



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

UIC Permit

CABOT OIL & GAS CORPORATION
900 LEE ST. , E. - SUITE 500
CHARLESTON, WV 25301-4308


Dear Applicant:

Enclosed you will find Underground Injection Control Permit Number UIC2D0791452 dated December 30, 2008. Be advised that the duration of the permit is for a period of five (5) years.

Also be advised that all conditions established by UIC Permit Number UIC2D0791452 either expressly or incorporated by reference, must be strictly adhered to. All monitoring forms shall be submitted to the Office of Oil and Gas in the manner and frequency prescribed. The monitoring forms will be compared with the scope of permitted activity to verify compliance.

Please review the permit carefully and be aware of all permit conditions. Compliance of all permit conditions will be strictly enforced.

The operation of this injection well facility in general, including maintenance of all related surface equipment, shall be conducted so as to preclude any unlawful discharge of waste materials into the surface or ground waters of the state.



James Martin
Chief,
Office of Oil and Gas

Enclosures as stated



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

December 30, 2008

Cabot Oil and Gas Corporation
900 Lee Street, E.
Suite 500
Charleston, WV 25301

RE: Underground Injection Control (UIC) Permit
#2D0791452

Please note, any time that acid is to be used to “stimulate” the above mentioned UIC well a Well Work Permit must be obtained through this agency. Acidizing a well is considered “stimulating” and a permit must be obtained per Code of West Virginia, Chapter 22, Article 6.

You state on UIC permit application, Form WW-3B (#20), that 15% HCL is to be used periodically to clean the well perforations to re-establish injection rates.

If you have any questions regarding this matter feel free to me at 304-926-0499, ext. 1653.

Sincerely,

James Peterson
Environmental Resources Specialist / Permitting



1) Date: April 21, 2008
2) Operator's Well No. Cabot #100
3) API Well No.: 47 - 079 - 01452
State County Permit
4) UIC Permit No. 2D 0791452

STATE OF WEST VIRGINIA
NOTICE OF LIQUID INJECTION OF WASTE DISPOSAL WELL WORK PERMIT APPLICATION
FOR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS,

5) Surface Owner(S) To Be Served	7) (a) Coal Operator
(a) Name <u>Drema Woods - Amherst Ind., Inc.</u>	Name <u>Drema Woods - Amherst Ind., Inc.</u>
Address <u>2 Port Amherst Drive</u>	Address <u>2 Port Amherst Drive</u>
<u>Charleston, WV 25306</u>	<u>Charleston, WV 25306</u>
(b) Name _____	7) (b) Coal Owner(S) With Declaration Of Record
Address _____	Name _____
_____	Address _____
(c) Name _____	Name _____
Address _____	Address _____
_____	_____
6) Inspector <u>Jamie Stevens</u>	7) (c) Coal Lessee with Declaration Of Record
Address <u>P O Box 1186</u>	Name _____
<u>Scott Depot, WV 25560</u>	Address _____
Telephone _____	_____

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

- (1) The Application For A Liquid Injection or Waste Disposal Well Work Permit on Form WW-3(B), which sets out the parties involved in the drilling or other work;
- (2) The plat (surveyor's map) showing the well location on Form WW-6; and
- (3) The Construction and Reclamation Plan on Form WW-9 (unless the well work is only to plug a well), which sets out the plan for erosion and sediment control and for reclamation for the site and access road.

The date proposed for the first injection or waste disposal is November 1, 20 08.

THE REASON YOU HAVE RECEIVED THESE DOCUMENTS IS THAT YOU HAVE RIGHTS REGARDING THE APPLICATION WHICH ARE SUMMARIZED IN THE "INSTRUCTIONS" ON THE REVERSE SIDE OF THE COPY OF THE APPLICATION [(FORM WW-3(B))] DESIGNATED TO YOU. HOWEVER YOU ARE NOT REQUIRED TO TAKE 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 Well Work Permit with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to a well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, the plat, and the Construction and Reclamation Plan 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 the mailing or delivery to the Chief.

The person signing this document shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments 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 and imprisonment.

Well Operator Cabot Oil and Gas Corp
Address 900 Lee Street, E - Suite 500
Charleston, WV 25301
By: Thomas S. Liberatore
Its: Vice President
Signature: Thomas S. Liberatore



1) Date: September 22, 2008
2) Operator's Well No. Cabot #100
3) API Well No.: 47 79 01452
State County Permit
4) UIC Permit No. 220791452

STATE OF WEST VIRGINIA
NOTICE OF LIQUID INJECTION OR WASTE DISPOSAL WELL WORK PERMIT APPLICATION
FOR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

- 5) WELL TYPE: Liquid Injection ☐ / Gas Injection (not storage) ☐ / Waste Disposal ☒ /
6) LOCATION: Elevation: 641.52 Watershed: Guano Creek of Kanawha River
District: Pocatalico County Putnam Quadrangle Bancroft
7) WELL OPERATOR: Cabot Oil and Gas Corp 8) DESIGNATED AGENT Thomas Liberatore
Address 900 Lee Street, E - Ste. 500 Address 900 Lee Street, E - Ste. 500
Charleston, WV 25301 Charleston, WV 25301
9) OIL & GAS INSPECTOR TO BE NOTIFIED 10) DRILLING CONTRACTOR
Name Jamie Stevens Name _____
Address P O Box 1186 Address _____
Scott Depot, WV 25560
11) PROPOSED WELL WORK Drill ☐ / Drill deeper ☐ / Redrill ☐ / Stimulate ☐
Plug off old formation ☐ / Perforate new formation ☐ Convert ☒
Other physical change in well (specify) _____
12) GEOLOGIC TARGET FORMATION Big Injun Depth 1710 Feet (top) to 1756 Feet (bottom)
13) Estimated Depth of Completed Well, (or actual depth of existing well): 3000 Feet
14) Approximate water strata depths: Fresh 86 Feet Salt 1202 Feet
15) Approximate coal seam depths: None reported in offset wells
16) Is coal being mined in the area? Yes ☐ No ☒
17) Virgin reservoir pressure in target formation _____ psig Source _____
18) Estimated reservoir fracture pressure _____ psig (BHFP)
19) MAXIMUM PROPOSED INJECTION OPERATIONS: Volume per hour 300 BBLs/hr Bottom hole pressure 2482 psi
20) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES 15% HCL, acid may
be used periodically to clean formation and perforations to re-establish injection rates. Produced fluids. Pipeline fluids
21) FILTERS (IF ANY) _____
22) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL _____

23) CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS					FOOTAGE INTERVALS		CEMENT FILL -UP OR SACKS (CU FT.)	PACKERS
	Size	Grade	Weight per ft.	New	Used	For Drilling	Left In Well		
Conductor									Kinds <u>Baker AL-2</u>
Fresh Water	<u>13 3/8'</u>	<u>LS</u>	<u>37</u>			<u>40</u>	<u>40</u>	<u>GFS</u>	
Coal	<u>9 5/8'</u>	<u>LS</u>	<u>26</u>			<u>190</u>	<u>190</u>	<u>112 ft3 CTS</u>	Sizes <u>4 1/2 x 7</u>
Intermediate	<u>7'</u>	<u>LS</u>	<u>19</u>			<u>1912</u>	<u>1912</u>	<u>CTS</u>	
Production	<u>4 1/2'</u>	<u>M-60</u>	<u>10.5</u>			<u>1657</u>	<u>1657</u>	<u>On packer</u>	Depths set <u>1657</u>
Tubing									
Liners									Perforations
									Top Bottom
									<u>1715 1745</u>

24) APPLICANT'S OPERATING RIGHTS were acquired from Amherst Industries, Inc.
by deed ☐ / lease ☒ / other contract ☐ dated 4-18-2007 of record in the
Putnam County Clerk's office in Lease Book 62 Page(s) 839 - 841

**UNDERGROUND INJECTION CONTROL PERMITS
FOR
DEPARTMENT OF ENVIRONMENTAL PROTECTION,
OFFICE OF OIL AND GAS AND DIVISION OF WATER AND WASTE MANAGEMENT
FOR
CLASS II DISPOSAL WELLS**

This document consists of the Underground Injection Control (UIC) Permit required by the Department of Environmental Protection, Office of Oil and Gas, and Division of Water and Waste Management. The permittee is allowed to engage in underground injection in accordance with the terms and conditions of this permit based upon an approved UIC Permit.

The Underground Injection Control Permit No. **UIC2D0791452** consists of Forms WW-3A and WW-3B and the terms and conditions below:

1. The underground injection activity authorized by this permit shall not allow the movement of fluid, as per (47CSR13-2.26), containing any contaminant into any subsurface area other than that which is specified and may not cause a violation of any primary drinking water regulation promulgated under 40 CFR Chapter 1, Part 141 or any water quality standard promulgated by the Department of Environmental Protection.
2. This permit is issued in accordance with the provisions of Article 11 and 12, Chapter 22 of the Code of West Virginia and the Legislative Rule 47CSR13.
3. All reports required by this permit shall be submitted to the Office of Oil and Gas with the exception to paragraph 4 below.
4. The following activities require the immediate cessation of facility operations and prompt notification of the Director of Water and Waste Management (47CSR13-13.6.d and 47CSR13-13.12.1.6).
 - a) Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;
 - b) Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and
 - c) Any non-compliance which may endanger health and environment.

5. This permit is for authorization of injection of only fluids as defined for Class II wells in 47CSR13-4.2. The fluids to be injected shall only be from those sources listed in the permit application. Additional sources of fluids may be approved upon written request by the permittee.
6. The permit must satisfy the requirements of the Office of Oil and Gas regarding any corrective action needed on all known wells penetrating the injection zone within the area of review (47CSR13-6).
7. Any production well within a ¼ mile radius of disposal well# 47-079-01452 which does not have cemented production casing shall be plugged immediately upon becoming inactive. Any temporary inactive well shall be monitored at a frequency and by a method prescribed by the Office of Oil and Gas upon notice by the permittee of such activity. Any well shut-in more than one (1) week shall be considered inactive.
8. The area of review is designated as a 1 / 4 mile radius around the injection project.
9. This permit approves the Big Injun formation for injection from 1,710' to 1,756'.
10. The maximum wellhead injection pressure shall be established at 436 PSI.
11. The permittee shall provide for security at the injection facility to guard against illegal or unauthorized dumping and injection at the injection facility.
12. The permittee shall monitor the 4 1/2" X 7" casing annuli with pressure sensitive devices or with such a method as approved or required by the Office of Oil and Gas to allow early detection on any leaks from the injection zone or casing. The results of such monitoring shall be reported on Form WR-40.
13. Authorization to inject is contingent upon submission and approval of the Office of Oil and Gas Form WR-37 for each well. Construction modifications from the proposed work plan (O&G Form WW-3) and mechanical integrity will be evaluated at this time. Operational conditions will be finalized at this time. Upon approval of Form WR-37, conditions established on this form are incorporated by reference as conditions of this permit. FORM WR-37 SHALL BE SUBMITTED WITHIN 30 DAYS OF THE EFFECTIVE DATE OF THE UIC PERMIT.
14. A well head pressure gauge shall be installed and maintained on the injection tubing / casing to facilitate inspection and ensure compliance of maximum injection pressures as approved on Oil and Gas Form WR-37. A daily reading of the injection pressure shall be taken and reported monthly on Form WR-40 to the Office of Oil and Gas.
15. The permittee shall sample and analyze injection fluids upon request by the Office of Oil and Gas at a frequency not to exceed twice a year. Analyses shall cover all parameters listed on Attachment A of this permit. Results of all analyses shall be submitted to the Office of Oil and Gas. Permittee shall submit a letter of explanation for any parameter which exceeds the ranges on Attachment A.

16. All injection lines shall be inspected, maintained, operated and monitored to allow early detection of any leakage and so that the occurrence of leaks will be minimized.
17. The permittee shall fulfill the requirements of the Office of Oil and Gas regarding maintaining financial responsibility and resources to close, plug, and abandon permitted wells.
18. The herein-described activity is to be extended, modified, added to, made, enlarged, acquired, constructed or installed, and operated, used and maintained strictly in accordance with the terms and conditions of this permit; with the information submitted with the Permit Application No. **UIC2D0791452** with the plan of maintenance and method of operation thereof submitted with such application(s); and with any applicable rules and regulations promulgated by the Department of Environmental Protection.
19. This permit is issued in accordance with the provisions of Article 11 and 12, Chapter 22, of the Code of West Virginia and Legislative Rule 47CSR13.
20. Failure to comply with the terms and conditions of this permit, with the plans and specifications submitted with the Permit Application No. **UIC2D0791452** and with the plan of maintenance and method of operation thereof submitted with such application(s) shall constitute grounds for the revocation or suspension of this permit and for the invocation of all the enforcement procedures set forth in Article 11 and 12, Chapter 22, of the Code of West Virginia and Legislative Rule 47CSR13.
21. The operation of this injection well facility in general, including maintenance of all unrelated surface equipment, shall be conducted so as to preclude any unlawful discharge of waste materials into the surface or ground waters of this State.
22. The permittee must satisfy the requirement of the Office of Oil and Gas for plugging and abandonment of permitted injection wells in such a manner as to ensure that no fluid movement occurs either from the injection zone into an underground source of drinking water or from one underground source of drinking water to another.

ATTACHMENT A

Injection Fluid Analyses Parameters

<u>Parameter</u>	<u>Ranges</u>
PH	>2 – 10
TDS	0 - 265,000 mg/l
TSS	0 - 1000 mg/l
Aluminum	0 - 10 mg/l
Arsenic	0 – 10 mg
Barium	0 – 1500 mg/l
Cadmium	0 – 2 mg/l
Chromium	0 – 1 mg/l
Iron	0 – 1000 mg/l
Lead	0 – 7.5 mg/l
Magnesium	0 – 5000 mg/l
Manganese	0 – 15 mg/l
Potassium	0 – 5000 mg/l
Sodium	0 – 110,000 mg/l
Zinc	0 – 15 mg/l
Surfactants	0 – 10 mg/l
TKN	0 – 25 mg/l
Oil and Grease	0 – 100 mg/l
TOC	0 – 10,000 mg/l
COD	0 – 30,000 mg/l
Acidity	0 – 500 mg/l
Chloride	0 – 250,000 mg/l
Sulfate	0 – 500 mg/l
Cyanide	0 – 1 mg/l
Phenols	0 – 10 mg/l
Calcium	0 – 60,000 mg/l
BNA – Extractables	Trace
Purgeable Aromatics	Trace
Purgeable Halocarbons	Trace
PCBs	<MDL or 50 ppm