Illinois Environmental Protection Agency

Underground Injection Control Program

General information and instructions for the preparation and submission of an Application for a Permit to Construction and Operate an Underground Injection Control (UIC) Well

January 2020

Guidance for Submitting Applications for a
Permit to Dispose of Waste Using an Underground Injection Control (UIC) Well

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1.0 General Information

Underground Injection Control (UIC) Wells are wells used to inject various wastes into a selected geologic formation beneath the surface of the Earth. In general, but not always these geologic formations are located below all underground sources of drinking water (USDW) at the location where the UIC well is to be drilled and there is a confining layer above this geologic formation which restricts the injected waste from migrating upward into a USDW. For the purposes of the UIC program implemented by the Illinois Environmental Protection Agency (Illinois EPA), a well is: (1) a bored, drilled or driven shaft, or a dug hole, whose depth is greater than its largest surface dimension; (2) an improved sink hole; or (3) a subsurface fluid distribution system.

Injection of industrial or municipal wastes into a UIC well is considered to be a form of disposal, as the waste is injected into a portion of the subsurface of the Earth. Since groundwater is a major source of drinking water in the United States, the Safe Drinking Water Act of 1974 established the UIC Program to prevent contamination of any groundwater resulting from the operation of injection wells. Both hazardous wastes (as defined in 35 Ill. Adm. Code 721) and non-hazardous wastes may be injected into UIC wells. Hazardous waste may be injected only if land disposal restrictions of 35 Ill. Adm. Code 728 are met and USEPA approves a no migration petition for the overall operation of the UIC well.

No person (individual, corporation or other legal entity) may begin drilling a new UIC well for the disposal of industrial or municipal waste or convert an existing well into an industrial or municipal waste disposal well without first obtaining a construction permit from the Illinois EPA (see 35 Ill. Adm. Code 704.121 and 704.161 as well as 35 Ill. Adm. Code 704.183 and 730.114(a)(15) which contain information regarding what constitutes "construction" or a UIC well). In applying to the Illinois EPA, the applicant should follow the procedures outlined in this document; the UIC permit application forms developed by Illinois EPA; and the rules and regulations governing underground injection control (UIC) facilities. The applicable rules and regulations for UIC facilities are 35 Ill. Adm. Code 702, 704, 705 and 730.

UIC permits can be issued for one or more individual wells. UIC permits for wells that will be injecting non-hazardous waste can be issued on an area basis. Area permits allow the Permittee to install several wells within a given area (also referred to as a "well field"). The requirements and procedures for area permits can be found in 35 Ill. Adm. Code 704.162.

The applicant for a UIC permit should apply for and obtain a site specific ID Number and a US EPA ID Number (if hazardous wastes are going to be injected) for the facility where the proposed UIC wells are located. Illinois EPA will assign these numbers to the site if

they have not already been assigned when it receives the application for a UIC permit. The Illinois EPA ID Number will be used in the placement of all information associated with this facility in the records of Illinois EPA. As such, all correspondence between the applicant and the Illinois EPA should reference the IEPA ID Number, the facility name, and if applicable, the US EPA ID Number.

2.0 Who Must Apply

UIC wells are divided into six (6) classifications based on their operating characteristics:

Well Classification	Injection Well Description
Class I	Wells used to inject liquid wastes beneath the lowermost underground source of drinking water.
Class II	Wells used to dispose of fluids associated with the production of oil and natural gas, enhance oil recovery, and storage of liquid hydrocarbons.
Class III	Wells used to inject fluids for the extraction of minerals.
Class IV	Wells used to dispose of hazardous or radioactive wastes into or above an underground source of drinking water. U.S. EPA no longer allows the use of Class IV injection wells.
Class V	Wells not included in Classes I-IV or Class VI and as specifically defined in 35 IAC 730.105(e). These wells can be above an underground source of drinking water.
Class VI	Wells used to inject carbon dioxide (CO_2) into underground subsurface rock formations for long-term storage, or geologic sequestration.

The operator of a Class I, III and some Class V injection well must obtain a permit from the Illinois EPA prior to drilling a new well or converting an existing well for purposes of injecting fluids into the subsurface. Class II injection wells are regulated by the Illinois Department of Natural Resources (IDNR), Office of Mines and Minerals, Division of Oil and Gas. Questions regarding these wells should be directed to the IDNR at 217/782-7756. Class VI injection wells are regulated by U.S. EPA Region V and questions regarding these wells should be directed to U.S. EPA at 312/353-5533.

Class V wells only need a permit if they meet one of the criteria set forth in 35 Ill. Adm. Code 704.284 (b). Wells which do not meet these criteria are considered to have a "permit by rule" provided the appropriate inventory form is submitted to Illinois EPA and the requirements of 35 Ill. Adm. Code 704, Subpart I are met. More information about Class V wells can be found at www2.illinois.gov/epa/topics/waste-management/Pages/underground-injection-control.aspx.

3.0 Who to Contact/Where to Apply

The UIC program in the State of Illinois is handled by the Permit Section of Illinois EPA's Bureau of Land. If you have any questions regarding the UIC permitting program, you may contact the Permit Section of the Bureau of Land at 217/524-3300. Guidance and the forms to be used in applying for a UIC permit can be found at the same Illinois EPA internet site listed at the end of Section 2.0 of this guidance document.

The applicant shall submit an original and four copies of the permit application to the Illinois EPA at:

Illinois Environmental Protection Agency
Bureau of Land
Permit Section #33
1021 North Grand Avenue East
PO Box 19276
Springfield, IL 62794-9276
Phone (217)524-3300

4.0 When to Apply

Operators of proposed new injection wells should apply twelve to eighteen months before construction (including drilling, testing of and setting the casings of the well) is expected to begin. The actual time needed to review the application will be dependent on the quality of the application and the need for Illinois EPA to request additional information to ensure the requirements of 35 Ill. Adm. Code 702, 704 and 730 are met. Applications for renewal of an existing permit must be submitted to Illinois EPA a minimum of 180 days prior to expiration of the permit.

5.0 Confidentiality

In accordance with Section 7 of the Illinois Environmental Protection Act and 2 Ill. Adm. Code 1828 allows certain information submitted to the Illinois EPA may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. In addition, justification for the claim must also be made and all requirements of 2 Ill. Adm. Code 1828 must be followed. If no claim is made at the time of submission, the Illinois EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with Board and Agency procedures. (35 Ill. Adm. Code 130) (2 Ill. Adm. Code 1828)

Claims of confidentiality for the following information will not be approved:

1. The name and address of any permit applicant or permittee;

2. The identity of substances being placed or to be placed in landfills or hazardous waste treatment, storage or disposal facilities (including injection wells);

3. Information which deals with the existence, absence or level of contaminants in the drinking water.

6.0 Permit Applications

6.1 For a New Well or a New Well Field or Conversion of an Existing Well to a UIC Well

A UIC Permit application for a new well, well field or conversion of an existing well consists of the following:

- UIC Form 1, General UIC Program Requirements
- UIC Form 2, Hydrogeologic Information
- UIC Form 3, Injection Well Design, Construction, Testing and Logging of Data
- UIC Form 4, Injection Well Operating Program and Equipment Used to Convey the Injection Fluid to the Wellhead
- UIC Form 5, Area of Review
- UIC Form 6, Characteristics, Compatibility and Pre-Injection Treatment of Injection Fluid
- UIC Form 7, Monitoring, Integrity Testing and Contingency Plan
- UIC Form 8, Plugging and Abandonment Procedure
- UIC Form 9, Well Completion Report
- Associated documents

In general, the application forms are designed to provide a checklist of the information that must be provided in a UIC permit application about the applicant, injection well, waste to be injected, the geology and hydrogeology of the location where the well will be installed, operating and monitoring programs for the well, and other pertinent data on the project. All documents required in the forms are to be included in the application and labeled accordingly. The location within the permit application of the information identified in each item of a given form must be documented on the forms. The only exception to this is Form UIC-1 which requests general information about the owner, operator, location and operation of the proposed well; it must be filled out in its entirety.

UIC Form 4 which is mentioned above requests information regarding the equipment used to convey the injection fluid to the well while UIC Form 6 requests information regarding any pre-injection treatment of the injection fluid. A state construction and operating permit must be obtained from Illinois EPA Division of Water Pollution Control for all equipment to be used in “pre-treating”

the injection fluid prior to it being injected into the well. Additional information regarding this permitting process can be found on Illinois EPA's internet site at www2.illinois.gov/epa/topics/forms/water-permits/waste-water.

The process of constructing a new UIC well can either be a one or two step process. If the applicant desires the process to be only one step, then detailed information regarding each item identified in UIC forms UIC-2 thru UIC-8 must be submitted to Illinois EPA. No construction of the well (which includes drilling, logging, coring, etc.) can begin until a construction permit is obtained from Illinois EPA. Under this scenario, Illinois EPA would issue the construction permit for public comment before it could eventually issue the final construction permit.

The other way to construct a new UIC well is to use a two-step process:

1. In Step 1, it is not necessary for the application to construct a UIC to include detailed information about the injection zone, confining layer, underground drinking water supplies, equipment and monitoring devices associated with the new proposed UIC well, but should contain information, as it is available, regarding these topics. The application must contain the general information about the facility required by the regulations and the information identified in 35 Ill. Adm. Code 730.114 (for non-hazardous waste Class I wells); 730.170 (for hazardous waste Class I wells) and 730.134 (for Class III wells). While there is no equivalence to these regulations for Class V wells, the general information identified in 35 Ill. Adm. Code 730.114 for non-hazardous waste UIC wells should be used. It should also contain as much information as is known regarding each item in forms UIC-2 thru UIC-8. It is understood that the additional information which will be obtained during the drilling, testing, and logging of the well is necessary before detailed information can be provided about the above-mentioned topics relative to the proposed UIC well system.

2. Under this scenario, Illinois EPA would issue a construction permit for public comment which would approve the general and important aspects of the UIC well and allow the UIC well to be drilled and cased, with all necessary logging, coring and testing conducted during these efforts. The final construction permit would approve the procedures for installing the well (including drilling, testing, logging and casing), and establishing the necessary operating, monitoring, reporting, and closure procedures, but require submittal of a final UIC well system report and updated permit application (Step 2) which would be subject to Illinois EPA review before the well could be constructed.

   The additional information gathered during installation of the well will provide what is needed for a final well system design report and updated

permit application. In general, this information should result in relatively minor changes to the design, operation, monitoring, reporting and closure of the well which would fall in the category of "limited changes" under 35 Ill. Adm. Code 704.264. In this case, a final construction permit detailing all aspects associated with the UIC well could be issued as a minor permit modification. However, it must be noted that if the additional information results in the design of a UIC well system vastly different than the one approved under Step 1, then this second submittal will have to be handled as a major permit modification by Illinois EPA.

6.2 To Request Authorization to Operate a UIC Well

Following construction of a new injection well system or the conversion of an existing well, installed in accordance with the facility's UIC permit, the permittee is required to submit a Well Completion Report (Form UIC-9) to the Illinois EPA along with Form UIC-1. The Illinois EPA will review the Well Completion Report for technical adequacy in order to determine if a revised UIC permit authorizing operation of the injection well system can be issued.

The Well Completion Report is a narrative description of the conditions found during construction, test results and other pertinent data developed during construction. The report should also outline any differences between the injection well system as constructed and the proposed design and operating procedures that were approved in the UIC permit obtained before construction. In addition, the report provides documentation of the geophysical and hydrological conditions at the site based on the geophysical testing required in the construction permit.

6.3 Applications to Modify an Existing Permit

The Illinois EPA may modify a permit based upon information gathered during a site inspection; information submitted by the Permittee; a request by the Permittee to modify the permit (including information to support the request); or information gathered during a file review. The procedures for modifying a permit are set forth in 35 Ill. Adm. Code 704.261, 704.262 and 704.264.

6.4 Renewal Applications

The UIC renewal application should consist of Completed UIC Forms UIC-1, UIC-2, UIC-3, UIC-4, UIC-5, UIC-6, UIC-7, UIC-8 and UIC-9 with revised and updated information where applicable and Prior Conduct Certification (39i Environmental Protection Act).

6.5 Completion of Forms and Development of a Permit Application

Unless specified otherwise, all items on each form must be completed or provided. If an item is not applicable to the injection well or activity for which a

UIC permit is sought, enter NA (not applicable), NO or NONE. For information requested that is not provided directly on the form, clearly indicate where in the application the information is located on the form. All information provided as an attachment to the application should be clearly labeled and reference the proper form and item it is associated with.

7.0 IEPA Procedures for Handling UIC Permit Applications

7.1 Applications for Construction of a New Well or Well Field

Upon receipt of an application, the Illinois EPA will conduct a review to determine if the application is complete as required by 35 Ill. Adm. Code 702.122. The purpose of this completeness review is to determine if the application contains all of the required information, i.e. all of the required forms and reports are included. This review does not include evaluation of the technical adequacy of the application. The application must be complete before the Illinois EPA can begin reviewing the application to determine the technical adequacy of the application. If the application is not complete the applicant will be informed of the additional items that need to be included in the application.

Once the application is considered to be complete a review of the application to identify any technical deficiencies will be performed. Technical deficiencies identified during this review will be transmitted to the applicant so the permit application can be revised to include the required information.

When the application is considered to be technically adequate, Illinois EPA will prepare a draft UIC permit. The Illinois EPA will notify the public of this draft decision in a series of announcements that will be run in the local media including the local newspaper. Other interested or affected persons and certain government entities will be notified of the decision in writing. The draft UIC permit and application will be made available for review and the submittal of comments for a time period of 35 days in accordance with the procedures of 35 Ill. Adm. Code 705. If interested individuals request a public hearing on this draft permit, then such a hearing may be held and will extend the public comment period. Once the public comment period has ended the Illinois EPA will review all comments, develop a response to the comments and issue a final permit which takes into account, as appropriate, the received comments. This permit will then become effective thirty-five days after it is issued unless an appeal is filed with the Illinois Pollution Control Board. A table outlining the permitting timeframes can be found in Section 9.0 of these instructions.

The Illinois EPA also will prepare a draft permit decision and provide for public review and comment as outlined above before issuing a final permit for all major permit modification or permit renewals in accordance with the procedures in 35 Ill. Adm. Code 705.

7.2 Applications to Request Authorization to Operate a UIC Well

Once a permit has been issued to construct a UIC well, the applicant will construct the well and all systems associated with it. When the well and associated systems have been constructed in accordance with the construction permit, the Permittee will submit a Well Completion Report to the Illinois EPA. If found to be acceptable, the Illinois EPA will issue a revised permit which allows for the injection of waste into the well to begin.

7.3 Permit Modification

When a permit is modified, only the conditions subject to modification are reopened. If a permit modification request from the Permittee, satisfies the criteria of 35 Ill. Adm. Code, Section 704.264 for a minor modification, the permit may be modified without a draft permit or public review. Major permit modifications (modifications that do not meet the definition of a minor modification in 35 Ill. Adm. Code 704.264) requested by the Permittee require preparation of a draft permit and then a final permit, similar to the procedures set forth in Section 7.1 above.

7.4 Permit Transfer

UIC permits may only be transferred to another person if a notice is first provided to the Illinois EPA. Depending upon the type of waste injected into the well, the Illinois EPA may require modification of the permit to change the name of the permittee and incorporate other requirements as may be necessary under the appropriate Act. (35 IAC 702.152(c))

A permit may be transferred to a new owner or operator only if the permit has been modified as described above or reissued, identifying the new permittee and incorporating other requirements as may be necessary under the appropriate Act. The new owner or operator shall comply with all terms and conditions specified in the permit. (35 IAC 704.260 (a))

An automatic transfer for a permit issued to a non-hazardous UIC facility may be done if each of the following conditions outlined below are fulfilled:

1. The current permittee notifies the Illinois EPA at least 30 days prior to the proposed transfer date;

2. The notice, submitted in accordance with Item 1 above, includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage and liability between the current and new permittee;

3. The notice, submitted in accordance with Item 1 above, demonstrates the

financial responsibility requirements of 35 Ill. Adm. Code 704.189 will be met by the new permittee and the new permittee agrees to comply with all the terms and conditions specified in the permit to be transferred under the automatic transfer conditions; and

4. The Illinois EPA does not notify the existing and proposed new permittee of its intent to modify or reissue the permit. (35 IAC 704.260 (b))

The Illinois EPA may decide to handle this notification as a minor modification under 35 Ill. Adm. Code 704.264 and issue a revised permit reflecting the transfer. The existing and proposed permittee will be notified of this decision.

7.5 Permit Renewal

A facility may continue to operate a UIC well after the expiration date of the permit as long as it has submitted a timely renewal permit application to the Illinois EPA. The application must be received by the Illinois EPA 180 days prior to the expiration of the UIC well permit. (35 IAC 702.125)

8.0 Required Certifications When Submitting a UIC Permit Application

8.1 Facility Certification

Any person requesting an Illinois EPA permit under the UIC Program must complete, sign and submit to the Illinois EPA an application for each permit required under 35 Ill. Adm. Code 704.101 through 704.105.

Applications must be accompanied by a certification as specified in 35 Ill. Adm. Code 702.126(d). The required signatures are as follows: (1) for a corporation, a principal executive officer (at least at the level of vice-president); (2) for a partnership or sole proprietorship, a general partner or the proprietor, respectively; (3) for a municipal, state, Federal, or other public Agency, either a principal executive officer or ranking elected official.

Signatures must be provided for both the operator of the UIC well and the owner of the land where the well will be located. This includes landowners of a site that are different from the company operating the injection well.

8.2 Technical Information Certification

In accordance with the Professional Engineering Act, certain technical data in the application, such as design drawings, specifications and engineering studies, must be certified (sealed) by a qualified Professional Engineer who is licensed to practice in the State of Illinois in accordance with Ill. Rev. Stat., par. 5101, Sec. 1 and par. 5119, Sec. 13.1. Furthermore, in accordance with the Professional Geologist Licensing Act, certain other data which focuses on the geology of the

site must be certified (sealed) by a qualified Professional Geologist licensed to practice in the State of Illinois.

Work required in developing an application for a UIC Permit may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, and the Structural Engineering Licensing Act of 1989. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority. Applications must be certified, as appropriate, by these professionals.

8.3 Prior Conduct Certification

Applications must be accompanied by a completed and signed prior conduct certification evaluation, as required under Section 39(i) of the Environmental Protection Act. Both the Agency form and applicant's signature must be originals, not copies. The form and instructions can be downloaded at the following website: www2.illinois.gov/epa/topics/forms/land-forms/permit-forms

9.0 UIC Permitting Timeframes for New Permits, Major Modifications to the Permit and Renewal Permits

ACTION	TIMEFRAME
Initial application received by the Agency	
Completeness Review - (35 IAC 705.122) Within 30 days, the Agency will determine if the application is complete. If the application is not complete the Agency will notify the applicant of all completeness deficiencies in the application. The completeness review does not determine if the application is technically adequate, it only determines if all required items have been included in application. Following receipt of additional information from applicant to address completeness deficiencies identified by Agency, another 30 day review period commences. This continues until Agency determines that application is complete.	30 days 60 days for an existing well
Technical review of application. Begins upon date that the Agency considers the application to be complete. The Agency may request additional information from the applicant to ensure the permit application meets the requirements of the UIC regulations.	Time of review dependent on technical adequacy of application.

ACTION	TIMEFRAME
Once the Agency determined the application is technically adequate, it develops a draft permit and issues it for public comment. 30 day comment period begins. (35 IAC 705.162)	30 days
If the Agency finds a significant degree of public interest in the draft permit, then it my hold a public hearing. If a public hearing is held, notice of the hearing must be given at least 45 days in advance of the hearing. In addition, the public comment period for the draft permit is extended to a date that falls 30 days after the close of the public hearing. The notice of the public hearing can be concurrently issued with the public notice of the draft permit.	Notice for a public hearing must be made 45 days before the scheduled hearing date.
End of public comment period following public hearing. (705.182(c))	30 days after hearing
Agency preparation of response to comments on draft permit and development of final permit. If additional information is received during the public comment period that raise <u>substantial</u> new questions the Agency may draft a new appropriately modified permit. The comment periods associated with the original draft permit begin again. (35 IAC 705.184)	Time of preparation dependent on number, type and complexity of technical issues that need to be addressed.
Issue Final Permit - permit is not effective until 35 days after issuance if any public comments are received. (35 IAC 705.201(d)) During this 35 day period: (35 IAC 705.212) - The permit applicant and any person who filed comments on the draft permit or who participated in the public hearing has the right to appeal the final permit decision to the Illinois Pollution Control Board. - Following the decision of the Illinois Pollution Control Board on the appeal of the permit the party may seek judicial review of the final agency action. - A person that has not commented on the draft permit or participated in the public hearing may petition for an administrative review of the changes from the draft permit to the final permit. If the permit is appealed, the permit is stayed until the appeal is resolved. (35 IAC 705.202 thru 705.205)	Permit becomes effective 35 days after its issuance unless appealed.

Illinois Environmental Protection Agency

Underground Injection Control Program

Underground Injection Control Permit Application Instructions

January 2020

Instructions for Submitting Applications for a Permit to Dispose of Waste Using an Underground Injection Control (UIC) Well

UIC Instructions

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FORM UIC-1 INSTRUCTIONS- General UIC Program Requirements

Provide the Illinois EPA identification number, the U.S. EPA identification number (if applicable), the facility's legal name, and the well number in the space provided at the top of the form.

I. Well Status

Provide the status of the well by placing an "X" next to the description which best describes the status.

II. Type of Permit/Application

Indicate whether this is a request for a new or an emergency permit.

There are two (2) types of UIC permits: Individual and Area. Wells covered by an area permit must be located in the same well field, site, reservoir, project or similar unit in the State, under the control of one person and used to inject other than hazardous waste (35 IAC 704.162). Specify the number of wells to be included in the permit either as individual wells or in an area. If the area being permitted has a common name, such as "Jay Field", provide the name in the space provided.

If the facility currently has a permit, provide its permit number and indicate the purpose of the application being submitted (operating permit, permit modification, permit renewal, or supplemental information). For all applications, provide a brief description of its contents.

III. Class and Type of Well

The classification of injection wells is found in 35 Ill. Adm. Code 704.106 and 730.105. Indicate the appropriate well classification in the space provided.

Please note: The Illinois Environmental Protection Agency regulates Class I, III, IV and V injection wells. The Class II injection wells are regulated by the Department of Natural Resources, Office of Mines and Minerals, Division of Oil and Gas. The Class VI injection wells are regulated by the U.S. Environmental Protection Agency Region V.

IV. Facility Information

Facility Location:
Give the address or location of the facility identified at the top of this form. If the facility lacks a street address or street name, give the most accurate alternative geographic information (e.g., section number or quarter section number from county records or intersection of nearest roads.)

Facility Contact:
Provide the name, title, work telephone number, and email of a contact person. The contact person should be thoroughly familiar with the operation of the facility and with the facts reported in the application.

Nature of Business:
Briefly describe the nature of your business, including products produced or services provided.

SIC Codes:
List in descending order of significance, the four (4) digit standard industrial classification (SIC) codes which best describe the facility in terms of the principle products or services produced or provided. SIC code numbers can be found in the "Standard Industrial Classification Manual" prepared by the Executive Office of the President, Office of Management and Budget, available from the Government Printing Office, Washington, D.C. www.osha.gov/pls/imis/sicsearch.html. Any questions concerning the appropriate SIC code for the facility should be directed to an IEPA office.

V. Operator Identification
Provide the legal name address and contact information of the person, firm, public organization or any other entity who operates the facility. If the owner is not the operator, the owner must also sign the application.

VI. Location of Well
The location of the well must be provided in both the Township-Range -Section system of the Bureau of Land Management and Latitude and Longitude. The closest municipality, both the name and county, must also be provided.

VII. Land Ownership
Provide the information on the owner of the land where the well is or will be located. If the land is not owned by the well operator, enter the land owners name and information in the area. If the land is operated under a lease agreement, provide the date of lease termination.

VIII. Existing Environmental Permits
List any other permits, existing or pending, which pertain to pollution control activities conducted by this plant or at this location. For any pending application provide the log number of the application if known. If more than one permit is currently effective for the facility under a particular permit program, list the additional permit numbers on a separate sheet attached to the application. List all relevant environmental, Federal, State or local, applications or permits under other programs such as: the Ocean Dumping Act, Section 404 of the Clean Water Act or the Surface Mining Control and Reclamation Act, State permits for new air emission sources in nonattainment areas under Part D of the Clean Air Act or State permits under Section 404 of the Clean Air Act. Please refer to 35 Ill. Adm. Code 702.123(f) for more details.

IX. Federal and/or State Legislative Requirements

This section of the UIC-1 form asks several self-explanatory questions regarding both federal and legislative requirements that must be met to obtain certain permits for disposing of waste in Illinois, including the injection of wastes into a UIC well. In general, the portions of the Illinois Environmental Protection Act and/or the federal environmental regulations are identified on the form. However, the following provides additional information regarding two questions in this Section:

1. In regards to Question C, the regulatory requirements for obtaining approval of a Petition to Allow Land Disposal of a Prohibited Waste (also known as a Land Ban Exemption) can be found in 40 CFR 148.20. More information on this topic can be found at the following location on USEPA's internet site: https://archive.epa.gov/r5water/uic/land_ban_files/web/html/index.html.

2. In regards to Question D, Illinois EPA may deny a permit application if the prospective owner or operator or any employee or officer of the prospective owner or operator has a history of:

    a. Repeated violations of federal, State or local laws, regulations, standards or ordinances in the operation of waste management facility

    b. Felony convictions associated with crimes against environmental laws, regulations, or permit terms or conditions

    c. Gross carelessness or incompetence in managing waste

Demonstrations must be made that neither the owner nor the operator has a history of any of the above. The form entitled 39(i) Certification for Operating a Waste Management Facility (IL 532-2857 LPC 643 Rev. 3/2014) must be completed if by the owner and/or operator of the facility.

X. Signatures and Certifications

The application must be certified and signed by an authorized agent of the owner and operator. In addition, the licensed professional engineer and/or licensed professional geologist involved in the preparation of the application must also certify and sign the application. Only professional engineers and professional geologists licensed to practice in the State of Illinois may prepare applications associated with UIC permits.

XI. Checklist for Forms and Attachments

Indicate all forms and attachments which are submitted with this form. If one or more of the requested attachments is not included, provide an explanation of why it is not included and indicate when it will be or was submitted.

USGS Topographic Map(s). Provide a topographic map, or maps, of the area extending at least 2.5 miles beyond the facility property boundaries which clearly shows the information required by 35 Ill. Adm. Code 702.123(g).

If an intake or discharge structure, hazardous waste disposal site or injection well associated with the facility is located more than one mile from the plant, include it on the map if possible. If not, attach additional sheets describing the location of the structure, disposal site or well, and identify the U.S. Geological Survey, or other, map corresponding to the location(s). On all maps of rivers, indicate the direction of the current.

A 7-1/2 minute series map published by the U.S. Geological Survey should be used when available. If a 7-1/2 minute series map has not been published for the facility area, a 15 minute series map may be used. If neither series has been published for the facility area, a plat map or other appropriate map may be used, including all the requested information. Briefly describe land uses in the map area (e.g. residential, commercial).

For your information, listed below is the address for the Illinois and U.S. Geological Surveys, sources for the topographic maps:

Illinois State Geological Survey	U.S. Geological Survey
Natural Resources Building	National Geospatial Technical Operations Center
615 East Peabody Drive	1400 Independence Road
Champaign, IL. 61820	Rolla, MO. 65401
Phone: 217-333-4747	Phone: 573-308-3800
www.isgs.illinois.edu	www.usgs.gov/core-science-systems/ngp/ngtoc

Siting Approval. To meet the requirements of the Environmental Protection Act, Section 39.2, the applicant must apply for and secure siting approval and/or zoning approval from the local government unit(s). The Agency can not issue a UIC permit without a copy of this approval being provided.

FORM UIC-2 – HYDROGEOLOGIC INFORMATION INSTRUCTIONS

These instructions describe the information which must be provided in an application for permit for a UIC well regarding each item identified in Form UIC-2. Form UIC-2 identifies the information which must be provided regarding: (1) geologic characteristics of the injection and confining zones; (2) characteristics of the injection zone formation water; (3) characteristics of groundwater overlying the injection zone including underground sources of drinking water; and (4) mineral and natural resources located beneath and within five (5) miles of the injection site.

The information discussed below must, at a minimum, be provided in support of information required to address the listed items. Individual maps may be used to meet multiple requirements provided they are easily legible and scaled as necessary to depict the required information.

Item I

This information must be provided on a surface geologic map or a structural contour map scaled as necessary to depict the regional geology.

Item II

Information regarding known or suspected faulting within the area of review must be provided using a geologic map(s) that depict the location, extent, and effects of the known or suspected faulting, fracturing and/or formation solution channels, or lineations in the area. Detailed discussion must be provided for each of the identified features, as well as detailed discussion regarding the tectonic (seismic) history of the area.

Item III

Maps and geologic cross-sections required by 35 Ill. Adm. Code 730.114(a) or 730.134(a) must provide the following:

1. A depiction of the injection well location for which a permit is sought and the applicable area of review. It must include the number or name of all producing wells, injection wells, abandoned wells, dry holes, surface water bodies, mines/quarries, residences, infrastructure, and known or suspected faults;

2. A depiction of the general vertical and lateral limits of all underground sources of drinking water within the area of review, their position relative to the injection formation, and the direction of water movement where known in each underground source of drinking water that may be affected;

3. A depiction of the geologic structure of the local area. This must include two geologic cross-sections perpendicular to each other crossing at the proposed injection well location. The cross-sections must include, at a minimum, available log control, geologic units and lithology indicated from the surface to the lower confining bed below the

injection zone, or if a major structure exists below the injection zone, to a depth necessary to depict the local geology (2½ mile radius from the well at a minimum).

4. Generalized maps and cross-sections indicating the regional geologic setting. This must include a structural contour map of the top of the proposed injection zone, and an isopach map of the injection zone between major confining zones (isopach of sand thickness in the injection zone, and if more than one zone is being requested, include isopachs for each sand or porous zone); and

5. Maps necessary for addressing the monitoring requirements of Section 730.113(b).

Item IV – Injection Zone

Detailed discussion of the injection zone(s) and injection zone(s) water must be provided and referenced as necessary. Information must be provided in tabulated summaries where possible. Information necessary to address Item IV must include the following:

1. Depositional structural, lithologic, and hydrologic properties of all units penetrated by the well;

2. Piezometric surface map of receiving strata, or if insufficient data exists, expected or measured static fluid level and regional gradient.

3. Fracture gradient or formation breakdown pressure. The calculations and method used must be provided.

4. Expected pressure changes and flow distances for the life of the well or project, including the ultimate fate of the injected waste or fluid.

5. Natural reservoir pressure (bottom-hole pressure) or hydrostatic head; fluid saturation and chemical characteristic of the formation and formation fluids.

6. Calculated changes in reservoir pressures, formation fluid displacement, and the direction(s) of dispersion of injected fluids.

7. Tabulation of all well data within the area of review that penetrate into the proposed injection zone, including a description of each well's type, construction, date drilled, location, depth, record of plugging or completion, and any additional information the Agency may require.

Item V – Upper Confining Zone

Detailed discussion of the upper confining zone(s) must be provided and referenced as necessary. Information must be provided in tabulated summaries where possible. Information necessary to address Item V must include the following:

1. Depositional structural, lithologic, and hydrologic properties of all units penetrated by the well.

2. Fracture gradient or formation breakdown pressure. The calculations and method used must be provided.

3. Nature and area development of upper and lower confining strata.

Item VI – Lower Confining Zone

Detailed discussion of the lower confining zone(s) must be provided and referenced as necessary. Information must be provided in tabulated summaries where possible. Information necessary to address Item VI must include the following:

1. Depositional structural, lithologic, and hydrologic properties of all the lower confining zone and any proposed alternative lower confining zones.

2. Fracture gradient or formation breakdown pressure. The calculations and method used must be provided.

3. Nature and area development of upper and lower confining strata.

Item VII – Overlaying Sources of Groundwater at the Site

Detailed discussion of groundwater directly overlying the primary confining zone, as well as underground sources of drinking water (USDWs) must be provided and referenced as necessary. Information must be provided in tabulated summaries where possible. Information necessary to address Item VII must include the following:

1. Maps and cross-sections indicating the general vertical and lateral limits of those aquifers containing water with less than 3,000 mg/L TDS, and those containing less than 10,000 mg/L TDS. This information may be shown on a structural contour map and the cross-sections depicting the geologic units and lithology from the source to the lower confining zone (2½ mile radius from the well at a minimum).

2. A tabular summary and map depiction of all USDWs within the area of review.

Item VIII – Mineral and Hydrocarbons

Detailed discussion must be provided regarding all mineral or natural resource beneath or within five miles of the site. A surface geologic map depicting the resources and a tabular summary of those resources must be included.

FORM UIC-3 - INJECTION WELL DESIGN, CONSTRUCTION, TESTING AND LOGGING OF DATA
INSTRUCTIONS

These instructions describe the information which must be provided in an application for permit for a UIC well regarding each item identified in Form UIC-3. Form UIC-3 identifies the information which must be provided regarding: (1) the design of the UIC well; (2) the construction of the UIC well; and (3) the testing and logging/collection of data to be carried during an immediately after construction of the well.

The information associated with Form UIC-3 must be provided for each proposed well if the applicant desires to obtain a permit for each well. The information associated with Form UIC-3 must be provided for any existing well and a typical well to be installed in the future if the applicant is seeking a permit on an area basis.

<u>Items I through XII</u>

Indicate whether a permit for individual wells is being pursued or an area permit. Identify: (1) the number of wells to be permitted; (2) whether any existing wells are to be incorporated into the permit; and (3) the anticipated distance between wells, if a permit is sought for more than one well or if an area permit is desired. Scaled drawings must also be provided relative to the facility's boundaries which show the proposed location of all wells and the boundaries of the proposed well-field if an area permit is being pursued.

Provide the depth of the well in feet.

Provide the expected service life for the well in years.

Identify the injection zone and confining layer, including type of geologic material and approximate depth below ground surface to the top/bottom of each unit.

Provide the anticipated fracturing pressure of the injection zone and the confining layer, in psi. Except during short-term stimulation of the well, the injection pressure at the wellhead must be below a value which would cause fracturing in the injection zone or the confining layer.

Provide the static fluid piezometric level in the injection zone in feet referenced to mean sea level and to ground surface elevation. Compare this value to the ground surface elevation at the proposed wellhead. Also provide the type and chemical characteristics of this formation fluid.

Provide the anticipated pressure under which fluid will be injected at the well head.

Provide the anticipated pressure under which fluid will be injected into the injection zone.

Provide the anticipated pressure in the injection zone while the well is in operation.

Provide an evaluation of all expected pressures to ensure the fracture pressure of the injection zone or confining layer is not exceeded. Provide all calculations, equations, assumption made, etc. as part of your evaluation. The source of all data must be referenced.

Item XIII

The well schematic should be on one sheet and depict the anticipated details of the completed well. The cemented intervals, well head design, tubing and casing type, location of centralizers and scratchers, and annulus monitoring system must be depicted. The approximate length of each type of casing must be depicted and the approximate top/bottom of the geologic units which the well passes thru and injects into.

Item XIV

A. Provide the depth interval and diameter in inches for the open hole.

B. Provide the following information for the listed casings:
   - Depth Interval (feet)
   - Outside Diameter (inches)
   - Inside Diameter (inches)
   - Weight (lb/ft)
   - Grade (API)
   - Design Coupling (short or long threaded)
   - Coupling Outside Diameter (inches)
   - Location of Centralizer

C. Provide the following information on the injection tubing:
   - Type/Grade (API)
   - Outside Diameter (inches)
   - Inside Diameter (inches)
   - Weight (lb/ft)
   - Joint Specification
   - Depth Interval (feet)
   - Maximum allowable suspended weight based upon joint strength (pounds or kilograms)
   - Weight of tubing string (axial load) in air (pounds)

D. Provide the following information on the cementing for each casing string:
   - Depth Interval (feet)
   - Type/Grade

Additives
Quantity (cubic yards)
Circulated to surface, if not, indicate top of cement
A description of the cementing techniques, equipment positions and staging depths
List the perforation depths

E. Annulus Protection System

Provide information pertaining to the packer(s) and fluid spotting procedure. A fluid seal or an alternative method to the use of a packer may be allowed with written approval from the Agency. To obtain approval, the applicant must submit a written request to the Agency which sets forth the proposed alternative and all technical data supporting its use (35 Ill. Adm. Code, Section 730.112(c)).

Describe the type of annulus pressure system to be used to maintain a positive pressure on the annulus.

F. Completion Details in the Injection Zone

Describe the type of well completion within the injection zone as open hole, screen and gravel pack, fully cased and perforated or other. If other, please specify.

Item XV

Provide information on the proposed construction and completion of the injection well, including:

- Data on the drilling firm, including name, address and contact person
- Drilling schedule
- Drilling method

Item XVI

Proposed testing, logging, bottom hole testing, coring, etc. must be described in detail. The minimum requirements for these efforts are listed below; they may be adjusted, if adequate technical information is provided in the application. The Agency may require additional logging or other formation testing during construction of the injection well.

1. Surface Hole
   a. Spontaneous Potential and Resistivity Log
   b. Caliper Log

2. Long String Hole
   a. Spontaneous Potential and Resistivity Log
   b. Gamma Ray (full hole)
   c. Porosity Log
   d. Directional or Inclination Survey
   e. Caliper Log
   f. Cement Bond Log (surface to bottom of long string casing after casing is set and cemented)

3. Injection Zone
   a. Full hole cores of the injection zone and lower most overlying confining zone must be obtained, or, if full hole coring is not feasible, sidewall cores of the injection zone and lower most overlying confining layer.
   b. Bottom Hole Pressure
   c. Temperature Logs
   d. Pressure at bottom hole to initiate fractures in the injection zone and confining layer
   e. Hydraulic fracture gradient at the top of the injection zone

4. Proposed well stimulation program (acidizing, etc.) to be conducted once construction of the well is complete.

5. A description of the proposed injectivity tests, such as permeability, reservoir limits, reservoir type, etc., to be conducted once construction of the well is complete.

6. Fracture pressure and gradient testing of confining layer and injection zone. Need for Leak Off Test (LOT)/(FIT) to be conducted to assess the formation for cementing.

FORM UIC-4 – INJECTION WELL OPERATING PROGRAM AND EQUIPMENT USED TO CONVEY THE INJECTION FLUID TO THE WELLHEAD INSTRUCTIONS

These instructions describe the information which must be provided in an application for a permit for a UIC well regarding each item identified in Form UIC-4. Form UIC-4 identifies the information which must be provided regarding: (1) the operation of the UIC Well(s); and (2) the equipment used to convey the injection fluid from the point of generation to the wellhead.

Item I: Injection Well Operating Program

35 Ill. Adm. Code 704.162 allows Illinois EPA to issue a UIC permit on an area basis, rather than for each individual well, provided hazardous wastes are not being injected into the well field. Specifically, when pursuing a permit on an area basis, the Permittee will be allowed to install several wells within a given area (typically referred to as a well field), provided the injection zone can accept all the proposed injection fluid. When pursuing a permit on an area basis, the wells within the area must be: (1) operated by a single owner or operator; (2) located within the same well field, facility site, reservoir, project or similar geologic unit.

Operators pursuing a permit on an area basis must provide the information requested in Sections A and B of Form UIC-4; the information required in Section B should be based on a typical well to be installed within the area. Operators pursuing a permit for individual injection wells only need to provide the information requested in Section B for each well they desire a permit for.

The location information requested in section A.8, B.2 and B.11 consists of the following:

1. A scaled drawing showing the location of the injection and monitoring wells relative to the boundaries of the facility being permitted;

2. Providing the location of each well using the US Public Lands Survey System. This description must include the county where the well is located and identification of the 10-acre parcel within the section where the well is located. Sections are divided into rows of one-eighth mile squares contain 10 acres and correspond to a quarter of a quarter of a quarter section. A normal section of one square mile contains eight rows of one-eighth mile squares. The rows are numbered from east to west (1 thru 8); the columns are lettered from south to north (A thru G). Where more than one well is located within a specific 10-acre parcel, identify the well by using an Arabic number after the upper case letter of the well location;

3. The latitude and longitude of each well;

4. Illinois State Plane coordinates of each well.

The injection pressure average and maximum values should be at the well head and the top of the injection formation. All calculations should be provided along with the source of equations used, and all assumptions used should be clearly stated.

Item II: Equipment Used to Convey the Injection Fluid to the Wellhead

Provide a complete description of the equipment used to convey the injection fluid from the point of generation to the wellhead. The equipment and associated appurtenances of interest include holding tanks, piping, filter systems, pumps, monitoring equipment and other instrumentation (including the equipment identified in Form UIC-7, Item I.B) and pretreatment system. Provide information addressing each of the items listed on the form. In addition, describe how the facility will protect the well system from extreme temperature changes and power failures.

In regards to any regulated system needed to pre-treat the injection fluid before it is injected into the well, provide:

1. A detailed description of the system;

2. A process flow diagram for the system;

3. A piping and instrumentation diagram for the system;

4. A discussion of the chemical and physical properties of the injection fluid after it has been treated;

5. A detailed description of all equipment, instrumentation and piping associated with the system, including dimensions; construction materials and their specifications; and compatibility of this equipment with the injection fluid;

6. The procedures used in designing/construction the system;

7. Plans for the disposal of solid or semi-solid waste generated during the pre-treatment process;

8. A scaled drawing showing the layout of the pre-treatment system from the point injection fluid is generated to the point it is discharged from the system; and

9. If hazardous waste is being treated by the system, provide a discussion of whether the treatment process is exempt from the permitting requirements of 35 Ill. Adm. Code 700-724. If the treatment process is not exempt, then a RCRA permit must be obtained before the system is constructed and operated.

A state construction and operating permit must be obtained from Illinois EPA Division of

Water Pollution Control for all equipment to be used in "pre-treating" the injection fluid prior to it being injected into the well. Additional information regarding this permitting process can be found on Illinois EPA's internet site at https://www2.illinois.gov/epa/topics/forms/water-permits/waste-water/ . If you have any questions regarding this program, you may contact the Industrial Unit of the Division of Water Pollution Control's Permit Section at 217-782-0610. This permit application must be submitted to Illinois EPA's Division of Water Pollution Control.

FORM UIC-5 - AREA OF REVIEW INSTRUCTIONS

Use the space provided to identify the location of each item in the application. The source of all data shall be referenced in the report.

Items I and II

Specify the method used to determine the radius of the area of review. Please note the fixed radius is 2.5 miles. If "other" than the fixed radius or the equation in 35 Ill. Adm. Code, Section 730.106(a), provide the equation or method and a reference(s) where the equation or method used can be found.

Item III (730.114(a) (2) & 730.134(a) (2))

Provide a map showing the injection well for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number, or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map.

Item IV

Provide the equation(s) used to calculate the anticipated fluid movement during the life of the project. Also provide the source for the equation and all of the parameters used. The description shall include calculations for the lateral movement of the injected fluid front and pressure front, and address hydrologic effects of the injection system on any other wells in the area of review.

Item V

The following information on other wells in the area of review shall include:

1. A map indicating the location of all water wells on the property and adjacent property, along with a tabulation of well depth, water level, owner, chemical analyses and other pertinent data keyed to the map. If no well exists on the property or adjacent property, then provide the above data on a minimum of three (3) selected wells within a 2.5 mile radius of the proposed well.

2. A piezometric map of the water table in the area using information from existing wells.

3. A map indicating the location of all artificial penetrations (oil and gas wells, exploratory tests, disposal wells, etc.) within a 2.5 mile radius of the

proposed well. In addition, the map must include the name and location of all surface bodies of water, springs, mines, quarries, and other pertinent surface features, including residences and roads within a 2.5 mile radius of the well. (Note: All maps should have the same scale.)

4. Data tabulation of all artificial penetrations including information on: operator, lease holder or owner; distance from proposed disposal well; well number; casing size; setting depth and cementing data for surface, intermediate and long string casings; plugging data for the abandoned wells. In addition to this information, include copies of available casing and cementing records for those wells which penetrate to within 300 feet of the uppermost injection interval, and all wells within a ½ mile radius of the disposal well including the appropriate Department of Natural Resources, Office of Mines and Minerals forms including cementing affidavits. The data tabulation should be keyed to the map.

5. A schematic of all artificial penetrations requested above.

FORM UIC-6 - CHARACTERISTICS, COMPATIBILITY AND PRE-INJECTION TREATMENT OF INJECTED FLUID
INSTRUCTIONS

These instructions describe the type of information which must be provided in an application for permit for a UIC well regarding the items listed in Form UIC-6. The information required by this form addresses the characteristics of the waste(s) being injected into the well; the compatibility of the waste(s) being injected into the well with the various components of the overall waste management/injection system; and any required pre-treatment needed for the waste(s) to be injected into the well.

Items I through III

Identify each component stream which forms the injected fluid. Include the source and the expected rate of generation (maximum, minimum and average) for each component stream. Provide the expected daily and annual volume of injected fluid (maximum, minimum, and average).

Item IV

Identify the generic waste/fluid name for each component stream, indicate if the fluid phase is liquid, gas or other (specify). Provide a detailed description of the chemical and physical characteristics of each component stream as well as the waste to be injected.

The characteristics of each component stream and the overall injection fluid (e.g. toxicity, reactivity, corrosiveness, and ignitability) must be identified according to the provisions of 35 Ill. Adm. Code, Part 721, Subpart C to determine if the injection fluid is a characteristically hazardous waste. In addition, an evaluation must be made to determine if each component stream is a listed hazardous waste as set forth in 35 Ill. Adm. Code 721 Subpart D. Provide the appropriate hazardous waste code, where applicable.

Complete chemical analysis of all inorganic constituents should be reported in ppm or mg/l. If organic fractions are present, all such constituents should be reported in ppm or mg/l, as individual percentages by weight, or in other appropriate terms. For pH, temperature and specific gravity provide the ranges of values expected for each component stream and the overall injection fluid. Specify and quantify, as appropriate any micro organisms that may be present in each component of the injection fluid. Finally, provide an evaluation of the persistence and degradability of the various chemicals present in the injected fluid.

Item V

Provide the results of a compatibility evaluation which discusses corrosiveness, reactivity and the production of by-products as a result of the various components of the UIC well

being exposed to each component stream and the overall injection fluid. The compatibility testing of the injection fluid with the injection and confining formations, formation fluids and well components should be conducted at expected bottom hole pressures and temperatures. In addition, evaluate possible effects of the injected fluid on filters and filter components of the overall waste injection system. Finally, provide an overall evaluation of the compatibility of each component stream and the overall injection fluid with the overall UIC well system.

Item VI

If it is necessary to pre-treat the injection fluid at some point in the overall UIC well system, then detailed information must be provided regarding the pre-treatment system. Such pre-treatment is typically necessary to ensure the injection fluid is compatible with all aspects of the UIC well system, from the point of generation to the injection zone. Pre-treatment may also be necessary to make the injection fluid more amenable to injection. A detailed description of the proposed pre-treatment system must be provided, as well as a discussion of the goals of the pre-treatment system. A general process layout diagram of the system must be provided as well as discussion of the physical and chemical characteristics of the treated injected fluid. More detailed information about the pre-treatment system is required in Item II of Form UIC-4.

A state construction and operating permit must be obtained from Illinois EPA Division of Water Pollution Control for all equipment to be used in "pre-treating" the injection fluid prior to it being injected into the well. Additional information regarding this permitting process can be found on Illinois EPA's internet site at https://www2.illinois.gov/epa/topics/forms/water-permits/waste-water/ . If you have any questions regarding this program, you may contact the Industrial Unit of the Division of Water Pollution Control's Permit Section at 217-782-0610. This permit application must be submitted to Illinois EPA's Division of Water Pollution Control.

FORM UIC-7 - MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN INSTRUCTIONS

These instructions describe the information which must be provided in an application for permit for a UIC well regarding the information provided in Form UIC-7. Form UIC-7 identifies the information which must be provided regarding: (1) the monitoring efforts carried out to ensure the well is operating properly; (2) the procedures which will be followed to conduct mechanical integrity tests (MITs) on a well on a regular basis (the first MIT must be conducted after the well is constructed and before it is placed in operation; and (3) steps which will be taken in the event of a well failure or shut in.

Item I – Monitoring Program

A. Waste Sampling and Analysis Plan

A waste sampling and analysis plan must be developed and implemented to monitor the physical and chemical characteristics of the waste(s) being injected. This monitoring is necessary to ensure that the injected waste does not vary substantially from the physical and chemical waste characteristics used to design the UIC well and all associated appurtances. The waste sampling and analysis plan, at a minimum, shall specify:

1. The location where samples are to be collected;

2. The parameters to be analyzed for, and the rational for the selection of the parameters for each individual waste stream;

3. The frequency at which samples will be collected and analyzed for each parameter (note that some parameters may be analyzed more frequently than others);

4. The test methods to be used to test for each parameter;

5. The sampling method used to obtain a representative sample of the waste to be analyzed and the frequency of sampling and analysis for each parameter;

6. Organic sampling and analysis procedures consistent with the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW 846) shall be incorporated in the waste analysis plan.

B. Recording Devices

For each proposed recording device, identify: the location; name and model; whether it is mechanical or electrical (if applicable); continuously or is non-

recording; and whether the gauge exceeds the maximum operating range by 20 percent. (Note: All gauges/recording devices must be able to measure values at least 20% higher than the maximum expected value of the parameter in question). The manufacture specifications for each device should be submitted.

C. Data Management

Describe how the recorded data from all monitoring devices will be stored/ archived. This data will be used when submitting monthly reports to the Illinois EPA. Also describe the backup systems for injection well monitoring used if the primary system fails (this could be manual readings). Describe how the facility will handle power failures and the effect it will have on the operation of the injection well monitoring systems.

D. Corrosion Monitoring Plan (730.168(c)(2))

The corrosion monitoring plan must address the procedure to be followed to determine if the waste stream is adversely affecting the injection well equipment.

E. Ambient Monitoring (730.113(d)(1) & 730.168(e)(1))

The Permittee must develop a plan to monitor the pressure buildup in the injection zone (due to the operation of the injection well(s)) annually, including at a minimum, a shutdown of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve.

F. Groundwater Monitoring Plan

The application must include a plan for monitoring the groundwater quality and formation fluid pressure in the first permeable zone immediately overlying the confining layer above the injection zone. A schedule of implementation should also be included. The plan must include, at a minimum, the following information:

A. A comprehensive report describing the local hydrogeologic framework in which the injection well operates. Specific information should be based upon historical and current operating records, research of available geologic literature and/or logs from nearby wells. An evaluation should be made of the reliability of the required information and any data gaps identified. Where adequate information does not exist, it must be supplied by actual measurements. This will include:

1. An interpretation of formation-specific geologic information relating to:

a. The adequacy of the confining layer or system;

b. The locations and physical characteristics of overlying permeable zones, including all underground sources of drinking water (USDWs); and

c. An evaluation of faulting, fracturing and jointing.

2. A detailed report on the existence of unplugged, abandoned holes which penetrate the confining layer above the injection zone within the area of review. The report should assess the level of reliability and completeness of existing data on abandoned wells. Where historical records are insufficient, magnetometer surveys or field reconnaissance may be necessary;

3. Identification of the proposed monitoring zone and a complete description of methods which will be used to determine aquifer parameters such as permeability, transmissivity and storage coefficient;

4. An evaluation of the lowest USDWs vulnerability to contamination; and

5. A computation of the zone of endangering influence as required by 35 Ill. Adm. Code 730.106, and a calculation of anticipated pressure build-up in the injection zone over the life of the facility. Actual data measurements should be used in these calculations.

B. Based on the above information, a monitoring well design and operating plan capable of:

1. Detecting any leakage of injected fluids above the confining zone; and

2. Monitoring pressure changes by continuous water level recording.

A minimum of three (3) wells is recommended to define the hydraulic gradient. Monitoring wells should be located as close as physically possible to the injection well.

3. Well Specifications, including:

a. Drilling and development methods;
b. Construction details;

c. Quality assurance plan;
d. Safety plan;
e. Proposed mechanical integrity determination;
f. Step drawdown test to determine well efficiency; and
g. Television survey (optional)

4. A sampling plan, including:
   a. Proposed data to be collected during drilling;
   b. Proposed monitoring parameters, including background formation fluid parameters, waste indicator "fingerprint" parameters and pressure;
   c. Sample collection procedures;
   d. Preservation and shipment;
   e. Analytical procedures; and
   f. Chain of custody control.

5. Reporting Proposal, including:

   a. An initial background survey of the formation pressure and water chemistry of the monitoring zone;
   b. Monthly and quarterly submittal of required data; and
   c. An annual interpretive summary report to be submitted by March 1of each year.

Waiver Demonstration

An exemption from the groundwater monitoring requirements may be granted provided the applicant can conclusively demonstrate there is no potential for fluid movement above the confining zone resulting from the injection activity, or USDWs are completely absent within the area of review. Examples of acceptable exemption criteria include:

- The demonstrated absence of complex geologic structures such as faults; and

- Accurate and detailed records confirm that no unplugged and abandoned, or improperly plugged wells exist within the area of review; and

- A sufficiently thick confining formation exists (e.g. 500 feet of clay or shale); and

- The potentiometric surface of the injection zone will not exceed that of the lowest USDW at any time during the operating life of the facility.

Where the above criteria cannot be adequately demonstrated using existing data, direct

measurements of vertical permeability of the confining system may be required.

Item II

A plan to demonstrate the mechanical integrity of the injection well must be included in the application. After a well is constructed, the Permitte must show the injection well has mechanical integrity through a series of test/logs (some are listed below) before an operating permit can be issued for the well.

The mechanical integrity plan must meet the requirements of 35 Ill. Adm. Code, 730.108, 730.113, and 730.168 and should clearly specify the procedures to be used for the mechanical integrity demonstration. Acceptable mechanical integrity tests include, but are not limited to:

1. Annulus Pressure Test
2. Radioactive Tracer Survey
3. Differential Temperature Log
4. Cement Bond Log
5. Magnetic Caliper Log

These tests are used in combination with each other to prove the injection well has mechanical integrity. The frequency of testing is dependent on the regulations, type of well and the discretion of the Illinois EPA. A step-by-step procedure for each proposed test or log must be submitted with the application.

Item III

Contingency Plan for Well Failure or Shut In

A contingency plan must be developed and implemented to address the procedures to be followed in the event of injection well or equipment failure. A copy of this plan must be included in the application for a UIC permit. The plan must include, at a minimum, the following:

- A description of the alarm system, including the values for tubing pressure, flow rate and annulus pressure which will trigger the alarm.

- A description of the automatic shut down of the injection pumps, including the annulus pressure, injection pressure and flow rate which will trigger pumps shut down.

- A list of the persons designated to oversee well operations in the event of an emergency. Phone numbers and qualifications should be included.

FORM UIC-8 - PLUGGING AND ABANDONMENT PROCEDURES INSTRUCTIONS

These instructions describe the information which must be provided in an application for permit for a UIC well regarding the information provided in Form UIC-8. Form UIC-8 identifies the information which must be provided regarding plugging and abandonment procedures for each injection well.

Item I. A and B

Provide a procedure for abandonment of the injection well during construction or after injection. Include a description of the specific subsurface well features that will be removed and the method for placement of the plug(s).

Item I. C

Provide information on the type and quantity of plugging materials, including the depth intervals; size of workstring; type, grade and additives; viscosity of mud and the quantity.

The entire longstring casing of the injection well should be cemented in a manner that will not allow the movement of fluids into or between USDWs or from the injection zone.

Item I. D.

A detailed step by step plugging and abandonment procedure should be included with the application. An example plugging and abandonment procedure is provided below. The following shall be included, at a minimum, in the plugging and abandonment plan.

1. Step by step procedures for removal of well equipment, establish mud system to kill well, remove wellhead and install blowout preventer, if needed.

2. Procedures for inspection of well casings and primary cement for corrosion breaks or voids, including:

    a. A bond log to determine if remedial work is required.

    b. Gamma ray-neutron, unless a previous [injection or inspection] is available.

    c. Caliper log after well is in static condition, or use of 33% extra volume above theoretical annular capacity.

3. Procedures for implementing any necessary well repairs.

4. Procedures for cleaning out hole:

    a. For new wells, a chemical wash;

    b. For old wells, run a bit gauged to the casing below the depth of the desired plug to remove deposits.

5. Procedures for establishing the mud system, and circulation of mud to achieve static equilibrium.

6. Procedures for preparation of casing wall or wall of open hole for cementing (e.g., by equipping the lower portion of the tubing or drill pipe with centralizers and rotating wall scratchers).

7. Procedures to test plug, pressure test, for basic integrity and tag for proper placement.

8. Cut of the casing 3 feet below grade.

9. Weld a blanking plate containing the required permit information.

<u>Item I. E.</u>

The cost estimate must equal the cost of plugging and abandonment at the point in the facility's operating life when the extent and manner of its operation would make plugging and abandonment the most expensive, as indicated by the plan.

At a minimum, the cost estimate shall include itemized costs for the following:

1. Cost for casing evaluation:
    - Cement Bond Log
    - Caliper Log
    - Electro-magnetic Log
    - Temperature profile, at least three (3) passes
    - Pressure test

2. Cost for evaluating any problems discovered by the casing evaluation;

3. Cost for repairing problems and cleanup of any groundwater or soil contamination;

4. Cost for cementing or other materials used to plug the well;

5. Cost for labor, engineering, rig time, equipment and consultants;

6. Cost for decontamination of equipment, i.e., injection tubing;

7. Cost for disposal of any equipment;

8. Estimated sales tax;

9. Miscellaneous and minor contingencies (20%);

10. Grand total.

Item I. F.

Once the Permittee has received approval of their proposed plugging and abandonment costs, they will need to submit financial assurance for plugging and abandonment in the amount of the approved cost estimate. The Illinois EPA will not issue a permit for construction until financial assurance has been submitted.

Item I. G. (730.172(a)(4))

For Class I hazardous waste injection wells, a post-closure care plan must be submitted as part of the permit application. The plan must include the following information:

1. The pressure in the injection zone before injection began;
2. The anticipated pressure in the injection zone at the time of closure;
3. The predicted time until pressure in the injection zone decays to the point that the well's cone of influence no longer intersects the base of the lowermost USDW;
4. The predicted position of the waste front at closure;
5. The status of any cleanups required pursuant to Section 730.164; and
6. The estimated cost of the proposed post-closure care.

Item I. H. (730.173)

Submit financial assurance for post closure care meeting the requirements of Subpart G of 35 Ill. Adm. Code 704.

Additional guidance on plugging and abandonment for UIC injection wells may be found at U.S. EPA Region V's website: https://www.epa.gov/uic/underground-injection-control-epa-region-5-il-mi-mn-oh-and-wi#guidance

FORM UIC-9 - WELL COMPLETION REPORT
INSTRUCTIONS

These instructions explain the information required in a Well Completion Report. Most of the information required is based on information that was gathered during the construction of the injection well. The information required in this report will be used to update the facility's current UIC permit with as-built specifications and will allow the facility to update the approved permit application with site specific hydrogeologic data and well specifications. This report also provides the results of logging and testing of the injection well and associated systems as required in the construction permit.

Once the Well Completion Report has been approved by the Illinois EPA, a revised UIC permit will be sent to the facility to authorize operation.

Item I

Indicate the type of permit as either an individual or area permit, including whether it is an emergency, new request. Requests for area permits should indicate the well number and the name of the field in addition to the above information.

Item II

The location of the well is to be provided in the Township-Range-Section System of the Bureau of Land Management of the US Government, Latitude and Longitude coordinates (degrees, minutes, seconds) and the Illinois State Plane coordinate system points. In addition, include the closest municipality name and county.

Items III, IV and V

Provide the surface elevation, referenced to mean sea level, in feet.
Provide the depth of the well in feet.
Provide the static water level, referenced to mean sea level, in feet.

Item VI

Provide the demonstrated fracturing pressure, if applicable, in psi. In addition, include information on the type of test used to determine the fracturing pressure.

Item VII

Indicate whether the well was completed as an open hole, fully cased and perforated, screen and gravel pack or other. If other, please specify.

Item VIII

Provide the schematics of the well, wellhead facilities and annulus monitoring system.

The well schematic and wellhead schematic should be on separate pages. Please provide each on an 8.5” x 11” sheet of paper. All casing, cemented intervals, centralizers, packer, tubing or other well equipment must be indicated and labeled.

Item IX. A

Provide the depth interval, in feet, and the corresponding diameter, in inches, of the hole.

Item IX. B

For the annulus protection system, provide the following information:

1. Annular space(s), including the inner and outer diameter;
2. Type of annular fluid;
3. Specific gravity of annular fluid;
4. Packer(s), including;
   - type
   - name and model
   - setting depth, in both feet and meters
   - manufactures spec sheets
6. Indicate if fluid was spotted under the packer, including the type, frequency and quantity
7. Well driller information should include the following information:
   - data on the drilling firm, including name, address and contact person
   - drilling method

Item IX. C.

Provide the following information for each of the casing strings used:

- depth interval in feet
- outside diameter in inches
- inside diameter in inches
- weight in pounds per foot
- grade, API
- design coupling
- coupling outside diameter in inches
- thermal conductivity BTU, ft.hr.degrees F

Item IX. D

Provide the following information for the injection tubing:

- type/grade, API
- outside diameter in inches

- inside diameter in inches
- weight in pounds per foot
- joint specification
- depth interval in feet
- thermal conductivity BTU, ft.hr. Degrees F
- maximum allowable suspended weight based on joint strengths of injection tubing
- weight of injection tubing string (axial load) in air
- manufactures spec sheets

Item IX. E

Provide the following cementing information for each casing string:

- depth interval in feet
- type/grade
- additives
- quantity in cubic yards
- circulated, yes or no
- thermal conductivity BTU, ft.hr. Degrees F
- if cement installed in stage identify stages, location of DV tool or perforations of casing used

Item IX.C – IX.E

Provide copies of logs, bottom-hole testing and data evaluation. Each of the logs and test results must be accompanied by a descriptive report prepared by a knowledgeable log analyst interpreting the results of such logs and tests. The results and interpretations of all logs and testing required in the approved UIC permit for the construction of conversion of the UIC well shall be included in the Well Completion Report. At a minimum, this would include the following logs and tests:

1. Surface Hole
   a. Resistivity
   b. Spontaneous Potential
   c. Caliper
   d. Variable density cement evaluation log
   e. Temperature, run down the well

2. Surface Casing (after cementing)
   a. Cement Bond Log
   b. Temperature or Density Log - at least one required

3. Intermediate and Production Hole
   a. Resistivity

b. Spontaneous Potential
c. Gamma Ray
d. Caliper
e. Porosity
f. Variable density cement evaluation log
g. Temperature, run down the well
h. Fracture finder

4. Cased Hole Logs
   a. Resistivity
   b. Spontaneous Potential
   c. Caliper
   d. Gamma Ray
   e. Porosity
   f. Variable density cement evaluation log
   g. Temperature, run down the well
   h. Fracture finder
   I. Casing Collar

5. Injection Zone
   a. Interpretation of full hole cores of injection zone and overlying confining zone
   b. Interpretation of formation samples
   c. Bottom hole pressure and temperature log
   d. Description of formation sample
   e. Results of formation water sampling

6. Confining Zone
   a. Based on sampling and logging data discuss the adequacy of the confining zone to prevent vertical migration of injected fluids or displaced formation water.
   b. Include parameters of thickness, permeability and porosity
   c. From the above data and factors, provide the projected flow time across the confining zone
   d. Include the results of formation water sampling.

Provide a description of injectivity tests conducted, such as permeability, reservoir limits, reservoir type, etc. A copy of the exact test procedures used and the results of the observed test data shall be included.

If the test or logs have been previously submitted, indicate the date(s) the logs were submitted.

<u>Item X</u>

Surface Installations

1. Provide a description of pressure and volume monitoring systems installed in the injection and annulus systems. The model and manufacturer of the temperature recorder installed should also be included.
2. Flow diagram with each waste stream identified, with detailed description of the differences in the pretreatment process and facilities, including the size, capacity and construction materials of system components identified.

Provide the following information for all filters and injection pumps:

- location
- type
- name
- model number
- capacity (gallons per minute)
- pore size in microns

Item XI

Revised copies of the form(s) are required following construction to account for any changes from the proposed well construction to the final well construction using actual data obtained during construction.

Item XII

Provide the results of detailed testing on the compatibility of the injection fluid with each of the listed items at expected bottom hole pressures and temperatures. Include a discussion on corrosiveness, reactivity and by products of the injection fluid and formation fluids and minerals and well components expected to come in contact with the injected fluids.

Item XIII

Attach a list of any changes in recording devices (including additional devices), specifying the location, name and model, mechanical or electrical if applicable, continuous or non-recording, and whether the gauge exceeds the maximum operating range by 20% , including:

- injection pressure gauges
- casing-tubing annulus pressure gauges
- flow meters
- pH recording devices
- temperature gauages

Item XII. F

Provide a revised Contingency Plan as necessary. This plan must provide a detailed description of procedures the facility will use when implementing a Well Failure scenario or a Well Shut In and must include, at a minimum, the following:

- A description of the alarm system, including the values for tubing pressure, flow rate and annulus pressure which will trigger the alarm.

- A description of the automatic shut down of the injection pumps, including the annulus pressure, injection pressure and flow rate which will trigger pumps shut down.

- A list of the persons designated to oversee well operations in the event of an emergency. Phone numbers and qualifications should be included.