

UIC Class 5 Mine Backfill / Coal-Slurry Permit Application Completeness Checklist

This checklist is provided to help permit applicants provide the appropriate material that the EPA permit writers need to evaluate the application. Much of the application was originally developed for UIC Class 2 wells and is not always appropriate for UIC Class 5 wells. The BOLD print is the added information. It is advised to organize the permit application in sections that match these sections A-U. One paper copy of the application with maps shall be provided to EPA. Also provide an electronic copy of the application. A CD included with the paper application works well.

- _____ **A. AREA OF REVIEW METHODS** - Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be a fixed radius of 1/4 mile from the well bore unless the use of an equation is approved in advance by the Director.

Mine Backfill permit application considerations are different than for Class 2 injection wells. This section should describe the abandoned and sealed mine where the injection will take place, the specific coal seam, and describe how the area of review (AOR) will be defined as ¼ mile beyond the extend of the subsurface injection zone which is the abandoned mine works. The boundary of the AOR around the subsurface injection zone can be “smoothed” out but it cannot be less than a ¼ mile.

- _____ **B. MAPS OF WELL/AREA AND AREA OF REVIEW** - Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

Mine Backfill permits are Area Permits. The items below should be shown on the map and be easy to read.

**Injection Zone
Area of Review
Injection Wells
Decant Wells
Vent Wells
Compliance Monitoring Wells
Public Water Supply Wells
Domestic Wells
Domestic Monitoring Wells
Oil and Gas Wells
Faults
Strike and Dip Symbol**

A separate map should show the surface property owners within the AOR and be tied back to a list of these property owners with their addresses. An electronic Excel spreadsheet of the property owners and their addresses will also be provided to EPA

as part of the permit application. Each property owner will be mailed a Public Notice.

- _____ **C. CORRECTIVE ACTION PLAN AND WELLDATA** -Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those on the map required in B, which penetrate the proposed injection zone. Such data shall include the following:

Class I

A description of each well's types, construction, date drilled, location, depth, record of plugging and/or completion and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

Class II

In addition to requirement for Class I, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells with in the area of review which penetrate formations affected by the increase in pressure. This requirement does not apply to existing Class II wells.

Class III

In addition to requirements for Class I, the corrective action proposed under 40 CFR 144.55 for all Class III wells.

This map and table is generally an inventory of the oil and gas wells within the AOR. Status of the well should be recorded (active, plugged, never drilled, etc.). Specifically, EPA wants to know how the well was cemented and how the well was plugged. Typically these wells are in unmined pillars if they penetrate through the mine. These wells are potential pathways for injected fluids to migrate out of the injection zone. Many of these well records are available from the Kentucky Geological Survey.

- _____ **D. MAPS AND CROSS SECTION OF USDWs** -Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection. (Does not apply to Class II wells.)

Cross section should be across the AOR and preferably perpendicular to strike. Should show units below the injection zone, the injection zone, confining units above and below the injection zone, other coal seams, drinking water aquifers, etc. A generalized stratigraphic column is also helpful.

- _____ **E. NAME AND DEPTH OF USDWs (CLASS II)** -For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.

For the Class 5 Mine Backfill wells, describe the area aquifers that are used for domestic and/or municipal use.

- _____ **F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA** - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining

intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

Information may be able to be shown on cross section in Attachment D or in another section.

- _____ **G. GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (Class II)** -For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.

Include this geological information. The fracture pressure is not needed.

- _____ **H. OPERATING DATA** - Submit the following proposed operating data for each well (including all those to be covered by area permits):(1)average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

Include operational data about the coal supply, preparation plant, transport of slurry to injection well, pumping rate, amount of calculated storage, estimated amount of injected fluid per day, fluid withdrawal, strike and dip, how fluid levels will be monitored to prevent fluid from moving from the injection zone, flowing to the surface, etc.

- I. FORMATION TESTING PROGRAM** - Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

For Class II wells the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

For Class III wells the testing must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the program formation is not water bearing. (Does not apply to existing Class III wells or projects.)

Not needed for Class 5 Mine Backfill wells.

- J. STIMULATION PROGRAM** - Outline any proposed stimulation program.

Not needed for Class 5 Mine Backfill wells.

- _____ **K. INJECTION PROCEDURES** - Describe the proposed injection procedures including pump, surge, tank, etc.

- _____ **L. CONSTRUCTION PROCEDURES** - Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and

cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

Discuss how injection and decant wells will be drilled, cased, and cemented. The casing is required to be cemented in from bottom of the well to the top. A Mechanical Integrity Test (MIT) is required for each injection well prior to injection. The injection well shall be pressurized to 220 psi and held for one hour with no more than a (10) percent pressure change. The cementing of the well and the MIT may be witnessed by EPA. EPA should be notified in advance. See Attachment A.

- _____ **M. CONSTRUCTION DETAILS** - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

Include injection well, decant well, monitoring well, etc. construction details and drawing. Be sure to show the cement in the drawings. The cement should extend the full length of the well.

- N. CHANGES IN INJECTED FLUID** - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injection fluid. (Class III wells only.)

Not needed.

- _____ **O. PLANS FOR WELL FAILURES** - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW.

Also show how fluids would not spill to the surface and how the operation would respond to a well or piping failure. Include information on how permittee would respond to monitoring exceedances.

- _____ **P. MONITORING PROGRAM** - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

The compliance monitoring wells will include a minimum of five (5) wells. These shall include two updip monitoring wells, one above and one below the injection zone. There shall be two downdip monitoring wells, one above and one below the injection zone. Additionally, there will be one monitoring well within an unmined coal in the injection zone. Existing wells can be used for monitoring if they are properly constructed and located in the appropriate places. See Attachments A and B.

- _____ **Q. PLUGGING AND ABANDONMENT PLAN** - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium

prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.

The wells shall be plugged from the bottom up, completely filled with Class A cement.

- _____ **R. NECESSARY RESOURCES** - Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.

A suitable Financial Responsibility (FR) instrument must be established for the injection wells and dewatering wells before the permit goes to Public Notice. FR is for the wells that are presently being drilled and for any existing active (unplugged) injection wells. FR is not presently necessary for future wells that have not been constructed. Coordinate all FR matters through Miriam Lester 404-562-9292, Lester.Miriam@epa.gov.

- S. AQUIFER EXEMPTIONS** -If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria :(1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon production, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR Sections 144.7 and 146.04.

This should not be needed for Class 5 Mine Backfill injection wells.

- _____ **T. EXISTING EPA PERMITS** - List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.

- _____ **U. DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business.

_____ **Comply with other Federal Laws, 40 CFR, Section 144.4; National Historic Preservation Act (NHPA) and Endangered Species Act (ESA). See Attachment C.**

Attachment B

Monitoring Parameters

Compliance Monitoring:

Antimony, dissolved

Arsenic, dissolved

Barium, dissolved

Beryllium, dissolved

Cadmium, dissolved

Chromium, dissolved

Copper, dissolved

Cyanide, total

Iron, dissolved

Lead, dissolved

Manganese, dissolved

Mercury

pH, field. on an instrument with readings in the calibrated range

Selenium, dissolved

Specific Gravity,

Thallium, dissolved

Total Dissolved Solids

Calcium, dissolved

Magnesium, dissolved

Sodium, dissolved

Potassium, dissolved

Carbonate

Bicarbonate

Sulfate

Chloride

Domestic Monitoring: (Does not need to be drinking water certified.)

Acidity

Fluoride

Iron, dissolved

Lead, dissolved

Manganese, dissolved

Nitrate, nitrate-N

Nitrite, nitrite- N

pH, field. on an instrument with readings in the calibrated range

Phosphate, dissolved

Calcium, dissolved

Magnesium, dissolved

Sodium, dissolved

Potassium, dissolved

Carbonate

Bicarbonate

Sulfate

Chloride

Attachment A

Monitoring and MIT Information

			Frequency	Reported to EPA
D2	Injection Parameters:	Injection Pressure Flow Rate Cumulative Volume	Weekly	Report to EPA Yearly
D3	Injectate Fluid Analysis	Sampled before injection and then annually	Yearly	First report to EPA 13 months after effective date of permit. Every 12 months after that.
D4a	Compliance Monitoring Wells		Quarterly (every three months)	Quarterly
D4b	Domestic Monitoring Wells		Quarterly	Quarterly
B3	MIT	220 psi for one hour with less than 10% change.	Before injection. Every 5 years thereafter.	After test.

Attachment C

United States Environmental Protection Agency - Region 4 Procedures for Complying with Other Federal Laws That May Apply for Underground Injection Control (UIC) Permits in Kentucky

Considerations under Federal Law

Under Title 40 of the Code of Federal Regulations (C.F.R.) §144.4, the EPA must consider several Federal laws that may apply to the issuance of permits. When any of these laws is applicable, its procedures must be followed. When the applicable law requires consideration or adoption of particular permit conditions or requires the denial of a permit, those requirements also must be followed. The list of laws that must be considered include: the Wild and Scenic Rivers Act; the National Historic Preservation Act (NHPA); the Endangered Species Act (ESA); the Coastal Zone Management Act; and the Fish and Wildlife Coordination Act (FWCA).

The EPA is requiring the following additional information regarding the NHPA and ESA for all permit applications to help determine whether these acts will require EPA to consider or adopt particular permit conditions, or deny the permit.

National Historical Preservation Act (NHPA)

Under Section 106 of the NHPA, the EPA is required before issuing a permit, to adopt measures when feasible to mitigate potential adverse effects of the permitted activity and properties listed or eligible for listing in the National Register of Historic Places. The Act's requirements are to be implemented in cooperation with State Historic Preservation Officers (SHPO) and upon notice to, and when appropriate, in consultation with the Advisory Council on Historic Preservation.

In Kentucky, the agency responsible for this process is the Kentucky Heritage Council (KHC). Applicants for UIC permits in Kentucky are required to use the KHC's review and compliance procedures, and submit KHC's comments to the EPA. This information is required before an application will be able to be considered technically complete. The KHC's procedures are available on KHC's website <http://heritage.ky.gov/siteprotect>.

In addition to the procedures listed on their site, KHC has asked that all applicants:

- submit a description of the types of disturbances that have occurred in the project area
- submit documentation of all aspects of the project, including water lines that will be installed (including the line's location on a map)
- be prepared to send a copy or scan of the permit application

Applicants should send copies of any information submitted to KHC, beyond what was included in their initial permit application, to their permit writer for inclusion in the administrative record. Applicants should also send copies or scans of any correspondence received from KHC to their permit writer.

Endangered Species Act (ESA)

Under Section 7 of the ESA, the EPA is required to ensure, in consultation with the Secretary of the Interior or Commerce, that any action authorized by EPA is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.

In Kentucky, the U.S. Fish and Wildlife Service (FWS) Kentucky Ecological Services Field Station facilitates this process. Applicants for UIC permits in Kentucky will now be required to use the FWS Pre-Development Consultation's review and compliance procedures, and submit FWS's comments to the EPA. This information is required before an application will be able to be considered technically complete. The Pre-Development Consultation procedures are available on the Kentucky Ecological Services Field Station website <http://www.fws.gov/frankfort/PreDevelopment.html>. Applicants should be prepared to submit a copy or scan of the permit application.

In addition to the procedures listed on their site and any site-specific concerns, one concern that FWS has expressed is the possibility for above ground failures and leaks to cause damage to aquatic species. As such, all applicants should provide FWS with information as to how they plan to address the following comments:

- “Properly berm the entire perimeter of the well pads to prevent injection fluids and other chemical contaminants from leaving the well pad area. The area surrounded by the berm should be large enough to contain all of the fluid contained in the existing tank plus an overflow volume sufficient to contain a spill that could occur but is not observed during the time between days of the site's routine monitoring/maintenance schedule.”
- “Consider the durability of the material for the proposed pipes and the routes of the pipes to minimize the likelihood of leaks.”
- “Monitor the sites regularly and have a spill response plan in place that considers how to eliminate or minimize potential migration of spills into water resources.”

Applicants addressing the comments above may wish to consider including information on the following items:

- any Kentucky Division of Water (DOW) permit information for your tanks and facility, (including information showing that such facilities currently are or will be compliant with DOW and any other applicable regulations) and any spill prevention, control and countermeasure (SPCC) you have regarding these items
- any Kentucky Division of Oil & Gas (DO&G) permit information for any gathering or water lines, (including information showing that such facilities currently are or will be compliant with DO&G and any other applicable regulations) and any SPCC you have regarding these items
- the placement of any pressure (Murphy) switches or other devices that are designed to halt flow in case of leaks and system failures
- a discussion about the pipeline design and construction showing that pipeline is designed to:
 - prevent freeze thaw ruptures (buried, insulated, drained, due to injectate salinity, etc.)
 - prevent damage from surface operations (truck traffic, plowing, etc)
- other impact minimization measures like those required by DO&G, such as the ones discussed in the KY Oil & Gas Well Operator's Manual, March 2016 edition

Applicants should send copies of any information submitted to FWS, beyond what was included in their initial permit application, to their permit writer for inclusion in the administrative record.

Applicants should also send copies or scans of any correspondence received from FWS to their permit writer.