ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

2520 WEST ILES AVENUE, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR JAMES JENNINGS, ACTING DIRECTOR

217/524-3301

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
9589 0710 5270 0389 7036 36

JUN 27 2025

Prairie State Generating Company, LLC
Attn: Randy Short
1739 New Marigold Road
Marissa, Illinois 62257-3438

RE: 1898995007 -- Washington County
Prairie State Generating Company
UIC Permit No. UIC-18-PSG
UIC Log No. UIC-213-M-2
UIC Admin Record - 23A
Draft Permit

Dear Mr. Short:

Enclosed is a draft modified Underground Injection Control Area Permit (UIC Permit) for the above referenced facility. This draft modified UIC Permit was developed in response to Prairie State Generating Company's (PSGC) permit modification request titled "Deep Well Operation Permit Modification Request", dated October 21, 2021 and received by the Illinois EPA on October 26, 2021. This permit modification request was assigned Log No. UIC-213-M-2 by the Illinois EPA.

This draft modified UIC Permit authorizes PSGC to continue operation of a Class I non-hazardous waste underground injection well, identified as WWDW #1, at PSGC facility located at 1739 New Marigold Road, approximately 6.5 miles northeast of the City of Marissa, Illinois. An additional well, identified as WWDW #2, may be constructed within the boundaries identified in the Area Permit Boundary Map located in Attachment C of the UIC Permit.

The draft modified UIC Permit is based on the administrative record contained in the Illinois EPA's files. The contents of the administrative record are described in Title 35 Illinois Administrative Code (IAC) 705.144. The major changes made to the existing UIC Permit, in response to this permit modification request are identified in Attachment 1 - Changes to Prairie State Generating Company's Underground Injection Control Area Permit.

Under the provisions of 35 IAC 705.141(d), the draft modified UIC Permit, Fact Sheet (Attached to this cover letter) and administrative record must be publicly noticed and made available for public comment. This application, draft modified UIC Permit, and fact sheet are available locally at the Marissa Area Public Library at 212 North Main Street in Marissa, Illinois.

The public comment period will begin on July 3, 2025 and close on August 4, 2025. Any interested party may request a public hearing and one will be held if deemed necessary by Illinois EPA. Please note that if a public hearing is held, it will be necessary to provide the public notice of the hearing at least forty-five (45) days prior to the date of the hearing and the comment period will be extended for up to thirty (30) days after the public hearing. During the comment period, the applicant or any interested party may submit comments to the Illinois EPA on the draft UIC Permit. Comments on the draft permit may be submitted to:

Illinois EPA
Office of Community Relations -- #5
Attn: Jeff Guy
2520 West Iles Avenue
P.O. Box 19276
Springfield, Illinois 62794-9272

Any questions regarding this permit should be directed to Jacob Nutt, by phone at 217/524-7048 or by email at jacob.nutt@illinois.gov. For any future submittals for this facility, please contact Keegan MacDonna, P.E., by phone at 217/524-3336 or by email at keegan.macdonna@illinois.gov.

Sincerely,

Joshua L. Rhoades, P.G.
Permit Section Manager
Bureau of Land

JLR:JDN:1898995007-UIC-213-M-2-DRAFT.docx
JDN JNH
Attachments: Attachment 1 - Changes to the Underground Injection Control Area Permit
Fact Sheet
Draft Non-Hazaroud Class I Well Underground Injection Control Area Permit

cc: John Schmale, Coal Combustion Residual Engineer – Prairie State Generating
James Andrew, Director, Environmental Services – Prairie State Generating
Stephanie Hill – SCS Engineers
Monte Markley – SCS Engineers
Floyd Cotter, P.E. – SCS Engineers
Chad Milligan, LPG – SCS Engineers

Attachment 1

Changes to Prairie State Generating Company's Underground Injection Control Area Permit

1898995007 -- Washington County
Prairie State Generating Company
UIC Log No. UIC-213-M-2

The following changes were made to Prairie State Generating Company's Underground Injection Control Area Permit (Permit) in response to permit modification request UIC-213-M-2. Prairie State Generating Company, LLC (PSGC) submitted this modification due to corrosion of the injection tubing that resulted in the loss of mechanical integrity of the well. This permit modification also addresses other minor issues to clarify permit conditions and address other operational changes.

1. Permit Condition A.3 - Establishment of Financial Assurance. Prior to commencing construction of an injection well the Permittee must establish financial resources to close, plug, and abandon the underground injection well(s) at this facility as required in Condition H.17 of this Permit and pursuant to 35 IAC 704.189. The amount of financial assurance to be provided is ~~$381,135.75~~ $499,802.78 per well in ~~2014~~ 2023 dollars.

2. Permit Condition B.2.b - Maximum injection rate. ~~Maximum injection rate.~~ The maximum injection rate for WWDW #1 shall not exceed ~~425~~ 625 gallons per minute (gpm) or a 24-hour rolling average of ~~400~~ 600 gpm (~~576,000~~ 864,000 gallons over any 24-hour period).

3. Permit Condition B.2.d.ii - A pressure differential of at least 100 psi shall be maintained between the annulus pressure and the injection pressure, except for brief period during startup and shutdown of the injection process. This pressure differential may be achieved with the annulus pressure either 100 psi lower than the injection pressure or 100 psi greater than the injection pressure.

4. Permit Condition B.2.d.iii - The maximum annulus pressure shall be no more than ~~2,100~~ 1,650 psi.

5. Permit Condition H.14.c - In case of an injection well failure, the Permittee shall implement the contingency plan developed for the injection wells, contained in ~~Form UIC-7, Permit Item III of the approved permit application~~ the October 2021, request for permit modification Log No. UIC-213-M-1, included as Attachment F of this Permit. An investigation of the well failure and plan of action to eliminate the problem must be conducted and the remedial work performed.

6. Permit Condition H.18.a - The Owner or Operator must prepare a written estimate, in current dollars, of the cost of plugging the injection well in accordance with the plugging and abandonment plan as identified in Condition H.24. 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. The currently approved cost estimate for plugging and abandonment of each injection well is ~~$381,135.75~~ $499,802.78 in ~~2014~~ 2023 dollars.

7. Permit Condition H.28 - Contingency Plan.

   a. The Permittee shall implement the contingency plan in accordance with the plans and methods described in the ~~May 2020, Well Completion Report - Part II: Surface Facilities Report - Volume I, Section XIII.F Revised Contingency Plan for Well Failure or Shut In.~~ October 2021, request for permit modification Log No. UIC-213-M-1, included as Attachment F of this Permit.

   b. The Permittee shall submit a revised contingency plan to the Illinois EPA within thirty (30) days of changes at the facility which necessitate changes to the existing contingency plan.

8. Revised Well Construction Details in Attachment B.

9. Various typographical errors throughout the modified permit.

10. The address of Illinois EPA in Springfield Office has been revised throughout the Permit.

11. Addition of Contingency Plan as Attachment F.

FACT SHEET

DRAFT NON-HAZARDOUS CLASS I WELL
UNDERGROUND INJECTION CONTROL AREA PERMIT

1898995007 -- WASHINGTON COUNTY
PRAIRIE STATE GENERATING COMPANY
PERMIT NO. UIC-018- PSGC
UIC LOG NO. UIC-213-M-2

This fact sheet has been prepared pursuant to the requirements of Title 35 Illinois Administrative Code (IAC) 705.143. This fact sheet is intended to be a brief summary of the principal facts and significant factual, legal, methodological, and policy questions considered in preparing the draft modified Class I Underground Injection Control Area Permit (UIC Permit).

Pursuant to 35 IAC 705.143(a), this fact sheet is sent to the applicant, the information repository, and to any other person who requests it.

I. INTRODUCTION

Prairie State Generating Company, LLC (PSGC) operates a 1,600-megawatt power plant utilizing coal from its adjacent underground mine. The facility located at 1739 New Marigold Road, Marissa, Illinois, approximately 6.5 miles to the northeast of Marissa. The Illinois EPA issued an UIC Permit to PSGC on June 6, 2018. This permit authorized the operation of a Class I non-hazardous waste injection well, identified as well WWDW#1, and the future construction of an additional injection well at the facility. Class I non-hazardous disposal wells inject non-hazardous fluids beneath the lowermost underground source of drinking water. Well WWDW#1 is authorized to dispose of non-hazardous wastewater from the facility's North Leachate Pond. These wastewaters are injected into the St. Peter sandstone formation which is located approximately 3,440 feet below the ground surface (ft-bgs).

II. PERMIT MODFICATION REQUEST

PSGC submitted a permit modification request application, titled "Deep Well Operation Permit Modification Request", dated October 21, 2021, to the Illinois EPA. The permit modification request proposed the following changes to the UIC permit:

a. Revision of financial assurance.

b. Increased maximum injection rate in gallons per minute, 24-hour rolling average, and maximum gallons over a 24 hour period for WWDW #1.

c. Clarification of "at least" 100 psi for differential pressure shall be maintained between annulus pressure and injection pressure, except for brief period during startup and shutdown of the injection process.

d. Reduction of maximum annulaus pressure from 2,100 psi to 1,650 psi in Permit Condtion B.2.d.iii.

e. Implementation of a contingency plan developed for the injection wells for the event of well failure.

f. Revision of cost estimate for well plugging and abandonment.

g. Revision of contingency plan.

h. Revised Well Construction Details in Attachment B.

III. STRUCTURE OF PERMIT

The Illinois EPA has reviewed PSGC's permit application for an Underground Injection Control Area Permit and has prepared a draft Permit in accordance with the requirements of Title 35 IAC Parts 702, 704, 705, and 730, and the Illinois Environmental Protection Act. The draft Permit is divided into the following sections:

Section A, Authorization for Construction, sets forth requirements for the construction of injection wells and reporting requirements, including the submittal of a Well Completion Report. The Well Completion Report documents the as built injection well; the results from tests conducted on the well; and proposed final operating parameters.

Section B, Operating, Monitoring, and Reporting Requirements, sets forth site-specific requirements for operation, monitoring and reporting for wells that are authorized for construction.

Sections C through G contain standard conditions associated with UIC permits.

Section H, Duties and Requirements, sets forth standard conditions required by regulation to be included in the Permit. Some conditions may be modified to reflect site-specific needs or site-specific codifications may be added that do not fit into other sections of the Permit.

IV. PROCEDURES FOR REACHING A FINAL DECISION

The public is given an opportunity to review the permit application and to provide written comments on the draft Permit. Under the provisions of 35 IAC 705.141(d), the draft Permit and administrative record must be publicly noticed and made available for public comment. The application and draft Permit are available locally at the Marissa Area Public Library at 212 North Main Street in Marissa, Illinois. The public comment period will begin on July 3, 2025 and close on August 4, 2025. Any interested party may request a public hearing and one will be held if deemed necessary by Illinois EPA. Please note that if a public hearing is

held, it will be necessary to provide public notice of the hearing at least 45 days prior to the date of the hearing and the comment period will be extended for 30 days after the public hearing.

During the comment period, the applicant or any interested party may submit comments to the Illinois EPA on the draft Permit. Comment on the draft Permit may be submitted to:

Illinois EPA
Office of Community Relations -- #5
Attn: Jeff Guy
2520 West Iles Avenue
P.O. Box 19276
Springfield, Illinois 62794-9272

At the close of the comment period, Illinois EPA will prepare a written response to significant comments and provide a copy of this response to all interested parties. Illinois EPA will consider these comments and will issue a final permit after the close of the public comment period unless the Illinois EPA decides to reverse the tentative decision. The appeal process and limitations on Illinois EPA's final decisions on UIC permits are addressed in 35 IAC 705.212.

Inspection of the administrative record must be scheduled by contacting Jeff Guy at the number listed below. To schedule a time to inspect the administrative record and or obtain further information regarding the permitting process, please contact:

Mr. Jeff Guy, Illinois EPA
Office of Community Relations
Phone: 217/785-8724
Email: jeff.guy@illinois.gov

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

2520 WEST ILES AVENUE, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR JAMES JENNINGS, ACTING DIRECTOR

NON-HAZARDOUS CLASS I WELL
UNDERGROUND INJECTION CONTROL AREA PERMIT

1898995007 -- Washington County
Prairie State Generating Company
Permit No. UIC-018-PSG
UIC Log No. UIC-213-M-2
UIC Admin Record-23A

Issue Date: June 6, 2018
Effective Date: July 11, 2018
Expiration Date: June 6, 2028
Modification Date: DRAFT

Prairie State Generating Company, LLC
Attn: Randy Short
1739 New Marigold Road
Marissa, Illinois 62257-3438

An Underground Injection Control Area Permit is hereby issued to Prairie State Generating Company, LLC as Owner, Operator and Permittee pursuant to Section 39(e) of the Illinois Environmental Protection Act (Act) and Title 35 Illinois Administrative Code (IAC) Subtitle G.

PERMITTED WASTE ACTIVITY

This Permit requires Prairie State Generating Company to conduct the following activities in accordance with the approved permit application and the conditions in this permit:

> **Operation of a Class I Underground Injection Control Well** (WWDW #1) injecting non-hazardous fluids.
>
> **Future Construction of a Class I Underground Injection Control Well** (WWDW #2)

This Permit consists of the conditions contained herein (including those in any attachments and appendices) and applicable regulations contained in the Act and Title 35 IAC Parts 702, 704, 705, and 730. The Environmental Protection Act 415 ILCS 5/1 et seq. grants the Illinois Environmental Protection Agency the authority to impose conditions on permits which it issues.

This Permit is issued based on the information submitted in the approved permit application identified in Attachment A of this Permit and any subsequent amendments. Any inaccuracies found in this information may be grounds for the termination or modification of this Permit (see 35 IAC 702.187 and 702.186) and potential enforcement action (415 ILCS 5/44(h)).

Sincerely,

DRAFT

Joshua L. Rhoades, P.G.
Permit Section Manager
Bureau of Land

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JDN TWH

2125 S. First Street, Champaign, IL 61820 (217) 278-5800
115 S. LaSalle Street, Suite 2203, Chicago, IL 60603
1101 Eastport Plaza Dr., Suite 100, Collinsville, IL 62234 (618) 346-5120
9511 Harrison Street, Des Plaines, IL 60016 (847) 294-4000
595 S. State Street, Elgin, IL 60123 (847) 608-3131
2309 W. Main Street, Suite 116, Marion, IL 62959 (618) 993-7200
412 SW Washington Street, Suite D, Peoria, IL 61602 (309) 671-3022
4302 N. Main Street, Rockford, IL 61103 (815) 987-7760

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A. AUTHORIZATION FOR CONSTRUCTION

1. Authorization for Construction. The Permittee, Prairie State Generating Company, is hereby authorized to complete construction of a Class I Underground Injection Control (UIC) injection well, identified as WWDW #2, for the disposal of non-hazardous wastewater. WWDW #2 must be constructed within the area identified in Condition A.5. The construction of the well shall be performed in accordance with the conditions of this Permit, the approved permit application, identified in Attachment A, the Illinois Environmental Protection Act (Act) and Title 35 Illinois Administrative Code (IAC) Parts 702, 704, 705, and 730. In the event of a conflict between the conditions of this Permit and the approved permit application, the conditions/requirements of the Permit shall supersede the application.

    a. Casing Cement. The Permittee proposes, in the permit application Form UIC-3 Permit Item XIV.B: Cementing and Permit Item XV.B: Drilling Schedule (item 13 and 23), that should cement fail to return to the surface during the cementing of the surface or intermediate casings, a 1-inch cementing string will be run alongside the casing and used to fill the annulus with cement to the surface using the tremie method.

        i. Prior to implementing the remedial cement job to address the failure of cement to return to the surface, the Permittee must locate the top of the cement in the annulus through the use of a temperature survey, cement bond log, or other means.

        ii. Should cement fail to circulate to the surface during the cementing of the surface and/or the intermediate casing, the Permittee shall within 24 hours notify the Illinois EPA by email as specified in Condition A.10. This notification must include:

            1. An estimate of the depth to the top of the cement, based on mud returns or other information available at the time of the notification.

            2. If a remedial cement plan has been developed to completely cement the casing (the use of a tremie pipe is one such available alternative), the notice should include a brief description of plan. If a remedial cement plan has not been developed an estimate of when the plan will be completed.

            3. Estimated timeline for activities associated with the development and implementation of the remedial cement job.

2. Notification of Construction (35 IAC 704.162). The Permittee must notify the Illinois EPA in writing at least 30 days prior to the date of the planned physical construction of an injection well. The written notification must state that the injection well will be constructed in accordance with the requirements of the Permittee's UIC Permit and include a map that includes the approximate location of the injection well to be constructed, any existing injection wells and the Area Permit Boundaries. A completed Illinois EPA General Application for Permit (Form UIC-1) form must accompany the notification. This form can be found at the Illinois EPA's website.

3. Establishment of Financial Assurance. Prior to commencing construction of an injection well the Permittee must establish financial resources to close, plug, and abandon the underground injection well(s) at this facility as required in Condition H.17 of this Permit, and pursuant to 35 IAC 704.189. The amount of financial assurance to be provided is $499,802.78 per well in 2023 dollars.

4. Application and Plans. Construction and if later authorized operation of the injection wells and associated monitoring systems shall be conducted in accordance with the terms and conditions of this Permit, the approved permit application, and subsequent approved modifications. The approved permit application is identified in Attachment A of this Permit.

5. Well Locations (35 IAC 704.162(b)). The Area Permit Boundary is defined as the area in which the approved injection wells may be constructed. This area is identified in Form UIC-3, Figure 1-2 of the approved permit application. A copy of this figure is included in Attachment C of this Permit. The coordinates of the approximate center of this area are:

   Latitude: 38° 16' 55" N Longitude: 89° 40' 55" W

6. Injection and Confining Layers. The following is based on information collected during the construction of WWDW #1. The injection zone is comprised of the geologic formation designated as the St. Peter Sandstone formation, which is located at a depth of approximately 3,564 to 3,772 feet below ground surface (ft-bgs) at the facility. The final location and thickness of the injection zone for WWDW #2 will be determined during construction of the injection well. The water in the injection zone was found to be highly mineralized with the concentration of total dissolved solids at 58,100 mg/L.

   The confining layer located above the injection zone was present at a depth of approximately 2,774 ft-bgs and is comprised of the Maquoketa Shale formation. This formation has a thickness of approximately 150 feet at WWDW #1. The Maquoketa Shale is a formation with low permeability and uniform thickness making it an effective upper confining unit which will limit the upward movement of any injected wastewater.

7. Injection Well Construction Details (35 IAC 730.112(b)). The well construction details for well WWDW#1 (as-built) and well WWDW#2 (proposed) are provided in Attachment B which contains:

   a. Injection well schematics;

   b. Details of the casing strings used in the construction of each well;

   c. Specification for the cementing of each of the casing strings;

   d. Tubing and packer specifications;

8. Well Completion Report. The Permittee shall submit a Well Completion Report (Attachment E) upon completion of each well. The report must also include the following:

   a. A description of construction of the well, including driller's log, materials used (i.e., tubing and casing tallies), cement (and other) volumes, appropriate logs and other tests conducted during the drilling and construction.

   b. Test and Logs during Construction. At a minimum, during drilling and construction of the injection well(s), all tests and geophysical logs listed under 35 IAC 730.112(d) shall be performed. Additional tests and geophysical logs identified in the approved permit application or required as a condition elsewhere in this Permit shall be performed. The results from logs and tests including appropriate evaluations and interpretations of the results shall be included in the Well Completion Report. A descriptive report interpreting the results of the logs and tests that has been prepared by a knowledgeable log analyst shall be included. Reports prepared by log analysts must be signed by the analyst and include their phone number and email address.

   c. Maximum Injection Pressure and Rate. The maximum injection pressure and injection rate will be determined from information collected during construction of the injection well. The tests used to determine the maximum injection pressure and rate are described in the permit application, Form UIC-3 Permit Item XVI, including a Step-Rate Test.

   d. Revised Contingency Plan. The Well Completion Report for a newly completed well shall include a revised contingency plan based on the as-built injection well system. The revised plan must include, at a minimum, the following:

      i. A description of the alarm system, including the values for tubing pressure, flow rate and annulus pressure that will trigger alarms;

ii. The action personnel will take in response to alarm conditions;

iii. A description of how operators and other appropriate personnel will be notified of system alarms;

iv. A description of the automatic shutdown of the injection pumps, including the annulus pressure, injection pressure and flow rate that will trigger the shutdown;

v. Procedures to be followed in the event of injection well or equipment failure; and

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

9. Reporting During Well Construction. During drilling and construction of an injection well, a weekly report shall be submitted to the Illinois EPA. The reports should describe the construction completed during the past week and the construction to be completed the following week at the well site. This report should include a list of all tests and logs preformed or to be performed on the well. In addition, a daily update shall be submitted that identifies activities that will be occurring and changes to the scheduled activities. These reports should be submitted electronically to: jacob.nutt@Illinois.gov and keegan.macdonna@illinois.gov. These reports are exempt from the signatory requirement in Condition H.11.

10. Change During Construction (35 IAC 704.183). Changes in construction plans during construction must be approved by the Illinois EPA prior to being physically incorporated into construction of the well. In accordance with 35 IAC 704.264, these changes may be approved as minor modifications.

11. Authorization for Injection. The Permittee shall not commence operation of any injection well until receiving writing authorization from the Illinois EPA to do so. Authorization to begin operation of an injection well shall not be granted until:

    a. The Permittee has submitted a Well Completion Report, which includes a permit modification request for authorization to operate the injection well, and other information as required, demonstrating that the well has been constructed in accordance with the approved permit application.

    b. The Illinois EPA Field Operations Section has conducted an inspection of the newly constructed injection well systems to verify the completion of the injection well.

c. The Illinois EPA has conducted a review of the Well Completion Report and other information as required by this Permit and has determined that the report is complete, i.e., all of the required testing, logging, evaluations, and inspections have been conducted in accordance with the approved permit applicaion.

d. The information provided demonstrates that the construction and operation of the injection well meets the requirements of the Act and 35 IAC Parts 702, 704, 705, and 730.

B. OPERATING, MONITORING AND REPORTING REQUIREMENTS

1. Authorization for Injection.

   a. WWDW #1. The Permittee is authorized to operate a Class I UIC injection well, identified as WWDW #1, for the disposal of non-hazardous wastewater generated at the facility, in accordance with the conditions of this Permit, the approved permit application (identified in Attachment A), the Illinois Environmental Protection Act (Act) and Title 35 IAC Parts 702, 704, 705, and 730. WWDW #1 was constructed in accordance with the Underground Injection Control Area Permit No. UIC-018-PSG, issued to the Permittee on June 6, 2018. The as-built construction details for WWDW #1 are provided in Attachment B.

      The well is located at:

      Latitude: 38° 16' 34.02" N Longitude: 89° 40' 12.91" W

2. Operating Requirements (35 IAC 730.113(a), 704.185)

   a. Maximum injection pressure. The Permittee must insure that the injection pressure at the wellhead does not exceed the maximum allowed injection pressure. The injection pressure of WWDW #1 shall not exceed 1,500 pounds per square inch (psi) at the wellhead.

   b. Maximum injection rate. The maximum injection rate for WWDW #1 shall not exceed 625 gallons per minute (gpm) or a 24-hour rolling average of 600 gpm (864,000 gallons over any 24-hour period).

   c. Injection Fluid.

      i. The wastewaters to be injected into the injection well(s) shall be limited to non-hazardous leachate stored in the Permittee's North Leachate Pond. The source of these wastewaters is leachate collected in the Permittee's Near Field Coal Combustion Residual (CCR) Landfill. The primary component of leachate is produced from rainwater contacting and infiltrating the CCR. A secondary component contributing to the leachate produced by the landfill is from the plant sulfur dioxide absorber system

process water. This water is present as residual moisture in the dewatered gypsum (generated in the absorber system) placed in the landfill and is also used to condition fly ash for conveyance prior to placement in the landfill and to aid in dust control on the surface within the landfill cell.

ii. Maximum specific gravity of the injection fluid shall not exceed 1.05, as determined by the Quarterly Monitoring program, contained in the permit application, Form UIC-7, Item I.A. Waste Sampling and Analysis Plan, as modified by this Permit.

d. Annulus Protection System. The following procedures shall be used to limit the potential for any unpermitted fluid movement into or out of the annulus.

i. The casing-tubing pressure within the annular spacing between the injection tubing and the long string casing (the "annulus") shall be maintained at a minimum pressure of 300 psi.

ii. A pressure differential of at least 100 psi shall be maintained between the annulus pressure and the injection pressure, except for brief period during startup and shutdown of the injection process. This pressure differential may be achieved with the annulus pressure either 100 psi lower than the injection pressure or 100 psi greater than the injection pressure.

iii. The maximum annulus pressure shall be no more than 1,650 psi.

iv. The annulus between the injection tubing and the long string casing shall be filled with an annulus fluid consisting of a fresh water mixed with Nalco Adomite ASP-539 packer fluid or equivalent. The Nalco Adomite ASP-539 contains a corrosion inhibitor and a biocide. The fresh water/packer fluid ratio shall be mixed in accordance to the manufacturer's recommendation resulting in a density equal to water.

v. The wellhead and the annulus protection system equipment whose operation or integrity may be impaired by temperature extremes shall be enclosed within a structure with a climate control system capable of protecting them from the temperature extremes that may impair their integrity and/or operation.

vi. Any changes to the composition of annular fluid shall be reported in the next monthly report submitted to the Illinois EPA.

vii. The annulus pressure shall be continuously monitored and recorded, including periods when active injection is not occurring or when the well has been shut-in.

e. Annulus injection prohibition. Injection between the outer most casing protecting underground sources of drinking water and the well bore is prohibited.

f. Prohibition of excessive pressure. The Permittee shall not use excessive injection pressure or volumes and cause:

i. New fractures or propagation of existing fractures in the injection zone (except during stimulation),

ii. Initiation of fractures in the confining zone,

iii. Migration of injected fluids into any underground source of drinking water,

iv. Displacement of formation fluid into any underground source of drinking water, or

v. Non-compliance with 35 IAC Part 730 operating requirements.

g. Well Stimulation. The Permittee must notify the Illinois EPA at least 30 days before conducting a well stimulation. The well stimulation notification shall include the procedures that will be used for the stimulation of the well. Well stimulation procedures other than as described in Form UIC-3, Permit Item XVI.D of the approved permit application may require the submittal of a permit modification request and subsequent approval in accordance with 35 IAC 704.261. It should be noted that this process will require more than 30 days to complete the issuance of a modified permit approving the proposed well stimulation.

h. Range of Injection Tubing. The Permittee may replace the current injection tubing with any of the approved injection tubing identified in Attachment B. The replacement of the injection tubing must be reported as required in Condition B.7.c.vi.

3. Monitoring Requirements (35 IAC 730.113(b)).

a. Sampling. Grab samples of the injection fluid shall be collected in accordance with Condition B.4.

b. Continuous Recording Devices. Continuous recording devices or their equivalents shall be installed and used to monitor the injection pressure, flow rate, volume, and annulus pressure. Information from the following continuous recording devices and manually read gauges/devices shall be utilized to monitor the operation of each injection well:

i. Injection pressure gauges - Rosemount 3051S (or equivalent) pressure transmitter gauge.

ii. Casing-tubing annulus pressure gauges – Rosemount 3051S (or equivalent) pressure transmitters gauge. In addition, two analog pressure gauges are present: Ashcroft 1279 Duragauge (max 2,000 psi) and WIKA 233.54 Liquid Filled (max 3,000 psi).

iii. Flow meter – Rosemount 8700 Magnetic Flow Meter (or equivalent)

iv. Volume – Volume is measured and recorded with equipment identified in item iii above and sum registered in the Yokogawa CX2000 data recorder.

v. pH – Continuous. Yokogawa FU20 pH and temperature sensor (or equivalent).

vi. Temperature – Continuous. Yokogawa FU20 pH and temperature sensor (or equivalent).

vii. Seal Pot Assembly fluid level - Continuous. Rosemount 5300 Level transmitter (or equivalent). A sight glass level is also present on the seal pot. The Permittee shall record the volume of fluid added or removed from the seal pot as described in the approved permit application.

c. Range of Recording Device and Gauges. All recording devices and gauges shall be capable of recording or reporting values that exceed maximum permitted operating range by a minimum of 20%.

4. Waste Analysis Plan (35 IAC 704.187).

a. The Permittee shall follow the written Waste Sampling and Analysis Plan, Form UIC-7, Permit Item I.A Waste Sampling and Analysis Plan of the approved permit application, as modified by this Permit. A copy of the plan shall be kept at the facility. The Permittee shall collect and analyze the injection fluid in a manner consistent with US EPA publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" and "Handbook for Sampling and Sample Preservation of Water and Wastewater," U.S. Environmental Protection Agency EPA-600/4-82-029.

b. The Quarterly Monitoring program, detailed in Form UIC-7, Item I.A. Waste Sampling and Analysis Plan, shall include collection, analysis, and reporting of the specific gravity of representative sample(s) of wastewater.

5. Ambient Monitoring (35 IAC 730.113(d)). The Permittee shall conduct an Ambient Pressure Monitoring Test annually in accordance with the procedures outlined in Form UIC-7, Permit Item I.E of the approved permit application.

6. Waiver of Monitoring (35 IAC 730.113). A waiver from groundwater monitoring is approved based on information submitted by the Permittee. The approval of this waiver request may be terminated if the Illinois EPA acquires new information regarding the geology in the vicinity of the facility or if new regulations requiring groundwater monitoring are promulgated. If the Illinois EPA terminates the approval of the waiver from groundwater monitoring based on acquisition of new geologic information or promulgation of new regulations, the modification procedures found in 35 IAC Part 702 must be followed.

7. Monthly Reporting Requirements.

    a. Report submittal date. Monthly monitoring reports are due by the 15th day of the month immediately following a reporting period. A reporting period is defined as a calendar month.

    b. Contents of monthly reports. The monthly reports shall include:

        i. Daily value for total volume injected, daily maximum and minimum values for annulus pressure, injection pressure, and flow rate.

        ii. Weekly averages for annulus pressures, injection pressure, and flow rate.

        iii. The number of well startups each day.

        iv. Total hours of injection each day.

        v. Total volume injected to date.

        vi. Monthly summary of:

            1. Maximum, minimum, and average values for annulus pressures, injection pressure, and flow rate.

            2. Total gallons of fluid injected.

            3. Total number of well startups.

vii. A copy of the operating charts for the month for:

1. Annulus pressure.
2. Injection pressure.
3. Flow rate.

viii. Results of chemical analyses required by this permit.

c. Other information in monthly reports. The results of any of the following tests or work shall be reported with the second monthly report after completion of the test or work:

i. Periodic tests of mechanical integrity.

ii. Copies of any logs run on the well, submitted with a log analysis.

iii. Any other test of the injection well conducted by the Permittee.

iv. Any well work over.

v. Maintenance performed on monitoring devices or well components.

vi. Changes of gauges, pipes, and other well components and monitoring devices. Change of injection tubing requires the submittal of a revised/updated as-built well diagram.

vii. Changes in the type of annulus fluid.

viii. Addition or removal of annulus fluid.

ix. Summary of annular fluid level fluctuations.

x. Ambient pressure monitoring results.

d. Illegible reports will be returned to the Permittee and deemed not filed. All graphs and charts must be labeled appropriately.

i. Charts and other information generated from digital/computer data shall provide an accurate representation of the operating condition of the well. The Illinois EPA reserves the right to require submittal of tabular paper copies of data, changes in the format and resolution of representative graph(s), and the submittal of digital data to Field Operations staff and Permit Section staff for review. The electronic data submitted must be in

a format that is useable, such as tab or comma delimited CSV format or Microsoft Excel format.

e. Report submittal addresses. The cover letter for the monthly report will indicate a copy of the report was submitted to each of the following addresses:

i. Illinois Environmental Protection Agency
Division of Land Pollution Control #33
Permit Section
2520 West Iles Avenue
P.O. Box 19276
Springfield, Illinois 62794-9276

ii. Illinois Environmental Protection Agency
Division of Land Pollution Control
Field Operations Section
1101 Eastport Plaza Dr., Suite 100
Collinsville, IL 62234

C. EFFECT OF PERMIT.

The existence of a UIC permit shall not constitute a defense to a violation of the Illinois Environmental Protection Act or 35 IAC Subtitle G except for prohibitions against development, modification, or operation without a permit. Issuance of this Permit does not convey property rights or any exclusive privilege. Issuance of this Permit does not authorize any injury to persons or property, or invasion of other private rights, or infringement of state or local law or regulations. (35 IAC 702.181)

The activity authorized by this Permit shall not allow the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or may otherwise adversely affect the health of persons or the environment. Any underground injection activity not authorized in this Permit or otherwise authorized by Permit is prohibited. (35 IAC 704.122)

Compliance with the terms of this Permit does not constitute a defense to any action brought under Section 1431 of the Safe Drinking Water Act (SDWA) or any other law governing protection of public health or the environment for any imminent and substantial endangerment to human health, or the environment. In the case of disagreement between the conditions of this Permit and the application, the permit conditions shall govern.

D. PERMIT ACTIONS.

This Permit may be modified, reissued, or revoked during its term for cause set forth in 35 IAC 702.183 through 702.186. The filing of a request by the Permittee for a permit

modification or reissuance, or a notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any permit condition. (35 IAC 702.146)

E. SEVERABILITY.

The provisions of this Permit are severable, and if any provision of this Permit or the application of any provision of this Permit is held invalid, the application of such provision to other circumstances and to the remaining provisions of this Permit shall not be affected thereby.

F. CONFIDENTIALITY.

In accordance with Section 7 of the Illinois Environmental Protection Act and Title 2 Illinois Administrative Code (2 IAC) Part 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 IAC Part 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 Illinois EPA procedures. (35 IAC Part 130) (2 IAC Part 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 drinking water.

G. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS.

Any person who violates a permit requirement is subject to civil penalties, fines, and other enforcement action under the Safe Drinking Water Act (SDWA) and the Illinois Environmental Protection Act.

H. DUTIES AND REQUIREMENTS.

1. Duty to Comply. The Permittee shall comply with all applicable UIC program regulations and conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by a temporary emergency permit under 35 IAC 704.163. Any permit noncompliance constitutes a violation of the Illinois Environmental Protection Act (Act) and is grounds for enforcement action, permit revocation,

modification, or denial of a permit renewal application. Such noncompliance may also be grounds for enforcement action under the Resource Conservation and Recovery Act (RCRA). (35 IAC 702.141 and 35 IAC 704.181(a)).

2. Duty to Reapply. If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this Permit, the Permittee must submit an application for a new permit at least 180 days before this Permit expires. (35 IAC 702.142)

3. Need to Halt or Reduce Activity. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. (35 IAC 702.143)

4. Duty to Mitigate. The Permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from non-compliance with this Permit. (35 IAC 702.144)

5. Proper Operation and Maintenance. The Permittee shall at all times properly operate and maintain all facilities, systems of treatment, and controls (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, adequate laboratory and process controls, and appropriate quality assurance procedures. This provision requires the operation of backups, auxiliary facilities, or similar systems used only when necessary to achieve compliance with the condition of this Permit. (35 IAC 702.145)

6. Property Rights. Issuance of this Permit does not convey any property rights of any sort, or any exclusive privilege. (35 IAC 702.147)

7. Duty to Provide Information. The Permittee shall furnish to the Illinois EPA, within the specified times, any information which the Illinois EPA may request, to determine whether cause exists for modifying, revoking and reissuing, terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Illinois EPA, upon request, copies of records required to be kept by this Permit. (35 IAC 702.148)

8. Inspection and Entry (35 IAC 702.149). The Permittee must allow an authorized representative of the Illinois EPA, upon the presentation of credentials and other documents, as may be required by law, and at reasonable times, to:

    a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

b. Have access to and copy any records that must be kept under the conditions of this Permit;

c. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

d. Sample or monitor for the purposes of assuring permit compliance or as otherwise authorized by the appropriate Act, any substances or parameters at any location.

e. Have access to witness the running of any logs or tests.

9. Monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (35 IAC 702.150(a))

10. Records (35 IAC 702.124; 702.150(b), (c) & 704.181(b)).

a. The Permittee shall keep records of all data used to complete the permit applications and any supplemental information submitted pursuant to 35 IAC 702.123 and 35 IAC 704.161 for a period of at least three years from the date the application is signed.

b. The Permittee shall retain records of all monitoring information, including all calibration, maintenance records, original chart recordings for continuous monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Illinois EPA at any time.

c. Retention of records. The Permittee shall retain records concerning the nature and composition of all injected fluids until three years after the completion of any plugging and abandonment procedures specified under 35 IAC 704.188 or under 35 IAC 730 Subpart G of, as appropriate. The Owner or Operator shall continue to retain the records after the three-year retention period unless the Owner or Operator delivers the records to the Illinois EPA or obtains written approval from the Illinois EPA to discard the records.

d. Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurements;

ii. The individual(s) who performed the sampling or measurements;

iii. A precise description sampling methodology and handling, including chain of custody procedures;

iv. The date(s) analyses were performed;

v. The individual(s) who performed the analyses;

vi. The analytical techniques or methods used; and

vii. The results of such analyses.

11. Signatory Requirements. All reports, application, or information submitted to the Illinois EPA shall be signed and certified as required in 35 IAC 702.126. (35 IAC 702.151)

12. Reporting Requirements.

a. Planned changes. The Permittee shall give written notice to the Illinois EPA within 15 days of any planned physical alterations or additions as to the permitted facility. (35 IAC 702.152(a))

b. Anticipated noncompliance. The Permittee shall give advance notice to Illinois EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. (35 IAC 702.152(b)).

c. Other noncompliance. The Permittee shall report all instances of noncompliance not reported under 35 IAC 702.152 paragraphs (d), (e), and (f) at the time monitoring reports are submitted. The reports shall contain the information required in 35 IAC 704.181(d)(2). (35 IAC 702.152(g))

d. A summary of the reporting dates can be found in Attachment D for information required by this Permit. This summary is provided as a convenience and is not necessarily complete, nor is it to be construed as a substitute for actual permit conditions.

13. Corrective Action Requirements (35 IAC 704.193 and 730.107).

a. The Permittee shall notify the Illinois EPA in accordance with the notification procedures in Condition H.15, and the injection well(s) shall be immediately shut-in upon: the discovery of upward fluid migration occurring through a previously unknown well bore, or other improperly sealed, completed or abandon wells in the area of review, due to injection of fluid into the Permittee's well(s), and/or;

b. In the event of the discovery of a well or wells described in item (a) above, the Permittee must prepare a permit modification request consisting of a corrective action plan describing such steps to be taken to properly plug or seal the wells and/or other actions necessary to prevent movement of fluid into Underground Sources of Drinking Water (USDW). A copy of the plugging affidavit(s) filed

with the Illinois Department of Public Health and the Illinois Department of Natural Resources, Office of Mines and Minerals, Division of Oil and Gas for wells that are subsequently properly plugged and abandoned must be submitted to the Illinois EPA.

14. Well Failure (35 IAC 704.190, 730.108). The Permittee shall notify the Illinois EPA in accordance with the notification procedures in Condition H.15, and the injection well(s) shall be immediately shut-in upon:

    a. The discovery of the loss of mechanical integrity of an injection well or;

    b. The discovery of a well failure including, the inability of the Permittee to properly monitor and/or operate an injection well, as required by the Permit, due to the malfunction of equipment or the failure of other well components.

    c. In case of an injection well failure, the Permittee shall implement the contingency plan developed for the injection wells, contained in the October 2021, request for permit modification Log No. UIC-213-M-1, included as Attachment F of this Permit. An investigation of the well failure and plan of action to eliminate the problem must be conducted and the remedial work performed.

       The Permittee may be required to submit a permit modification request for review and approval by the Illinois EPA prior to implementation of work to investigate and/or repair a well. Remedial work that would likely require the submittal a permit modification request for review and approval prior to implementation includes:

       i. Alterations to the design of the injection well system; and/or

       ii. Procedures used to investigate and/or repair a well failure that may affect the mechanical integrity of the well.

       If a well failure results in an imminent and substantial threat to the health of persons, the Illinois EPA may issue a temporary emergency permit in response to a modification request which describes the steps to be taken to address this threat pursuant to 35 IAC 704.163.

15. Twenty-Four Hour Reporting (35 IAC 702.152(f); 704.181(d)).

    a. The Permittee shall report to the Illinois EPA any noncompliance or well activity which may endanger health or the environment including but not limited to the following:

       i. Any monitoring or other information which indicates any contaminant my cause an endangerment to USDW.

ii. Any noncompliance with a permit condition or malfunction of the injection well system which may cause fluid migration into or between underground sources of drinking water.

Any information shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances.

b. A written submission must also be provided to the Illinois EPA within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission must contain:

i. A description of the noncompliance problem and its cause;

ii. The period of noncompliance including exact dates and times;

iii. If the noncompliance problem has not been corrected, the anticipated time it is expected to continue; and

iv. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance problem.

16. Transfer of Permit.

a. Transfers. This permit is not transferable to any person except after notice to the Illinois EPA. The Illinois EPA may require modification of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under appropriate sections of the Act. (35 IAC 702.152(c))

b. Transfer by modification. A permit may be transferred by the Permittee to a new owner or operator only if the Permit has been modified or reissued (under 35 IAC 704.261 through 704.264) to identify the new Permittee and incorporate such other requirements as may be necessary under the under appropriate sections of the Act. The new owner or operator to whom the Permit is transferred must comply with all the terms and conditions specified in such Permit. (35 IAC 704.260(a))

c. Automatic transfers (35 IAC. 704.260(b)) As an alternative to transfers under condition 15(b), a UIC Permit for a well not injecting hazardous waste may be automatically transferred to a new Permittee if each of the following conditions are fulfilled:

i. The current Permittee notifies the Illinois EPA at least 30 days in advance of the proposed transfer date, described in Condition 16(c)(ii) of this section;

ii. The notice 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 Permittees;

iii. The notice demonstrates that the financial responsibility requirements of 35 IAC 704.189 will be met by the new Permittee and that the new Permittee agrees to comply with all the terms and conditions specified in the Permit to be transferred under automatic transfer conditions; and

iv. The Illinois EPA does not notify the existing Permittee and the proposed new Permittee of its intent to modify the permit. A modification under this subparagraph may also be a minor modification under 35 IAC 704.264. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Condition 16(c)(ii).

17. Financial Responsibility. (35 IAC 704.189). The Permittee shall maintain financial responsibility and resources to close, plug, and abandon all the underground injection wells at this facility in a manner prescribed by the Illinois EPA, and Condition H.24 of this Permit.

    a. The Permittee must show evidence of financial responsibility to the Illinois EPA by the submission of a surety bond, other adequate assurance such as financial statements, or other materials acceptable to the Illinois EPA.

    b. The financial documents submitted must be revised and maintained as specified in 35 IAC Part 704 and 40 CFR 144.

    c. Construction and/or operation of any injection well(s) and groundwater monitoring well(s) is prohibited unless the Permittee has adequate financial assurance as described in subpart (a) of this condition.

18. Cost Estimates for Plugging and Abandonment (35 IAC 702.160; 704.212).

    a. The Owner or Operator must prepare a written estimate, in current dollars, of the cost of plugging the injection well in accordance with the plugging and abandonment plan as identified in Condition H.24. 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. The currently approved cost estimate for plugging and abandonment of each injection well is $499,802.78 in 2023 dollars.

    b. The Owner or Operator must adjust the cost estimate for inflation within 30 days after each anniversary of the date on which the first cost estimate was prepared. The adjustment must be made as specified in paragraphs (i) and (ii) of this condition, using an inflation factor derived from the annual Oil and Gas Field

Equipment Cost Index. The inflation factor is the result of dividing the latest published annual Index by the Index for the previous years.

i. The first adjustment is made by multiplying the cost estimate by the inflation factor. The result is the adjusted cost estimate.

ii. Subsequent adjustments are made by multiplying the latest adjusted cost estimate by the latest inflation factor.

c. The Owner or Operator must review the cost estimate whenever a change in the plan increases the cost of plugging and abandonment. The revised cost estimate must be adjusted for inflation as specified in paragraph (b) of this condition.

d. The Owner or Operator must keep the following at the facility during the operating life of the facility:

i. the latest cost estimate prepared in accordance with paragraphs (a) and (c) of this condition and,

ii. the latest adjusted cost estimate prepared in accordance with paragraph (b) of this condition.

19. Incapacity (35 IAC 702.160; 704.230).

a. An owner or operator shall notify the Illniois EPA by certified mail of the commencement of a voluntary or involuntary proceeding under 11 U.S.C. (Bankruptcy), naming the owner or operator as debtor, within ten (10) business days after the commencement of the proceeding. A guarantor of a corporate guarantee as specified in 35 IAC 704.219 must make such a notification if the guarantor is named as debtor, as required under the terms of guarantee in 35 IAC 704.240.

b. An owner or operator who fulfills the requirements of 35 IAC 704.213 by obtaining a letter of credit, surety bond or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy insolvency or a suspension or revocation of the license or charter of the issuing institution. The owner or operator must establish other financial assurance within 60 days after such an event.

20. Revocation of Permits (35 IAC 702.186). The Illinois Pollution Control Board will revoke a permit during its term in accordance with Title VIII of the Act or the Illinois EPA will deny permit renewal for the following causes:

a. The Permittee's violation of the Act or regulations adopted thereunder;

b. Noncompliance by the Permittee with any condition of the Permit;

c. The Permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time; or

d. A determination the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification, reissuance, or revocation.

21. State Mining Board Permits. Issuance of this Permit does not relieve the Permittee of the responsibility of complying with the provisions of Illinois State Mining Board Rules and Regulations and an Act in Relation to Oil, Gas, Coal, and Other Surface and Underground Resources. (Rule II, Illinois Department of Natural Resources, Office of Mines and Minerals, Division of Oil and Gas, Rules and Regulations)

22. False or Omitted Information.

    a. The Permittee shall not make any false statement, representation, or certification in any application, record, report, plan, or other document submitted to the Illinois EPA, the United States Environmental Protection Agency (USEPA), or required to be maintained under this Permit.

    b. If, or when, the Permittee becomes aware of a failure to submit any relevant facts in a permit application or incorrect information was submitted in a permit application or in any report to the Illinois EPA, the Permittee shall promptly submit such facts or correct information to the Illinois EPA within ten (10) days. (35 IAC 702.152(h))

23. Restriction on Unpermitted Waste. Injection of waste other than those specified in the approved permit application is prohibited. Other fluids may be injected for short periods for purposes of well testing, well stimulation or for the purposes of formation testing provided the Permittee provides notice to the Illinois EPA of these tests in accordance with Condition H.27(e).

24. Plugging and Abandonment.

    a. The Permittee shall notify the Illinois EPA, sixty (60) days prior to abandonment of a well. The Permittee must submit significant changes to the plans for plugging and abandonment 180 days prior to abandonment. (35 IAC 704.181(e))

    b. The Permittee shall plug and abandon the injection well as provided in 35 IAC 704.188 and 730.110 and in accordance with the schedule and provisions of the approved plugging and abandonment plan. The approved plan is contained in Form UIC-8, Plugging and Abandonment of the approved permit application,

herein incorporated by reference and as modified by conditions of this Permit. (35 IAC 704.188).

c. No later than sixty (60) days after plugging and abandonment of any injection or monitoring well, the Permittee shall submit a plugging report required by 35 IAC 704.181 (g) to the Illinois EPA. The report shall be certified as accurate by the person who performed the plugging operation, and shall consist of:

   i. A statement that the well was plugged in accordance with the plan most recently submitted to the Illinois EPA; or

   ii. A statement defining the actual plugging and explaining why the Illinois EPA should approve such deviation, if the actual plugging differed from the approved plan. Any deviation from a previously approved plan which may endanger USDW is cause for the Illinois EPA to require the operator to re-plug the well; and

   iii. Copy of well plugging affidavit submitted to the Illinois Department of Natural Resources, Office of Mines and Minerals, Division of Oil and Gas; and the Illinois Department of Public Health.

   iv. If the approved plugging and abandonment plan requires a change, a revised plan shall be submitted to the Illinois EPA for approval. If approved, the revised plugging and abandonment plan shall be incorporated into the approved permit application as a permit modification.

25. Conversion of Well (35 IAC 704.181(e)). The Permittee shall notify the Illinois EPA 45 days prior to conversion of any well. Plans for conversion must be submitted 180 days prior to actual conversion or abandonment. Injection into converted wells shall not be conducted until the Permittee receives written authorization for injection from the Illinois EPA.

26. Inactive Well (35 IAC 704.188). After cessation of injection for two (2) years, the Permittee shall plug and abandon the well in accordance with Condition H.24 of this Permit and 35 IAC 730.110, unless the Permittee has:

   a. Provided notice to the Illinois EPA; and

   b. Described actions or procedures, which are deemed satisfactory to the Illinois EPA, to ensure the well will not endanger USDW during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells, including mechanical integrity testing, unless waived by the Illinois EPA in writing.

27. Duty to Establish and Maintain Mechanical Integrity (35 IAC 704.181(h) and 704.190).

a. The Permittee shall establish mechanical integrity as defined in 35 IAC 730.108 prior to commencing injection.

b. A demonstration of mechanical integrity in accordance with Form UIC-7, Permit Item II, Mechanical Integrity Tests During Service Life of Well of the approved permit application shall be conducted to ensure the well has integrity during the life of this Permit. A descriptive report interpreting the results of all geophysical logs and tests must be prepared by a knowledgeable log analyst and submitted to the Illinois EPA. This report shall be signed by the analyst and shall include their phone number and email address.

c. Annulus Pressure Test. The Permittee shall demonstrate the absence of significant leaks in the casing, injection tubing, and packer by use of an annulus pressure test to be conducted annually. The annulus pressure test shall be conducted in accordance with procedures contained in Form UIC-7, Permit Item II of the approved permit application, and the following conditions:

   i. The annular space must be completely filled with annular fluid.

   ii. A pressure differential between the pressure in the annular space and the injection tubing pressure of at least 100 psi shall be maintained throughout the entire annular space.

   iii. Measurements of pressure should be taken at a minimum of every ten (10) minutes.

   iv. The well will be deemed to have failed the annulus pressure test if a pressure change of greater than 3% occurs over a one-hour period.

d. Temperature Survey. The Permittee shall demonstrate the absence of significant fluid movement into an USDW through vertical channels adjacent to the injection well bore by use of a temperature survey to be conducted biennially.

e. The Permittee will inform the Illinois EPA of its intent to conduct pressure test(s) and temperature log(s), plus any additional mechanical tests, logs, or inspections, at least thirty (30) days prior to the demonstration of mechanical integrity. The notice must include the type of test to be conducted; any fluid that will be injected as part of the test; and a demonstration that the fluid will be compatible with the injection well materials and formation that may come into contact with the testing fluid. If a demonstration of this compatibility has previously been submitted, the Permittee may reference the previous submittal.

f. The Permittee shall cease injection if an apparent loss of mechanical integrity, as defined by 35 IAC 730.108, becomes evident during operation or at the time of the mechanical integrity demonstration. Operation shall not be resumed until the Permittee has complied with the provisions of this Permit, and applicable regulations, regarding mechanical integrity demonstration, and testing.

g. All gauges used in mechanical integrity demonstrations and in daily operations shall be calibrated according to the procedures of the National Bureau of Standards, initially and at least annually thereafter. A copy of the calibration certificate shall be submitted to the Illinois EPA on January 15 of each year. In addition, recording devices are to be time synchronized at least quarterly.

h. In addition to the mechanical integrity demonstration required by this permit, the Illinois EPA has the authority to require the Permittee to conduct a demonstration of mechanical integrity of the well at any time well operations, or other information, leads the Illinois EPA to decide an additional mechanical integrity demonstration is necessary. The notice requiring the mechanical integrity demonstration shall be in writing and contain justification for requiring the additional testing.

28. Contingency Plan.

    a. The Permittee shall implement the contingency plan in accordance with the plans and methods described in the October 2021, request for permit modification Log No. UIC-213-M-1, included as Attachment F of this permit.

    b. The Permittee shall submit a revised contingency plan to the Illinois EPA within thirty (30) days of changes at the facility which necessitate changes to the existing contingency plan.

29. 39(i) Certification. The Permittee shall submit a current 39(i) Certification form and supporting documentation with all permit applications, including permit modification requests that are submitted to the Illinois EPA. Individuals that are authorized to sign applications or reports on behalf of the Permittee must also be included in Section II of the form. The 39(i) Certification form can be found on the Illinois EPA website.

30. Other Permitting Requirements. The issuance of this UIC Permit does not relieve the Permittee of the responsibility for obtaining other permits or authorizations required by the Illinois EPA Bureau of Water, Illinois EPA Bureau of Air, Illinois Department of Natural Resources or other federal, state, or local agencies.

ATTACHMENT A

APPROVED PERMIT APPLICATION

ATTACHMENT A

APPROVED PERMIT APPLICATION

Document	Dated	Received	Permit Issued
Initial Application - Log No. UIC-213	May 16, 2015	May 20, 2016	June 6, 2018
• Addendum No. 1, revised pages Response to Illinois EPA Comments	July 28, 2017	July 31, 2017	June 6, 2018
WWDW #1 Well Completion Report - Part I: Subsurface Report - Vol. 1 & 2 Log No. UIC-213-M-1	November 2019	December 13, 2019	September 25, 2020
• Four additional copies of WWDW #1 Well Completion Report - Part I: Subsurface Report - Vol. 1 & 2	November 2019	January 15, 2020	September 25, 2020
• Response to Illinois EPA 4/1/2020 Comments	May 2020	May 11, 2020	September 25, 2020
• WWDW #1 Well Completion Report - Part II: Surface Components	May 2020	May 14, 2020	September 25, 2020
• WWDW #1 Annulus Pressure Test Results for WWDW #1 - Insert to Appendix F.15 of WCR Part I	July 2020	July 16, 2020	September 25, 2020
• Additional Information	August 19, 2020	August 24, 2020	September 25, 2020
• Deep Well Operation – Permit Modification Request Log No. – UIC-213-M-2	October 21, 2021	October 26, 2021	

ATTACHMENT B

WELL CONSTRUCTION DETAILS

WELL WWDW #1 (As-built)

AND

WELL WWDW #2 (Proposed)

Construction Details for Underground Injection Well WWDW #1

Pre-Injection Water Treatment

Biocide and corrosion inhibitor to be added to pre-injection water as recommended based on tubing failure analysis.

Surface Casing

468.84 ft of 20-in, API J-55, 94 lbs/ft buttress threaded steel casing with a butt weld float shoe installed on the bottom casing.

Cementing: The surface casing was cemented to surface with the following cement:

i. Lead Slurry 500 sacks (31.48 cubic yards) of 35/65, Pozmix A, 0.6% C-20, 0.7% NFL, 1% C-1, 1/8# C-30 cement (fill to surface with excess1.04 cubic yards).

   The cement was further topped off by running a 1-in pipe to 13 ft below the surface in the annulus to top off with 26 sacks (1.64 cubic yards) of 35/65 Pozmix A, 6% C-20, 0.7% NFL, 1% C-1, 1/8# C-30 cement with a density of 13.7 pounds per gallon (ppg)

ii. Tail slurry 400 sacks (17.48 cubic yards) of Class A, 1% C-1, 0.7% NFL. 1/8# C-30 with a density of 15.6 ppg.

Intermediate Casing

1766.52 ft of 13 3/8-in, API J-55, 61 lbs/ft, buttress threaded steel casing with a 2 ft long guide shoe on bottom of the first joint and a self-filling check collar at the base of the first joint (shoe joint).

Cementing: The intermediate casing was cemented to surface with the following cement:

i. Lead Slurry: 750 sacks (47.22 cubic yards) of 35/65 Pozmix A, 6% C-20, 0.7% NFL, 1% C-1, 1/8# C-30 cement with a density of 13.7 ppg

ii. Tail Slurry: 425 sacks (25.66 cubic yards) of 10/8 FSS, 0.7% NFL, 1/8# C-30 with a density of 14.2 ppg.

iii. Light surface returns were noted by the driller and loss of circulation occurred 7,560 gal into displacement. A 1-in pipe was run 75 ft below the surface in the annulus to top off with 53 sacks (3.34 cubic yards) of 35/65 Pozmix A, 6% C-20, 0.7% NFL, 1% C-1, 1/8# C-30 cement.

Long String Casing

9 ⅝-inch diameter casing, 40 lb./ft., J55 steel (or L80 or N80 based on market availability), buttress thread, 8rd casing with a DV tool installed at 2,005 ft. BGS. The casing was set at a total depth of 3,822 ft BGS.

Perforation depths: The casing was perforated from 3,554 ft to 3,704 ft BGS in the St. Peter Sandstone.

Cementing: The long string casing was cemented in two stages. A DV tool was installed at a depth of 2,005 ft BGS. The cementing procedure consisted of:

i. First Stage: No lead, tail slurry of 830 sacks (32.89 cubic yards) of Class H cement with 3% potassium chloride, 0.9% NFL, 1% C-13, and 1/8# C-30 at 16.48 ppg.

ii. Second Stage: No lead, tail slurry 540 sacks (34 cubic yards) of 35/65 Pozmix A with 6% C-20, 0.8% NFL, 1% C-79, and 1/8# C-30 at 13.7 ppg

iii. The cementing ticket noted 1,470 gallons of cement returning to surface on the first stage and 1,680 gallons on second stage.

Tubing and Packer Specifications

Injection Tubing: between 3 ½-inch diameter and 5 ½-inch diameter OD, 9.2 lbs/ft from a depth of 3,536 ft BGS to surface.

Packer: D&L Oil Tools ASI-X, 8 1/2-in outside diameter by 4-in inside diameter, nickel plated paker (Part # 60396). It is a mechanically set retrievable packer, set at a depth 3,525 ft BGS with 30,000 pounds of compression.

Injection Well Pumps

Three positive displacement pumps (300Q-5 Quintuplex Plunger Pumps each with 250 HP, 1200 RPM motors) will provide injectate to the well, each with a capacity of 200 gpm at a maximum pressure of 1,500 psi.

Injection Tubing Replacement Options

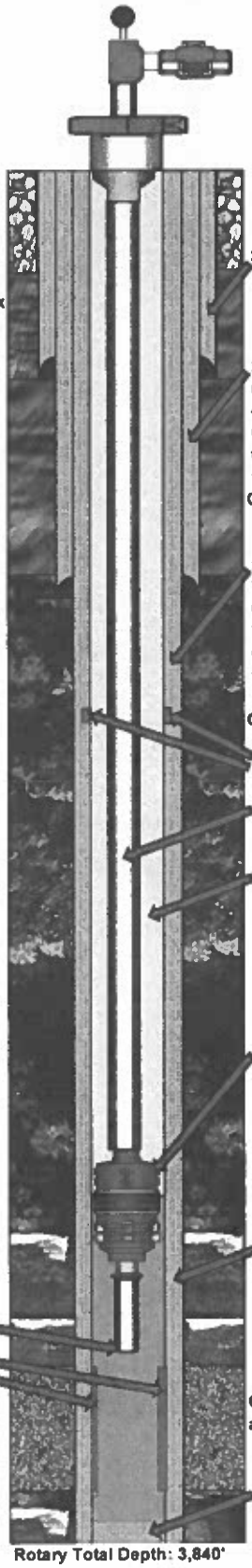
	Nominal Size	Material Grade	Weight (lb/ft)	Collapse Pressure (psi)	Burst Pressure (psi)	Joint Yield Strength (lb/ft)	OD (in)	ID (in)	Drift ID (in)
Coated	3-1/2"	epoxy coating	9.275	7,400	6,980	109,370	3.5	2.942	2.817
Coated	3-1/2"	epoxy coating	9.35	10,540	10,160	159,100	3.5	2.892	2.767
Coated	4-1/2"	epoxy coating	10.85	3,310	4,380	77,000	4.5	2.832	2.707
Coated	4-1/2"	epoxy coating	12.35	3,310	4,380	77,000	4.5	2.772	2.647
Coated	5-1/2"	epoxy coating	14.1	4,910	5,320	247,000	5.5	2.692	2.567
Coated	5-1/2"	epoxy coating	15.85	6,390	7,740	397,000	5.5	2.612	2.487
Uncoated	3-1/2"	J-55	9.2	7,400	6,980	109,370	3.5	2.992	2.867
Uncoated	3-1/2"	L-80	9.2	10,540	10,160	159,100	3.5	2.992	2.867
Uncoated	4-1/2"	J-55	9.5	3,310	4,380	77,000	4.5	4.090	3.965
Uncoated	4-1/2"	L-80	11.6	6,250	7,780	212,000	4.5	4.000	3.875
Uncoated	5-1/2"	J-55	14	4,910	5,320	247,000	5.5	5.012	4.887
Uncoated	5-1/2"	L-80	17	6,390	7,740	397,000	5.5	4.892	4.767
Minimum Specification for Injection Tubing				**3,310**	**4,380**	**77,700**	**3.5 - 5.5" Diameter**		

Uncoated tubular characteristics adapted from American Petroleum Institute (API) Bulletin 5C2

Revisions for epoxy coating adapted from NOV/Tuboscope

Represents minimum tubular weight for procurement, heavier tubulars may be procured based on material availability

Prarie State Generating Company
Class I Disposal WWDW#1
0667' FNL & 2,576' FEL
Sec 17, T3S, R 5W
Wasington County, Illinois



Ground Level @ 453'
Kelly Bushing Level @ 469'
Depths Measured From KB

Well Head-11" 5M
Tubing Hanger
3 1/2" EUE Box X 3 1/2" Vam Top Box
Top Valve 3 1/8 " 5M

30" Conductor driven to 32' no cement

20" 94# J-55 Buttress set @ 447'
500 sks 65/35 POZ A, .6% c20, .7%NFL, 1%C1, 1/8# c30
400 sks Class A, 1%c1, .7%NFL, 1/8# c30
Cement did not circulate, 1" pipe was run in annulus
to top off-26 sks 35/65 POZ A, 6% C-20, .7% NFL, 1% C-1,
1/8# C-30
Centralizers placed every three joints

13 3/8" 61 #/ft J-55 Buttress intermediate casing @ 1704'
750 sks 35/65 POZ A, 6% C-20, .7% NFL-211, 1% C-1, 1/8#
C-30 & 425 sks 10/8 FSS (Class A, 10% Gypsum, 8% NaCl)
7% NFL-211, 1/8# C-30
Cement did not circulate, 1" pipe was run in annulus
to top off -53 sks 35/65 POZ A, 6% C-20, 0.7% NFL, 1% C-1,
1/8# C-30
Centralizers placed every three joints

9 5/8" D.V. Tool @ 2,021'

84 joints 3 1/2" 9.2# CR13-L80 VAM TOP tubing

9 5/8" x 3 1/2" annulus loaded with fresh
water and ASP-639 corrosion inhibitor/biocide

9 5/8" x 4 1/2" Baker ASI-X Nickel
Coated Packer @ 3,541' COE with 6' 4 1/2" tailpipe

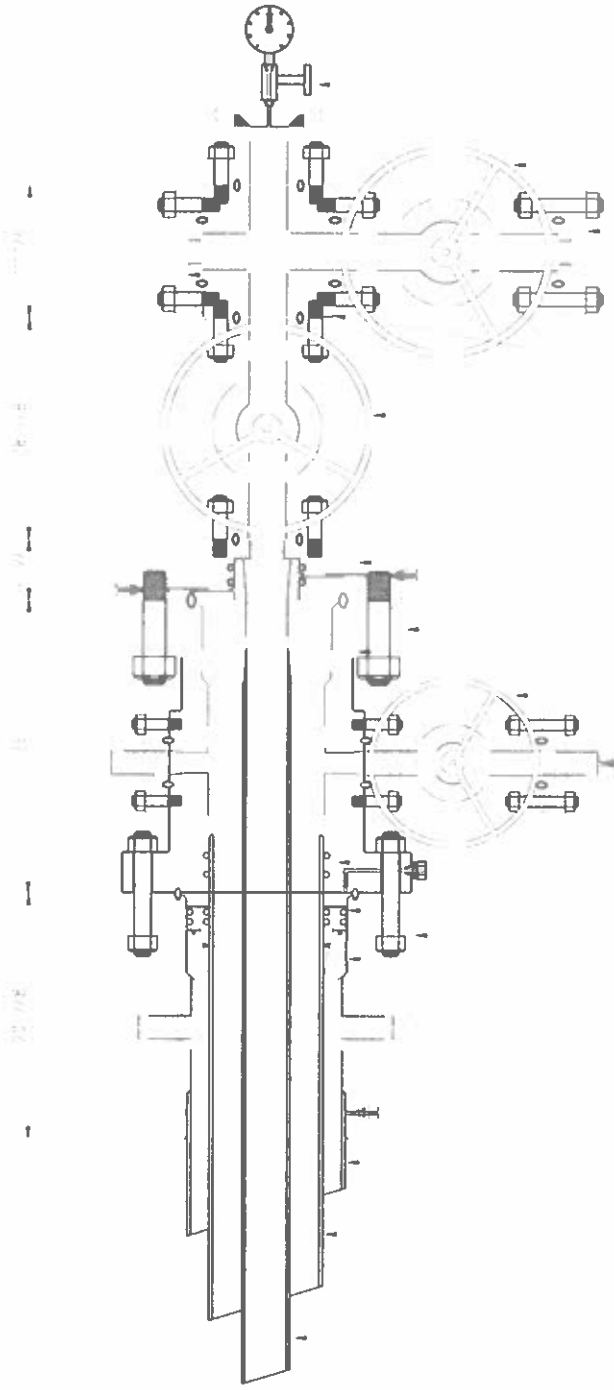
9 5/8" 40# J-55 Buttress csg @ 3,838'
Cemented in Two Stages:
Bottom Stage; 830 sks class H, 3% KCL, .9%NFL
1% c13, ¼# c30, 40 bbls mud flush
Second Stage, through D.V. Tool at 2,012' ft w/
540 sks 35/65 poz, 6% c20, .8% NFL, 1% c79, ¼# c30
Cement Circulated to Surface on both stages.
Centralizers placed at the collar of every other joint and
at the middle of the bottom joint

Bottom of tubing at 3,600'

Perforations 8 SPF 3570'-3730'

Backfill TD to 3,826' TD

Rotary Total Depth: 3,840'



DRAWN FOR:
SCS ENGINEERS / STEPHANIE HILL

PROJECT:
WWDW #1

LOCATION:	RELATED DOCUMENTS:	
TBD	SO#47798	
FILENAME: /Drawings/SCS Engineers/47798.dxf		REVISION: 0001
UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN INCHES	DRAWN BY: ERIC ROSEMA	DATE: 7/26/2018
	CHECKED BY: ERIC ROSEMA	DATE: 7/26/2018

GREAT LAKES WELLHEAD, INC.
4243 M-37 South
GRAWN, MI 49637
PHONE: 231-943-9100
FAX: 231-943-3914
WEBSITE: http://www.glwinc.us
E-MAIL: sales@glwinc.us

Construction Details for Future Underground Injection Well WWDW#2

Construction Details for Underground Injection Well WWDW #2

Pre-Injection Water Treatment

Biocide and corrosion inhibitor to be added to pre-injection water as recommended based on tubing failure analysis.

Surface Casing

20-inch diameter, 94 lb./ft., J-55 steel, STC, with a butt weld float shoe will be installed on the bottom of the casing. Ten (10) centralizers spaced out from approximately 20 feet from the bottom of the casing string to approximately 50 ft-bgs. Casing is set at approximately 500 ft-bgs. This is below the below the base of the USDW and is designed to protect shallower formations and aquifers from the deeper high TDS waters encountered in the highly mineralized formations.
Cementing: Casing cemented to surface.

i. Lead Slurry 625 sacks, 35/65 Poz/A, 6% Bentonite, 1% $CaCl_2$, 0.7% NFL-211, l/8# C-30 flake (fill to surface with 100% excess)

   Density: 13.7 pounds per gallon (ppg)
   Yield: 1.7 ft^3/sack
   Mix Water: 8.47 gal/sack

ii. Tail slurry 396 sacks, Class "A", 1% $CaCl_2$, 0.7% NFL-211, l/8# C-30 flake (fill to surface with 100% excess)

   Density: 15.6 ppg
   Yield: 1.18 ft^3/sack
   Mix Water: 5.2 gal/sack

Intermediate Casing

13⅜-inch diameter, 61 lb./ft., J-55 steel (or L80 or N80 based on market availability), LTC, 8rd, Range 3. Casing will be set at approximately 1,700 ft-bgs. The casing will have a guide shoe on the bottom of the first joint and a float collar on top of the first joint. Eighteen (18) swirl-type centralizers will be located in the middle of the first joint and then approximately every 100 feet to the surface.

Cementing: The casing will be cemented in a single stage, unless lost circulation zones or incompetent formations are encountered. If multi-stage cementing is necessary, the stages and locations of the cement baskets will be determined during construction and the information will be included in the Well Completion Report.

i. Lead Slurry: 750 sacks, 35/65 Poz/A, 6% Bentonite, 1% $CaCl_2$, 0.7% NFL-211, 1/8# C-30 Flake (fill to surface with 55% excess)

   Density: 13.7 ppg
   Yield: 1.7 ft^3/sack
   Mix Water: 8.47 gal/sack

ii. Tail Slurry: 425 sacks, 10/8 FSS +0.7% NFL-211 + 1/8# C-30 Flake (figured with 40% excess)

Density: 14.2 ppg
Yield: 1.63 ft^3/sack
Mix Water: 7.9 gal/sack

Long String Casing

9 ⅝-inch diameter casing, 40 lb./ft., J55 steel, buttress thread, 8rd casing welded at each joint. A DV tool installed at ± 2,000 feet. Forty-five (45) swirl-type centralizers located in the middle of the first joint, the collar of the first joint, then approximately every 100 feet to the D.V. tool of which one centralizer will be placed approximately 30 feet below and 30 feet above the D.V. tool. If multi-stage cementing is necessary, two (2) cement baskets will be placed just above the top of the insert check valve, plus two (2) more just below the D.V. tool. The casing will pass below the Maquoketa Shale confining zone, and be set at approximately 4,000 feet ft-bgs.

Perforation depths: The casing will be perforated in the injection zone from ±3,100 feet to ±3,260 feet (anticipated depth of the St. Peter and Everton Sandstone). The perforations will be made using a 7-inch gun with 12 shots per foot (spf) on the 9 ¾-inch casing. This will create a total of ±1,920 perforations over ±160-foot injection interval.

Cementing: Casing cemented to surface in two stages.

First Stage (~4,000 to 2,000 feet):

i. Lead Slurry: 830 sacks, Class "H", 3% KCl, 0.9% NFL, 1% C-13 Retarder, 1/8# C-30 Flake (fill from 4000 - 2000 with 50% excess)

Density: 16.48 ppg
Yield: 1.07 ft^3/sack
Mix Water: 4.29 gal/sack

Second Stage (~2,000 feet to surface):

i. Lead Slurry: 651 sacks, 35/65 Poz/A, 6% Bentonite, 1% C-79 Extender, 0.8% NFL-211, 1/8# C-30 flake (fill to surface with 50% excess)

Density: 13.7 ppg
Yield: 1.7 ft^3/sack
Mix Water: 8.47 gal/sack

Tubing and Packer Specifications

Injection Tubing: between 3 ½-inch diameter and 5 ½-inch diameter, 9.2 lb/ft, J-55, integral joint

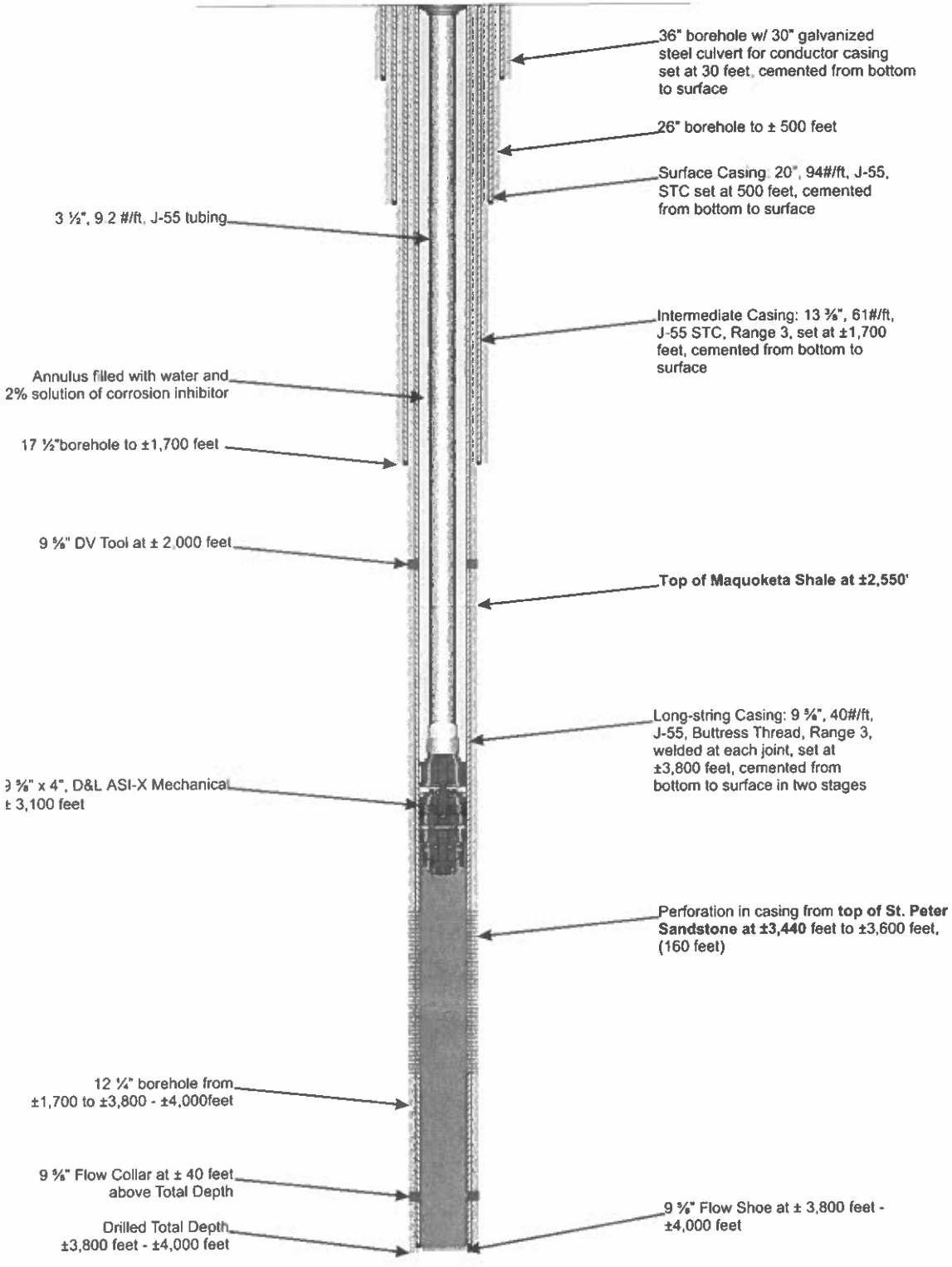
Packer: The 9⅝-inch by 4-inch packer will be an ASI-X mechanically set retrievable packer, set at a depth of ±3,100 feet ft-bgs and set in ±15,000 lbs. compression or equivalent. The packer will be nickel plated to prevent corrosion. No tail pipe installation.

Injection Well Pumps

Baker Hughes HPump 675 series multi-stage centrifugal pump with a horizontal thrust chamber, fluid intake and discharge, instrumentation and driver mounted on a common fabricated steel skid. Each pump has a capacity of approximately 400 gpm at the expected injection pressures. Manufacturer's specification sheets and pump curves are located in Appendix 4-3 of the permit application.

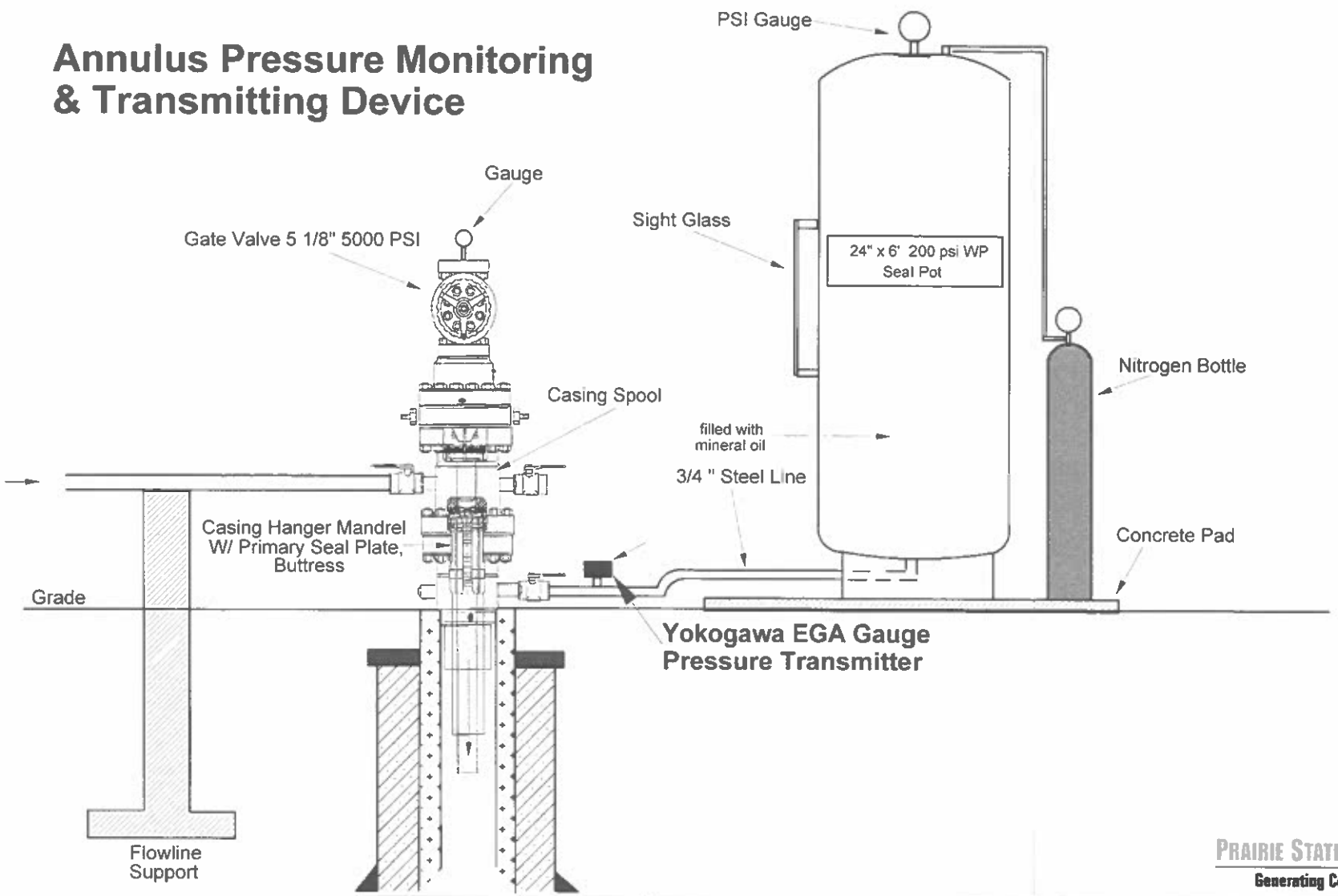
PRAIRIE STATE
Generating Company
Washington County, Illinois
Revised June 2017

Figure 3-9
UIC WWDW#2 Schematic
(Proposed)



SCS ENGINEERS

Annulus Pressure Monitoring & Transmitting Device



DEEP WELL CLASS I UIC PERMIT APP.
PRESSURE MONITORING LOCATION

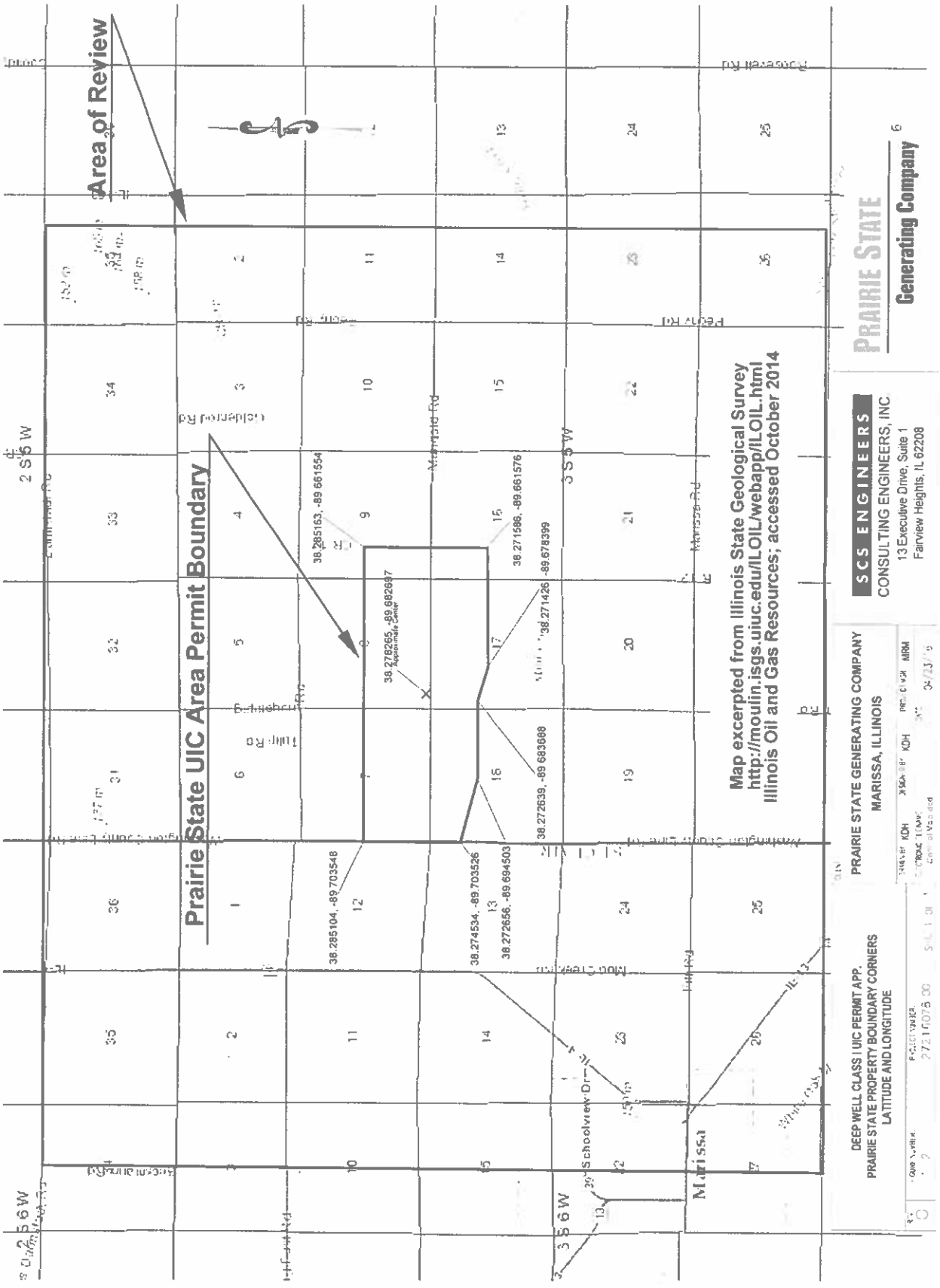
PRAIRIE STATE GENERATING COMPANY
MARISSA, ILLINOIS

SCS ENGINEERS
CONSULTING ENGINEERS, INC.
13 Executive Drive, Suite 1
Fairview Heights, IL 62208

PRAIRIE STATE
Generating Company

ATTACHMENT C

AREA PERMIT BOUNDARY MAP


Area of Review
Prairie State UIC Area Permit Boundary
Map excerpted from Illinois State Geological Survey
http://moulin.isgs.uiuc.edu/ILOIL/webapp/ILOIL.html
Illinois Oil and Gas Resources; accessed October 2014
38.285163, -89.661554
38.278265, -89.682697
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38.271426, -89.678399
38.272639, -89.683688
38.285104, -89.703548
38.274534, -89.703526
38.272656, -89.694503
PRAIRIE STATE
Generating Company
SCS ENGINEERS
CONSULTING ENGINEERS, INC
13 Executive Drive, Suite 1
Fairview Heights, IL 62208
PRAIRIE STATE GENERATING COMPANY
MARISSA, ILLINOIS
DEEP WELL CLASS I UIC PERMIT APP.
PRAIRIE STATE PROPERTY BOUNDARY CORNERS
LATITUDE AND LONGITUDE

ATTACHMENT D

SUMMARY OF SUBMITTAL DATES

ATTACHMENT D

SUMMARY OF SUBMITTAL DATES

The following is a summary of submittal dates for data required by this permit. This summary is provided to highlight some of the submittals required by this permit. The referenced condition must be consulted for complete details.

Condition	Submittal	Date Due
A. 2	Notification of Construction	30 days prior to planned construction.
A. 8	Well Completion Report	After completion of injection well
A. 8(c)	Revised Contingency Plan	Included with Well Completion Report for WWDW #2
A. 9	Weekly Well Construction Reports	Weekly, during construction of injection well
B. 2(d)(vi)	Changes to composition of annular fluid used	Next monthly report
B. 2(g)	Procedures for controlled stimulation	30 days prior
B. 7	Monthly Operation Reports	15th each month
B. 7(c)	Results of test, maintenance, and changes of equipment	Second monthly report after completion
H. 2	Duty to Reapply	180 days prior to expiration
H. 12(a)	Planned Changes	15 days prior to planned changes
H. 13(a)	Oral Notification of Corrective Action Requirement	24 hours after the discovery
H. 13(a)	Corrective Action Notification by Letter	5 days after the discovery
H. 14	Oral Notification of Well Failure	24 hours after the discovery
H. 14	Notification by letter of Well Failure	5 days after the discovery
H. 15(a)	Oral Notification of Endangerment to Health and/or the Environmental	Within 24 hours of time of endangerment
H.15(b)	Notification by letter of Endangerment of Environmental	Within 5 days of endangerment
H. 24(a)	Notice of well abandonment	60 days prior to abandonment

Condition	Submittal	Date Due
H. 24(c)	Certification of Plugging and Abandonment	60 days after plugging
H. 25	Plans for Conversion	180 days prior to actual conversion
H. 25	Notify before Conversion or Abandonment	45 days prior to conversion or abandonment
H. 27(d)	Conduct a Temperature Survey	Biennially
H. 27(e)	Mechanical Integrity Testing	30 days prior to demonstration
H. 27(g)	Gauge calibration	January 15 of each year

ATTACHMENT E

WELL COMPLETION REPORT INSTRUCTIONS
AND
WELL COMPLETION REPORT Form UIC-9

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.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. 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.

Item X

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 gauges

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, email addresses, and qualifications should be included.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM UIC-9 - WELL COMPLETION REPORT

IEPA ID NUMBER _____ U.S. EPA NUMBER _____
FACILITY NAME _____
PERMIT NO. _____

I. Type of Permit: ____ Area ____Individual
New_____ Emergency _____

Well No. _____ Name of Well Field _____

Please use this form as a checklist and identify the location in the application where the information listed below may be found. The source of all data used in addressing the items below must also be identified in the application. A detailed description of the information to be provided regarding each item below can be found in the instructions for Form UIC-9.

_____ II. Location of well
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ D. Illinois State Plane coordinates

_____ III. Surface Elevation

_____ IV. Well Depth

_____ V. Static Water Level

_____ VI. Demonstrated Fracturing Pressure, if applicable

_____ VII. Injection Well Completion Details

_____VIII. Well schematic or other appropriate drawing of surface and subsurface construction details

_____ IX. Well Design and Construction

_____ A. Well hole diameters and corresponding depth intervals

_____ B. Annulus Protection System
_____ 1. Annular space, ID and OD
_____ 2. Type of annular fluid(s)

3. Specific gravity of annular fluid
4. Packer(s)
   a. Setting depth
   b. Type
   c. Name and model
   d. manufactures spec sheets
5. Description of fluid spotting frequency, type and quantity
6. Information on well driller used for construction of this well

C. Casings
1. Conductive casing
2. Surface casing
3. Intermediate casing(s)
4. Long string casing
5. Other casing

D. Injection Tubing
1. Maximum allowable suspended weight based on joint strength
2. Weight of injection tubing string (axial load) in air

E. Cement
1. Conductive casing
2. Surface casing(s)
3. Intermediate casing
4. Long string casing
5. Other casing

X. Surface Facilities
A. Monitoring systems
B. Flow diagrams
C. Filter(s)
D. Injection pump(s)

XI. Hydrogeologic Information

A. Revised Form UIC-2
B. Revised Form UIC-5 using actual data on injection formation
C. Revised Form UIC-8
D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
E. Copy of any plugging affidavits on existing injection wells which were filed with Department of Natural Resources

XII. Injection Fluid Compatibility

____ A. Compatibility with injection zones fluid

____ B. Compatibility with minerals in the injection zone

____ C. Compatibility with minerals in confining zone

____ D. Compatibility with injection well components
____ 1. Injection tubing
____ 2. Long string casing
____ 3. Cement
____ 4. Annular fluid
____ 5. Packer(s)
____ 6. Well head equipment
____ 7. Holding tank(s) and flow lines

____ E. Full description of compatibility of injection fluid with items A through D

____ XIII. Monitoring Program

____ A. Injection pressure gauge(s)
____ B. Casing-tubing annular pressure gauge(s)
____ C. Flow meter(s)
____ D. pH recording device(s)
____ E. Temperature
____ F. Revised Contingency Plan for Well Failure or Shut In

ATTACHMENT F

CONTINGENCY PLAN

Well WWDW#1 Contingency Plan

Control Parameters

Criteria	Warning Alarms	System Fault Levels
Low injection pressure	100 psi	50 psi (Manual Trip)
High injection pressure	1400 psi	>1500 psi [PIT309A/B/C], Trip single pump >1500 psi [PIT311]] Trip all pumps
Low annulus pressure	<injection pressure + 110 psi [PIT313] or [PIT315]	<Injection Pressure + 100 psi [PIT313] or [PIT315] < ([PIT311] or [PIT312] +100)
High annulus pressure	>injection pressure + 220 psi [PIT313] or [PIT315]	>1650 psi
Injection low flow	25 gpm [FIT310]	0 gpm [FIT310] (Manual Trip)
Injection high flow	600 gpm [FIT310]	>625 gpm [FIT310] (Manual Trip) >600 gpm (Rolling 24-hr Avg)
Low injection pH	5.0 Low pH Alarm [AIT102A/B] 4.5 Low Low Alarm	>4.0 [AIT307] (Manual Trip)
High injection pH	6.25 High pH Alarm [AIT102A/B] 6.5 High High pH Alarm	>6.8 [AIT307] (Manual Trip)
Low injection temperature	34 °F [AIT307]	32 °F [AIT307] (Manual Trip)
High injection temperature	130 °F [AIT307]	32 °F [AIT307] (Manual Trip)
Low annulus fluid volume	10 in [LIT314]	6 in [LIT314]
High annulus fluid volume	5 ft [LIT314]	6 ft [LIT314]

All of the above conditions will trigger an alarm in the site control room for water treatment. The control room is occupied 24 hours per day, 365 days per year. The Warning alarms simply prompt the control room operator, notifying them of a condition at the well. The System Fault levels will immediately shut the injection operation down. In either case, the control room operator will notify the proper personnel so that the condition can be investigated further. Proper personnel will immediately be notified via radio or telephone of the condition. In the event of complete injection well or equipment failure, injection will immediately cease, the well will be shut in by closing the main shut off valve, and proper personnel and agencies will be notified.

Persons Designated to Oversee Well Operations in the Event of an Emergency

Name	Title/Responsibility	Phone Number
John Schmale	Sr. Engineer	618-824-7672
Dustin Wathen	Surface Manager	618-824-7652
Jonathan Sander	Sr. VP Power Generation	618-824-7644