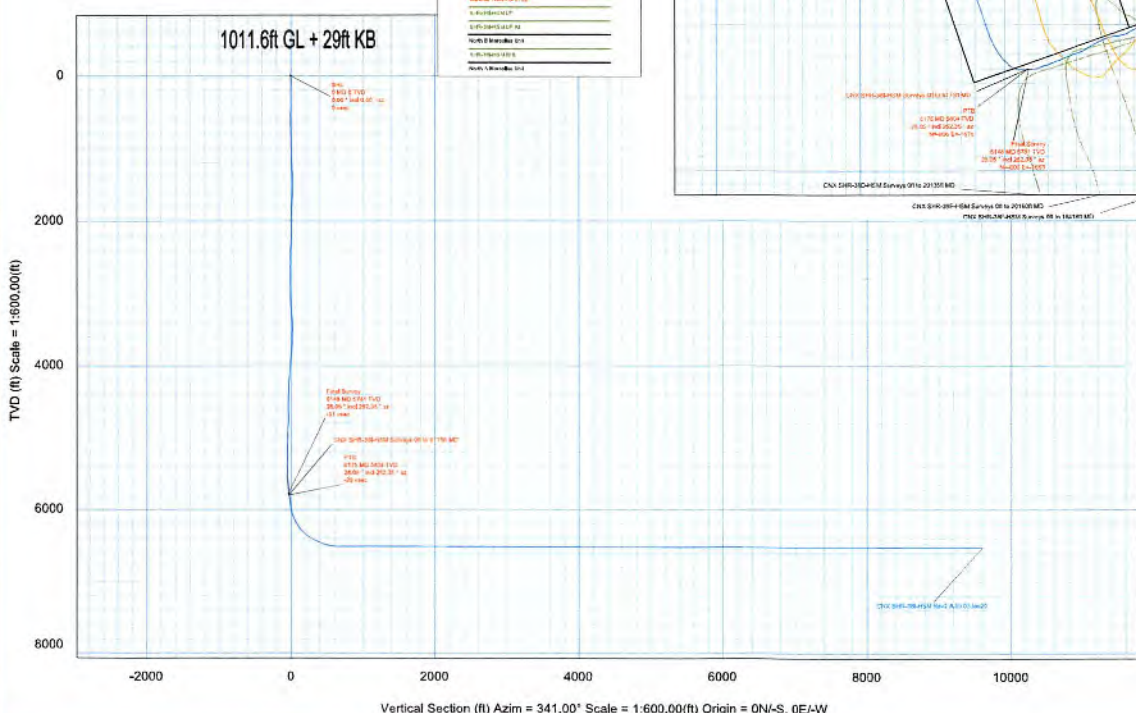
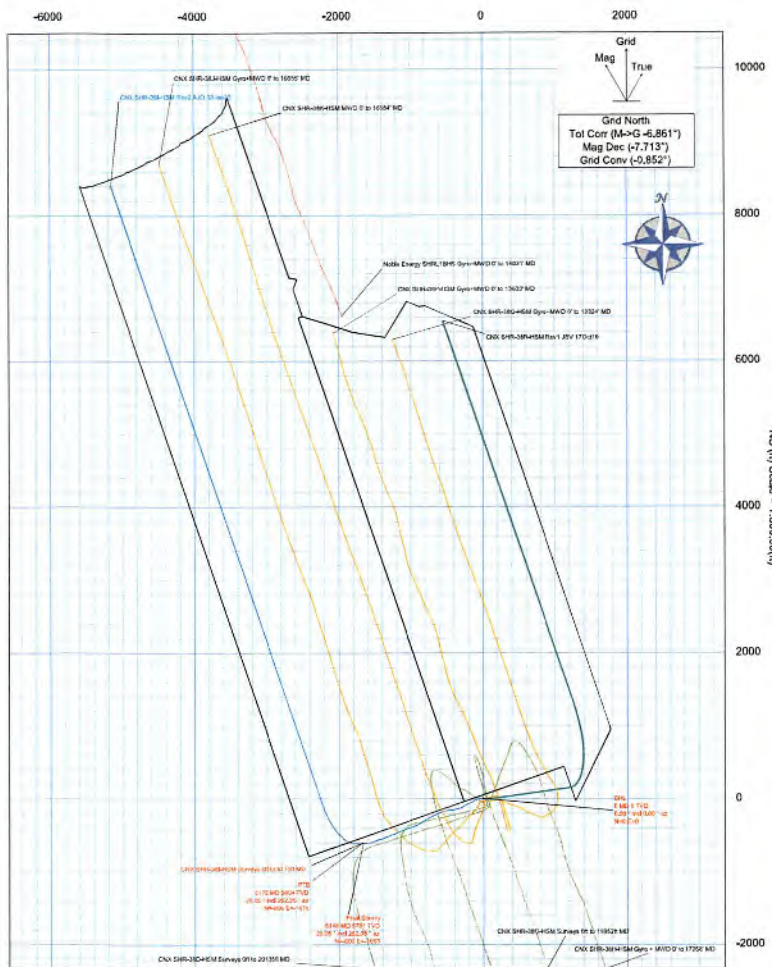
<b>Gravity &amp; Magnetic Parameters</b>		<b>Surface Location</b>			<b>Miscellaneous</b>		
Model: HDGM 2019	Dip: 66.337°	Date: 05-Jan-2020	Lat: N 39 22 17.86	Northing: 320271.481US	Grid Conv: -0.8518°	Slot: SHR-381-HSM	TVD Ref: RKB(1040.0ft above MSL)
MagDec: -7.713°	FS: 51766.959mT	Gravity FS: 986.321mgN (9.80665 Based)	Lon: W 80 50 8.67	Easting: 1622436.88US	Scale Fact: 0.99995054	Plan: CNX SHR-381-HSM Surveys 0ft to 6175ft MD	

EW (ft) Scale = 1:600.00(F)

Well	MD	RCL	ADN	TVD	VNEC	HO-9th	Ev-9th	DLB
SHR-381-HSM	5.30	5.00	5.07	5.06	5.01	5.00	5.01	
Final Survey	518.29	28.91	282.31	878.92	-37.42	-491.39	-1663.11	2.04
TVD	6175.00	28.91	282.31	8904.42	-29.99	-497.58	-1675.70	6.00

PNR	Seq	Survey Tool	Vendor/Tool	Well Size (in)	MD (ft)	Expected MD (ft)	MD From (ft)	MD To (ft)	Survey Frequency (ft)	EQD Size (Inch Min)	EQD Size (Inch Max)	Comments/Contingency
1	1	NAI_NGG-HSHOT-CWB-DH		30	30	0	29	168.405	1.25	1.25		
1	2	NAI_NGG-HSHOT-CWB-DH		30	30	29	29	Act Str	1.25	1.25		
1	3	NAI_NGG-HSHOT-CWB-DH		30	30	71	8.00	Act Str	1.25	1.25		
1	4	NAI_NGG-HSHOT-CWB-DH		30	30	806	6.75	Act Str	5.5/1.1	10.750		

Target Description		Grid Coord		Local Coord		
Target Name	Depth	Latitude	Longitude	Northing	Easting	
Address Tool - SHR-381	PLM-N	N 39 22 15.26	W 80 50 44.73	320070.70	161920.13	1390.00
North B Marcellus Unit	PLM-N	N 39 22 15.26	W 80 50 6.07	320271.40	1622436.80	1940.00
North A Marcellus Unit	PLM-N	N 39 22 15.26	W 80 50 6.07	320271.40	1622436.80	1940.00
SHR-381-HSM-1P-AB	PLM-N	N 39 22 14.70	W 80 50 36.49	320189.60	1622035.00	992.00
SHR-381-HSM-1P-AB	PLM-N	N 39 22 15.11	W 80 50 36.49	320189.60	1622035.00	992.00
SHR-381-HSM-2IL	PLM-N	N 39 22 16.70	W 80 51 16.04	320611.24	1617366.12	6490.00



<b>CONTROLLED</b>	
Drawn by	B. Eason
Checked by	
Date	2/10/2020
Drawn by	
Checked by	



# HALLIBURTON

**CNX GAS COMPANY LLC-EBUS**  
1000 CONSOLE ENERGY DR  
CANONSBURG, PA, 15317  
US

SHR381HSM IHSM

TYLER County, WV, US  
API/UWI 47-095-02648-00

Rig: PATTERSON 563

## Plugs to Abandon

Proposal 357824 - Version 1.0  
January 08, 2020

**Prepared for:**  
John Schilling

Submitted by:  
Samuel Yates - 724-717-3713  
1000 Noble Energy Drive, Suite 400  
Canonsburg, PA - 15317  
USA

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**HALLIBURTON**



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*Halliburton appreciates the opportunity to present this cost estimate and looks forward to being of service to you.*

## 1 Foreword

Enclosed is our recommended procedure for cementing the casing strings in the referenced well. This proposal is being submitted by the Halliburton Cementing product service line of Halliburton Energy Services, Inc. The information in this proposal includes well data, calculations, materials requirements, and cost estimates. This proposal is based on information from our field personnel and previous cementing services in the area.

**The selection and use of non-Halliburton plugs and casing attachments often compromises the holistic approach and may jeopardize the overall objective for effective zonal isolation. Furthermore, Halliburton is not involved in the design, manufacture or use of plugs and casing attachments supplied by other manufacturers and assumes no liability for their installation and operation. For this reason we recommend Halliburton plugs and casing attachments be used when Halliburton performs any zonal isolation operation.**

Cement job pump rates will be executed in accordance with Halliburton best practices unless specifically designed otherwise. Deviation from or fluctuations of planned pump rates may be necessary for the successful completion of services.

**Halliburton strongly recommends an additional 10 feet of rat hole beyond the calculated amount of pipe stretch to ensure adequate capacity for elongation while pumping and displacing cement.**

Halliburton recognizes the importance of meeting society's needs for health, safety, and protection of the environment. It is our intention to proactively work with employees, customers, the public, governments, and others to use natural resources in an environmentally sound manner while protecting the health, safety, and environmental processes while supplying high quality products and services to our customers.

We appreciate the opportunity to present this proposal for your consideration and we look forward to being of service to you. Our services for your well will be coordinated through the Service Center listed below. If you require additional information or designs, please feel free to contact myself or our Service Coordinators listed below.

Prepared by: \_\_\_\_\_  
Brenda Jankowski  
Proposals Specialist

Submitted by: \_\_\_\_\_  
Sam Yates  
Account Representative

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## 2 Service Center Contacts

SERVICE CENTER: Zanesville, OH  
Dedicated Customer Line: 888-223-4255

**"In the event a material change in the scope of work or services is requested by Company and, as a result of such change, Contractor's costs hereunder are increased or Contractor's margins are diminished, the rates set forth herein for the work or services shall be increased in order to fully compensate Contractor for such costs."**

### 3 Plugs to Abandon

#### 3.1 Job Information Plugs to Abandon

Job Criticality Status: GREEN

Well Name: SHR381HSM

Well #: IHSM

9-5/8" Intermediate Casing	0 - 2,675 ft (MD)
Outer Diameter	9.625 in
Inner Diameter	8.921 in
Linear Weight	36 lbm/ft
Casing Grade	J-55
Thread Type	LTC
8-3/4" Open Hole	2,675 - 5,887 ft (MD)
Inner Diameter	8.75 in
Excess Factor	10 %
8-1/2" Open Hole	5,887 - 6,175 ft (MD)
Inner Diameter	8.5 in
Excess Factor	10 %
5-1/2" Drill Pipe	0 - 5,175 ft (MD)
Outer Diameter	5.5 in
Inner Diameter	4.778 in
Linear Weight	21.9 lbm/ft
Casing Grade	S-135
2-7/8" Tubing	5,175 - 6,175 ft (MD) - 5,825 ft (TVD)
Outer Diameter	2.875 in
Inner Diameter	2.441 in
Linear Weight	6.5 lbm/ft
Cement Plug	6,175 ft (MD)
Cement Plug	5,275 ft (MD)
Cement Plug	4,375 ft (MD)
Cement Plug	3,475 ft (MD)
Cement Plug	2,575 ft (MD)
Cement Plug	1,675 ft (MD)
Cement Plug	775 ft (MD)

Mud Type  
Mud Weight

Oil Based  
12.8 lbm/gal

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### 3.2 Estimated Calculations Plugs to Abandon

#### Stage 1

**Drill Pipe: In:**

SPACER: (4,584 ft fill)  
1,909 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 562.04 ft<sup>3</sup>  
2,675 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 719.78 ft<sup>3</sup>  
Spacer - OBM = 1,281.82 ft<sup>3</sup>  
= 228.3 bbl

SPACER: (666 ft fill)  
75 ft \* (0.3725 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 30.92 ft<sup>3</sup>  
591 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 173.84 ft<sup>3</sup>  
Rheologically Enhanced Spacer = 204.76 ft<sup>3</sup>  
= 36.5 bbl

CEMENT: (925 ft fill)  
288 ft \* (0.349 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.3941 \* 10 %) = 121.21 ft<sup>3</sup>  
637 ft \* (0.3725 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4176 \* 10 %) = 284.74 ft<sup>3</sup>  
Plug Cement = 405.95 ft<sup>3</sup>  
= 72.3 bbl

SPACER: (666 ft fill)  
75 ft \* 0.0325 ft<sup>3</sup>/ft = 2.43 ft<sup>3</sup>  
591 ft \* 0.1245 ft<sup>3</sup>/ft = 73.54 ft<sup>3</sup>  
Displacement Fluid = 75.97 ft<sup>3</sup>  
= 13.5 bbl

SPACER: (4,584 ft fill)  
1,909 ft \* 0.1245 ft<sup>3</sup>/ft = 237.75 ft<sup>3</sup>  
2,675 ft \* 0.1245 ft<sup>3</sup>/ft = 333.08 ft<sup>3</sup>  
Displacement Fluid = 570.83 ft<sup>3</sup>  
= 101.7 bbl

CEMENT: (925 ft fill)  
288 ft \* 0.0325 ft<sup>3</sup>/ft = 9.36 ft<sup>3</sup>  
637 ft \* 0.0325 ft<sup>3</sup>/ft = 20.71 ft<sup>3</sup>  
Plug Cement = 30.07 ft<sup>3</sup>  
= 72.3 bbl

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Stage 2

Drill Pipe: In:

SPACER: (3,684 ft fill)  
1,009 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 297.12 ft<sup>3</sup>  
2,675 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 719.78 ft<sup>3</sup>  
Spacer - OBM = 1,016.9 ft<sup>3</sup>  
= 181.1 bbl

SPACER: (666 ft fill)  
75 ft \* (0.3725 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 30.92 ft<sup>3</sup>  
591 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 173.84 ft<sup>3</sup>  
Rheologically Enhanced Spacer = 204.76 ft<sup>3</sup>  
= 36.5 bbl

CEMENT: (925 ft fill)  
925 ft \* (0.3725 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4176 \* 10 %) = 413.41 ft<sup>3</sup>  
Plug Cement = 413.41 ft<sup>3</sup>  
= 73.6 bbl

SPACER: (666 ft fill)  
75 ft \* 0.0325 ft<sup>3</sup>/ft = 2.43 ft<sup>3</sup>  
591 ft \* 0.1245 ft<sup>3</sup>/ft = 73.54 ft<sup>3</sup>  
Displacement Fluid = 75.97 ft<sup>3</sup>  
= 13.5 bbl

SPACER: (3,684 ft fill)  
1,009 ft \* 0.1245 ft<sup>3</sup>/ft = 125.69 ft<sup>3</sup>  
2,675 ft \* 0.1245 ft<sup>3</sup>/ft = 333.08 ft<sup>3</sup>  
Displacement Fluid = 458.77 ft<sup>3</sup>  
= 81.7 bbl

CEMENT: (925 ft fill)  
925 ft \* 0.0325 ft<sup>3</sup>/ft = 30.07 ft<sup>3</sup>  
Plug Cement = 30.07 ft<sup>3</sup>  
= 73.6 bbl

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Stage 3

**Drill Pipe: In:**

SPACER: (2,784 ft fill)

109 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 32.21 ft<sup>3</sup>  
2,675 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 719.78 ft<sup>3</sup>  
Spacer - OBM = 751.99 ft<sup>3</sup>  
= 133.9 bbl

SPACER: (666 ft fill)

75 ft \* (0.3725 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 30.92 ft<sup>3</sup>  
591 ft \* (0.2526 ft<sup>3</sup>/ft + 0.4176 ft<sup>3</sup>/ft \* 10 %) = 173.84 ft<sup>3</sup>  
Rheologically Enhanced Spacer = 204.76 ft<sup>3</sup>  
= 36.5 bbl

CEMENT: (925 ft fill)

925 ft \* (0.3725 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4176 \* 10 %) = 413.41 ft<sup>3</sup>  
Plug Cement = 413.41 ft<sup>3</sup>  
= 73.6 bbl

SPACER: (666 ft fill)

75 ft \* 0.0325 ft<sup>3</sup>/ft = 2.43 ft<sup>3</sup>  
591 ft \* 0.1245 ft<sup>3</sup>/ft = 73.54 ft<sup>3</sup>  
Displacement Fluid = 75.97 ft<sup>3</sup>  
= 13.5 bbl

SPACER: (2,784 ft fill)

109 ft \* 0.1245 ft<sup>3</sup>/ft = 13.62 ft<sup>3</sup>  
2,675 ft \* 0.1245 ft<sup>3</sup>/ft = 333.08 ft<sup>3</sup>  
Displacement Fluid = 346.7 ft<sup>3</sup>  
= 61.7 bbl

CEMENT: (925 ft fill)

925 ft \* 0.0325 ft<sup>3</sup>/ft = 30.07 ft<sup>3</sup>  
Plug Cement = 30.07 ft<sup>3</sup>  
= 73.6 bbl

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Stage 4

**Drill Pipe: In:**

SPACER: (1,840 ft fill)

1,840 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 495.12 ft<sup>3</sup>  
Spacer - OBM = 495.12 ft<sup>3</sup>  
= 88.2 bbl

SPACER: (708 ft fill)

73 ft \* (0.389 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 28.45 ft<sup>3</sup>  
635 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 170.85 ft<sup>3</sup>  
Rheologically Enhanced Spacer = 199.3 ft<sup>3</sup>  
= 35.5 bbl

CEMENT: (927 ft fill)

800 ft \* (0.3725 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4176 \* 10 %) = 357.41 ft<sup>3</sup>  
127 ft \* (0.389 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4341 \* 0 %) = 53.47 ft<sup>3</sup>  
Plug Cement = 410.88 ft<sup>3</sup>  
= 73.2 bbl

SPACER: (708 ft fill)

73 ft \* 0.0325 ft<sup>3</sup>/ft = 2.38 ft<sup>3</sup>  
635 ft \* 0.1245 ft<sup>3</sup>/ft = 79.06 ft<sup>3</sup>  
Displacement Fluid = 81.44 ft<sup>3</sup>  
= 14.5 bbl

SPACER: (1,840 ft fill)

1,840 ft \* 0.1245 ft<sup>3</sup>/ft = 229.11 ft<sup>3</sup>  
Displacement Fluid = 229.11 ft<sup>3</sup>  
= 40.8 bbl

CEMENT: (927 ft fill)

800 ft \* 0.0325 ft<sup>3</sup>/ft = 26 ft<sup>3</sup>  
127 ft \* 0.0325 ft<sup>3</sup>/ft = 4.12 ft<sup>3</sup>  
Plug Cement = 30.12 ft<sup>3</sup>  
= 73.2 bbl

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Stage 5

**Drill Pipe: In:**

SPACER: (940 ft fill)

940 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 252.95 ft<sup>3</sup>  
Spacer - OBM = 252.95 ft<sup>3</sup>  
= 45.1 bbl

SPACER: (708 ft fill)

73 ft \* (0.389 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 28.45 ft<sup>3</sup>  
635 ft \* (0.2691 ft<sup>3</sup>/ft + 0.4341 ft<sup>3</sup>/ft \* 0 %) = 170.85 ft<sup>3</sup>  
Rheologically Enhanced Spacer = 199.3 ft<sup>3</sup>  
= 35.5 bbl

CEMENT: (927 ft fill)

927 ft \* (0.389 ft<sup>3</sup>/ft + 0.0325 ft<sup>3</sup>/ft + 0.4341 \* 0 %) = 390.66 ft<sup>3</sup>  
Plug Cement = 390.66 ft<sup>3</sup>  
= 69.6 bbl

SPACER: (708 ft fill)

73 ft \* 0.0325 ft<sup>3</sup>/ft = 2.38 ft<sup>3</sup>  
635 ft \* 0.1245 ft<sup>3</sup>/ft = 79.06 ft<sup>3</sup>  
Displacement Fluid = 81.44 ft<sup>3</sup>  
= 14.5 bbl

SPACER: (940 ft fill)

940 ft \* 0.1245 ft<sup>3</sup>/ft = 117.05 ft<sup>3</sup>  
Displacement Fluid = 117.05 ft<sup>3</sup>  
= 20.8 bbl

CEMENT: (927 ft fill)

927 ft \* 0.0325 ft<sup>3</sup>/ft = 30.12 ft<sup>3</sup>  
Plug Cement = 30.12 ft<sup>3</sup>  
= 69.6 bbl

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Stage 6

**Drill Pipe: In:**

SPACER: (677 ft fill)

73 ft * (0.389 ft <sup>3</sup> /ft + 0.4341 ft <sup>3</sup> /ft * 0 %)	= 28.45 ft <sup>3</sup>
604 ft * (0.2691 ft <sup>3</sup> /ft + 0.4341 ft <sup>3</sup> /ft * 0 %)	= 162.4 ft <sup>3</sup>
Rheologically Enhanced Spacer	= 190.85 ft <sup>3</sup>
	= 34 bbl

CEMENT: (927 ft fill)

927 ft * (0.389 ft <sup>3</sup> /ft + 0.0325 ft <sup>3</sup> /ft + 0.4341 * 0 %)	= 390.66 ft <sup>3</sup>
Plug Cement	= 390.66 ft <sup>3</sup>
	= 69.6 bbl

SPACER: (677 ft fill)

73 ft * 0.0325 ft <sup>3</sup> /ft	= 2.38 ft <sup>3</sup>
604 ft * 0.1245 ft <sup>3</sup> /ft	= 75.15 ft <sup>3</sup>
Displacement Fluid	= 77.53 ft <sup>3</sup>
	= 13.8 bbl

CEMENT: (927 ft fill)

927 ft * 0.0325 ft <sup>3</sup> /ft	= 30.12 ft <sup>3</sup>
Plug Cement	= 30.12 ft <sup>3</sup>
	= 69.6 bbl

Stage 7

**Drill Pipe: In:**

CEMENT: (775 ft fill)

775 ft * (0.389 ft <sup>3</sup> /ft + 0.0325 ft <sup>3</sup> /ft + 0.4341 * 0 %)	= 326.65 ft <sup>3</sup>
Plug Cement	= 326.65 ft <sup>3</sup>
	= 58.2 bbl

CEMENT: (775 ft fill)

775 ft * 0.0325 ft <sup>3</sup> /ft	= 25.19 ft <sup>3</sup>
Plug Cement	= 25.19 ft <sup>3</sup>
	= 58.2 bbl

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**3.3 Job Volume Estimates Plugs to Abandon**

**Stage 1**

Fluid 1: Oil Based Mud

Oil-Based Mud- Well Fluid at Start

Fluid Density: 12.8 lbm/gal  
Volume Ahead: **228.3 bbl**

Fluid 2: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **36.5 bbl**

Fluid 3: Plug

PLUGCEM (TM) SYSTEM

5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 72.3 bbl**  
Proposed Volume: **72.3 bbl**  
Top Of Fluid: 5,275 ft  
Calculated Fill: 900 ft  
Calculated sack: 328.71 sack  
Proposed sack: 329 sack

Fluid 4: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **13.5 bbl**

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Fluid 5: Oil Based Mud

Oil-Based Mud- Displacement

Fluid Density: 12.8 lbm/gal  
Volume Behind: **101.7 bbl**

Cement Plug

6,175(MD)

**Stage 2**

Fluid 1: Oil Based Mud

Oil-Based Mud- Well Fluid at Start

Fluid Density: 12.8 lbm/gal  
Volume Ahead: **181.1 bbl**

Fluid 2: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **36.5 bbl**

Fluid 3: Plug

PLUGCEM (TM) SYSTEM

5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 73.6 bbl**  
Proposed Volume: **73.6 bbl**  
Top Of Fluid: 4,375 ft  
Calculated Fill: 900 ft  
Calculated sack: 334.74 sack  
Proposed sack: 335 sack

Fluid 4: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **13.5 bbl**

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Fluid 5: Oil Based Mud

Oil-Based Mud- Displacement

Fluid Density: 12.8 lbm/gal  
Volume Behind: **81.7 bbl**

Cement Plug

5,275(MD)

**Stage 3**

Fluid 1: Oil Based Mud

Oil-Based Mud- Well Fluid at Start

Fluid Density: 12.8 lbm/gal  
Volume Ahead: **133.9 bbl**

Fluid 2: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **36.5 bbl**

Fluid 3: Plug

PLUGCEM (TM) SYSTEM

5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 73.6 bbl**  
Proposed Volume: **73.6 bbl**  
Top Of Fluid: 3,475 ft  
Calculated Fill: 900 ft  
Calculated sack: 334.74 sack  
Proposed sack: 335 sack

Fluid 4: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **13.5 bbl**

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Fluid 5: Oil Based Mud

Oil-Based Mud- Displacement

Fluid Density: 12.8 lbm/gal  
Volume Behind: **61.7 bbl**

Cement Plug

4,375(MD)

**Stage 4**

Fluid 1: Oil Based Mud

Oil-Based Mud- Well Fluid at Start

Fluid Density: 12.8 lbm/gal  
Volume Ahead: **88.2 bbl**

Fluid 2: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **35.5 bbl**

Fluid 3: Plug

PLUGCEM (TM) SYSTEM

5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 73.2 bbl**  
Proposed Volume: **73.2 bbl**  
Top Of Fluid: 2,575 ft  
Calculated Fill: 900 ft  
Calculated sack: 332.7 sack  
Proposed sack: 333 sack

Fluid 4: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **14.5 bbl**

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Fluid 5: Oil Based Mud

Oil-Based Mud- Displacement

Fluid Density: 12.8 lbm/gal  
Volume Behind: **40.8 bbl**

Cement Plug

3,475(MD)

**Stage 5**

Fluid 1: Oil Based Mud

Oil-Based Mud- Well Fluid at Start

Fluid Density: 12.8 lbm/gal  
Volume Ahead: **45.1 bbl**

Fluid 2: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **35.5 bbl**

Fluid 3: Plug

PLUGCEM (TM) SYSTEM

5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 69.6 bbl**  
Proposed Volume: **69.6 bbl**  
Top Of Fluid: 1,675 ft  
Calculated Fill: 900 ft  
Calculated sack: 316.32 sack  
Proposed sack: 317 sack

Fluid 4: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base

30.941 gal/bbl FRESH WATER

3 lbm/bbl D-AIR 5000

0.3 gal/bbl D-AIR 3000L

282.477 lbm/bbl Barite 41

0.5 lbm/bbl FE-2

2 lbm/bbl SEM-93P, 35 LB SACK

1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **14.5 bbl**

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Fluid 5: Oil Based Mud

Oil-Based Mud- Displacement

Fluid Density: 12.8 lbm/gal  
Volume Behind: **20.8 bbl**

Cement Plug

2,575(MD)

**Stage 6**

Fluid 1: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base  
30.941 gal/bbl FRESH WATER  
3 lbm/bbl D-AIR 5000  
0.3 gal/bbl D-AIR 3000L  
282.477 lbm/bbl Barite 41  
0.5 lbm/bbl FE-2  
2 lbm/bbl SEM-93P, 35 LB SACK  
1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **34 bbl**

Fluid 2: Plug

PLUGCEM (TM) SYSTEM  
5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 69.6 bbl**  
Proposed Volume: **69.6 bbl**  
Top Of Fluid: 775 ft  
Calculated Fill: 900 ft  
Calculated sack: 316.32 sack  
Proposed sack: 317 sack

Fluid 3: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base  
30.941 gal/bbl FRESH WATER  
3 lbm/bbl D-AIR 5000  
0.3 gal/bbl D-AIR 3000L  
282.477 lbm/bbl Barite 41  
0.5 lbm/bbl FE-2  
2 lbm/bbl SEM-93P, 35 LB SACK  
1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **13.8 bbl**

Cement Plug

1,675(MD)

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Stage 7

Fluid 1: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base  
30.941 gal/bbl FRESH WATER  
3 lbm/bbl D-AIR 5000  
0.3 gal/bbl D-AIR 3000L  
282.477 lbm/bbl Barite 41  
0.5 lbm/bbl FE-2  
2 lbm/bbl SEM-93P, 35 LB SACK  
1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Ahead: **30 bbl**

Fluid 2: Plug

PLUGCEM (TM) SYSTEM  
5.45 Gal/sk FRESH WATER

Fluid Weight: 14.5 lbm/gal  
Slurry Yield: 1.235 ft<sup>3</sup>/sack  
Total Mixing Fluid: 5.45 Gal/sack  
**Calculated Volume: 58.2 bbl**  
Proposed Volume: **58.2 bbl**  
Top Of Fluid: 0 ft  
Calculated Fill: 775 ft  
Calculated sack: 264.49 sack  
Proposed sack: 265 sack

Fluid 3: Rheologically Enhanced Spacer

Tuned Prime Cement Spacer Base  
30.941 gal/bbl FRESH WATER  
3 lbm/bbl D-AIR 5000  
0.3 gal/bbl D-AIR 3000L  
282.477 lbm/bbl Barite 41  
0.5 lbm/bbl FE-2  
2 lbm/bbl SEM-93P, 35 LB SACK  
1 lbm/bbl SEM-94P, 35 LB SACK

Fluid Density: 14 lbm/gal  
Volume Behind: **0 bbl**

Cement Plug

775(MD)

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### 3.4 Volume Estimate Table Plugs to Abandon

Calculations are used for volume estimation. Well conditions will dictate final cement job design.

#### Stage 1

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Oil-Based Mud-Well Fluid at Start	12.8		228.3 bbl
2	SPACER	Tuned Prime Cement Spacer Base	14	8	36.5 bbl
3	CEMENT	PlugCem (TM) System	14.5	8	329 sack
4	SPACER	Tuned Prime Cement Spacer Base	14	10	13.5 bbl
5	SPACER	Oil-Based Mud-Displacement	12.8		101.7 bbl

#### Stage 2

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Oil-Based Mud-Well Fluid at Start	12.8		181.1 bbl
2	SPACER	Tuned Prime Cement Spacer Base	14	8	36.5 bbl
3	CEMENT	PlugCem (TM) System	14.5	8	335 sack
4	SPACER	Tuned Prime Cement Spacer Base	14	10	13.5 bbl
5	SPACER	Oil-Based Mud-Displacement	12.8		81.7 bbl

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**Stage 3**

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Oil-Based Mud-Well Fluid at Start	12.8		133.9 bbl
2	SPACER	Tuned Prime Cement Spacer Base	14	8	36.5 bbl
3	CEMENT	PlugCem (TM) System	14.5	8	335 sack
4	SPACER	Tuned Prime Cement Spacer Base	14	10	13.5 bbl
5	SPACER	Oil-Based Mud-Displacement	12.8		61.7 bbl

**Stage 4**

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Oil-Based Mud-Well Fluid at Start	12.8		88.2 bbl
2	SPACER	Tuned Prime Cement Spacer Base	14	8	35.5 bbl
3	CEMENT	PlugCem (TM) System	14.5	8	333 sack
4	SPACER	Tuned Prime Cement Spacer Base	14	10	14.5 bbl
5	SPACER	Oil-Based Mud-Displacement	12.8		40.8 bbl

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**Stage 5**

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Oil-Based Mud- Well Fluid at Start	12.8		45.1 bbl
2	SPACER	Tuned Prime Cement Spacer Base	14	8	35.5 bbl
3	CEMENT	PlugCem (TM) System	14.5	8	317 sack
4	SPACER	Tuned Prime Cement Spacer Base	14	10	14.5 bbl
5	SPACER	Oil-Based Mud- Displacement	12.8		20.8 bbl

**Stage 6**

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Tuned Prime Cement Spacer Base	14	8	34 bbl
2	CEMENT	PlugCem (TM) System	14.5	8	317 sack
3	SPACER	Tuned Prime Cement Spacer Base	14	10	13.8 bbl

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Stage 7

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	Tuned Prime Cement Spacer Base	14	8	30 bbl
2	CEMENT	PlugCem (TM) System	14.5	8	265 sack
3	SPACER	Tuned Prime Cement Spacer Base	14	10	0 bbl

NOTE: These slurries and spacers will require lab testing. The additives and concentrations are estimates based on field experience in the area and may need to be modified prior to the job. The proposed spacer is designed to be generally compatible with water base mud systems. Compatibility testing with field mud samples used may indicate changes in the additive package and the related costs.

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**3.5 Cost Estimate**

Mtrl Nbr	Description	Qty	UOM	Unit Price	Gross Amt	Discount %	Net Amount
7528	CMT PLUG TO ABANDON BOM 7528	1.00	JOB	0.00	0.00		0.00
2	MILEAGE FOR CEMENTING CREW Number of Units	250.00 1	MI	USD 5.76/ 1 MI	1,440.00	74.00	374.40
76400	MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	125.00 152.664	MI	USD 3.35/ 1 MI	63,928.05	74.00	16,621.29
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI Unit of Measurement NUMBER OF EACH	3,481.00 EA 1	CF	USD 5.49/ 1 CF	19,110.69	74.00	4,968.78
372867	Cmt PSL - DOT Vehicle Charge, CMT	10.00	EA	USD 241.00/ 1 EA	2,410.00	50.00	1,205.00
152016	DR-PIPE WIPR BL 6-IN,MED FOAM,150 MM	2.00	EA	USD 230.00/ 1 EA	460.00	74.00	119.60
	<b>SubTotal</b>				<b>87,348.74</b>	<b>73.34</b>	<b>23,289.07</b>
<b>Plug #1</b>							
<b>Tuned Prime Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	37.00	BBL	USD 293.00/ 1 BBL	10,841.00	74.00	2,818.66
101577109	CHEM, BARITE 41, BULK Barite 41	104.00	SK	USD 31.07/ 1 SK	3,231.28	74.00	840.13
102068797	CHEM, D-AIR 5000, 50 LB SACK D-AIR 5000	110.00	LB	USD 11.92/ 1 LB	1,311.20	74.00	340.91
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL D-AIR 3000L	11.00	GAL	USD 140.55/ 1 GAL	1,546.05	74.00	401.97
1023977	CHEM, SEM-93P, 35 LB SACK SEM-93P, 35 LB SACK	73.00	LB	USD 31.80/ 1 LB	2,321.40	74.00	603.56
100001615	CHEM, FE-2 FE-2	19.00	LB	USD 2.38/ 1 LB	45.22	74.00	11.76
1023987	CHEM, SEM-94P, 35 LB SACK SEM-94P, 35 LB SACK	37.00	LB	USD 41.70/ 1 LB	1,542.90	74.00	401.15
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	329.00	SK	0.00	13,148.90	74.00	3,418.72
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	14.00	BBL	USD 293.00/ 1 BBL	4,102.00	74.00	1,066.52
101577109	CHEM, BARITE 41, BULK Barite 41	39.00	SK	USD 31.07/ 1 SK	1,211.73	74.00	315.05
102068797	CHEM, D-AIR 5000, 50 LB SACK D-AIR 5000	41.00	LB	USD 11.92/ 1 LB	488.72	74.00	127.07
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL D-AIR 3000L	5.00	GAL	USD 140.55/ 1 GAL	702.75	74.00	182.71
1023977	CHEM, SEM-93P, 35 LB SACK SEM-93P, 35 LB SACK	27.00	LB	USD 31.80/ 1 LB	858.60	74.00	223.24
1023987	CHEM, SEM-94P, 35 LB SACK SEM-94P, 35 LB SACK	14.00	LB	USD 41.70/ 1 LB	583.80	74.00	151.79
100001615	CHEM, FE-2 FE-2	7.00	LB	USD 2.38/ 1 LB	16.66	74.00	4.33
<b>Plug #2</b>							
<b>Tuned Prime Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	37.00	BBL	USD 293.00/ 1 BBL	10,841.00	74.00	2,818.66
102068797	CHEM, D-AIR 5000, 50 LB SACK D-AIR 5000	110.00	LB	USD 11.92/ 1 LB	1,311.20	74.00	340.91
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL D-AIR 3000L	11.00	GAL	USD 140.55/ 1 GAL	1,546.05	74.00	401.97
101577109	CHEM, BARITE 41, BULK Barite 41	104.00	SK	USD 31.07/ 1 SK	3,231.28	74.00	840.13

Mtrl Nbr	Description	Qty	UOM	Unit Price	Gross Amt	Discount %	Net Amount
100001615	CHEM, FE-2 <i>FE-2</i>	19.00	LB	USD 2.38/ 1 LB	45.22	74.00	11.76
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	73.00	LB	USD 31.80/ 1 LB	2,321.40	74.00	603.56
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	37.00	LB	USD 41.70/ 1 LB	1,542.90	74.00	401.15
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	335.00	SK	0.00	13,390.90	74.00	3,481.63
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	14.00	BBL	USD 293.00/ 1 BBL	4,102.00	74.00	1,066.52
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	41.00	LB	USD 11.92/ 1 LB	488.72	74.00	127.07
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	5.00	GAL	USD 140.55/ 1 GAL	702.75	74.00	182.71
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	39.00	SK	USD 31.07/ 1 SK	1,211.73	74.00	315.05
100001615	CHEM, FE-2 <i>FE-2</i>	7.00	LB	USD 2.38/ 1 LB	16.66	74.00	4.33
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	27.00	LB	USD 31.80/ 1 LB	858.60	74.00	223.24
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	14.00	LB	USD 41.70/ 1 LB	583.80	74.00	151.79
<b>Plug #3</b>							
<b>Tuned Prime Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	37.00	BBL	USD 293.00/ 1 BBL	10,841.00	74.00	2,818.66
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	110.00	LB	USD 11.92/ 1 LB	1,311.20	74.00	340.91
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	11.00	GAL	USD 140.55/ 1 GAL	1,546.05	74.00	401.97
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	104.00	SK	USD 31.07/ 1 SK	3,231.28	74.00	840.13
100001615	CHEM, FE-2 <i>FE-2</i>	19.00	LB	USD 2.38/ 1 LB	45.22	74.00	11.76
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	73.00	LB	USD 31.80/ 1 LB	2,321.40	74.00	603.56
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	37.00	LB	USD 41.70/ 1 LB	1,542.90	74.00	401.15
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	335.00	SK	0.00	13,390.90	74.00	3,481.63
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	14.00	BBL	USD 293.00/ 1 BBL	4,102.00	74.00	1,066.52
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	41.00	LB	USD 11.92/ 1 LB	488.72	74.00	127.07
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	5.00	GAL	USD 140.55/ 1 GAL	702.75	74.00	182.71
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	39.00	SK	USD 31.07/ 1 SK	1,211.73	74.00	315.05
100001615	CHEM, FE-2 <i>FE-2</i>	7.00	LB	USD 2.38/ 1 LB	16.66	74.00	4.33
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	27.00	LB	USD 31.80/ 1 LB	858.60	74.00	223.24
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	14.00	LB	USD 41.70/ 1 LB	583.80	74.00	151.79
<b>Plug #4</b>							
<b>Tuned Prime Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	36.00	BBL	USD 293.00/ 1 BBL	10,548.00	74.00	2,742.48
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	107.00	LB	USD 11.92/ 1 LB	1,275.44	74.00	331.61

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Mtrl Nbr	Description	Qty	UOM	Unit Price	Gross Amt	Discount %	Net Amount
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	11.00	GAL	USD 140.55/ 1 GAL	1,546.05	74.00	401.97
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	101.00	SK	USD 31.07/ 1 SK	3,138.07	74.00	815.90
100001615	CHEM, FE-2 <i>FE-2</i>	18.00	LB	USD 2.38/ 1 LB	42.84	74.00	11.14
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	71.00	LB	USD 31.80/ 1 LB	2,257.80	74.00	587.03
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	36.00	LB	USD 41.70/ 1 LB	1,501.20	74.00	390.31
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	333.00	SK	0.00	13,306.32	74.00	3,459.65
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	15.00	BBL	USD 293.00/ 1 BBL	4,395.00	74.00	1,142.70
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	44.00	LB	USD 11.92/ 1 LB	524.48	74.00	136.36
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	5.00	GAL	USD 140.55/ 1 GAL	702.75	74.00	182.71
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	41.00	SK	USD 31.07/ 1 SK	1,273.87	74.00	331.21
100001615	CHEM, FE-2 <i>FE-2</i>	8.00	LB	USD 2.38/ 1 LB	19.04	74.00	4.95
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	29.00	LB	USD 31.80/ 1 LB	922.20	74.00	239.77
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	15.00	LB	USD 41.70/ 1 LB	625.50	74.00	162.63
<b>Plug #5</b>							
<b>Tuned Prime Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	36.00	BBL	USD 293.00/ 1 BBL	10,548.00	74.00	2,742.48
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	107.00	LB	USD 11.92/ 1 LB	1,275.44	74.00	331.61
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	11.00	GAL	USD 140.55/ 1 GAL	1,546.05	74.00	401.97
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	101.00	SK	USD 31.07/ 1 SK	3,138.07	74.00	815.90
100001615	CHEM, FE-2 <i>FE-2</i>	18.00	LB	USD 2.38/ 1 LB	42.84	74.00	11.14
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	71.00	LB	USD 31.80/ 1 LB	2,257.80	74.00	587.03
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	36.00	LB	USD 41.70/ 1 LB	1,501.20	74.00	390.31
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	317.00	SK	0.00	12,670.78	74.00	3,294.41
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	15.00	BBL	USD 293.00/ 1 BBL	4,395.00	74.00	1,142.70
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	44.00	LB	USD 11.92/ 1 LB	524.48	74.00	136.36
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	5.00	GAL	USD 140.55/ 1 GAL	702.75	74.00	182.71
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	41.00	SK	USD 31.07/ 1 SK	1,273.87	74.00	331.21
100001615	CHEM, FE-2 <i>FE-2</i>	8.00	LB	USD 2.38/ 1 LB	19.04	74.00	4.95
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	29.00	LB	USD 31.80/ 1 LB	922.20	74.00	239.77
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	15.00	LB	USD 41.70/ 1 LB	625.50	74.00	162.63
<b>Plug #6</b>							
<b>Tuned Prime Spacer Ahead</b>							

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Mtrl Nbr	Description	Qty	UOM	Unit Price	Gross Amt	Discount %	Net Amount
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	34.00	BBL	USD 293.00/1 BBL	9,962.00	74.00	2,590.12
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	102.00	LB	USD 11.92/1 LB	1,215.84	74.00	316.12
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	11.00	GAL	USD 140.55/1 GAL	1,546.05	74.00	401.97
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	97.00	SK	USD 31.07/1 SK	3,013.79	74.00	783.59
100001615	CHEM, FE-2 <i>FE-2</i>	17.00	LB	USD 2.38/1 LB	40.46	74.00	10.52
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	68.00	LB	USD 31.80/1 LB	2,162.40	74.00	562.22
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	34.00	LB	USD 41.70/1 LB	1,417.80	74.00	368.63
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	317.00	SK	0.00	12,670.78	74.00	3,294.41
<b>Tuned Prime Spacer Behind</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	14.00	BBL	USD 293.00/1 BBL	4,102.00	74.00	1,066.52
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	42.00	LB	USD 11.92/1 LB	500.64	74.00	130.17
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	5.00	GAL	USD 140.55/1 GAL	702.75	74.00	182.71
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	39.00	SK	USD 31.07/1 SK	1,211.73	74.00	315.05
100001615	CHEM, FE-2 <i>FE-2</i>	7.00	LB	USD 2.38/1 LB	16.66	74.00	4.33
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	28.00	LB	USD 31.80/1 LB	890.40	74.00	231.50
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	14.00	LB	USD 41.70/1 LB	583.80	74.00	151.79
<b>Plug #7</b>							
<b>Tuned Spacer Ahead</b>							
1107538	SBM CEM TUNED PRIME CEMENT SPACER SYS	30.00	BBL	USD 293.00/1 BBL	8,790.00	74.00	2,285.40
102068797	CHEM, D-AIR 5000, 50 LB SACK <i>D-AIR 5000</i>	90.00	LB	USD 11.92/1 LB	1,072.80	74.00	278.93
101007444	CHEM, D-AIR 3000L, 5 GAL PAIL <i>D-AIR 3000L</i>	9.00	GAL	USD 140.55/1 GAL	1,264.95	74.00	328.89
101577109	CHEM, BARITE 41, BULK <i>Barite 41</i>	85.00	SK	USD 31.07/1 SK	2,640.95	74.00	686.65
100001615	CHEM, FE-2 <i>FE-2</i>	15.00	LB	USD 2.38/1 LB	35.70	74.00	9.28
1023977	CHEM, SEM-93P, 35 LB SACK <i>SEM-93P, 35 LB SACK</i>	60.00	LB	USD 31.80/1 LB	1,908.00	74.00	496.08
1023987	CHEM, SEM-94P, 35 LB SACK <i>SEM-94P, 35 LB SACK</i>	30.00	LB	USD 41.70/1 LB	1,251.00	74.00	325.26
<b>Primary Cement</b>							
452969	CMT, PlugCem (TM) system	265.00	SK	0.00	10,599.73	74.00	2,755.92
<b>Cement Skid on Location</b>							
94755	DAILY SERVICE CHARGE, ZI DAYS OR PARTIAL DAY(WHOLE NO.)	1.00 3	EA	USD 1,800.00/1 EA	5,400.00		5,400.00
<b>Misc. Materials</b>							
100008028	CHEM, SUGAR, GRANULATED, 50LB BAG	200.00	LB	USD 6.96/1 LB	1,392.00	74.00	361.92
<b>Total Gross Amount</b>							<b>371,603.18</b>
<b>Total Item Discounts</b>							<b>270,412.00</b>
<b>Total Net Amount</b>							<b>101,191.18</b>

**Primary Plant:** Zanesville, OH, USA  
**Secondary Plant:** Zanesville, OH, USA

**Price Book Ref:** 26 - NORTHEAST  
**Price Date:** 01/08/20

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## 4 Conditions

The cost in this analysis is good for the materials and/or services outlined within and shall be valid for 30 days from the date of this proposal. In order to meet your needs under this proposal with a high quality of service and responsive timing, Halliburton will be allocating limited resources and committing valuable equipment and materials to your area of operations. Accordingly, the discounts reflected in this proposal are available only for materials and services awarded on a first-call basis. Alternate pricing may apply in the event that Halliburton is awarded work on any basis other than as a first-call provider.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. A copy of the latest version of our General Terms and Conditions is available from your Halliburton representative or at: <http://www.halliburton.com/terms> for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials.

Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.

If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice.

Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

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State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-095-02648 County TYLER District CENTERVILLE  
Quad WEST UNION Pad Name SHR38 Field/Pool Name \_\_\_\_\_  
Farm name ASH Well Number SHR38IHSM  
Operator (as registered with the OOG) CNX GAS COMPANY LLC  
Address 1000 CONSOL ENERGY DRIVE City CANONSBURG State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4358039.86 Easting 514177.84 As-drilled plat N/A - well plugged  
Landing Point of Curve Northing \_\_\_\_\_ Easting \_\_\_\_\_  
Bottom Hole Northing \_\_\_\_\_ Easting \_\_\_\_\_

Elevation (ft) 1,011' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additive(s)  
SYNTHETIC BASED FLUID

ADDITIVES: ABS MUL (EMULSIFIER), CALCIUM CHLORIDE, FLR PLUS (GILSONITE), CLAYTONE EM (SUSPENSION AGENT), AES WA II (WETTING AGENT), LIME

Date permit issued 10.18.2019 Date drilling commenced 10.30.2019 Date drilling ceased 01.08.2020  
Date completion activities began \_\_\_\_\_ Date completion activities ceased \_\_\_\_\_  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 225 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1,920 Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 430, 580, 900 TRACES: 160, 260, 1380, 1400, 1480, 1500 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
\_\_\_\_\_

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API 47-095 - 02648 Farm name ASH Well number SHR38IHSM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	100	NEW	94 lb/ft	N/A	GROUT TO SURFACE
Surface	17.5"	13.375"	601	NEW	J-55 54.5 lb/ft	N/A	Y - CEMENT TO SURFACE
Coal							
Intermediate 1	12.25"	9.625"	2,598	NEW	J-55 36 lb/ft	N/A	Y - CEMENT TO SURFACE
Intermediate 2							
Intermediate 3							
Production							
Tubing							
Packer type and depth set							

Comment Details ALL DEPTHS ARE REFERENCE TO GROUND LEVEL (-29' KB)

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	HALCEM	510	15.8	1.176	600	0	8
Coal							
Intermediate 1	HALCEM	850	15.8	1.147	975	0	8
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) 6,146' Loggers TD (ft) 6,146'

Deepest formation penetrated ALEXANDER Plug back to (ft) Surface

Plug back procedure Yes. 6,146' MD - 5,214' MD, 5,120' - 4,429', 4,178' - 3,307', 3,234' - 2,363', 2,290' - 1,452', 994 - surface

14.5 ppg cement, 1.275 ft<sup>3</sup>/sk plugs

Kick off depth (ft) 2,736'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_

SURFACE = 8: Centralize every other joint from shoe to surface

INTERMEDIATE = 31: Centralize every other joint from shoe to surface

PRODUCTION = 0: No casing run

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

API 47-095 - 02648 Farm name ASH Well number SHR38IHSM

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

Please insert additional pages as applicable.

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API 47- 095 - 02648 Farm name ASH Well number SHR38IHSM

PRODUCING FORMATION(S)	DEPTHS	
	TVD	MD
N/A		

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump  
 SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs  
 OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd GAS MEASURED BY  
 Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
					FORMATION LOG ATTACHED

Please insert additional pages as applicable.

Drilling Contractor PATTERSON UTI DRILLING  
 Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company HALLIBURTON  
 Address 121 Champion Way, Suite #210 City Canonsburg State PA Zip 15317

Stimulating Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please insert additional pages as applicable.

Completed by John Schilling Telephone 724 485 4746  
 Signature [Signature] Title Engineer Date 8/3/20

API: 47-095-02648		FARM NAME: ASH				WELL NUMBER: SHR38IHSM	
LITHOLOGY / FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT NAME TVD	TOP DEPTH IN FT NAME MD	BOTTOM DEPTH IN FT NAME MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S, ETC)		
Undifferentiated Sand	0	250	0	250	Sandstone / Traces of Siltstone & Limestone & Coal		
Undifferentiated Silt	250	300	250	300	Siltstone / Traces of Sandstone & Coal		
Undifferentiated Sand	300	400	300	400	Sandstone / Traces of Siltstone & Limestone		
Undifferentiated Shale	400	430	400	430	Red Shale / Traces of Siltstone		
Washington Coal	430	431	430	431	Sandstone / Red Shale / Coal		
Undifferentiated Sand	431	480	431	480	Sandstone / Red Shale		
Undifferentiated Shale	480	510	480	510	Red Shale / Traces of Sandstone & Gray Shale		
Undifferentiated Quartz	510	580	510	580	Quartz / Traces of Red Shale, Siltstone & Sandstone		
Waynesburg Coal	580	582	580	582	Quartz / Traces of Gray Shale, Coal, Siltstone & Sandstone		
Undifferentiated Sand	582	610	582	610	Sandstone / Traces of Gray Shale, Quartz & Siltstone		
Undifferentiated Silt	610	740	610	740	Siltstone / Traces of Gray Shale, Quartz & Siltstone		
Undifferentiated Sand	740	760	740	760	Sandstone / Traces of Red Shale		
Undifferentiated Shale	760	900	760	900	Red Shale / Traces of Siltstone, Sandstone, Limestone		
Pittsburgh Coal	900	901	900	901	Sandstone / Coal		
Undifferentiated Sand	901	940	901	940	Sandstone / Traces of Gray Shale, Limestone & Siltstone		
Undifferentiated Shale	940	980	940	980	Red Shale / Traces of Limestone & Sandstone		
Undifferentiated Sand	980	1,000	980	1,000	Sandstone / Traces of Red Shale		
Undifferentiated Shale	1,000	1,040	1,000	1,040	Gray Shale / Traces of Limestone, Siltstone & Sandstone		
Undifferentiated Sand	1,040	1,060	1,040	1,060	Sandstone / Siltstone		
Undifferentiated Quartz	1,060	1,100	1,060	1,100	Quartz / Traces of Sandstone & Siltstone		
Undifferentiated Lime	1,100	1,120	1,100	1,120	Limestone / Traces of Sandstone & Siltstone		
Undifferentiated Sand	1,120	1,160	1,120	1,160	Sandstone / Siltstone		
Undifferentiated Silt	1,160	1,280	1,160	1,280	Siltstone / Traces of Sandstone & Limestone		
Undifferentiated Quartz	1,280	1,320	1,280	1,320	Quartz		
Undifferentiated Silt	1,320	1,340	1,320	1,340	Siltstone / Traces of Sandstone		
Undifferentiated Quartz	1,340	1,380	1,340	1,380	Quartz / Traces of Siltstone & Sandstone		
Upper Kitaning	1,380	1,480	1,380	1,480	Quartz & Siltstone / Traces of Sandstone & Coal		
Lower Kitaning	1,480	1,840	1,480	1,840	Sandstone & Siltstone / Traces of Quartz & Coal		
Big Lime	1,840	1,920	1,840	1,920	Limestone / Traces of Siltstone		
Big Injun	1,920	2,060	1,920	2,060	Sandstone & Limestone / Traces of Siltstone		
Price	2,060	2,210	2,060	2,210	Siltstone / Traces of Red Shale		
Weir	2,210	2,360	2,210	2,360	Sandstone & Siltstone / Traces of Limestone		
Berea	2,360	2,540	2,360	2,540	Siltstone		
Gordon	2,540	3,350	2,540	3,350	Siltstone / Traces of Sandstone & Pyrite		
Warren Sand	3,350	4,940	3,350	4,940	Siltstone & Sandstone		
Benson	4,940	5,150	4,940	5,150	Siltstone & Sandstone		



47-095-02648 P

API: 47-095-02648		FARM NAME: ASH				WELL NUMBER: SHR38IHSM	
LITHOLOGY / FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT NAME TVD	TOP DEPTH IN FT NAME MD	BOTTOM DEPTH IN FT NAME MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S, ETC)		
Alexander	5,150	5,757	5,150	5,757	Siltstone / Traces of Gray Shale		
TD - Alexander							

Waste Management		Gas Specific Waste Streams										Other Accepted Waste Streams										Contact Information		
Industrial Landfills	Landfill	Location	Drill * Cuttings	Waste Liners	Waste Brine	Contaminated Soil (Including Petroleum)	Construction & Demolition Waste	Industrial Waste	Sludge	Frangible Asbestos	Non-Frangible Asbestos	Process Waste	Solidification Services	Municipal Solid Waste										
	Alden Landfill	Washington	X	X		X	X	X	X			X	X	X										
	South Hills (Armoni)	PA	X	X		X	X	X	X			X	X	X										
	Kelly Run	PA	X	X		X	X	X	X			X	X	X										
	Valley Landfill	PA	X	X		X	X	X	X			X	X	X										
	Evergreen Landfill	PA	X	X		X	X	X	X			X	X	X										
	Blairsville	PA	X	X		X	X	X	X			X	X	X										
	Charleston Landfill	WV	X	X		X	X	X	X			X	X	X										
	Knappa County	WV	X	X		X	X	X	X			X	X	X										
	Meadow Hill Landfill	WV	X	X		X	X	X	X			X	X	X										
	Northwestern Landfill	WV	X	X		X	X	X	X			X	X	X										
	S&S Grading Landfill	WV	X	X		X	X	X	X			X	X	X										
	American Landfill	OH	X	X		X	X	X	X			X	X	X										
	Suburban RDF	OH	X	X		X	X	X	X			X	X	X										
	Coalcoction Landfill***	OH	X	X		X	X	X	X			X	X	X										
	Mahoning Landfill	OH	X	X		X	X	X	X			X	X	X										
	New Spangfield	OH	X	X		X	X	X	X			X	X	X										

Additional Landfills		Gas Specific Waste Streams										Other Accepted Waste Streams										Contact Information		
Landfill	Location	Drill * Cuttings	Waste Liners	Waste Brine	Contaminated Soil (Including Petroleum)	Construction & Demolition Waste	Industrial Waste	Sludge	Frangible Asbestos	Non-Frangible Asbestos	Process Waste	Solidification Services	Municipal Solid Waste											
Westmoreland Waste (WVLC Group)	111 Corner Lane, Belle Vernon, PA 15012	PA	X	X		X	X	X	X			X	X	X	Mike Horne: 412-552-4427 Mark Thomas: 724-929-7694									
MAX Environmental	200 Max Drive, Bolles, PA 15010	PA	X	X		X	X	X	X			X	X	X	Carl Spadaro: 412-343-4900 cell: 412-445-9789									
Bullet Facilities	233 MAX Lane, Yukon, PA 15998	PA	X	X		X	X	X	X			X	X	X	Joe Teterick: 740-275-2887 joe@elb-company.com									
Apex Sanitary Landfill (Apex Environmental)	11 County Road 78, Amistarsdam, Ohio 43903	OH	X	X		X	X	X	X			X	X	X	Carl Walker: 513-623-2471									
Rumple, M. Sterling (Rumple Consolidated)	30 Larison Rd, Jeffersonville, KY 40337	KY	X	X		X	X	X	X			X	X	X	Bruce Crouch: Work: 606-864-7996 Cell: 606-219-0261									
Laurel Ridge Landfill (Waste Connections of KY)	3612 E State Highway, Sycamore, KY 40774	KY	X	X		X	X	X	X			X	X	X										
	Chestnut Valley 1184 McClellandtown Rd, McClellandtown, PA 15458	PA	X	X		X	X	X	X			X	X	X										
Advanced Disposal	Greentree Landfill; 635 Toby Rd., Kensey, PA	PA	X	X		X	X	X	X			X	X	X	Tony Labenne 6184 Route 219, Brockway, PA 15824 814-590-9906									
	Monrolier Landfill; 7035 Glades Pike Rd., Somerset, PA	PA	X	X		X	X	X	X			X	X	X										

Ohio "TENORM" - requires Radium 226/228 analysis by load before leaving the well pad. Solid waste landfills in Ohio can only accept TENORM waste with combined concentration less than 5 picocuries per gram above the natural background level. Accepts drilling wastes but profile for disposal is not currently completed. Waste stream accepted by facility. \* Drill Cuttings include frac sand for the purpose of this table (Contact facility directly to verify waste streams accepted).



**Well Name: SHR38IHSM**

**Surface**

API 4709502648	Surface Legal Location	Field Shirley	Permit Number	State West Virginia	Well Configuration Type Horizontal
Ground Elevation (ft) 1,011.00	Casing Flange Elevation (ft)	KB-Ground Distance (ft) 29.00	KB-Casing Flange Distance (ft)	Spud Date (Conductor) 10/30/2019 12:00	Rig Release Date

**Wellbore**  
Wellbore Name: Original Hole

**Wellbore Sections**

Section Des	Size (in)	Act Top (ftKB)	Act Btm (ftKB)	Start Date	End Date
Surface	17 1/2	129.0	679.0	1/1/2020	1/1/2020

**Kick Offs & Key Depths**

Date	Point or Interval	Type	Top Depth (ftKB)	Depth Top (TVD) (ftKB)	Bottom Depth (ftKB)	Depth Bottom (TVD) (ftKB)	Length (ft)

**Wellhead**

Type	Start Date	Service	Comment

**Wellhead Components**

Des	Make	Model	SN	WP Top (psi)

**Casing**

Casing Description Surface	Set Depth (ftKB) 629.7	Run Date 1/1/2020	Set Tension (kips)
Centralizers 8	Scratchers		

**Casing Components**

Item Des	OD (in)	Wt (lb/ft)	Grade	Top Thread	Jts	Len (ft)	Top (ftKB)	Btm (ftKB)	Mk-up Tq (ft-lb)	Class	Max OD (in)	ID (in)
PUP Joint 2	13 3/8	54.50	J-55	Buttress Thread	0	0.00	34.2	34.2				12.62
PUP Joint 1	13 3/8	54.50	J-55	Buttress Thread	0	0.00	34.2	34.2				12.62
Casing Joints	13 3/8	54.50	J-55	Buttress Thread	0	0.00	34.2	34.2				12.62
Landing Joint	13 3/8	54.50	J-55	Buttress Thread	0	0.00	34.2	34.2				12.62
Casing Hanger	13 3/8	54.50	J-55	Buttress Thread	1	6.00	34.2	40.2				12.62
Casing Joints	13 3/8	54.50	J-55	Buttress Thread	14	576.01	40.2	616.2				12.62
Float Collar	13 3/8	54.50	J-55	Buttress Thread	1	1.50	616.2	617.7				12.62
PUP Joint	13 3/8	54.50	J-55	Buttress Thread	1	10.10	617.7	627.8				12.62
Casin Shoe	13 3/8	54.50	J-55	Buttress Thread	1	1.89	627.8	629.7				12.62

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**Well Name: SHR38IHSM**

**Intermediate 1**

API 4709502648	Surface Legal Location	Field Shirley	Permit Number	State West Virginia	Well Configuration Type Horizontal
Ground Elevation (ft) 1,011.00	Casing Flange Elevation (ft)	KB-Ground Distance (ft) 29.00	KB-Casing Flange Distance (ft)	Spud Date (Conductor) 10/30/2019 12:00	Rig Release Date

**Wellbore**  
Wellbore Name  
Original Hole

Section Des	Size (in)	Act Top (ftKB)	Act Btm (ftKB)	Start Date	End Date
Surface	17 1/2	129.0	679.0	1/1/2020	1/1/2020
Intermediate 1	12 1/4	679.0	2,675.0	1/2/2020	1/3/2020

Kick Offs & Key Depths							
Date	Point or Interval	Type	Top Depth (ftKB)	Depth Top (TVD) (ftKB)	Bottom Depth (ftKB)	Depth Bottom (TVD) (ftKB)	Length (ft)

Wellhead			
Type	Start Date	Service	Comment

Wellhead Components				
Des	Make	Model	SN	WP Top (psi)

Casing			
Casing Description	Set Depth (ftKB)	Run Date	Set Tension (kips)
Intermediate 1	2,627.0	1/3/2020	
Centralizers 31		Scratchers	

Casing Components												
Item Des	OD (in)	Wt (lb/ft)	Grade	Top Thread	Jts	Len (ft)	Top (ftKB)	Btm (ftKB)	Mk-up Tq (ft*lb)	Class	Max OD (in)	ID (in)
PUP Joint	9 5/8	36.00	J-55	LT&C	0	0.00	32.4	32.4				8.92
Casing Joints	9 5/8	36.00	J-55	LT&C	0	0.00	32.4	32.4				8.92
Landing Joint	9 5/8	36.00	J-55	LT&C	0	0.00	32.4	32.4				8.92
Casing Hanger	9 5/8	36.00	J-55	LT&C	1	4.50	32.4	36.9				8.92
PUP Joint	9 5/8	36.00	J-55	LT&C	1	8.47	36.9	45.4				8.92
Casing Joints	9 5/8	36.00	J-55	LT&C	62	2,568.56	45.4	2,613.9				8.92
Float Collar	9 5/8	36.00	J-55	LT&C	1	1.89	2,613.9	2,615.8				8.92
Casing Pup Joint	9 5/8	36.00	J-55	LT&C	1	9.30	2,615.8	2,625.1				8.92
Float Shoe	9 5/8	36.00	J-55	LT&C	1	1.89	2,625.1	2,627.0				8.92

**Disclaimer: Vendors have been approved for the below category by ENV. UPDATED AGREEMENT with MSCM MUST BE CONFIRMED.**

**USE APPROVED NON-HAZARDOUS WASTE DISPOSAL FACILITIES (version 05-23-2016)**

Landfill	Location	Gas Specific Waste Streams			Other Accepted Waste Streams							Contact Information			
		Drill * Casing	Waste Liners	Waste Brite	Contaminated Soil (Including Petroleum)	Construction & Demolition Waste	Industrial Waste	Sludge	Friable Aerosols	Non-Friable Aerosols	Process Waste		Solidification Services	Municipal Solid Waste	
McLean County	Bloomington	IL	X	X	X	X	X	X	X	X	X	X	X	X	317-921-1667 or 480-627-2700 1-800-634-0215
ERC/Coles County	Charleston	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Bris and Duval	Danville	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Southern Illinois Regional	De Soto	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Lee County	Dixon	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Upper Rock Island	East Moline	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Bond County	Greensville	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Illinois	Hosopston	IL	X	X	X	X	X	X	X	X	X	X	X	X	
LandComp	LaSalle	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Litchfield-Hillsboro	Litchfield	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Environmentech	Morris	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Livingston	Pontiac	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Roxana	Roxana	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Sananton Valley	Springfield	IL	X	X	X	X	X	X	X	X	X	X	X	X	
Benson Valley	Frankfort	KY	X	X	X	X	X	X	X	X	X	X	X	X	
Blue Ridge	Irvine	KY	X	X	X	X	X	X	X	X	X	X	X	X	
Morehead	Morehead	KY	X	X	X	X	X	X	X	X	X	X	X	X	
Green Valley	Rush	KY	X	X	X	X	X	X	X	X	X	X	X	X	
Cherokee Run	Bellefontaine	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Williams County	Bryan	OH	X	X	X	X	X	X	X	X	X	X	X	X	
County Environmental	Carry	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Celina	Celina	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Carbon-Limestone**	Lowellville	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Countywide Landfills**	East Supta	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Lorain County	Oberlin	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Oakland Marsh	Shiloh	OH	X	X	X	X	X	X	X	X	X	X	X	X	
Imperial	Imperial	PA	X	X	X	X	X	X	X	X	X	X	X	X	
Conestoga	Morrisstown	PA	X	X	X	X	X	X	X	X	X	X	X	X	
Brusswick	Lawrenceville	VA	X	X	X	X	X	X	X	X	X	X	X	X	
King and Queen	Little Pleasant	VA	X	X	X	X	X	X	X	X	X	X	X	X	
Old Dominion	Richmond	VA	X	X	X	X	X	X	X	X	X	X	X	X	
Seacore	Hurricane	WV	X	X	X	X	X	X	X	X	X	X	X	X	
Short Creek	Wheeling (Storr Creek)	WV	X	X	X	X	X	X	X	X	X	X	X	X	
Carter Valley	Church Hill	TN	X	X	X	X	X	X	X	X	X	X	X	X	

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WW-4A  
Revised 6-07

1) Date: 1/15/20  
2) Operator's Well Number  
SHR38IHSM  
3) API Well No.: 47 - 095 - 02648-00

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF APPLICATION TO PLUG AND ABANDON A WELL**

4) Surface Owner(s) to be served:	5) (a) Coal Operator
(a) Name <u>Robert Bruce Ash</u>	Name _____
Address <u>7717 Summercrest Dr</u>	Address _____
<u>Apex, NC 27539</u>	_____
(b) Name _____	(b) Coal Owner(s) with Declaration
Address _____	Name <u>Robert Bruce Ash</u>
_____	Address <u>7717 Summercrest Dr</u>
_____	<u>Apex, NC 27539</u>
(c) Name _____	Name _____
Address _____	Address _____
_____	_____
6) Inspector <u>Cragin Blevins</u>	(c) Coal Lessee with Declaration
Address <u>1407 19th street</u>	Name _____
<u>Vienna WV 26105</u>	Address _____
Telephone <u>304-8987583</u> <u>304-382-5433</u>	_____

**TO THE PERSONS NAMED ABOVE: You should have received this Form and the following documents:**

- (1) The application to Plug and Abandon a Well on Form WW-4B, which sets out the parties involved in the work and describes the well its and the plugging work order; and
- (2) The plat (surveyor's map) showing the well location on Form WW-6.

The reason you received these documents is that you have rights regarding the application which are summarized in the instructions on the reverses side. However, you are not required to take any action at all.

Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed this Notice and Application and accompanying documents for a permit to plug and abandon a well with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to the well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, and the plat have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of mailing or delivery to the Chief.

Commonwealth of Pennsylvania - Notary Seal  
 Rebecca Zachwieja, Notary Public  
 Washington County  
 My commission expires November 7, 2023  
 Commission number 1269683  
 Member, Pennsylvania Association of Notaries

Well Operator CNX Gas Company LLC  
 By: Raymond Hoon  
 Its: Senior Project Manager  
 Address 1000 Consol Energy Dr  
Canonsburg, PA 15317  
 Telephone 724-485-4000

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JAN 16 2020

WV Department of Environmental Protection

Commonwealth of Pennsylvania, County of Washington  
 Subscribed and sworn before me this 10<sup>th</sup> day of January, 2020  
Rebecca Zachwieja Notary Public  
 My Commission Expires November 7, 2023

**Oil and Gas Privacy Notice**

The Office of Oil and Gas processes your personal information, such as name, address and phone number, as a part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at [depprivacyofficer@wv.gov](mailto:depprivacyofficer@wv.gov).

WW-9  
(4/16)

47-095-02648P

API Number 47 - 095 - 02648-00

Operator's Well No. SHR36iHSM

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name CNX Gas Company, LLC OP Code 494458046

Watershed (HUC 10) Middle Island Creek Quadrangle West Union

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used? Yes  No

If so, please describe anticipated pit waste: no pits JCB  
1/10/2020

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? NA

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number \_\_\_\_\_ )
- Reuse (at API Number \_\_\_\_\_ )
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain No Pits)

Will closed loop system be used? If so, describe: Yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. NA  
Horizontal: synthetic oil-based mud (SOBM) from curve KOP to lateral TD

-If oil based, what type? Synthetic, petroleum, etc. NA

Additives to be used in drilling medium? NA

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. NA

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? \_\_\_\_\_

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature Raymond Hoon

Company Official (Typed Name) Raymond Hoon

Company Official Title Project Manager

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WV Department of Environmental Protection

Subscribed and sworn before me this 10th day of January, 2020

Rebecca Zachwieja  
My commission expires November 7, 2023

Notary Public Rebecca Zachwieja, Notary Public  
Commonwealth of Pennsylvania - Notary Seal  
Washington County  
My commission expires November 7, 2023  
Commission number 1269683  
Member, Pennsylvania Association of Notaries

CNX Gas Company, LLC

Proposed Revegetation Treatment: Acres Disturbed 15.57 Prevegetation pH 6.5

Lime according to pH test Tons/acre or to correct to pH 7.0

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch hay or straw @ 2 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Orchard Grass	25
Birdsfoot Trefoil	15
Ladino Clover	10

Seed Type	lbs/acre
Orchard Grass	25
Birdsfoot Trefoil	15
Ladino Clover	10

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: J Cragin Blevins

Comments:

Title: Oil and Gas Inspector

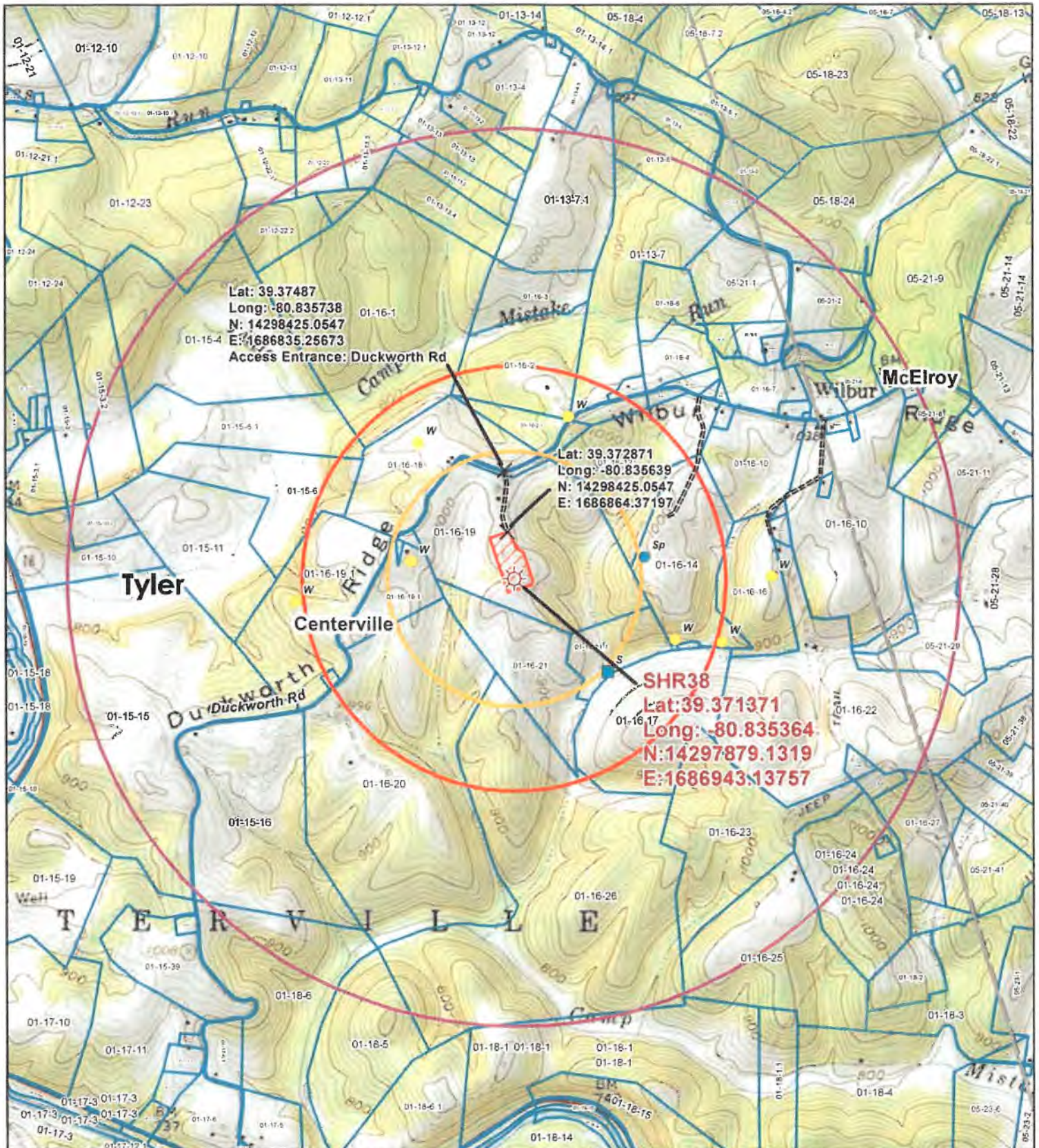
Date: 01/10/2020

Field Reviewed? ( ) Yes ( ) No

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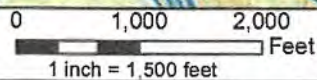
Lat: 39.37487  
 Long: -80.835738  
 N: 14298425.0547  
 E: 1686835.25673  
 Access Entrance: Duckworth Rd

Lat: 39.372871  
 Long: -80.835639  
 N: 14298425.0547  
 E: 1686864.37197

**SHR38**  
 Lat: 39.371371  
 Long: -80.835364  
 N: 14297879.1319  
 E: 1686943.13757

**Legend**

- Wellbore
- Access Points
- Sp
- St
- W
- Access Road
- Surface Parcel
- Well Pad
- 1,500 Foot Buffer
- 2,500 Foot Buffer
- 1 Mile Buffer



Original Date: 5/8/2018

Prepared By: GIS

Revision Date: 5/8/2018

Approved By: GIS

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Topographic Well Map

**SHR38**

WW-7  
8-30-06



West Virginia Department of Environmental Protection  
Office of Oil and Gas  
**WELL LOCATION FORM: GPS**

API: 4709502648-00 WELL NO.: SHR37IHSM

FARM NAME: \_\_\_\_\_

RESPONSIBLE PARTY NAME: CNX Gas Company

COUNTY: Tyler DISTRICT: Centerville

QUADRANGLE: West Union

SURFACE OWNER: Robert Bruce Ash

ROYALTY OWNER: \_\_\_\_\_

UTM GPS NORTHING: 4355993.93

UTM GPS EASTING: 513310.94 GPS ELEVATION: 1011 ft

The Responsible Party named above has chosen to submit GPS coordinates in lieu of preparing a new well location plat for a plugging permit or assigned API number on the above well. The Office of Oil and Gas will not accept GPS coordinates that do not meet the following requirements:

1. Datum: NAD 1983, Zone: 17 North, Coordinate Units: meters, Altitude: height above mean sea level (MSL) – meters.
2. Accuracy to Datum – 3.05 meters
3. Data Collection Method:

Survey grade GPS \_\_\_\_\_: Post Processed Differential \_\_\_\_\_  
Real-Time Differential \_\_\_\_\_

Mapping Grade GPS X: Post Processed Differential X  
Real-Time Differential \_\_\_\_\_

RECEIVED  
Office of Oil and Gas  
JAN 16 2020  
WV Department of  
Environmental Protection

4. **Letter size copy of the topography map showing the well location.**

I the undersigned, hereby certify this data is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Office of Oil and Gas.

[Signature]  
Signature

PM  
Title

1-10-2020  
Date