UNDERGROUND INJECTION CONTROL PERMIT APPLICATION PACKAGE

West Virginia Department
Of Environmental Protection

Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304

MATERIALS CONTAINED WITHIN THIS UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION PACKAGE

- Underground Injection Control (UIC) Permit Procedure
- Form WW-3 (A)
- Form WW-3 (A) -- Instructions to Applicant
- Form WW-3 (B)
- Form WW-3 (B) – Office of Oil & Gas Use Only
- Underground Injection Control (UIC) Permit Guidelines
- Underground Injection Control (UIC) Operational Guidelines
- Additional Items Required As Part Of All Class II and III UIC Permit Applications

UNDERGROUND INJECTION CONTROL (UIC) PERMIT PROCEDURE

A. Complete the attached Forms WW-3(A) and WW-3(B).

B. Complete the thirteen (13) additional items required as part of all Class II UIC applications.

C. A fee of $500.00 shall accompany the UIC permit application.

D. A, B and C combined for the UIC permit application. The original and one (1) complete copy of the application shall be submitted to:

Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304

E. When the Office receives the permit application, a completeness check will be conducted. If the Office finds the application to be incomplete it will be returned to the operator for the additional information required.

F. If the Office considers the application to be complete a technical review of the application shall begin. This process takes approximately two (2) weeks if no problems are found.

G. If no additional information is needed as a result of the technical review, a draft permit will be issued.

H. A public notice will be included in the draft permit. The notice is to be published as a Class I legal advertisement in the newspaper servicing the area of the proposed injection well or facility.

- The notice needs to be published only once.
- Obtain an "affidavit of publication" at the time the notice is published and forward it to:

Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304
Attn: Gene Smith

- Cost of the publication is the responsibility of the permittee.
- There is a thirty (30) day public commenting period beginning with the notice publication date.

I. The final UIC permit can be issued after the commenting period if no comments are filed.

FORM WW-3 (A)
1/12

1) Date: _____
2) Operator's Well No. _____
3) API Well No.: **47** - _____ - _____
State County Permit
4) UIC Permit No. _____

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
(a) Name _____
Address _____
_____
(b) Name _____
Address _____
_____
(c) Name _____
Address _____
_____
6) Inspector _____
Address _____
_____
Telephone _____

7) (a) Coal Operator
Name _____
Address _____
_____
7) (b) Coal Owner(S) With Declaration Of Record
Name _____
Address _____
_____
Name _____
Address _____
_____
7) (c) Coal Lessee with Declaration Of Record
Name _____
Address _____
_____

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 _____ 20 ____ .

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 _____
Address _____
_____
By: _____
Its: _____

Signature: _____

FORM WW-3 (A)
(Instructions to Applicant)
1/12

INSTRUCTIONS TO APPLICANT

CONCERNING THE LINE ITEMS:

1) Date of Notice;

2) Your Well Name and Number;

3) To be filled out by the Office of Oil & Gas unless this well is covered by an existing permit;

4) To be filled out by the Office of Oil & Gas unless this well is covered by an existing permit;

5) Use separate sheet, if necessary;
Surface Owner(s) of record to be served with the Notice of Application. However, see also Code 22-6-9(b) if "more than three tenants in common or other co-owners of interest described in subsection (a) of this section hold interests in such lands."

6) Inspector;

7) Use separate sheet, if necessary;
   a) "Coal Operator" means a person, firm, partnership, partnership association or corporation that proposes to or does operator a coal operator;
   b) See Code 22-6-36;
   c) See Code 22-6-36;

CONCERNING THE REQUIRED COPIES FOR FILING AND SERVICE:

Filing. Code 22-6-6 and Regulation 7.02 provide that the original and two copies of the Notice and Application must be filed with the Chief, accompanied by (1) a plat in the form prescribed by Regulation 11; (2) a bond in one of the forms prescribed by Regulation 12, or in lieu thereof the other security allowed by code 22-6-26; and (3) the "Construction and Reclamation Plan" for Form WW-9, applicable to the plan required by Code 22-1-G(d) and the reclamation required by Code 22-6-30 and Regulation 23; unless if applicable, the consent required by code 22-6-21 from the owner of any water well or dwelling within 200 feet of the proposed well.

Service. In addition, service must be made on the surface owner(s) and the person(s) with interest in the coal. See Code 22-6-9, 22-6-13 and 22-6-14.

FORM WW-3 (B)
1/12

1) Date: _____
2) Operator's Well No. _____
3) API Well No.: **47** - _____ - _____
State County Permit
4) UIC Permit No. _____

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: _____ Watershed: _____
District: _____ County _____ Quadrangle _____
7) WELL OPERATOR: _____ 8) DESIGNATED AGENT _____
Address _____ Address _____
_____ _____
9) OIL & GAS INSPECTOR TO BE NOTIFIED 10) DRILLING CONTRACTOR
Name _____ Name _____
Address _____ Address _____
_____ _____
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 _____ Depth _____ Feet (top) to _____ Feet (bottom)
13) Estimated Depth of Completed Well, (or actual depth of existing well): _____ Feet
14) Approximate water strata depths: Fresh _____ Feet Salt _____ Feet
15) Approximate coal seam depths: _____
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 _____ Bottom hole pressure _____
20) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES _____
_____
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
Fresh Water									
Coal									Sizes
Intermediate									
Production									Depths set
Tubing									
Liners									Perforations
									Top Bottom

24) APPLICANT'S OPERATING RIGHTS were acquired from _____
by deed _____ / lease _____ / other contract _____ / dated _____ of record in the
_____ County Clerk's office in _____ Book _____ Page _____

FORM WW-3(B)
(Office of Oil & Gas Use Only)
1/12

OFFICE USE ONLY

DRILLING PERMIT

Permit Number _____ Date: _____

This permit covering the well operator and well location shown below is evidence of permission granted to drill in accordance with the pertinent legal requirements subject to the conditions contained herein and on the reverse hereof. Notification must be given to the District Oil & Gas Inspector, (Refer to No. 9) prior to the construction of roads, locations, pits for any permitted work. In addition, the Well Operator or his contractor shall notify the proper District Oil & Gas Inspector 24 hours before actual permitted work has commenced.

The permitted work is as described in the Notice of Application, plat and (if required) Construction and Reclamation Plan, subject to any modifications and conditions specified below.

Permit Expires _____ unless well work is commenced prior to that date and prosecuted with due diligence.

Bond	Agent	Plat	Casing	Fee

CHIEF, OFFICE OF OIL & GAS

Note: Keep One Copy of this permit posted at the drilling location.

PERMIT MODIFICATIONS AND CONDITIONS (IF ANY) TO THE PROPOSED WELL WORK

OFFICE USE ONLY

This part of Form IV-3(b) is to record the dates of certain occurrences and any follow-up inspections.

	Date			Date
Application Received		Follow-up Inspection(s)		
Well Work Started		"	"	
Total Depth Reached		"	"	
Well Record Received		"	"	
Reclamation Completed		"	"	

OTHER INSPECTIONS

Reason: _____

Reason: _____

UNDERGROUND INJECTION CONTROL (UIC) PERMIT GUIDELINES

1) The term of a UIC Permit is five (5) years from its effective date. Therefore, the UIC permit must be renewed every five (5) years for injection to continue.

2) It is the policy of the Office of Oil & Gas that fluid shall be injected into the same formation from which it is produced or deeper.

3) For any well to be permitted as an injection well, the surface casing must be cemented to surface.

4) For any well to be permitted as an injection well, a tubing and packer arrangement must be utilized as the injection string of casing. The packer shall be set immediately above the injection formation.

5) An Area of Review (AOR) shall be completed for each well permitted as an injection well. All wells within a ¼ mile radius or a calculated radius according to 40CFR146.6 of the proposed injection well or field shall be reviewed for construction and/or plugging adequacy to prevent the migration of injected fluids into any underground sources of drinking water.

UNDERGROUND INJECTION CONTROL (UIC) OPERATIONAL GUIDELINES

INJECTION PRESSURE

The Office of Oil and Gas presently follows a policy that limits maximum bottom-hole injection pressure (MBHIP) not to exceed 0.8 psi/ft. gradient. The MBHIP is calculated by multiplying 0.8 psi/ft. by the top injection zone perforation depth. For example, the maximum allowable bottom hole injection pressure for an injection well with the top perforation at 1000 feet would be 800 psi. The maximum wellhead injection pressure is then determined by subtracting the hydrostatic pressure from the maximum allowable bottom-hole pressure. Hydrostatic pressure equals 0.433 psi/ft. X Injection Fluid Specific Gravity X top injection zone perforation depth.

MECHANICAL INTEGRITY TESTING

All wells drilled or converted for injection must demonstrate mechanical integrity through a pressure test prior to initiating any injection operations. The mechanical integrity test (MIT) is performed to ensure there is no significant leak in the casing, tubing or packer.

The Office and/or regional oil and gas inspector shall be notified at least twenty four (24) hours prior to conducting a mechanical integrity test so that it may be witnessed.

A "Pre-Operation Certificate" (Form WR-37) must be completed with the results of each Mechanical Integrity Test (MIT) conducted and submitted to the Office for approval. The test shall be conducted and the Form submitted within thirty (30) days of the effective date of the UIC Permit.

The Office requires that a chart be used to record the results of any pressure test. This chart shall be submitted with Form WR-37.

When conducting a pressure test the tubing and production casing annulus shall be pressured up on to one and one half (1 ½) to two (2) times the maximum allowable injection pressure and shut in for twenty (20) minutes.

The Office will approve no more than a five percent (5%) bleed off on any pressure test conducted.

STEP RATE TEST

Should the 0.8 psi/ft. gradient not allow for sufficient injection pressure for injection operations, a higher pressure may be approved based upon a step-rate test. The Office would then approve up to 90% of the determined formation parting pressure or the maximum pressure reached during the step-rate test in which formation parting does not occur.

In order that step-rate test data is valid and supplies the required information needed for the Office to approve a higher injection pressure, the following procedures and equipment should be utilized for testing.

1. The test should be shut-in at least seventy-two (72) hours prior to testing to allow bottom-hole pressure to approach the formation pressure.

2. Test consists of a series of constant-rate injections which increase in a stepwise fashion. Rates should center around the proposed injection rate.

3. Injection periods should last sixty minutes for formations having a permeability of less than ten millidarcies and thirty minutes for formations having a permeability of greater than ten millidarcies.

4. Test should consist of at least six injection periods.

5. Injection rates should be controlled with a constant flow-rate regulator.

6. Flow rates should be measured with a turbine flowmeter and rate meter. A stopwatch should be used to check flow rates.

7. Calibrated pressure gages should be used for observing pressure at each rate at the surface on the flowing string and all annulus. Measurement of bottom-hole pressures is preferable but not necessary.

8. Test procedures along with injection rates and pressures are to be recorded and submitted to the Office along with a plot of the data.

Should there be a need to vary from this test procedure substantially; the Office should be contacted first for agreement of the test procedure.

Please notify the Office forty-eight (48) hours prior to testing to allow the Office the opportunity to witness the test.

ADDITIONAL ITEMS REQUIRED AS PART OF ALL CLASS II AND III UIC PERMIT APPLICATIONS

It is essential that all information requested on Forms WW-3(A) and WW-3(B) be completely and accurately addressed. Estimates and proposals must be based upon valid sources of information. In addition to WW-3(A) and WW-3(B) the following fifteen (15) items must be addressed individually through a narrative and any supporting data be referenced as an exhibit.

1. A 7.5 minute topographic map or section showing one mile around the well or facility. Within this one mile area the map must show the location of the well or facility, all known drinking wells, springs and surface water bodies.

2. Submit analyses from all water wells within a ¼ mile radius of the proposed well or facility. The parameters for analysis shall include but are not limited to: pH, TDS, Iron, Manganese, Chlorides, Sodium and Barium. Indicate on the map or section in Item No. 1 the locations and label all water wells for which an analysis was submitted. If there are no water wells within the ¼ mile radius then strategically select and sample enough water wells to accurately describe the groundwater quality in the vicinity of the proposed well or facility.

3. A detailed analysis of the fluids to be injected including specific gravity.

4. A detailed description of all additives to be injected including concentrations.

5. If available, any lithologic logs and coring program information derived from the immediate area.

6. If available, any geophysical logs derived from the immediate area. Identify the injection zone and confining zone on any logs submitted.

7. A detailed description of the proposed injection zone including thickness, permeability and porosity.

8. Describe the confining layer which would prevent the upward migration of injected fluid out of the proposed injection zone.

9. Structural contour map of the top or bottom of the proposed injection formation. Indicate the location of the proposed well or facility.

10. Isopach map of the injection formation. Indicate the location of the proposed well or facility.

11. To fulfill the requirements of an Area of Review (AOR) submit well records and/or plugging affidavits for all wells within a ¼ mile radius of the proposed well or facility. Locate and label these wells on a topo map or section (preferably with Item No. 1).

12. A list of the API well numbers for all wells to be serviced by a brine disposal well or wells enhanced for pressure maintenance or secondary recovery purposes as applicable. This list shall include the producing formation.

13. Well schematic including cement tops for each well being proposed for waste disposal. If an area UIC permit is being proposed then submit a representative schematic for each different type of well construction within the waterflood.

14. Conduct a detailed geologic investigation of subsurface features in vicinity of injection well. This investigation will assess the likelihood for the presence of subsurface faults, fractures or potential seismically active features. At a minimum, this investigation will draw upon public or privately available geologic information such as seismic survey lines, well records, published academic reports, government reports or publications, earthquake history, geologic maps, or other like information to access the potential that injection of fluids could lead to activation of fault features and increasing the likelihood of earthquakes. .

15. Provide a schematic/model of fluid migration horizontally and/or vertically over time within subsurface formation(s) around the proposed injection well.