Bureau

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/524-3300

July 20, 2015

CERTIFIED MAIL
7012 0470 0001 2976 7746
7012 0470 0001 2976 7753

OWNER:
City of Aurora
Attention: Mr. Alex Alexandrou
44 East Downer Place
Aurora, IL. 60507-2067

OPERATOR:
City of Aurora
Attention: Mr. Robert Leible
1111 Aurora Avenue
Aurora, IL. 60507-9731

Re: 0894075971 – Kane County
City of Aurora – Route 25 Repository Site
Permit No. UIC-015-COA
Log No. UIC-147
UIC Administrative Record
Permit Approval

Dear Mr. Alexandrou:

Attached is a final Class V Non-Hazardous Underground Injection Control (UIC) Area Permit for the above referenced facility located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois. The final permit is based on the administrative record contained in the Illinois EPA's files. The contents of the administrative record are described in 35 Illinois Administrative Code (Ill. Adm. Code) Section 705.211. This permit is in response to your permit application received by the Illinois EPA on February 26, 2013 and based on the draft permit issued for public comment by Illinois EPA on June 1, 2015. Read this document carefully. Failure to meet any portion of the permit could result in civil and/or criminal penalties.

No substantial comments on the draft permit were received by the Illinois EPA during the 30-day public comment period. Attachment 1 identifies minor changes to the draft permit language that were made by Illinois EPA to clarify some conditions and correct typographical errors in the final permit.

Within 35 days after the notification of a final permit decision; the permittee may petition the Illinois Pollution Control Board to contest the issuance of the permit. The petition shall include a statement of the reasons supporting a review, including a demonstration that any issues raised in the petition were previously raised during the public comment period. In all other respects, the petition shall be in accordance with the requirements for permit appeals as set forth in 35 Ill. Adm. Code Part 105. Nothing in this paragraph is intended to restrict appeal rights under Section 40(b) of the Illinois Environmental Protection Act (35 Ill. Adm. Code 705.212(a)).

Work required by this permit, your application, or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Engineering Practice Act

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601

of 1989, the Professional Land Surveyor Act of 1989, the Professional Geologist Licensing Act and the Structural Engineering Licensing Act of 1989. This permit does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

If you have any questions regarding the geologic and hydrogeologic aspects of this permit, please contact Scott Kaufman at 217/785-6869. Questions regarding other aspects of this permit should be directed to Kelly Huser at 217/524-3867.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

SFN:KDH:0894075971-UIC-UIC147-Approval.docx
KDH JKH TBM

Attachment: Attachment 1 – Changes to Permit Language
Non-Hazardous Waste Class V Underground Injection Control Area Permit

cc: Stephen Jann, UIC Branch Chief – USEPA Region V
Marc Fisher, Deuchler Environmental, Inc.
Phillippe Moreau, Deuchler Environmental, Inc.

Bcc: UIC Admin Record
Des Plaines Region
Steve Nightingale
Jim Moore
Terri Blake Myers
Scott Kaufman
Gino Bruni
Kelly Huser

Attachment 1
Changes to Draft Permit

1. Condition B.1.b; replaced "must be" with "is normally" in the third sentence.

2. Condition B.1.b; changed "north" to "south" in the fifth sentence. The Water Treatment Plant is south of the subject property.

3. Condition B.1.c; added "by visual observation of the manhole structure" to the end of the last sentence.

4. Attachment C; there were duplicate Attachment C's, deleted one.

5. Attachment D; added information to headers and corrected page numbers.

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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

Non-Hazardous Waste Class V
Underground Injection Control Area Permit

Re: 0894075971 – Kane County
City of Aurora – Route 25 Repository Site
Permit No. UIC-015-COA
Log No. UIC-147
UIC Administrative Record

Issue Date: July 20, 2015
Effective Date: August 24, 2015
Expiration Date: August 24, 2025

An Underground Injection Control Area Permit is hereby granted pursuant to Title 35 Illinois Administrative Code (Ill. Adm. Code) Section 704.163, the Illinois Environmental Protection Act and Title 35 Ill. Adm. Code Parts 702, 704, 705, and 730 to the City of Aurora to construct four non-hazardous waste Class V Underground Injection Control (UIC) wells, known as UIC #1, UIC #2, UIC #3, and UIC #4 within a fifty acre facility located at southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois.

The Permittee, the City of Aurora, shall submit the Well Completion Report (Attachment D) and other information as required under this permit in order for the Illinois EPA to determine if authorization for injection can be granted. If authorization is granted, the constructed injection well(s) will be used to dispose of lime sludge from the City of Aurora's Water Treatment Plant.

This permit consists of the conditions contained herein (including those in any attachments and appendices) and applicable regulations contained in the Illinois Environmental Protection Act and Title 35 Ill. Adm. Code 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 (hereafter referred to as the approved permit application). Any inaccuracies found in this information may be grounds for the termination or modification of this permit (see 35 Ill. Adm. Code 702.187 and 702.186) and potential enforcement action.

If you have any questions regarding the geology and hydrogeology aspects of this permit, please contact Scott Kaufman at 217/785-6869. If you have any questions regarding the other aspects of this permit, please contact Kelly Huser at 217/524-3867.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

KDH JKM TBN

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A. AUTHORIZATION FOR CONSTRUCTION

1. Authorization for Construction. The Permittee is hereby authorized to complete construction of four (4) Class V nonhazardous underground injection wells, identified as UIC Well #1, UIC Well #2, UIC Well #3, and UIC Well #4. The injection wells will eventually be used to dispose of lime sludge from the City of Aurora's Water Treatment Plant into a subterranean limestone and dolomite mine cavity located 240 to 365 feet below ground surface.

2. Application and Plans. The 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 (identified in Attachment A of this permit), the Illinois Environmental Protection Act, Title 35 Illinois Administrative Code (Ill. Adm. Code) Sections 702, 704, 705 and 730, and subsequent approved modifications. In the event of a conflict between conditions of this permit and the approved permit application, the condition/requirements of the permit shall supersede the application.

3. Well Location. The injection will occur on City of Aurora property that is approximately fifty acres in size and is located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois. The fifty acre property is located within the northwest quarter of Section 10, Township 38 North, Range 8 East of the Third Principal Meridian, Kane County, Illinois. (Fig. 2.2 and 2.3 in the approved permit application)

4. Injection and Confining Layers. The lime sludge will be injected into an injection zone that is located in a mine cavity from a depth of 240 to 365 feet below ground surface (ft-bgs) at the injection site. The geologic formations designated as the Ordovician Galena and Platteville Groups are located within this interval beyond the horizontal boundaries of the mine cavity.

   The confining layer is located at a depth of approximately 64 ft-bgs and is comprised of the Maquoketa Shale. This formation has a thickness of approximately 144 feet in the vicinity of the injection site. The Maquoketa Shale is a formation with low permeability and uniform thickness making it an effective upper confining unit.

5. Wellhead. The wellheads will be located inside of a protective below-grade injection manhole structure. See Attachment B for construction details. Each injection well will have an air/vacuum release valve to allow air balancing during pumping of the lime sludge.

6. Casing and Cementing (35 Ill. Adm. Code 730.112(b)). The casing and cementing details for each well are provided in Attachment B which contains:

   - An injection well schematic (same for each well);
   - An injection well manhole detail (same for each well);
   - Details of the casing strings used in the construction of each well; and
   - Specification for the cementing of the long string casing.

7. Tubing and Packer Specifications. The injection tubing shall be a 6-inch schedule 40 carbon steel pipe with threaded joints. All threaded joints will be bead welded. There is no packer for this injection well system as the lime sludge is being injected into an open cavity.

8. Well Completion Report. The Permittee shall submit a Well Completion Report (Attachment D) upon completion of each injection well. The report must present the information that has been obtained during construction of the injection wells; accurately document the as-built injection well system; document the geophysical and hydrological conditions present and provide appropriate operating limits for the system based on the evaluation of the information that has been collected. The report must also include the following:

   a. A description of construction of each 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) system, a pressure test on each injection tubing/string and extraction tubing shall be performed. A cement bond log for all long string casings (injection and extraction wells) shall be performed. Additional test 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 his/her phone number.

   c. A revised Contingency Plan as required in Condition H.27.

9. Reporting During Well Construction. During drilling and construction of the injection well(s) system, 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 test and logs preformed or to be performed on the well. These reports should be submitted electronically to: Gino.Bruni@Illinois.gov and Kelly.Huser@Illinois.gov. These reports are exempt from the signatory requirement in Condition H.11.

10. Authorization for Injection. The Permittee shall not commence operation of any injection well until they have received written 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, a permit modification request for authorization to operate injection wells UIC Well #1, UIC Well #2, UIC Well #3, and UIC Well #4 and other information as required demonstrating that the well(s) has been constructed in accordance with the approved permit.

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

    c. The Agency 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.

    d. The information provided demonstrates that the construction and operation of the injection well meets the requirements of the Illinois Environmental Protection Act and Title 35 Illinois Administrative Code Sections (Ill. Adm. Code) 702, 704, 705 and 730.

    e. The Permittee has established financial resources to close, plug, and abandon all underground injection wells and extraction well at this facility as required in Condition H.16 of this permit. (35 Ill. Adm. Code 704.189)

B. OPERATING, MONITORING AND REPORTING REQUIREMENTS

1. Operating Requirements (35 Ill. Adm. Code 730.113(a), 704.185)

    a. Flow rate. The approximate flow rate for each well is 800 gallons per minute.

    b. Injection Fluid. The fluid injected into wells UIC Well #1, UIC Well#2, UIC Well #3, and UIC Well #4 shall only be lime sludge slurry generated from the

City of Aurora Water Treatment Plant (WTP). Suspended and dissolved solids are removed from the water supply as part of the lime softening process. In this treatment process, lime (calcium oxide) in powder form is mixed with raw source water and forms a floc with the dissolved solids within five claricones at the WTP located at 1111 Aurora Ave., Aurora, Illinois. The lime sludge that is generated during the treatment process is normally removed from the claricones approximately every 3 hours. This is the source of the lime sludge slurry that will be injected into the underground mine through the four injection wells. The WTP is approximately 3500 feet north of the subject property. The lime sludge will be transported from the WTP to the injection wells by a forcemain.

c. Annulus System. The annulus for this injection system has no annular fluid and is not pressurized (this is due to the fact that the lime sludge is being injected, mainly by gravity, into an open mine cavity). The injection well manholes will be inspected quarterly to insure the injection string is not leaking by visual observation of the manhole structure.

2. Monitoring Requirements (35 Ill. Adm. Code 730.113(b))

a. Sampling. Grab samples of the injection fluid shall be collected in accordance with Condition B.3.

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

i. Continuous Sludge Level Measurement – Seimens, Model :SITRANS LR200

ii. Pump Station pressure gauge – Ashcroft, Model 1279 Duragauge

iii. Magnetic Flow meter – Toshiba, Model LF654 and LF622F.

iv. Volume - The injection volume will be calculated by the supervisory control and data acquisition (SCADA) system based on the magnetic flow meter.

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%.

3. Material Analysis Plan (35 Illinois Admn. Code 704.187). The Permittee shall follow the written Waste Sampling and Analysis Plan, Form 4e, Permit Item I 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.

4. Groundwater Monitoring Plan (35 Ill. Adm. Code 730.113). The Illinois EPA approves herein a request for a waiver from the groundwater monitoring requirements based on information provided in Exhibit A of the approved UIC Permit Application. The waiver request approval may be terminated if: (1) the waste sludge is determined to be hazardous pursuant to Condition B.3 above, (2) the Illinois EPA acquires new information on the geology of the facility area, or (3) new regulations requiring groundwater monitoring are promulgated. If the Illinois EPA terminates the approval of the groundwater monitoring plan waiver based on determination that the sludge is hazardous, acquisition of new geologic information, or promulgation of new regulations, the modification procedures of 35 Ill. Adm. Code Part 702 will be followed.

5. Quarterly Reporting Requirements

   a. Report submittal date. Quarterly monitoring reports are due by April 15th (First Qtr.), July 15th (Second Qtr.), October 15th (Third Qtr.), and January 15th (Fourth Qtr.). After two years of submitting quarterly reports, the Permittee may submit an annual report containing the information required in Conditions 5.b and 5.c below. The annual report must be submitted by February 1st of each year.

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

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

      ii. Weekly averages for flow rate.

      iii. Total volume injected to date

      vi. Monthly summary of:

(a) maximum, minimum, and average values for pump station pressure, and flow rate

(b) total gallons of fluid injected

vii. Results of chemical analyses required by this permit.

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

i. 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.

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

e. Report submittal addresses. The cover letter for the quarterly 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
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

ii. Illinois Environmental Protection Agency
Division of Land Pollution Control
Field Operations Section
9511 Harrison St.
Des Plaines, IL 60016

C. **EFFECT OF PERMIT.** The existence of a UIC permit shall not constitute a defense to a violation of the Environmental Protection Act or 35 Ill. Adm. Code Subtitle G except for 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 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 702.183 through 702.186. The filing of a request by the Permittee for a permit modification or revocation, 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 Ill. Adm. Code 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 2 Ill. Adm. Code 1828 allows certain information submitted to the Illinois EPA may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. In addition, justification for the claim must also be made and all requirements of 2 Ill. Adm. Code 1828 must be followed. If no claim is made at the time of submission, the Illinois EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with Board and Agency procedures. (35 Ill. Adm. Code 130) (2 Ill.

Adm. Code 1828) Claims of confidentiality for the following information will not be approved:

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

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

3. Information, which deals with the existence, absence or level of contaminants in 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 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 Ill. Adm. Code 704.163. Any permit noncompliance constitutes a violation of the Illinois Environmental Protection 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 Ill. Adm. Code 702.141 and 35 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 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 the permit. (35 Ill. Adm. Code 702.145)

6. Property Rights. Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege. (35 Ill. Adm. Code 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 Ill. Adm. Code 702.148)

8. Inspection and Entry (35 Ill. Adm. Code 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;

   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; and

   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 Ill. Adm. Code 702.150(a))

10. Records (35 Ill. Adm. Code 702.150(b),(c) & 704.181(b))

    a. 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 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.

    b. 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 Ill. Adm. Code 704.188 or under Subpart G of 35 Ill. Adm. Code 730, 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.

    c. 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 Ill. Adm. Code 702.126. (35 Ill. Adm. Code 702.151)

12. Reporting Requirements.

    a. Planned changes. The Permittee shall give written notice to the Permit Section, Division of Land Pollution Control within 15 days of any planned physical alterations or additions as to the permitted facility. (35 Ill. Adm. Code 702.152(a))

    b. Anticipated noncompliance. The Permittee shall give advance notice to the Permit Section, Division of Land Pollution Control, of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. (35 Ill. Adm. Code 702.152(b)).

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

    d. A summary of the reporting dates can be found in Attachment C 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 Ill. Adm. Code 704.193)

    a. The permitted well(s) shall be immediately shut-in and the Permit Section, Division of Land Pollution Control, shall be notified orally within twenty-four (24) hours if:

        i. 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

        ii. any problems developed with the casing or components of the Permittee's own injection well(s).

    Within five (5) days of an incident described above, the Permittee shall submit to the Permit Section, Division of Land Pollution Control a report containing the information specified by Conditions H.14.b. below.

b. Any improperly sealed, completed or abandoned wells within the injection well's area of review that penetrate the injection zone, the Permittee must also submit a plan consisting of such steps or modifications as necessary to prevent movement of fluid into USDWs ("corrective action"). 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 must be submitted to the Permit Section, Division of Land Pollution Control.

c. In case of well failure, the Permittee shall implement the contingency plan developed for the injection well. An investigation of the indicated well failure and plan of action to eliminate the problem must be conducted and the remedial work performed.

14. Twenty-four Hour Reporting. (35 Ill. Adm. Code 702.152(f))

a. The Permittee shall report to the Permit Section, Division of Land Pollution Control, 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 may cause an endangerment to underground sources of drinking water.

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 Permit Section, Division of Land Pollution Control, within 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.

15. 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 the appropriate Act. (35 Ill. Adm. Code 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 Sections 704.261 through 704.264) to identify the new Permittee and incorporate such other requirements as may be necessary under the appropriate 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 Ill. Adm. Code 704.260(a))

c. Automatic transfers. (35 Ill. Adm. Code. 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 15(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 Permittee;

iii. The notice demonstrates that the financial responsibility requirements of 35 Ill. Adm. Code 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 Ill. Adm. Code 704.264. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in condition 15(c)(ii).

16. Financial Responsibility. (35 Ill. Adm. Code 704.189) The Permittee shall maintain financial responsibility and resources to close, plug, and abandon all the underground injection wells and extraction well at this facility in a manner prescribed by the Illinois EPA, and Condition H.23 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 Ill. Adm. Code 704 and 40 CFR 144.

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

17. Cost Estimates for Plugging and Abandonment. (35 Ill. Adm. Code 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(s) and extraction well in accordance with the plugging and abandonment plan as identified in Condition H.23. 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 the four injection wells and extraction well is $243,000 (2015 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.

18. Incapacity (35 Ill. Adm. Code 702.160; 704.230)

a. An owner or operator shall notify the Waste Reduction and Compliance Section, Division of Land Pollution Control, 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 10 business days after the commencement of the proceeding. A guarantor of a corporate guarantee as specified in 35 Ill. Adm. Code 704.219 must make such a notification if the guarantor is named as debtor, as required under the terms of guarantee in 35 Ill. Adm. Code 704.240.

b. An owner or operator who fulfills the requirements of 35 Ill. Adm. Code 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.

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

a. The Permittee's violation of the Environmental Protection 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 or revocation.

20. 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)

21. 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 Permit Section, Division of Land Pollution Control within ten (10) days. (35 Ill. Adm. Code 702.152(h))

22. Restriction on Unpermitted Waste. Injection of waste other than those specified in the approved permit application is prohibited.

23. Plugging and Abandonment.

    a. The Permittee shall notify the Permit Section, Division of Land Pollution Control, 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 Ill. Adm. Code 704.181(e))

    b. The Permittee shall plug and abandon the injection well as provided in 35 Ill. Adm. Code 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 4g, Plugging and Abandonment of the approved permit

application, herein incorporated by reference and as modified by conditions of this permit. (35 Ill. Adm. Code 704.188).

c. No later than 60 days after plugging and abandonment of any injection or extraction well, the Permittee shall submit a plugging report required by 35 Ill. Adm. Code 704.181 (g) to the Permit Section, Division of Land Pollution Control. 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 underground sources of drinking water 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 Permit Section, Division of Land Pollution Control for approval. If approved, the revised plugging and abandonment plan shall be incorporated into the approved permit application as a permit modification.

24. Conversion of Wells (35 Ill. Adm. Code 704.181(e)) The Permittee shall notify the Permit Section, Division of Land Pollution Control, 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.

25. Inactive Wells. (35 Ill. Adm. Code 704.188) After cessation of injection for two (2) years, the Permittee shall plug and abandon the well in accordance with Condition H.23 of this permit and 35 Ill. Adm. Code 730.110, unless the Permittee has:

a. Provided notice to the Permit Section, Division of Land Pollution Control; and

b. Described actions or procedures, which are deemed satisfactory to the Illinois EPA, to ensure the well will not endanger underground sources of drinking water 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.

26. Duty to Establish and Maintain Mechanical Integrity (35 Ill. Adm. Code 704.181(h) and 704.190)

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

b. A demonstration of mechanical integrity in accordance with Section 12.4 of the approved permit application shall be conducted after construction of each well. The Permittee must establish mechanical integrity prior to any injection into or extraction from any well. A descriptive report interpreting the results all logs and tests must be prepared by a knowledgeable log analyst and submitted to the Permit Section, Division of Land Pollution Control. This report shall be signed by the analyst and shall include his/her phone number.

c. The Permittee shall demonstrate the absence of significant leaks in the injection tubing by use of a pressure test. The pressure test shall be conducted in accordance with procedures contained Section 12.4.1 of the approved permit application.

d. The Permittee shall provide a Cement Bond Log for each well (injection and extraction) to demonstrate protection of underground sources of drinking water. A descriptive report interpreting the results of the Cement Bond Log must be prepared by a knowledgeable log analyst and submitted as part of the Well Completion Report (Att. D) for each well required by Condition A.8.

e. The Permittee shall cease injection if an apparent loss of mechanical integrity as defined by 35 Ill. Adm. Code 730.108, becomes evident during operation of the injection system. 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.

f. All gauges used in mechanical integrity demonstrations or 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 Permit Section, Division of Land Pollution Control on January 15 of each year. In addition, recording devices are to be time synchronized at least quarterly.

g. 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.

27. Contingency Plan. The Permittee shall revise the contingency plan, as necessary, contained in Form 4e Permit Item IV of the approved permit application based on the final design of the injection well system. The finalized plan shall be submitted with the Well Completion Report required by Condition A.8. The contingency plan must address the procedures to be followed in the event of injection well or equipment failure. The plan must include, at a minimum, the following:

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

    b. A description of the automatic shut down of the forcemain pumps, including the pressure and flow rate which will trigger pumps to shut down.

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

28. 39i Certification. The Permittee shall submit a 39i certification and supporting documentation within 30 days of any of the following events:

    a. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has violated federal, State, or local laws, regulations, standards, or ordinances in the operation of waste management facilities or sites; or

    b. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has been convicted in this or another State of any crime which is a felony under the laws of this State, or conviction of a felony in a federal court; or

c. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has committed an act of gross carelessness or incompetence in handling, storing, processing, transporting or disposing of waste.

d. a new person is associated with the owner or operator who can sign the application or who has control over operating decisions regarding the facility, such as a corporate officer or a delegated employee.

The certification shall describe the violation(s), convictions, carelessness or incompetence as outlined in a, b, or c above and must include the date that a new person as described in d above began employment with the applicant.

The 39i certification and supporting documentation shall be submitted to the address specified below:

Illinois Environmental Protection Agency
Bureau of Land #33
39(i) Certification
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

29. 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 Division of Water Pollution Control, Illinois EPA Division of Public Water Supplies, Illinois EPA Bureau of Air, Illinois Department of Natural Resources or other federal, state, or local agencies.

ATTACHMENT A

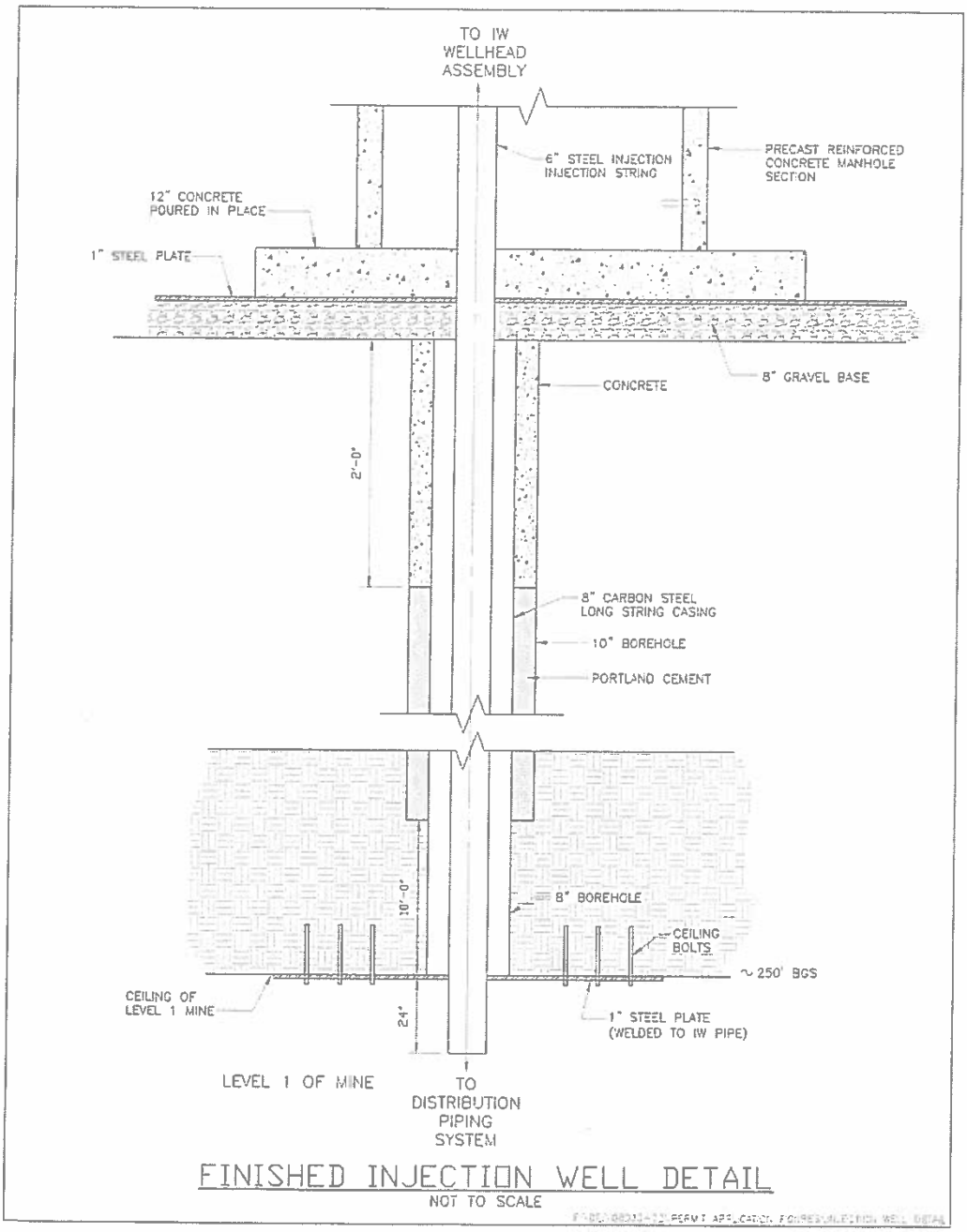
APPROVED PERMIT APPLICATION

APPROVED PERMIT APPLICATION

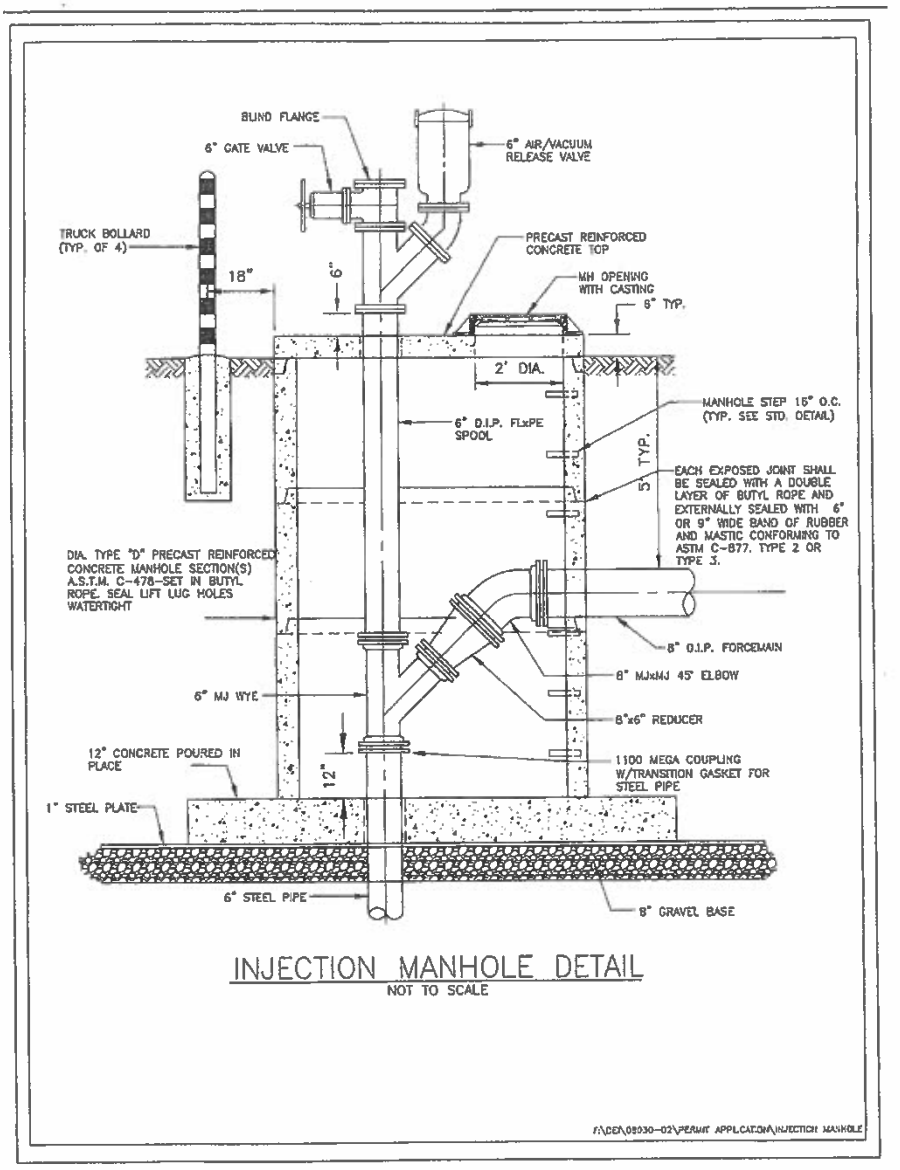
Document	Dated	Received
Initial Permit Application	February 19, 2013	February 26, 2013
Additional Information	October 29, 2013	October 31, 2013
Additional Information	September 30, 2014	October 1, 2014
Additional Information	April 29, 2015	April 30, 2015

ATTACHMENT B

INJECTION WELL SCHEMATIC,
INJECTION MANHOLE DETAILS,
CASING AND CEMENTING SPECIFICATIONS
FOR
UNDERGROUND INJECTION WELLS UIC #1, #2, #3 & #4



FINISHED INJECTION WELL DETAIL
NOT TO SCALE


BLIND FLANGE
6" GATE VALVE
6" AIR/VACUUM RELEASE VALVE
TRUCK BOLLARD (TYP. OF 4)
18"
6"
PRECAST REINFORCED CONCRETE TOP
MH OPENING WITH CASTING
6" TYP.
2' DIA.
6" D.I.P. FLxPE SPOOL
MANHOLE STEP 16" O.C. (TYP. SEE STD. DETAIL)
5' TYP.
EACH EXPOSED JOINT SHALL BE SEALED WITH A DOUBLE LAYER OF BUTYL ROPE AND EXTERNALLY SEALED WITH 6" OR 9" WIDE BAND OF RUBBER AND MASTIC CONFORMING TO ASTM C-877, TYPE 2 OR TYPE 3.
DIA. TYPE "D" PRECAST REINFORCED CONCRETE MANHOLE SECTION(S) A.S.T.M. C-478-SET IN BUTYL ROPE, SEAL LIFT LUG HOLES WATERTIGHT
8" D.I.P. FORCEMAIN
8" MJxMJ 45° ELBOW
6" MJ WYE
8"x6" REDUCER
12" CONCRETE POURED IN PLACE
12"
1100 MEGA COUPLING W/TRANSITION GASKET FOR STEEL PIPE
1" STEEL PLATE
6" STEEL PIPE
8" GRAVEL BASE
INJECTION MANHOLE DETAIL
NOT TO SCALE
I:\DEN\08030-02\PERMIT APPLICATION\INJECTION MANHOLE

Casing and Cementing Specifications for Underground Injection Well UIC #1, #2, #3, & #4

Long String Casing

8-inch diameter, schedule 40 carbon steel, coal tar epoxy exterior coating, with a weight of 28.5 lbs/ft.

Casing cemented from 290 ft. below ground surface to 2 feet below the bottom of the manhole excavation. The volume of cement to be used is 750 to 800 gallons of portland cement.

Cementing procedure: The portland cement will be installed via a tremie hose. The hose will be worked around the casing to insure even distribution and to avoid bridging.

Injection String

6-inch diameter, schedule 40 carbon steel, threaded, bead welded, with a weight of 19 lbs/ft.

ATTACHMENT C

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.8	Well Completion Report	After completion of injection well and extraction well
A. 9	Weekly Well Construction Reports	Weekly, during construction of injection well
B.5	Quarterly Operation Reports	April 15th, July 15th, Oct. 15th, Jan. 15th
B. 7(c)	Results of test, maintenance, and changes of equipment	Next quarterly 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)	Corrective Action Requirements by Telephone	24 hours after the discovery
H. 13(a)	Corrective Action Requirements by Letter	5 days after the discovery
H. 14	Oral Notification of Endangerment of Environment	Within 24 hours of time of endangerment
H.14	Notification by letter of Endangerment of Environment	Within 5 days of endangerment
H. 23(a)	Notice of well abandonment	60 days prior to abandonment
H. 23(c)	Certification of Plugging and Abandonment	60 days after plugging
H. 24	Plans for Conversion	180 days prior to actual conversion
H. 24	Notify before Conversion or Abandonment	45 days prior to conversion or abandonment
H. 26(g)	Gauge calibration	January 15 of each year

Condition	Submittal	Date Due
H. 27	Final Contingency Plan	Included with the Well Completion Report
H. 28	39i Certification	Within 30 days of any event described in Condition H.28

ATTACHMENT D

WELL COMPLETION REPORT INSTRUCTIONS
AND
WELL COMPLETION REPORT Form 4h

FORM 4h - WELL COMPLETION REPORT INSTRUCTIONS

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

Item I

Indicate the type of permit as either an individual or area permit, including whether it is an emergency, new or renewal request. For renewal requests, provide the permit number of the existing permit. 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). In addition, include the closest municipality name and county.

Items III, IV and V

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

Item VI

Provide the demonstrated fracturing pressure, if applicable, in psi or kg/cm2. 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

Attach a schematic or other appropriate drawing of the surface and subsurface details of the well. If the schematic is not attached, please explain.

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. Coefficient of annular fluid;
5. Packer(s), including;
   - type
   - name and model
   - setting depth, in both feet and meters
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 X

Include copies of all logs unless the logs have previously been submitted to the Agency. If the logs have been previously been submitted, indicate the date(s) the logs were submitted.

Item XI. A

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

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

Item XI. B

Provide the following information for the injection tubing:

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

Item XI. C

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

Item XII

Provide the following information for all filters and injection pumps:

- location
- type
- name
- model number
- capacity (g.p.m.)
- pore size in microns

Item XIII

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

Item XIV

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 XV

Attach a list of any changes in recording 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% from the devices approved in the approved permit, including:

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

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4h - WELL COMPLETION REPORT

USEPA ID NUMBER _____
IEPA ID NUMBER _____
WELL NUMBER _____

I. Type of Permit
Individual: _____
Emergency _____
New _____
Renewal _____
Permit Number _____
Area: _____
Number of well _____
Name of Field _____
Emergency _____
New _____
Renewal _____
Permit Number _____

Location in Application

_____ II. Location, see instructions
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ III. Surface Elevation
_____ IV. Well Depth
_____ V. Static Water Level
_____ VI. Demonstrated Fracturing Pressure, if applicable
_____ VII. Injection Well Completion
_____ 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. Coefficient of annular fluid
_____ 5. Packer(s)

a. Setting depth
b. Type
c. Name and model

6. Description of fluid spotting frequency, type and quantity
7. Information on well driller used for construction of this well

X. Tests and Logs
A. During Drilling
B. During and after casing installation
C. Demonstrate mechanical integrity prior to operation
D. Copies of logs and tests listed above
E. Description of well stimulation

XI. Well Design and Construction
A. Casings, see instructions
1. Conductive casing
2. Surface casing
3. Intermediate casing(s)
4. Long string casing
5. Other casing
B. Injection Tubing, see instructions
1. Maximum allowable suspended weight based on joint strength
2. Weight of injection tubing string (axial load) in air
C. Cement, see instructions
1. Conductive casing
2. Surface casing(s)
3. Intermediate casing
4. Long string casing
5. Other casing

XII. Surface Facilities, see instructions
A. Filters(s)
B. Injection pump(s)

XIII. Hydrogeologic Information
A. Revised UIC Form 4a
B. Revised UIC Form 4d using actual data on injection formation
C. Revised UIC Form 4g
D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
E. Copy of any plugging affidavits on injection well filed with Department of Natural Resources

XIV. Injection Fluid Compatibility, see instructions
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

_____ XV. Monitoring Program, see instructions
_____ A. Injection pressure gauge(s)
_____ B. Casing-tubing annular pressure gauge(s)
_____ C. Flow meter(s)
_____ D. pH recording device(s)
_____ E. Temperature

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Name & Official Title

_____ Phone Number

_____ Signature

_____ Date Signed

0894075971-UIC-UIC147-Approval.docx

BOL Permit Section RCRA Tracking Sheet

BOLSiteCode ***0894075971*** *Federal ID(s)* *Respond by:* ***8/19/2015***

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Review Status	PermitClass	AppType	Reviewers: RCRA, CAU, DAU, RCRA GAU			
Inactive	New UIC Pmt (Existing Facility)	UIC Class V	KDH			DSK

DocTitle_Description	Submittal Type	Review Type	Agency Response
			Final Action

Date Received | Date Due | Date Mailed: 07/20/2015

Submittal Comment:

Resp to 11/3/14 email	Additional Info	Technical	

Date Received: 04/30/2015 | Date Due: 06/29/2015 | Date Mailed:

Submittal Comment:

Resp to Tech NOD	Resp-Technical NOD	Technical	Draft Permit

Date Received: 10/01/2014 | Date Due: 11/30/2014 | Date Mailed: 06/01/2015

Submittal Comment:

Cert form	Additional Info	Technical	

Date Received: 05/13/2014 | Date Due: 07/12/2014 | Date Mailed:

Submittal Comment:

Resp to Completeness NOD	Resp-Completeness NO	Technical	Technical NOD

Date Received: 10/31/2013 | Date Due: 12/30/2013 | Date Mailed: 06/02/2014

Submittal Comment:

New UIC Permit	1st Submittal	Technical	Completeness NOD

Date Received: 02/26/2013 | Date Due: 04/27/2013 | Date Mailed: 06/19/2013

Submittal Comment:

BOLSiteCode ***0894075971*** *Federal ID(s)* *Respond by:* ***8/19/2015***

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Final Action Data

For Log No: UIC-147

Units Addressed	Final Action Status	Date FA Issued	Date NFA	Date Closure Cert Accepted	Acres Remediated
	Approved	07/20/2015			0

Closure Type:	Institutional Control	Clean Closed:	1 Institutional Control:	2 Institutional Control:
	☐			

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/524-3300

July 20, 2015

Mr. William Dittman
1981 Nottingham Dr.
Aurora, IL. 60505

Dear Mr. Dittman,

Thank you for your letter dated June 9, 2015 in regards to the City of Aurora's Non-Hazardous Class V Underground Injection Control (UIC) draft permit. The Illinois EPA appreciates the comments and concerns expressed in your letter.

After careful consideration of the application and review of the existing regulations, we have determined that City of Aurora's application for a Non-Hazardous Class V UIC area permit application can be approved. The approved activity as outlined in the permit will be protective of both human health and the environment. The City of Aurora is required to operate their injection well system in accordance with the final permit. The system will also be inspected periodically by the Illinois EPA.

If you have any questions or would like a copy of the UIC permit issued to City of Aurora (UIC-147), please contact Kelly Huser at 217/524-3867.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120

9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601

Public Info

PUBLIC PARTICIPATION CHECKLIST
FOR
UIC PERMIT ADMINISTRATIVE RECORD

FACILITY: City of Aurora, UIC permit for POTW lime treatment sludge
DATE: July 14, 2015

X Public Notice
X Cover letters (legislators, concerned citizens, etc.)
X Repository cover letter
X Verification that materials were received by repository location
NA Press release or evidence of any other public participation activity (fact sheets, etc.)
X Dated mailing list
X Newspaper tear sheets or affidavit of publications and payment voucher
NA Public hearing transcript
X Public comment(s) (copy of comments)
* Response summary (if any)
NA Final permit issuance or denial notice (if any)

ADDITIONAL COMMENTS:

* Received one comment letter. Permit reviewer prepared and sent a response letter from the Permit Section Manager (enclosed).

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

Illinois EPA #: 0894075971
Notice #: UIC-03-15

UIC Log #: UIC-147
First Notice Date: June 3, 2015

PUBLIC NOTICE of UNDERGROUND INJECTION WELL PERMITTING

The Illinois Environmental Protection Agency (EPA) hereby gives notice of intent to issue an Underground Injection Control (UIC) well area permit to the City of Aurora, Illinois. The applicant's mailing address is 44 East Downer Place, Aurora, IL 60507. If issued, the UIC permit will allow the City of Aurora to pump lime sludge from municipal water treatment approximately 250 feet below ground surface into an abandoned limestone mine via four UIC wells located north of the water treatment plant at a 50 acre site on the SE corner of Illinois Rte. 25 and Mettel Road.

Those interested are invited to review the permit application, the draft UIC permit and a related fact sheet at:

Aurora Public Library, West Branch
233 S. Constitution Dr.
Aurora, IL 60506

Send written comments and/or hearing requests on the draft permit to the Agency contact listed below postmarked by midnight, July 6, 2015. Timely comments will become part of the Administrative Record (AR) and be evaluated in making the final permit decision. Written public hearing requests must state opposition to the draft permit and the nature of issue(s) to be raised at a hearing. Public notice will be made 45 days prior to any hearing.

The AR (permit application, draft permit and all permitting data submitted to the Agency) is available for inspection by appointment only at Illinois EPA's Springfield office, contact:

Mara McGinnis (#5) Phone: 217/524-3288
Illinois EPA TDD: 217-782-9143
1021 North Grand Avenue East, P. O. Box 19276
Springfield, Illinois 62794-9276

The Agency will respond to comments on the draft permit decision and indicate whether additional documents have been included in the AR. Commenters will be notified of the final permit decision and the permit decision appeal process.

The Safe Drinking Water Act established the federal UIC program in order to prevent contamination of underground sources of drinking water from injection activities. The Illinois EPA is authorized to administer certain aspects of the UIC program in Illinois, including those governing the wells proposed by the City of Aurora. Illinois' UIC regulations may be found at 35 IAC 702, 704, 705 and 730.

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/782-3397

June 2, 2015

The Honorable Richard Durbin
United States Senator
230 S. Dearborn St., Suite 3900
Chicago, IL 60604

Dear Senator Durbin:

The enclosed public notice refers to a draft Underground Injection Control (UIC) permit applied for by the City of Aurora for four UIC wells to be used to inject lime sludge into an abandoned limestone mine in northern Aurora.

A public information repository has been established at the Aurora Public Library, West Branch, so that interested area residents can review the city's UIC permit application and the Illinois Environmental Protection Agency's draft UIC permit. Illinois EPA is accepting public comments on the draft permit renewal until July 6, 2015 for consideration prior to making a final UIC permit decision.

If you have any questions, please call me at 217/782-3397.

Sincerely,

Donovan Griffith
Legislative Liaison

Enclosure

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/782-3397

June 2, 2015

The Honorable Mark Kirk
United States Senator
Kluczynski Federal Bldg.
Chicago, IL 60604

Dear Senator Kirk:

The enclosed public notice refers to a draft Underground Injection Control (UIC) permit applied for by the City of Aurora for four UIC wells to be used to inject lime sludge into an abandoned limestone mine in northern Aurora.

A public information repository has been established at the Aurora Public Library, West Branch, so that interested area residents can review the city's UIC permit application and the Illinois Environmental Protection Agency's draft UIC permit. Illinois EPA is accepting public comments on the draft permit renewal until July 6, 2015 for consideration prior to making a final UIC permit decision.

If you have any questions, please call me at 217/782-3397.

Sincerely,

Donovan Griffith
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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/782-3397

June 2, 2015

The Honorable Linda Holmes
Illinois State Senator
129 Capitol Bldg.
Springfield, IL 62706

Dear Senator Holmes:

The enclosed public notice refers to a draft Underground Injection Control (UIC) permit applied for by the City of Aurora for four UIC wells to be used to inject lime sludge into an abandoned limestone mine in northern Aurora.

A public information repository has been established at the Aurora Public Library, West Branch, so that interested area residents can review the city's UIC permit application and the Illinois Environmental Protection Agency's draft UIC permit. Illinois EPA is accepting public comments on the draft permit renewal until July 6, 2015 for consideration prior to making a final UIC permit decision.

If you have any questions, please call me at 217/782-3397.

Sincerely,

Donovan Griffith
Legislative Liaison

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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/782-3397

June 2, 2015

The Honorable Linda Chapa LaVia
Illinois State Representative
229 E. Stratton Bldg.
Springfield, IL 62706

Dear Representative Chapa LaVia:

The enclosed public notice refers to a draft Underground Injection Control (UIC) permit applied for by the City of Aurora for four UIC wells to be used to inject lime sludge into an abandoned limestone mine in northern Aurora.

A public information repository has been established at the Aurora Public Library, West Branch, so that interested area residents can review the city's UIC permit application and the Illinois Environmental Protection Agency's draft UIC permit. Illinois EPA is accepting public comments on the draft permit renewal until July 6, 2015 for consideration prior to making a final UIC permit decision.

If you have any questions, please call me at 217/782-3397.

Sincerely,

Donovan Griffith
Legislative Liaison

Enclosure

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BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/782-3397

June 2, 2015

The Honorable Jim Oberweis
Illinois State Senator
303 F. Stratton Bldg.
Springfield, IL 62706

Dear Senator Oberweis:

The enclosed public notice refers to a draft Underground Injection Control (UIC) permit applied for by the City of Aurora for four UIC wells to be used to inject lime sludge into an abandoned limestone mine in northern Aurora.

A public information repository has been established at the Aurora Public Library, West Branch, so that interested area residents can review the city's UIC permit application and the Illinois Environmental Protection Agency's draft UIC permit. Illinois EPA is accepting public comments on the draft permit renewal until July 6, 2015 for consideration prior to making a final UIC permit decision.

If you have any questions, please call me at 217/782-3397.

Sincerely,

Donovan Griffith
Legislative Liaison

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1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

May 28, 2015

Steven Carmody
Aurora Public Library, West Branch
233 S. Constitution Dr.
Aurora, IL 60506-4468

Dear Mr. Carmody:

Enclosed please find the binders of information that we discussed by phone on May 14. The information is relevant to the Underground Injection Control (UIC) well area permit that the City of Aurora is required to obtain in order to pump lime sludge from municipal water treatment into an abandoned limestone mine in northern Aurora via four injection wells. It is very important that area residents have the opportunity to review the application materials submitted by the city and the draft permit proposed by the Illinois Environmental Protection Agency.

The best place for someone to begin review of the permit information is the pale green binder entitled Draft UIC Permit and Related Materials for the City of Aurora. The other two binders contain all the background information referenced in the draft permit. My name and phone number are listed in the pale green binder in case your patrons have questions regarding this process. Written comments should be sent to me by **July 6, 2015**.

These binders should not be allowed to circulate since those interested might then be prevented from reviewing the materials during the 30-day comment period. At the end of the permit process (usually 6-9 months), I will contact you regarding the disposition of the informational binders unless you prefer to keep them as part of your local history archives. This UIC permit will be effective for 10 years, may be modified and/or renewed during its lifetime. I will notify the applicant that you have agreed to maintain the repository for this permitting action but we may try to use the Main Library location for any future modification or renewal requests.
Please complete the attached verification form and return it to me in its postage-paid envelope.
Thank you again for your cooperation in this effort.

Sincerely,

Mara McGinnis
Office of Community Relations

Attachment/Enclosures

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
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VERIFICATION OF INFORMATION REPOSITORY RECEIPT

Please fill out this form and return it to Ms. McGinnis in the postage-paid envelope (enclosed).

Repository Location: Aurora Public Library, West Branch
233 S. Constitution Dr.
Aurora, IL 60506

Facility Site: City of Aurora
Route 25 Lime Sludge Site
Illinois 25 and Mettel Road
Aurora, IL

Date binders arrived: _____

Signature of documents recipient: _____

VERIFICATION OF INFORMATION REPOSITORY RECEIPT

Please fill out this form and return it to Ms. McGinnis in the postage-paid envelope (enclosed).

Repository Location: Aurora Public Library, West Branch
233 S. Constitution Dr.
Aurora, IL 60506

Facility Site: City of Aurora
Route 25 Lime Sludge Site
Illinois 25 and Mettel Road
Aurora, IL

Date binders arrived: 6/3/2015

Signature of documents recipient: Steve Carmody
Steve Carmody

RECEIVED
JUN 08 2015
ASSOCIATE DIRECTOR'S OFFICE

Myrna Molina
719 Batavia Ave.
Geneva, IL 60134

Theresa Barreiro
719 Batavia Ave.
Geneva, IL 60134

Don Ishmael
719 Batavia Ave.
Geneva, IL 60134

Brian Pollock
719 Batavia Ave.
Geneva, IL 60134

Bill Lenert
719 Batavia Ave.
Geneva, IL 60134

Ron Ford
719 Batavia Ave.
Geneva, IL 60134

Monica Silva
719 Batavia Ave.
Geneva, IL 60134

Maria Vazquez
719 Batavia Ave.
Geneva, IL 60134

Susan Starrett
719 Batavia Ave.
Geneva, IL 60134

Drew Frasz
719 Batavia Ave
Geneva, IL 60134

Dale Berman
25 E State St.
North Aurora, IL 60542

Mark Carroll
25 E State St.
North Aurora, IL 60542

Laura Curtis
25 E State St.
North Aurora, IL 60542

Chris Faber
25 E State St.
North Aurora, IL 60542

Mark Gaffino
25 E State St.
North Aurora, IL 60542

[illegible]rk Guethle
25 E State St.
North Aurora, IL 60542

Michael Lowery
25 E State St.
North Aurora, IL 60542

Tina Bohman
44 E. Downer Place
Aurora, IL 60507

Juany Garza
44 E. Downer Place
Aurora, IL 60507

Ted Mesiacos
44 E. Downer Place
Aurora, IL 60507

Bill Donnell
44 E. Downer Place
Aurora, IL 60507

Carl Franco
44 E. Downer Place
Aurora, IL 60507

Mike Saville
44 E. Downer Place
Aurora, IL 60507

Scheketa Hart-Burns
44 E. Downer Place
Aurora, IL 60507

Lynne Johnson
44 E. Downer Place
Aurora, IL 60507

Mayor Thomas J. Weisner
City of Aurora
44 E. Downer Place
Aurora, IL 60507

Eden Supportive Living
311 S. Lincolnway
North Aurora, IL 60542

Illinois EPA FOIA Exemption Reference Sheet

SID: 33134

Agency ID: 170000614271
Bureau ID: 0894075971
Site Name: Aurora, City Of
Site Address1: Rte 25
Site Address2:
Site City: Aurora
Media File Type: LAND
State: IL
Zip: 60507-

This record has been determined to be partially or wholly exempt from public disclosure

Exemption Type:

Redaction

Exempt Doc #: 9
Document Date: 7 /20/2015
Staff: MED

Document Description: MAILING LIST

Category ID: 23A
Category Description: UIC/ADMIN REC - UNDERGROUND INJECTION CONTROL
Exempt Type: Redaction

Permit ID: UIC-147
Date of Determination: 7 /24/2015

City of Aurora, IEPA Permit Modification June 6, 201

The Honorable Richard Durbin
230 S. Dearborn St., Suite 3900
Chicago, IL 60604

The Honorable Mark Kirk
Kluczynski Federal Bldg.
230 S. Dearborn St.
Chicago, IL 60604

Mary Setnicar, RCRA/TSCA Prgms. Chief
U.S. EPA - Region V
77 West Jackson Boulevard
Chicago, IL 60604

Rafael P. Gonzalez - Public Affairs
U. S. EPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Gary Victorine, Chief
Land and Chemicals Division
U.S. EPA - Region V, 77 W. Jackson Blvd
Chicago, IL 60604

IL Office of Attorney General
Environmental Law Division
500 South 2nd Street
Springfield, IL 62706

Office of Illinois Attorney General
Environmental Bureau North
69 West Washington St., Suite 1800
Chicago, IL 60602

Illinois Dept. of Natural Resources
Resource Management
One Natural Resources Way
Springfield, IL 62702-1271

Illinois Dept. of Natural Resources
Div. of Natural Resource Review
One Natural Resources Way
Springfield, IL 62702-1271

Illinois Dept. of Natural Resources
Office of Water Resource Management
One Natural Resources Way
Springfield, IL 62702-1271

John Lohse
Division of Natural Resources
State Fairgrounds, P. O. Box 19281
Springfield, IL 62794

Illinois State Chamber of Commerce
215 East Adams Street
Springfield, IL 62701

Director
Ill. State Natural History Survey
607 East Peabody
Champaign, IL 61820

Director
Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820

Scott Franks, Environmental Programs
Illinois Dept. of Transportation
P.O. Box 19281
Springfield, IL 62794-9281

tor
IL Dept. Commerce and Economic Opp.
620 East Adams Street
Springfield, IL 62701

Director
Illinois State Geological Survey
615 East Peabody
Champaign, IL 61820

IDPH Chicago Regional Office
122 S. Michigan Avenue, 7th Floor
Chicago, IL 60603

Sierra Club
70 E. Lake St., Suite 1500
Chicago, IL 60601-7447

Aurora Public Library
233 S. Constitution Dr.
Aurora, IL 60506

Kane County Health Department
1240 N. Highland Ave.
Aurora, IL 60506

Kane Co. State's Attorney's Office
37 W. 777 Route 38, Suite 300
St. Charles, IL 60175-7535

Kane County
Office of Emergency Management
719 S. Batavia Ave., Bldg. C
Geneva, IL 60134

Beacon News
c/o Chicago Tribune
435 N. Michigan Ave.
Chicago, IL 60611

The Voice
314 N. Lake St., Suite 2
Aurora, IL 60506

Dennis Walsh, Esq.
Klein, Thorpe & Jenkins, Ltd.
15010 S. Ravinia Ave., Suite 10
Orland Park, IL 60462-5353

Chuck Grigalauski, IEPA
9511 West Harrison Street
Des Plaines, IL 60016

Heartland Recycling
lettel Rd.
Aurora, IL 60505

Commonwealth Edison Company
3 Lincoln Ctr Fl 4
Oakbrook Terrace, IL 60181

AHA
1630 Plum St.
Aurora, IL 60506

Aldrich Leasing LLC
320 NE Industrial Dr.
Aurora, IL 60505

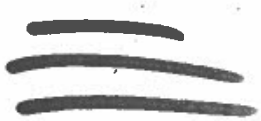
Challenge Investment Grp LLC
6048 Dover Ct.
Oswego, IL 60543

D & A Powertrain Components
380 NE Industrial Dr.
Aurora, IL 60505

Worth Hill
P.O. Box 548
North Aurora, IL 60542

Bltrejv3 Chicago Llc-
PO Box 2249
Cumming, GA 30028

Linda F Claud Llc
1000 S Jackson Ave.
Saint Charles, IL 60174



D & M Properties Inc
336 E Sullivan Rd.
Aurora, IL 60505

Southside Liquidators Inc
8016 Farmhill Ln.
Palos Park, IL 60464

Levan Inc
380 NE Industrial Dr.
Aurora, IL 60505

City of Aurora
44 E. Downer Pl.
Aurora, IL 60505

Fox Valley Park District
101 W Illinois Ave.
Aurora, IL 60506

Schmidt Investments Inc
3535 S Kostner Ave.
Chicago, IL 60632

Catholic Diocese Of Rockford
100 Park Av - Po Box 1389
Rockford, IL 61105

- Aurora Properties
1560 Aurora Ave Ln.
Aurora, IL 60505

Aurora Memory Care Inc
55 W Wacker Dr #1400
Chicago, IL 60601

Commonwealth Edison Company
P.O. Box 767
Chicago, IL 60690

Browning Ferris Of LL Inc
P.O. Box 29246
Phoenix, AZ 85038

Unilock Chicago Inc
301 E Sullivan Rd.
Aurora, IL 60505

Burlington Northern Railroad
PO Box 961089
Fort Worth, TX 76161

Tollway
25 E. State St.
North Aurora, IL 60542

Land Trust
37 S. River St.
Aurora, IL 60506-4172

Property Tax Dept - ABO - 2
P.O. Box 961089
Fort Worth, TX 76161-0089

Owner of Record
288 W South Tec Dr.
Kankakee, IL 60901-8310

Owner of Record
8700 W Bryn Mawr Ave, Ste 300
Lafarge North America, Land Dept.
Chicago, IL 60631-3540

Owner of Record
3 Lincoln Ctr Fl 4
Oakbrook Terrace, IL 60181-4204

Owner of Record
tate St.
North Aurora, IL 60542

Owner of Record
2211 Feltes Ln.
Aurora, IL 60502-9746

Owner of Record
9700 W. Higgins Rd. Ste. 690
Rosemont, IL 60018

Owner of Record
25 E. State St.
North Aurora, IL 60542-1684

Owner of Record
P.O. Box 961089
Fort Worth, TX 76161-0089

Owner of Record
101 W Illinois Ave.
Aurora, IL 60506-5989

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
220 N Broadway St.
Joliet, IL 60435-7167

Owner of Record
[redacted]

Owner of Record
101 W Illinois Ave.
Aurora, IL 60506-5989

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

tland Bank
Multi-Family Loan Service
14125 Clayton Rd.
Chesterfield, MO 63017-8361

Ruben Management
3330 Dundee Rd. Ste. S1
Northbrook, IL 60062-2327

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Owner of Record
[redacted]

Bridgestone/Firestone Retail & Comm
535 Marriott Dr., Tax Dept 135313
Nashville, TN 37214

Owner of Record
[redacted]

Lawrence Yellin
303 Lawndale Ave.
Aurora, IL 60506-3132

ner of Record
[redacted]

Owner of Record
539 S Main St.
Findlay, OH 45840-3229

Owner of Record
500 Quail Ridge Dr.
Westmont, IL 60559-6154

Owner of Record

Owner of Record

Owner of Record

Owner of Record

Owner of Record

Owner of Record

Motta & Notte LLC
559 W Galena Blvd.
Aurora, IL 60506-3899

Owner of Record

Owner of Record

Owner of Record
37 S River St.
Aurora, IL 60507

Owner of Record

Owner of Record
25 E. State St.
North Aurora, IL 60542

Owner of Record

Owner of Record

ner of Record

Owner of Record

Owner of Record
25 E State St.
Aurora, IL 60542

Owner of Record
25 E State St.
North Aurora, IL 60542

Owner of Record

Owner of Record

Senator Linda Holmes
129 Capitol Bldg.
Springfield, IL 62706

State Rep. Linda Chapa LaVia
229 E. Stratton Bldg.
Springfield, IL 62706

Senator Jim Oberweis
303 F. Stratton Bldg.
Springfield, IL 62706

T. Khouri
421 N. County Farm Road
Wheaton, IL 60187

J. Healy
421 N. County Farm Road
Wheaton, IL 60187

T. Michelassi
421 N. County Farm Road
Wheaton, IL 60187

arson
N. County Farm Road
Wheaton, IL 60187

K. Wiley
421 N. County Farm Road
Wheaton, IL 60187

J. Zay Jr.
421 N. County Farm Road
Wheaton, IL 60187

10:09:30 Thursday, July 09, 2015 City of Aurora UIC LT45 is UIC code X

```
PESECM01          BUREAU C-13 AND C-14 INVOICE MAINTENANCE ___ DATE: 07/09/15
 AGCY-CD: EP       PSWD:                    OPERID: BLC   STATUS CODE: B1
TASK: _ TYPE: DR WARR #: _________ WARR DATE: ________ EFT TRACE #: _______
  FY  FUND   AGCY   DIV   LINE   SQ/TYP    SUBA          FY  PROJ  DEPTC
 2015 065    532    30    1200   0000      30600 LP455   ____ ____  ____
CONTROL #: 0000009113 DOC: 1273 GOODS ACPT DATE: 06302015 AGE DAYS:   9
FEIN: 370628114627030I     1264/TYPE: V          INVOICE RECPT DATE: 06302015
VENDOR INV#: 15062IE0          AMT:      1215 . 00          INV DATE: 06192015
REF DOC: __________  CONTRACT #:   MUL11301   BUREAU APPROVAL DATE: ________
VOUCHER #: _________  DATE: ________          ACCOUNTING APPROVAL DATE: ________
OB:   MUL11301  EXPEND: _________  DESC 1: ____________________________________
CNTY/REP DIST: ___ - ___           DESC 2: ____________________________________
 DOC: ____      DOC: ____      DOC: ____      DOC: ____      DOC: ____
AMOUNT:        AMOUNT:        AMOUNT:        AMOUNT:        AMOUNT:
_________ . __ _________ . __ _________ . __ _________ . __ _________ . __
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ANNOUNCEMENTS TO MEET STATE AND FEDERAL MANDATES
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EDI/EFT OVR: N

EFT/EDI DESCRIPT: 15062IE0

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Order 15062IE0

Newspaper

Caption	Run Date	Ad Size	Rate	Rate Name	Color	Disc.	Total
Aurora Beacon-News							
Notice of Underground Injection Well Permitting	06/03/2015	2 x 5.25	$276.00	EPA Government Rate	$0.00	0.0000%	$276.00
Notice of Underground Injection Well Permitting	06/10/2015	2 x 5.25	$276.00	EPA Government Rate	$0.00	0.0000%	$276.00
Notice of Underground Injection Well Permitting	06/17/2015	2 x 5.25	$276.00	EPA Government Rate	$0.00	0.0000%	$276.00
				Newspaper Total			$828.00
				Newspaper Net			$828.00
Benton Evening News							
Public Notice of Emergency Permit Extension	05/29/2015	2 x 6	$10.75	Display Rate	$0.00	0.0000%	$129.00
Public Notice of Emergency Permit Extension	06/05/2015	2 x 6	$10.75	Display Rate	$0.00	0.0000%	$129.00
Public Notice of Emergency Permit Extension	06/12/2015	2 x 6	$10.75	Display Rate	$0.00	0.0000%	$129.00
				Newspaper Total			$387.00
				Newspaper Net			$387.00
				Total Advertising			$1,215.00
				Discounts			$0.00
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BEAUTIFUL NEW FLOORING A

Illinois EPA #: 0890475971 — **UIC Log #: UIC-147**
Notice #: UIC-03-15 — **First Notice Date: June 3, 2015**

PUBLIC NOTICE of UNDERGROUND INJECTION WELL PERMITTING

The Illinois Environmental Protection Agency (EPA) hereby gives notice of intent to issue an Underground Injection Control (UIC) well area permit to the City of Aurora, Illinois. The applicant's mailing address is 44 East Downer Place, Aurora, IL 60507. If issued, the UIC permit will allow the City of Aurora to pump lime sludge from municipal water treatment approximately 250 feet below ground surface into an abandoned limestone mine via four UIC wells located north of the water treatment plant at a 50 acre site on the SE corner of Illinois Rte. 25 and Mettel Road.

Those interested are invited to review the permit renewal application, the draft UIC permit and a related fact sheet at:

Aurora Public Library, West Branch
233 S. Constitution Dr.
Aurora, IL 60506

Send written comments and/or hearing requests on the draft permit to the Agency contact listed below postmarked by midnight, July 6, 2015. Timely comments will become part of the Administrative Record (AR) and be evaluated in making the final permit decision. Written public hearing requests must state opposition to the draft permit and the nature of issue(s) to be raised at a hearing. Public notice will be made 45 days prior to any hearing.

The AR (permit application, draft permit and all permitting data submitted to the Agency) is available for inspection by appointment only at Illinois EPA's Springfield office, contact:

Mara McGinnis (#5)
Illinois EPA
1021 North Grand Avenue East, P.O. Box 19276
Springfield, Illinois 62794-9276

Phone: 217/524-3288
TDD: 217-782-9143

The Agency will respond to comments on the draft permit decision and indicate whether additional documents have been included in the AR. Commenters will be notified of the final permit decision and the permit decision appeal process.

The Safe Drinking Water Act established the federal UIC program in order to prevent contamination of underground sources of drinking water from injection activities. The Illinois EPA is authorized to administer certain aspects of the UIC program in Illinois, including those governing the wells proposed by the City of Aurora, Illinois. UIC regulations may be found at 35 IAC 702, 704, 705 and 730.

East Aurora district hires new buildings, grounds director

North Chicago

candidate that could have met more of (my) criteria," he said.

Department

Anyone with information about the crash can call 630-305-5379 or email celk@naperville.il.us.

scarlman@scfpub.com

salary in East Aurora will be $120,000, the same rate Feltes was hired at.

Before starting work in in the district.

The employees will be off-duty responders, said Oswego Fire Chief Rick Neitzer. The fire district

hired him at a lower salary and hired another employee with the additional qualifications Laesch was looking for.

and ... to think that he's ball game," Neitzer said.

In the past, the fire district's responders have

sfreisinger@scfpub.com
Twitter @scfpubfresh

Illinois EPA #: 0884075971
Notice #: UIC-03-15

UIC Log #: UIC-147
First Notice Date: June 3, 2015

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Ingemunson approved as ...

Board appoints replacement for ... official

The vote in favor of Ingemunson was 6-1, with board member Dan Koukol voting against the appointment. He gave no reason for his vote.

... munson has worked ... since ...

She handles child support service cases, and divorce orders of protection.

"I know the civil side," Ingemunson said after her appointment was approved. "I don't know everything about the office, but I'm willing to learn."

... will serve as interim ... Nov. 30, ...

... eral citize... her nominat... week's County Bo... mittee of the Whole ... ing. They said it was unfa... to anyone else that might seek the GOP nomination for Circuit Clerk to Ingemunson the job ahead of time. They said Shaw should have appointed someone who would agree ... next year.

... or law ...

... organiza... munson is ... Dallas' son, Gregg. But Shaw said ... Ingemunson was the mo... qualified person among the five who applied for the position. He stres... ... before Tues...

... said.

alord@tribpub.com

... parade and ... celebration.

"The biggest advice we can give for the parade, it to appreciate that you will be in a mass of millions of other people," Aurora Police Department spokesperson Dan Ferrelli said. "Be aware of your surroundings and make sure your wallets are secure."

Ferrelli also recommended revelers take public transportation and drink plenty of water to avoid overheating.

Metra officials said they have been tweaking what it learned from the parade two years ago and will be adding trains to its routes.

"We'll be adjusting the Metra schedules as best we can," Metra spokeswoman Meg Reile said.

Reile said Metra will post a summary of what it will be doing to accommodate the many extra riders and post information on its website with the details.

Round trip tickets for the Hawks parade day will be $5 for adults. As with other summer days, up to three children 11 and younger ride free when accompanied by an fare-paying adult.

No alcohol or bicycles will be allowed on the trains, and Metra will suspend having designated quiet cars on parade day.

Wet weather led Chicago officials to hold Thursday's victory rally at Soldier Field.

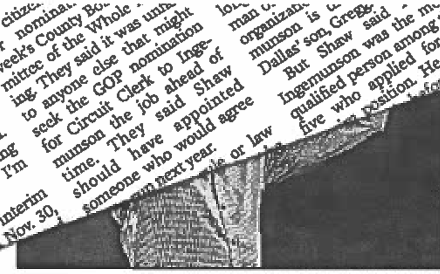
Following drenching downpours Monday, parts of Grant Park are flooded. More rain is forecast this week, and the city needed to ... estimated the ... last time was in excess of 2 million people. Soldier Field, by contrast, holds about 61,500 for Bears games, and thousands more attendees could be added on the grass itself if the city goes that route. Still, the great majority of those who want to attend the rally likely will be disappointed.

This year's rally will be free but require tickets. The mayor's office said details on how to get them were not available as of late Tuesday evening.

Huge crowds will be able to line the parade route, which the mayor's office said will run along Monroe Street, starting at Jefferson Street and ending on Michigan Avenue.

After the Monday night victory, suburban officials said they responded to a number of calls for noise, but there were no serious issues, local officials said.

Beckman is a freelancer.



CHARLES REX ARBOGAST/AP

Blackhawks star Patrick Kane carries the Stanley cup to the mound Tuesday at the Cubs-Indians game in Chicago.

Illinois EPA #: 0894075971 UIC Log #: UIC-147
Notice #: UIC-03-15 First Notice Date: June 3, 2015

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Mara McGinnis (#5) Phone: 217/524-3288
Illinois EPA TDD: 217-782-9143
1021 North Grand Avenue East, P. O. Box 19276
Springfield, Illinois 62794-9276

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Illinois EPA FOIA Exemption Reference Sheet

SID: 33134

Agency ID: 170000614271
Bureau ID: 0894075971
Site Name: Aurora, City Of
Site Address1: Rte 25
Site Address2:
Site City: Aurora
Media File Type: LAND
State: IL
Zip: 60507-

This record has been determined to be partially or wholly exempt from public disclosure

Exemption Type:

Redaction

Exempt Doc #: 10 **Document Date:** 7 /20/2015 **Staff:** MED

Document Description: CITIZEN'S CORRESPONDENCE

Category ID: 23A **Category Description:** UIC/ADMIN REC - UNDERGROUND INJECTION CONTROL **Exempt Type:** Redaction

Permit ID: UIC-147 **Date of Determination:** 7 /24/2015

June 9th 2015

Sirs:

In reply of your letter received June 6/15 I am in Township not Aurora City. [redacted] from me however — I have a well and hope it won't effect mine. Most people in this Subdivision have wells. I dont care what the City does as long it dont hurt my well. Since I lived here in same place [redacted] - Im [redacted] or [redacted] an I believe it makes no difference what people don't want they do what ever they want anyway. If it wont effect my 88 ft well it makes no difference to me any-way what they do.

I trust if the IEE thinks its OK why not. Its up to IEA To say yes or no.

Thank you

[redacted]

[redacted]

JUN 2015 PM 10 L

...UBURBAN IL 604

Mara M. McInnis (45)
Ill. E.P.A.
1021 North Grand ave East
P.O. Box 19276
Springfield
IL 62794-9276

EPA - DIVISION OF RE... MANAGEMENT
RELEAS...
JUL 25 2015
REVIEWER MED

Review Notes

0894075971 -- Kane County
City of Aurora – Route 25 Repository Site
Log No. UIC- 147
Permit No. UIC-016- COA
UIC Administrative Record File

Date Received by IEPA: February 26, 2013
Date Given to this reviewer: February 10, 2014

New application for Area Permit for Non-Hazardous Class V UIC injection wells

LOG for UIC-147 New UIC Permit Application		
DATE	DESCRIPTION	
2-19-13	City of Aurora (COA) UIC Application	Vol. 2 & 3
3-12-13	CROPA(s)	Vol. 1
3-20-13	Completeness Review Package from GU, DSK.	Vol. 1
3-25-13	Kevin Lesko Review Package	Vol. 1
6-19-13	NOD sent to City of Aurora	Vol. 1
10-29-13	COA response to Completeness NOD	Vol. 1
2-11-14	Memo to IEMA	Vol. 1
2-21-14	Memo from IEMA on COA application	Vol. 1
4-15-14	Email from IEMA, Director's Exemption dated April 7, 2014	Vol. 1
5-9-14	LPC-PA1 Form from consultant (DEI) for 10-29-13 submittal	Vol. 1
5-15-14	Email from David Cook, Public Water Supply	Vol. 1
6-2-14	GW NOD sent to City of Aurora	Vol. 1
7-3-14	Memo from IEMA on RESRAD model	Vol. 1
9-30-14	City of Aurora's Response to IEPA Technical NOD	Vol. 1
10-30-14	Memo from Scott Kaufman, GU	Vol. 1
11-3-14	Emailed Comments on September 30 Revisions	Vol. 1
12-2-14	Email from Darin LeCrone, DWPC	Vol. 1
12-2-14	Email from David Cook, DPWS	Vol. 1
4-29-15	COA revisions to the permit application	Vol. 1
5-5-15	Email from Duechler Env. , corrected typos in application	Vol. 1
5-13-15	COA letter in regards to Financial Assurance	Vol. 1
5-22-15	COA comments on preliminary draft permit	Vol. 1
6-1-15	DRAFT Permit sent to COA	Vol. 1
6-9-15	Email from Bob Mathis- Financial Assurance	Vol. 1
7-7-15	Email from DEI – typos in draft permit	Vol. 1
	Public Notice Information	Vol. 1
	Final Permit	Vol. 1

REVIEW NOTES -- KELLY HUSER
0894075971 -- Kane County
City of Aurora (COA) Route 25 Repository Site
Log No. UIC-147
Permit No. UIC-015-COA
New UIC Permit Application
UIC Administrative Record File

Facility Contact -- Alex Alexandrou, Chief Administrative Officer
City of Aurora
44 East Downer Place
Aurora, IL. 60507-2067
630-256-3441

Consultant -- Marc R. Fisher
Deuchler Environmental, Inc.
230 Woodlawn Ave.
Aurora, IL. 60506
630-897-8380
630-926-4083 (cell)

NATURE OF APPLICATION
A UIC area permit is being requested to authorize injection of lime sludge from COA Water Treatment Plan into a subterranean limestone and dolomite mine located approximately 250 feet below ground surface. This is a Class V Area UIC injection well application.

FACILITY DESCRIPTION

COMMENTS (2-10-14)
The application was given to me today by Kevin Lesko. Kevin has completed the completeness review and a preliminary technical review. I am to review the application, determine if there are any other technical deficiencies that need to be addressed, and review the information sent in from the consultant in response to Kevin's technical comments, dated October 29, 2013. Scott Kaufman is the groundwater reviewer for this site. Scott has completed a completeness review only. The NOD for completeness and some technical issues were sent to the facility on June 19, 2013.

It was brought to my attention by Steve Nightingale, permit section manager, that by the nature of this application as in water treatment sludge, there is likely naturally occurring radioactive material (NORM) or technically enhanced NORM (TENORM) in the proposed injection slurry for this site. Steve asked that I look into the radioactive components and also check with Illinois Emergency Management Association (IEMA) to see if they have any comments on this particular disposal method. I checked the analytical data in the application for the sludge and supernatant that will be removed from the waste. The analytical testing showed the following average concentrations:

Lime Sludge		**Supernatant**	
Gross Alpha	18.69 pCi/g	Gross Alpha	1.11 pCi/g
Gross Beta	12.44 pCi/g	Gross Beta	5.53 pCi/g
Radium 226	4.26 pCi/g	Radium 226	0.90 pCi/g
Radium 228	3.55 pCi/g	Radium 228	1.91 pCi/g

2-11-14
Today we sent a memorandum to IEMA requesting their opinion on this COA UIC application. Please see memo in this review package.

2-13-14
Additional background information was sent to IEMA today to go with our memo that was sent yesterday (part of this review package).

2-24-14
We received comments from IEMA in the form of a memorandum dated February 21, 2014. IEMA recommends we deny COA's application. They state this is not a disposal option for them.

3-17-14
A conference call was held between COA, IEPA and IEMA to discuss the proposed disposal option for COA's TENORM waste in regards to IEMA regulations. At first IEMA sent IEPA a memo dated Feb. 21, 2014 and asked IEPA to deny COA's application. They stated this was not a disposal option for COA's water treatment sludge. In the phone conversation they stated there may be a way to allow this project to move forward. They also said they have formed a committee to look at changing their regulations to allow this type of disposal for LLRW. They asked for more time to investigate and said they would try and have an answer by the end of the week.

Kelly Horn, from IEMA called after the meeting and told Steve and I they were going to try and get a Director Authorization for the proposed disposal of COA TENORM waste. They said they would write something up and send it to us as well.

3-19-14
Kelly called yesterday and wanted to know the citation in the IEPA regulations that allow for disposal of radioactive waste in Class V wells. I called him back at 10:30am and left a message. I called Kelly again at 1:00pm. I told him to look at 35 IAC 730.103, definition of radioactive waste and 730.105(e) (11) states that a radioactive waste well could be a Class V well. He said thanks and he would send us a copy of the final document.

4-15-14
IEMA sent us a copy of a Director's Exemption allowing Alternative Disposal of radium residuals for the City of Aurora, dated April 7, 2014 and signed by Jonathon E. Monken, Director of IEMA. IEMA also sent this to Marc Fisher, consultant for COA.

Because of this exemption, Steve said we can continue our technical review of this application. I informed Scott and Teri Myers of this as well.

5-1-4

I have reviewed the application and do not have any additional technical comments to add to Kevin's NOD.

REVIEW OF DOCUMENT SUBMITTED BY DEUCHLER ENVIRONMENTAL, INC. (DEI) IN RESPONSE TO IEPA NOD OF 6-19-2013.

It appears DEI did not submit any revised pages of the application at this time.

Attachment 1, Number 1 of IEPA's June 19, 2013 letter was in regards to GU's list of deficiencies for the GW information in the application. This will be reviewed by DSK.

Attachment 1, Number 2 were other deficiencies from the completeness review.

Form 4b, VII.B.2 & 4 – conductive casing should be marked N/A as it should be identified as the long string casing.

DEI Response- There will be three casings for each of the four injection wells. The forms will be modified as follows: OK.

"Surface casing" will be changed to" protective casing" – 12" (Any diagrams showing this?)In the 5/15/14 conference call they said they would revise the well drawing to include the 12" protective casing. Ok.
"Outer casing" will be changed to "long string casing" – 8"
"Inner casing" will be changed to "injection tubing" – 6"

Form 4b, VIII – information on the drilling company should be provided when known.

DEI Response – Agreed. The drilling company information will be forwarded to the Illinois EPA once the bid(s) have been awarded by the City. OK.

The rest of the completeness deficiencies were discussed in response to the technical deficiencies listed in Attachment 2 of IEPA's NOD.

5-6-14
Attachment 2, Technical Deficiencies Responses from DEI
TRC 1- Form 1, Section II. D will be modified to mark "no" instead of "yes" for discharge to the waters of the State since the proposal will discharge directly to the Fox Metro Water Reclamation District (FMWRD). They will submit a revised form.

TRC 2 – Form 4b, Section VII, the proposed design of the injection well does not appear to include installation of centralizers on the injection string. IEPA is concerned about movement of the injection sting within the casing when injection of the sludge is occurring.

The consultant states the injection string itself will remain relatively stable throughout the operating life and will be connected and stabilized at the following points:

- To the forcemain via megacouplings (see Fig. 12-5, pg. 12-12 in the permit application); Where is the diagram showing the connection of the forcemain to the 6" injection tubing? In the 5/15/14 conference call they stated they would provide this. Ok.
- Welded to a steel plate where the injection string pipe protrudes above the ground surface (see Section 12.3.2, pg. 12-9 in the permit application) which will be buried under a concrete pad;
- A steel plate which will be bolted to the ceiling of Level 1 of the mine and welded around the injection string pipe as it protrudes into the mine; and
- At the base of the injection string pipe to the energy dissipater/long radius bend. The energy dissipater/long radius bend will be anchored to the floor of Level1 of the mine so as to absorb the force generated as the lime sludge drops within the injection string (see Fig. 4.7, pg. 4-10).

Based upon the current preliminary design, the velocity of the lime sludge in the forcemain will be 4.64 feet/second at the design flow rate of 800 gpm. This will create a force of 0.14 psi, which they state will have no impact on the stability of the connection of the injection string to the forcemain or on the injection string itself.

Based upon data supplied by the pipe manufacturer, the long string casing (8-inch) and the injection string (6-inch) will have the following strengths:

- Tensile strength: 60,000 psi minimum for both strings
- Yield: 35,000 psi minimum for both strings
- Burst Pressure: 17,080 psi for the injection string and 15,070 for the long string

The flow of lime sludge from the wet well to the injection well will not be continuous but intermittent (blowdowns – 6 to 8 times in a 24 hour period; grit blowdowns 2 times in a 24-hour period). Once the lime sludge enters the injection string from the forcemain it will drop by gravity. Each IW will have an air/vacuum release valve installed at the well-head. This will allow air to either be released as the "slug" approaches the IW or be allowed to enter the pipe as the last of the "slug" passes into the mine. They state because of this there will be very little if any force exerted on the injection string as the "slug" is delivered into the mine.

The greater force will be generated once the "slug" reaches the floor of Level 1 of the mine. Calculations conducted by the energy dissipater manufacturer estimate that at the floor of Level 1 of the mine approximately 9,000 pounds of force will be generated. The energy dissipater will be able to absorb and release most of the energy created by this force. When going to final design they may or may not incorporate the large radius pipe at the floor of the mine, if used energy will be further dissipated.

Due to all the connection points and energy dissipaters they feel the injection string will be very stable and therefore do not require centralizers. They state if after final design concerns arise regarding the movement of the injection string (how will they inspect for this?), the annulus will be grouted with a foam grout, specifications provided in Att. 1 to their submittal. I feel they have addressed our concerns. They need to add the information in their response to this comment to their permit application. In the 5/15/14 conference call they said the system will be heavily monitored during initial startup and for several months thereafter. Ok.

TRC-3 – Form 4b, Section VII.B – They agree to reference the 8-inch casing as the long string casing and not the surface casing. Ok.

TRC-4 – Form 4b, Section VII.C – We had concerns about the welding of the injection string pipe joints:

- What effect does the heat generated during welding of the pipe joints have on the o-rings in the threaded connections?
- What are the procedures for welding galvanized piping? What effect does this have on the corrosion resistance of the joints?

They state that upon consideration of our comments the injection string will not include o-rings. The pipe will be completely water-tight with the threads and welding that is proposed. Also they propose to now use schedule 40 carbon steel pipe for the injection string. OK. They will need to modify the permit application with this information.

TRC-5 – Form 4b, VII.C – Item 1 and 2 is general information about the injection tubing and should be provided. The weight of the injection tubing (axial load) is 5700 lbs. They state the maximum allowable joint stress is approximately 20,000 psi. This is 17.5 times greater than the maximum force of 1,133 psi that will be exerted at the upper-most pipe joint. Ok. They need to include the submitted information into the permit application.

TRC-6 – Form 4b, VII.C – We had concerns about the welding of steel tabs during installation of the injection string and the effects it would have. They state that in discussions with the drilling contractor they strongly feel this is not an issue. The tensile strength, the yield and the burst pressure rating are all several times higher than the maximum load of the entire 300 foot injection string. Based on their evaluation they feel there will be no deformation at the end of the injection string. Ok.

TRC-7 – Form 4b, Section VII.D – They marked all items in this section as N/A. They need to submit the specification of the material that may be used to cement the long string casing and the method of placement. They state they may use a Portland cement grout that will dry faster and would be easier to apply. They provide some specifications for this but not how it will be placed. They provide the spec sheets for the bentonite grout as Attachment 2 to their submittal. They also refer to section 7.2 of the permit application for the placement of the bentonite grout. It is the same as what was used in the deep monitoring well. They need to revise the form and provide the information in the application. We would recommend cementing the long string casing in place as this is what most injection wells use to protect USDWs. I talked to them

during 5/15/14 conference call about this and said they need to be specific on placement of cement and should refer to the instructions for this form.

TRC-8 – Form 4b, Section VIII – They will provide the information on the drilling company when a bid has been awarded by the City. Ok.

TRC-9 – Form 4c, Section I.A.6 - They marked N/A for the name and location of the injection wells. They will revise the form to include this information. OK.

TRC-10 – Form 4c, Section II.C – We requested the specific location of the Piping and Instrumentation Diagram. They have provided a preliminary PID (Att. 3 of their submittal) and they will incorporate this into App. D – Memorandum of Design. Ok.

TRC-11 – Form 4c, Section II.D (This should be II.E, there was a typo in KL's notes) they marked the information on the injection pumps as App. D. We wanted a specific location in App. D because it is 49 pages. They actually marked N/A for this section on filters. They will not use filters but will use a coarse screen chamber. They will include the reference to this information on the form. They also need to look at II.E and provide specific location for that information.

TRC-12 – Form 4e, Section II – Item 1, we had several concerns about injection pressure or how the system will be monitored to determine if there are problems. They state the highest pressure in the entire lime sludge delivery and injection system will occur at the pumps at the WTP. They will be using Red Valve's Series 48 Pressure Sensor. The series 48 eliminates plugging and fouling that can occur in slurry. The series 48 is designed to fit inside the bolt pattern of the pipe flanges, allowing ease of installation and reducing the size of the unit. This is discussed in App. D, page 23 and is shown on Exhibit A-3, sheet 3 of the MOD in the permit application. The principal of operation is that line pressure is sensed through a flexible rubber sleeve which is a full 360 degree circumference of the pipe ID. Once the slug is delivered to the IW via the forcemain, the entire system operates under gravity. Pressure gauges will be installed at the WTP to monitor the pressure as the sludge is pumped from the wet well into the forcemain as described in the MOD (App. D). Due to this and the use of air/vacuum release valves, monitoring of pressure at the IW(s) is not needed. I do not have a problem with not having pressure gauges at the well head but they should give us information on the gauges that will be installed at the WTP and how will these gauges be monitored to know there is a problem with the injection system. Will they have flow meters? Provide specific information about the flow meters. They also need to submit a revised Contingency Plan with their Well Completion Report. It should describe the information that is requested in the instructions for Form 4e.

TRC-13 – Form 4e, Section III - the applicant should propose a program for MIT of the wells. They state an MIT will be incorporated into the permit application as requested. They provide more detail about the physical characteristics of the lime sludge and should incorporate that information into the compatibly section of the application. They are going to propose internal pressure testing of the injection string every 5 years. They need to submit a procedure (propose pressures and duration of test). This is ok. Will there be any monitoring of the annulus space or injection well manholes? During 5/15/14 call they stated they did not want to do MIT because this is a closed system and it could damage their system. I ask them to submit the reasoning as

revisions to the application. They said they would do periodic manhole checks. They will do initial MIT.

TRC-14 – Form 4f, Section V – The injection fluid compatibility section is marked N/A. They need to provide a discussion of the compatibility of the lime sludge with the well system components. They did provide this information in their response and state all system components are compatible with the lime sludge. They need to incorporate this into their application and revise their Form 4f.

TRC-15 – Form 4g, Section I – The P&A plan does not address plugging the annular space between the injection string and the long string casing. They state this space may be grouted in the final design then this may not be an issue. This is correct. They state it will be difficult to remove much of the injection string because it will be bolted to the floor, but they will remove as much as possible. If the annulus is not grouted we recommend they cement the entire area at closure. They need to revise abandonment plan to require cementing annulus space. We also recommend cementing for the closure of all injection wells and the extraction system.

TRC- 16 - Form 4g, Section I, Item A – The applicant should provide a plan on how a well will be plugged should it not be completed due to unforeseen circumstances. They state the drill string will be removed and the hole plugged with bentonite slurry. Ok.

TRC-17 – Form 4g, Section I, Item D. - The applicant should demonstrate that the bentonite grout column will have adequate support/strength to stay in place without permanent support below it that a cement retainer/bridge plug would provide. They state this item will be modified. They will place a permanent pneumatic bladder fitter with a bridge plug will be placed at the bottom of the injection string, just above the ceiling elevation of Level 1 of the mine. They have provided information on the bladder in attachment 5 of their submittal. This is ok. They need to put this information into the application.

TRC-18 – Form 4g, Section I, Item E – A cost estimate should be provided for P& A of the injection well system. They state it was assumed that since the City is a self-insured and bonded governmental subdivision that it would be exempt from this requirement. They are not exempt and must provide FA. I will let them know to contact Bob Mathis with any questions on this. They should provide FA for P& A of the 4-IWs and the EW. In the 5/15/14 call I gave them Bob's contact information and said they should call him if they have questions.

5-8-14
I talked to Jim today and he agreed that I could set up a conference call with Marc Fisher, DEI to discuss their response to our NOD. After the call they will be required to submit revisions to the application. I checked with Scott and he is only going to have a few technical comments. I am not sure if we will send a letter on the GW deficiencies or just address them verbally to the consultant. I called Marc Fisher and he said he will email me some potential call dates for next week.

I called IDNR Mines and Minerals to check with someone to see if the permit for the mine, if there is one, needs to be modified or one issued for this activity. I left a message for Mike Falter, 785-9019.

5-12-14
I talked to Mike Falter today and he stated they do not regulate below the surface aggregate mines so they would not need to do anything for them. He suggested I check with Doug Shutt at IDNR Oil and Gas section to see if they need anything. I said I would.

5-15-14
I talked to David Cook, Public Water Supply, about this application. He did return our CROPA and stated that it was not significant and no permit was needed. I explained to David that they are building a pump station and will attach it to the WTP and they might want to look at this further as the pump house might need to be included in some of their permits for COA. Dave asked me to scan the CROPA and send it back to him with the consultant's information. I sent this to Dave.

I had a conference call with Marc Fisher and Mark Halm from DEI in regards to their responses to Kevin's NOD. We reviewed each response and I told them what they needed to submit to revise the application. I asked them to submit an original and four copies of revised pages to the application. I also said they need to make sure they contact BOW and PWS for permits. The groundwater technical review letter or discussion will be done at a separate time.

I received an email from David Cook, PWS (attached to this review package). Dave stated that he talked to Mark Fisher and he said they were planning to apply for a DPWS construction permit for the work at the water treatment plant. David stated the CROPA form would be sent back through inter-office mail after DPWS/Groundwater reviewed it.

5-20-14
Scott Kaufman said he had completed his technical review and has submitted his memorandum review package to Terri.

5-21-14
I talked to Doug Shutt, DNR Mines & Minerals and he said there were no permitting requirements for COA through his office.

6-3-14
I received a revise CROPA from David Cook, PWS. It states a permit is needed from PWS and that David has spoken with Marc Fisher the consultant.

Also the Groundwater NOD was mailed on 6/2/14.

7-1-14
I sent Mara the consultant information so they can start working on a facility mailing list for this application. I also asked her to determine a location for a repository.

A site visit has been scheduled for July 16, 2014 to inspect the propose injection site and water treatment plant.

7-9-14
We received a memorandum from IEMA dated July 3, 2014 that stated IEMA has completed its RESRAD dose model specific to the geological parameters of the proposed injection site and finds, with respect to radiological dose, the disposal method protective of public health and the environment.

10-16-14
We have received their revisions to the permit application based on IEPA's comments. Their submittal is dated September 30, 2014.

I removed the 39(i) information for Robert Leible (Ass. Supt. Water Production Div.) from the application. He will be the operator of the injection well system. I will give this information to Cheryl to put in the 39(i) database.

10-29-14
REVIEW OF SEPTEMBER 30, 2014 REVISIONS TO THE APPLICATION

They submitted the proper LPC-PA1 form with this submittal and it has the required signatures. The form now lists Robert Leible, Asst. Supt. Water Production Division as the Operator. Ok.

TRC 1 – They have revised Form 1. They have checked no to discharging to water of the State.

TRC 2 - They have revised Section 12.3, page 12-8 to include information about forces and stability of pipes. Ok.

TRC 3 – They have changed the reference of 8-inch casing to long string casing and "inner casing" to injection string casing in multiple locations in Section 12.0. Ok.

TRC 4 – They have removed O-rings from the design of the injection well and extraction well. Ok. They have replaced galvanized pipe with carbon steel pipe. Ok. All threaded joints for the injection string will be bead welded. Ok.

TRC 5 – They added in information on page 12-14 and 12-15 for maximum allowable suspended weight and joint strength. Ok.

TRC 6 – They revised page 12-11 to include information that the welded tabs will not deform the pipe and welded tabs are strongly recommended by the drillers for safety and efficiency. Ok.

TRC-7 – They have revised page 12-10 to state they will use Portland cement from the bottom of the borehole to 2 feet below the bottom depth of the manhole excavation. Ok. They have some typos on this page. They reference Fig. 12.1 and it should be 12.2. They state Long string casing has OD of 6-inches and it should be 8-inches. Next page, 12 -1, injection string casing, OD of 8-inches and it should be 6-inches. Page 12-12 they reference Fig. 12.2 and it should be 12.3. I

called Marc Fisher and discussed the typos and he is going to email me revisions. Also on Fig. 12.2 and 12.4 they are showing bentonite seal when they are going to use all cement now. Marc will revise.

TRC-8 – Form 4b has been revised to state the well drilling company information will be provided after city has awarded a contract. Ok.

TRC-9 – Form 4c, Item I.A.6 has been revised to show the name and location of the injection wells. They put down Fig. 4.6/12.3. Fig 12.3 does not show well locations. I called Marc and he will revise. Ok.

TRC-10 – They have provided the required piping and instrumentation diagram as Exhibit B to the application. Ok.

TRC-11 – They added the course screen description to section 12.1.1 as this is their filter for the system. Ok.

TRC-12 – They have provided a new Section 12.1.3, Contingency Plan. This is for when there are problems observed at the pump station. There will be instruments that continuously measure the level of sludge in the wet well. A magnetic flowmeter will continuously measure the volume pumped. If there is a blockage in the forcemain or if the pump fails, a high level alarm will be shown on the SCADA system. If the level continues to rise there will be a gravity overflow into the adjacent sludge dewatering lagoon. Ok. They have provided the specific information on the sludge level controls, magnetic flowmeter, and pressure gauge. Ok.

TRC-13 – They are proposing some MIT testing during construction of the wells, but since this will be a closed system after the construction is complete, there will be no other MIT(s), only inspections of the above-ground systems (forcemain, man holes, etc.). They are proposing a pressure test for the injection tubing. The test will be for 30 minutes at a rate of 125 psi. with pressure loss of 10% or less. I called Marc to see if they used any guidance to come up with these numbers. I left a message. They also propose and initial Cement Bond Log. Ok. They just need to add they will provide a report interpreting the results of the CBL by a qualified analyst. I will discuss this with Marc as well.

They are proposing semi-annual well head, manhole and surface valves along the forcemain inspections. Ok.

TRC-14 – They have provided a new Section 12.9 Injection Fluid Compatibility. They have evaluated all the well components (see Exhibit C) and have determined they are compatible with the lime sludge which has a pH of 10. Ok.

TRC-15 – They have revised their plugging and abandonment plan to include plugging the well and annulus from depth to surface with cement, page 17-2. Ok.

TRC-16- They have revised page 12-10 to include abandonment during construction procedures. They will plug abandoned wells with cement. Ok.

TRC- 17 – They have revised the application to use a bridge plug during closure, section 17.2.

TRC-18 – They have added a new section 17.5 closure cost estimate. Ok. They estimate $220,000 for closure of the entire well system. They say they will provide FA. I have told them in the past that we will need FA before we can issue a final permit.

10-30-14

They have revised their waste monitoring that was in Section 16.0 and state it is now part of their Groundwater Monitoring Waiver Request in Exhibit A. Scott has reviewed the majority of this Waiver request, but I did review Sections 2.2, 2.3, 2.4, and 2.5.

2.2 Parameter List
I am ok with the proposed list as it is very comprehensive. It appears to cover all TCLP parameters which are what I would look for in determining if it is hazardous for toxicity. They do not mention temperature so I will talk to Marc about that. As long as they are showing the waste is not hazardous I am ok with this monitoring.

2.3 Sampling Frequency
They would like to sample Bi-monthly for the first year. I am not sure if this is twice a month or every other month. I will discuss with Marc. Then it is quarterly for years 2 through 6; semi-annual for years 7 and 8 and annually thereafter. Ok.

2.4 Contingency Plan
They state if one or more parameter exceeds the State regulation. What regulations are we talking about? I think they just need to be below the hazardous waste requirements of 721. 124 and not show any hazardous characteristics. I will discuss this with Marc.

The plan does not have them re-sample within 30 days to confirm exceedance or discuss if an exceedance is confirmed how they will divert the waste to a holding lagoon until they are back to normal. I will discuss revising this with Marc.

2.5 Reporting
They should give a time frame for when the report will be submitted after the sampling event.

I talked to Marc and he requested I send him an email with all the information we would like to see changed in the application. I discussed each topic that I mentioned above for sampling and analysis. He also said the pressure test was taken from a standard pressure test they use to test water lines. I asked him to put a reference in the application.

11-3-14
I sent Marc an email with comments from IEPA on their revisions to the application. They are to address our comments and make additional revisions to the application. We can go ahead with preparing a draft permit. Scott Kaufman gave me his review memo today.

11-5-14
I reviewed Scott's memorandum and he will approve their request for a waiver from ground water monitoring as long as they revise their Contingency Plan. I have discussed this with the consultant and he is to revise the CP. Ok.

11-24-14
Marc sent his revisions via email for me to review. I reviewed and then called him and made a few comments. He will revise and submit the changes.

12-2-14
I sent an email to Darin LeCrone, DWPC, and David Cook, DPWS, for comment on Condition H.29 of my permit, "Other Permitting Requirements". They both suggested some changes and I incorporated them into Condition H.29 of the Draft permit.

I gave Jim my final cover letter, fact sheet and Draft Permit for COA today. I asked Mara, via email to confirm the repository.

12-29-14
I talked to Marc today and he still does not have the signatures for COA personnel on the forms for his revisions to the applications. He said it would be after the first of the year before he would submit revisions. We are ready to public notice draft permit as soon as we get the revisions and the application is screened.

1-7-15
I talked to Marc again today. He had just talked to the city people to get the signatures on the forms and he said they want to discuss the changes with the mayor. He is not sure how long that is going to take. He said he would let me know as soon as he knows anything.

4-15-15
I emailed Alex Alexandrou (City of Aurora) to see if he could give me any update on the status of their revisions to the application. He said he would call me Friday. I emailed him back and said I was out Fridays, but he could leave a message or he could call me Monday.

4-16-15
I talked to Alex today and he said they had discussed the changes with the consultant and that Deuchler (consultant) should be able to submit the revisions to the application by the end of next week. He also said they were working on the facility mailing list and he would be in contact with Mara McGinnis. He also said he was working with Bob Mathis to submit the proper financial assurance.

4-22-15
I had a conference call with Marc from Deuchler today. We reviewed what revisions I was expecting for the application. We reviewed my NOD email that was sent November 3, 2014. A couple of new things we discussed were; revised cost estimate to 2015 dollars and add IEMA approval letter to the permit application. Marc said he had an appointment with the city people

on Monday to go over the revisions and obtain the correct signatures on all the forms. I told Marc once we get the revisions then we will send them a preliminary draft permit for comments.

5-5-15
I received COA's revisions to their permit application based on our 11/03/2014 comments.

Technical review of COA's April 29, 2015 submittal.

Form LPC-PA1 has been submitted with this submittal and with appropriate signatures. I will add these forms to the application.

They have submitted a revised Form 4c, 4e and Table of Contents based on the revisions to the application. Ok.

Revised Section 12.0 SYSTEM DESIGN SUMMARY

Section 12.3, description on filling the annulus between the 10" bore hole and the 8" casing will be filled entirely with Portland cement grout and concrete. They have deleted bentonite. Ok.

Section 12.3.2, corrected the typo, and changed reference from Fig. 12.1 to Fig. 12.2. Changed the description for Long string casing OD: 6-inches to correct dimension of OD: 8-inches. Changed the description of Injection String Casing OD:8-inches to correct dimensions of OD: 6-inches. Ok.

Page 12-12, changed the reference to Fig. 12.3. Ok.

Page 12-16, revised Fig. 12-4, Finished IW Design, deleted bentonite seal and now the annulus is concrete and Portland cement grout. Ok.

Section 12.4.1, they added a reference for the pressure testing they will do on the injection tubing. They will use "Standard Specification for Water and Sewer Main Construction", Illinois Society of Profession Engineers, may 1996, pages 105 and 106 and USEPA, Region VIII Ground Water Section Guidance Document No. 39, "Pressure Testing Injection Wells". Ok.

Section 12.4.2, it appears they did not make the required changes for this section. I will email consultant.

They did not submit revised cost estimates for inflation factors for 2014 and 2015 as I discussed with consultant. I will email consultant about this.

They have revised Exhibit A, Section 2 and have met all our technical comments on this section. Ok.

They have provided a new Exhibit D; Exemption from IEMA dated April 7, 2014. Ok. I added to the application. They did not reference this Exhibit anywhere in the text. I will discuss this with consultant.

I talked Marc and he is going to email the three minor changes to the application as discussed above. He will send a new page 12-20, 17-4 and page 11 of Exhibit A.

The corrected pages have been updated in the application. We can send a preliminary draft permit to the City of Aurora now and I will give the permit application and repository copy of the application to Mike Dura for screening.

5-6-15
I gave the permit application and repository copy to Mr. Dura today for screening. He said he would work on it next week. I also called Mara and let her know we are getting close to being ready to public notice. She will confirm with library that they will still be a repository and to work on getting mailing list from City of Aurora.

5-13-15
I received an email from Alex Alexandrou (COA) that they are submitting their financial assurance for closure costs to Bob Mathis today. I forwarded the email to Bob.

5-14-15
I emailed Mr. Dura today to see how the screening process was going. He said he would have it done by next Tuesday.

5-18-15
Mara sent an email stating we will be using the West Branch of the Aurora Public Library as our repository. Also Mr. Dura said the application would be ready by COB on Wednesday. I will pick up Thursday morning.

5-26-15
I received the comments on the preliminary draft permit. I will review those today. Also Mr. Dura was to finish the screening of the application on Friday. I will pick it up today from him.

5-27-15
I have completed all the changes to the draft permit, most of the comments from COA were typographical errors in the permit. I asked Mara to set the public notice dates. She has set June 3, 2015 through July 6, 2015. I will give the draft permit to Terri and Steve to sign and then we will need to post-date it for maybe June 1, 2015 when we will officially mail it out and send out the email copies. We post-date because Mara needs a copy for the repository which will have to be mailed out probably at the end of this week.

5-28-15
I gave Mara the repository copy of the application and permit and fact sheet. She will mail to the library today. We send out hard copies of draft permit on June 1, 2015.

6-9-15
I received an email from Bob Mathis today and City of Aurora's financial assurance is ok.

6-15-15
We received a letter from a citizen who lives in a subdivision in the township of Aurora not the city. He state he had an 88 ft. well and as long as this did not affect his well he was ok with the proposal. He also stated it is up to IEA to say yes or no. I do not think this is a substantial comment on the proposed application.

7-7-15
I talked to Marc Fisher and he said he found some more typos in the application. I asked him to email me his list. I said I would make the corrections and then start to prepare the final permit and administrative record. I asked Mara for her Public Information section.

Huser, Kelly

From: Marc R Fisher <mfisher@deuchler.com>
Sent: Tuesday, July 07, 2015 2:52 PM
To: Huser, Kelly
Cc: 'Alex Alexandrou'; 'Dave Schumacher'; 'Ken Schroth'; 'Alayne Weingartz'; 'Dennis Walsh'; 'John Frerich'; 'Philippe Moreau'; 'Mark Halm'; 'Marc R. Fisher'
Subject: UIC Log No. UIC-147, Permit No. UIC-016-COA, LPC 0894075971 - City of Aurora Comments Regarding Draft Class V UIC Permit

Importance: High

Kelly,

As per our phone conversation, the following represent the City of Aurora's comments regarding the draft permit.

1. Page 4 of 36 of the permit, Section 1.b, third complete sentence that starts, "The lime sludge that is generated..."; please replace the words "must be" to "is normally"
2. Page 4 of 36 of the permit, Item 1.b, second to last sentence: Please replace the word "north" with the word "south"
3. Page 4 of 36 of the permit, Item 1.c, last sentence: add the following language to the end of the sentence, "by visual observation of the manhole structure."
4. Attachments: Attachment C seems to be repeated; please remove the repeated Attachment and renumber Attachments
5. Page Numbers: Beginning with the "second" Attachment C, page number 27 is repeated and the total number of pages goes from 36 to 46 (i.e., Page 27 of 36 to Page 27 of 46). Please renumber the pages starting at Attachment C.
6. Please add an Attachment letter for form 4h, "Well Completion Report" and add the same type of header to the first page of this form consistent with the rest of the permit.

This concludes the City's comments regarding the draft permit. Please let me know if you have any questions. As a note: I will be out of the office from July 8th through July 10th and will be back in the office July 13th. You can reach me on my cell phone listed below.

Sincerely,

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

Marc R. Fisher
Environmental Manager

230 Woodlawn Avenue
Aurora, Illinois 60506

Direct Line: (630) 423-0482
Main Phone: (630) 897-8380
Fax: (630) 897-5696
Cell: (630) 926-4083

mfisher@deuchler.com

Huser, Kelly

From: Mathis, Robert
Sent: Tuesday, June 09, 2015 9:39 AM
To: Huser, Kelly
Subject: RE: City of Aurora

Kelly –

Yes I did...sorry I didn't give you an update. Busy trying to keep up mine and Nancy's stuff. The city is utilizing the financial test (self-insurance) and I found there is no problems and it is acceptable.

If you have questions or need something else, please let me know.
Thanks!
Bob

From: Huser, Kelly
Sent: Tuesday, June 09, 2015 9:24 AM
To: Mathis, Robert
Subject: RE: City of Aurora

Bob, have you reviewed the FA for City of Aurora?
Kelly

From: Mathis, Robert
Sent: Thursday, May 28, 2015 1:02 PM
To: Huser, Kelly
Subject: RE: City of Aurora

Ok, thanks! I will be looking at their financial assurance tomorrow. Had a couple things in front of it. I don't foresee any issues.

From: Huser, Kelly
Sent: Thursday, May 28, 2015 12:44 PM
To: Mathis, Robert
Subject: City of Aurora

Bob, draft permit for COA should be going out on June 1, 2015.

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax

Please consider the environment before printing this e-mail

DRAFT

Bureau

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

217/524-3300

June 1, 2015

CERTIFIED MAIL
7012 0470 0001 2976 7562
7012 0470 0001 2976 7579

OWNER:
City of Aurora
Attention: Mr. Alex Alexandrou
44 East Downer Place
Aurora, IL. 60507-2067

OPERATOR:
City of Aurora
Attention: Mr. Robert Leible
1111 Aurora Avenue
Aurora, IL. 60507-9731

Re: 0894075971 – Kane County
City of Aurora – Route 25 Repository Site
Permit No. UIC-015-COA
Log No. UIC-147
UIC Administrative Record
Draft Permit

Dear Mr. Alexandrou:

Enclosed is a DRAFT Class V Non-Hazardous Underground Injection Control (UIC) Area Permit and fact sheet for the above referenced facility located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois. The draft permit is based on the administrative record contained in the Illinois EPA's files. The contents of the administrative record are described in 35 Illinois Administrative Code (Ill. Adm. Code) Section 705.144. If the Illinois EPA issues a final UIC permit, the City of Aurora will be allowed to construct four (4) injections wells to be used in the disposal of non-hazardous lime sludge generated at the Aurora Community Water Supply facility. The lime sludge is to be injected into a former limestone and dolomite mine which extends from 240 to 365 feet below ground surface at the above-referenced site.

Under the provisions of 35 Ill. Adm. Code 705.141(d), the draft permit and administrative record must be publicly noticed and made available for public comment. Copies of the draft decision, fact sheet and application are available for review at the Aurora Public Library West Branch, 233 S. Constitution Dr., Aurora, Illinois 60506. The public comment period will begin on June 3, 2015 and will close on July 6, 2015. The Illinois EPA will consider these comments prior to taking final action on the permit.

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

Illinois Environmental Protection Agency
Government and Community Affairs Section, Director's Office
Attn: Mara McGinnis (#5)

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120

9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62704-9276

At the close of the comment period, the 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 revise the tentative decision. The appeal process and limitations on the Illinois EPA's final decisions on UIC permits are addressed in 35 Ill. Adm. Code 705.212.

If you have any questions regarding the geological and hydrogeologic aspects of this permit, please contact Scott Kaufman at 217/785-6869. Questions regarding other aspects of this permit should be directed to Kelly Huser at 217/524-3867.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

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KDH JRM TBM
Attachment: Fact Sheet
Draft Class V Underground Injection Control Permit

cc: Marc Fisher, Deuchler Environmental, Inc.
Phillippe Moreau, Deuchler Environmental, Inc.

bcc: UIC Admin Record
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Des Plaines Region – FOS
Scott Kaufman – GU
Kelly Huser
Bob Mathis
Bar Filson
Darin LaCrone - DWPC
David Cook – OPWS

FACT SHEET

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

0894075971—KANE COUNTY
CITY OF AURORA – ROUTE 25 REPOSITORY SITE
PERMIT NO. UIC-015-COA
UIC LOG NO. UIC-147

This fact sheet has been prepared pursuant to the requirements of Title 35 Illinois Administrative Code (35 Ill. Adm. Code) Section 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 a draft Class V Underground Injection Control (UIC) Area permit. Specifically, a draft Class V UIC permit has been prepared for public comment which, if a final permit is eventually issued, will allow the City of Aurora (COA), to construct and eventually operate four (4) injection wells that will dispose of non-hazardous lime sludge into a subterranean limestone and dolomite mine which extends 240 feet to 365 feet below ground surface (bgs).

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

I. INTRODUCTION/OVERVIEW

COA has applied for a Class V UIC Area permit to construct and eventually operate four (4) injection wells, located within a fifty acre parcel of land, that will dispose of non-hazardous lime sludge into a subterranean limestone and dolomite mine cavity which extends 240 to 365 feet bgs. A Class V well is used to inject non-hazardous waste above an Underground Source of Drinking Water (USDW) beneath the facility where the well is being constructed. The property where the proposed injection is to occur is located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois of which the subsurface mine and mineral rights are owned by the COA.

The COA operates a Community Water Supply (CWS) that serves a population of approximately 198,000 residents. Drinking water is treated by a lime softening treatment process at the COA Water Treatment Plant (WTP) located at 1111Aurora Avenue, Aurora, Illinois. Suspended solids are removed as part of the lime softening process. In this treatment process, powdered lime (calcium oxide) is mixed with the raw source water, causing the suspended solids to settle out within five claricone tanks at the WTP, forming a lime sludge.

The lime sludge must be removed from the tanks at regular intervals during a plant operation called "blowdown." Blowdowns typically occur every 3 hours of operation for a duration of 3 minutes under normal operating conditions, generating up to 1000 gallons of lime sludge per minute.

Currently, the lime sludge generated by blowdowns is pumped from the tanks to five different dewatering lagoons. There the lime sludge is dewatered and then loaded into trucks and transported either to a licensed municipal waste landfill for disposal, or used as an agriculture soil amendment (land applied).

Illinois EPA has completed its review of the application mentioned above and has developed a draft permit for public comment. If a final permit is eventually issued to COA, it will allow COA to construct four injection wells to inject lime sludge into a limestone dolomite mine cavity approximately 3500 feet to the north of the WTP.

A forcemain will be used to transfer the lime sludge from the WTP to the injection wells. The forcemain will then be connected to the injection well in a below-ground manhole structure (this manhole will be large enough to allow for any needed maintenance or testing of the well). The pressure in the forcemain, along with gravity, will allow the lime sludge to flow into the injection zone.

The proposed injection area is within a subterranean limestone and dolomite mine cavity which extends 240 feet to 365 feet bgs. The mine cavity will serve as a permanent detention area for the lime sludge. Water extracted from the disposed lime sludge will be pumped to the surface via a single extraction well and discharged into the Fox Metro Water Reclamation District sanitary sewer system for further treatment.

The draft permit contains all of the standard conditions required by 35 Ill. Adm. Code Parts 702, 704, and 730 for the operation of Class V UIC wells.

II. INJECTION ZONE

If issued, the UIC permit will allow COA to inject lime sludge into the mine void of Galena and Platteville Groups (limestone and dolomite deposits) approximately 207-540 feet bgs. Limestone and dolomite formations typically have low hydraulic conductivity (the ease in which a fluid can move through the pore spaces of a formation). Water movement in these formations is mainly through joints, cracks, or faults. All open joints, cracks or faults on the floors and walls of the injections zones have been identified in the permit application and will be sealed before injection begins.

III. UNDERGROUND INJECTION CONTROL WELL CONSTRUCTION

This Class V injection well system will be constructed to prevent the movement of fluids into or between underground sources of drinking water. The wells are designed with an injection tubing nested inside a long string casing which is cemented in place from the base of the borehole to the bottom of the manhole mentioned above.

1. Long String casing: approximately 300 ft of 8-inch steel casing installed from the surface through the ceiling of Level 1 of the mine cavity.

2. Injection Tubing: approximately 290 ft of 6-inch steel casing installed from the connection with the forcemain (which comes from the WTP) to the energy dissipater on the floor of Level 1 of the mine cavity.

A 10-inch bore hole will be used to install the 8-inch long steel string casing; this casing is constructed using ten foot sections of steel pipe with threaded and/or welded joints. Cement will be injected between the outside of the 8-inch casing and the bored hole from ground surface to ten feet above the ceiling of Level 1 of the mine cavity.

A 6-inch steel injection tube is installed inside of the 8-inch steel casing; this casing is constructed using ten foot sections of steel pipe with threaded and/or welded joints. It will be welded to a steel plate at the surface and at the ceiling on Level 1 in the mine cavity. The space between the outside of the injection tube and inside of the long string casing is called the annular space. The annular space for this closed injection system will not be filled and will not be pressurized but will be monitored periodically for leaks during inspections of the manholes that will be protecting each injection well at the surface.

IV. INJECTION WELL INTEGRITY AND MONITORING REQUIREMENTS

During operation of the injection well(s), COA will be continuously monitoring the injection system from the new pump station that will be constructed north of the existing Water Treatment Plant. The pump station will house the pumping system for the forcemain, a wet well and all electrical and control systems.

In order to ensure the injection well's mechanical integrity; COA will be required to perform initial mechanical integrity testing (MIT) on each injection well. This will consist of an internal pressure test on the injection tubing to determine if there are any leaks in the tubing before injection is allowed. COA must also install cement around the outside of the 8-inch long string casing from surface to final depth to ensure that there is adequate cement/grout between the entire length of the long string casing and the original bore hole. This will be verified by a Cement Bond Log that will be submitted to the Illinois EPA. During operation of the injection well system, COA will be required to inspect the injection manholes to verify systems are operating as designed.

Mechanical integrity must be established before any injection well is allowed to operate.

V. GROUNDWATER MONITORING REQUIRMENTS

COA has been granted an exemption from groundwater monitoring for the approved injection operation. This exemption is based on information provided in the approved UIC permit application that demonstrates the following: (1) suitability of the geology to sequester the lime sludge from contact with groundwater, (2) the nonhazardous nature of the sludge, (3) a minimal potential for migration of sludge constituents to groundwater, and (4) adequate protective measures including regular analysis of sludge prior to injection and contingency procedures in the event that hazardous constituents are detected. This waiver does not relieve COA of the groundwater monitoring requirements of 35 Ill. Adm. Code Parts 702, 704 and 730 in the event that site conditions change.

VI. AUTHORIZATION TO BEGIN INJECTION

If this permit is granted, COA will be allowed to complete the construction of four injection wells. After COA has completed construction of a well, including the required testing and collection of information, COA must prepare a Well Completion Report. This report provides the final construction details for that well, the results from tests conducted on the well, and proposed final operating parameters.

The Well Completion Report will be reviewed by the Illinois EPA to determine if the well can be safely operated. If the review determines that the well was constructed properly and can be operated in accordance with the applicable regulations, the Illinois EPA will modify the Underground Injection Control permit to authorize COA to begin injection. This modification process completes the two-step UIC permit approval process; no public comment period will be provided on the injection authorization modification of the permit.

VII. STRUCTURE OF PERMIT

The Illinois EPA has reviewed COA's permit application for an Underground Injection Control Area Permit and has prepared a draft permit in accordance with the requirements of Title 35 Ill. Adm. Code Parts 702, 704, 705, and 730, and 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 conditions may be added that do not fit into other sections of the permit.

VIII. PROCEDURES FOR REACHING A FINAL DECISION

The public is given at least thirty (30) days to review the permit application and to provide comment on the draft permit. Under the provisions of 35 Ill. Adm. Code 705.141(d), the draft permit and administrative record must be publicly noticed and made available for public comment. The public comment period will begin on June 3, 2015, and will end on July 6, 2015.

Copies of the permit application, draft permit, and this fact sheet are available for review at the following location:

Aurora Public Library
West Branch
233 S. Constitution Dr.
Aurora, IL. 60506
630-264-3600

In addition to the library's information repository, the Illinois EPA's administrative record for COA's draft permit is available for public inspection by appointment only, at the Illinois EPA's Springfield office from 9:00 a.m. to 5:00 p.m., Monday through Friday. The administrative record contains the permit application, draft permit, fact sheet and other supporting documents and correspondence submitted to the Illinois EPA. Inspection of the administrative record must be scheduled by contacting Mara McGinnis at the number listed below.

For further information regarding the permit process or to submit written comments on the draft UIC permit, please contact:

Mara McGinnis
Office of Community Relations (#5)
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276
Phone: 217/524-3288

In response to requests received during the comment period or at the discretion of the Illinois EPA, a public hearing may be held to clarify one or more issues concerning the permit application. A request for a public hearing must be in writing, indicate opposition to the draft permit and state the nature of the issues proposed to be raised at the hearing. Public notice of a public hearing will be issued at least forty-five (45) days before the hearing date.

The Illinois EPA will take into account all comments received from the public, as appropriate, in making its final permit decision. When the Illinois EPA makes its final permit decision, notice will be given to the applicant and each person who has submitted written comments or requested notice of the final permit decision. A response to all comments received will also be developed by Illinois EPA and accompany this notice. The permit will become effective thirty-five (35) days after service of notice of the decision or at a later date if stated in the permit, unless the decision is appealed.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

Non-Hazardous Waste Class V
Underground Injection Control Area Permit

Re: 0894075971 – Kane County
City of Aurora – Route 25 Repository Site
Permit No. UIC-015-COA
Log No. UIC-147
UIC Administrative Record

Issue Date:
Effective Date:
Expiration Date:

DRAFT

An Underground Injection Control Area Permit is hereby granted pursuant to Title 35 Illinois Administrative Code (Ill. Adm. Code) Section 704.163, the Illinois Environmental Protection Act and Title 35 Ill. Adm. Code Parts 702, 704, 705, and 730 to the City of Aurora to construct four non-hazardous waste Class V Underground Injection Control (UIC) wells, known as UIC #1, UIC #2, UIC #3, and UIC #4 within a fifty acre facility located at southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois.

The Permittee, the City of Aurora, shall submit the Well Completion Report (Attachment D) and other information as required under this permit in order for the Illinois EPA to determine if authorization for injection can be granted. If authorization is granted, the constructed injection well(s) will be used to dispose of lime sludge from the City of Aurora's Water Treatment Plant.

This permit consists of the conditions contained herein (including those in any attachments and appendices) and applicable regulations contained in the Illinois Environmental Protection Act and Title 35 Ill. Adm. Code 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 (hereafter referred to as the approved permit application). Any inaccuracies found in this information may be grounds for the termination or modification of this permit (see 35 Ill. Adm. Code 702.187 and 702.186) and potential enforcement action.

If you have any questions regarding the geology and hydrogeology aspects of this permit, please contact Scott Kaufman at 217/785-6869. If you have any questions regarding the other aspects of this permit, please contact Kelly Huser at 217/524-3867.

Sincerely,

DRAFT

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

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4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

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A. AUTHORIZATION FOR CONSTRUCTION

1. Authorization for Construction. The Permittee is hereby authorized to complete construction of four (4) Class V nonhazardous underground injection wells, identified as UIC Well #1, UIC Well #2, UIC Well #3, and UIC Well #4. The injection wells will eventually be used to dispose of lime sludge from the City of Aurora's Water Treatment Plant into a subterranean limestone and dolomite mine cavity located 240 to 365 feet below ground surface.

2. Application and Plans. The 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 (identified in Attachment A of this permit), the Illinois Environmental Protection Act, Title 35 Illinois Administrative Code (Ill. Adm. Code) Sections 702, 704, 705 and 730, and subsequent approved modifications. In the event of a conflict between conditions of this permit and the approved permit application, the condition/requirements of the permit shall supersede the application.

3. Well Location. The injection will occur on City of Aurora property that is approximately fifty acres in size and is located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois. The fifty acre property is located within the northwest quarter of Section 10, Township 38 North, Range 8 East of the Third Principal Meridian, Kane County, Illinois. (Fig. 2.2 and 2.3 in the approved permit application)

4. Injection and Confining Layers. The lime sludge will be injected into an injection zone that is located in a mine cavity from a depth of 240 to 365 feet below ground surface (ft-bgs) at the injection site. The geologic formations designated as the Ordovician Galena and Platteville Groups are located within this interval beyond the horizontal boundaries of the mine cavity.

   The confining layer is located at a depth of approximately 64 ft-bgs and is comprised of the Maquoketa Shale. This formation has a thickness of approximately 144 feet in the vicinity of the injection site. The Maquoketa Shale is a formation with low permeability and uniform thickness making it an effective upper confining unit.

5. Wellhead. The wellheads will be located inside of a protective below-grade injection manhole structure. See Attachment B for construction details. Each injection well will have an air/vacuum release valve to allow air balancing during pumping of the lime sludge.

6. Casing and Cementing (35 Ill. Adm. Code 730.112(b)). The casing and cementing details for each well are provided in Attachment B which contains:

   - An injection well schematic (same for each well);
   - An injection well manhole detail (same for each well);
   - Details of the casing strings used in the construction of each well; and
   - Specification for the cementing of the long string casing.

7. Tubing and Packer Specifications. The injection tubing shall be a 6-inch schedule 40 carbon steel pipe with threaded joints. All threaded joints will be bead welded. There is no packer for this injection well system as the lime sludge is being injected into an open cavity.

8. Well Completion Report. The Permittee shall submit a Well Completion Report (Attachment D) upon completion of each injection well. The report must present the information that has been obtained during construction of the injection wells; accurately document the as-built injection well system; document the geophysical and hydrological conditions present and provide appropriate operating limits for the system based on the evaluation of the information that has been collected. The report must also include the following:

   a. A description of construction of each 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) system, a pressure test on each injection tubing/string and extraction tubing shall be performed. A cement bond log for all long string casings (injection and extraction wells) shall be performed. Additional test 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 his/her phone number.

   c. A revised Contingency Plan as required in Condition H.27.

9. Reporting During Well Construction. During drilling and construction of the injection well(s) system, 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 test and logs preformed or to be performed on the well. These reports should be submitted electronically to: Gino.Bruni@Illinois.gov and Kelly.Huser@Illinois.gov. These reports are exempt from the signatory requirement in Condition H.11.

10. Authorization for Injection. The Permittee shall not commence operation of any injection well until they have received written 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, a permit modification request for authorization to operate injection wells UIC Well #1, UIC Well #2, UIC Well #3, and UIC Well #4 and other information as required demonstrating that the well(s) has been constructed in accordance with the approved permit.

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

    c. The Agency 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.

    d. The information provided demonstrates that the construction and operation of the injection well meets the requirements of the Illinois Environmental Protection Act and Title 35 Illinois Administrative Code Sections (Ill. Adm. Code) 702, 704, 705 and 730.

    e. The Permittee has established financial resources to close, plug, and abandon all underground injection wells and extraction well at this facility as required in Condition H.16 of this permit. (35 Ill. Adm. Code 704.189)

B. OPERATING, MONITORING AND REPORTING REQUIREMENTS

1. Operating Requirements (35 Ill. Adm. Code 730.113(a), 704.185)

    a. Flow rate. The approximate flow rate for each well is 800 gallons per minute.

    b. Injection Fluid. The fluid injected into wells UIC Well #1, UIC Well#2, UIC Well #3, and UIC Well #4 shall only be lime sludge slurry generated from the

City of Aurora Water Treatment Plant (WTP). Suspended and dissolved solids are removed from the water supply as part of the lime softening process. In this treatment process, lime (calcium oxide) in powder form is mixed with raw source water and forms a floc with the dissolved solids within five claricones at the WTP located at 1111 Aurora Ave., Aurora, Illinois. The lime sludge that is generated during the treatment process must be removed from the claricones approximately every 3 hours. This is the source of the lime sludge slurry that will be injected into the underground mine through the four injection wells. The WTP is approximately 3500 feet north of the subject property. The lime sludge will be transported from the WTP to the injection wells by a forcemain.

c. Annulus System. The annulus for this injection system has no annular fluid and is not pressurized (this is due to the fact that the lime sludge is being injected, mainly by gravity, into an open mine cavity). The injection well manholes will be inspected quarterly to insure the injection string is not leaking.

2. Monitoring Requirements (35 Ill. Adm. Code 730.113(b))

a. Sampling. Grab samples of the injection fluid shall be collected in accordance with Condition B.3.

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

i. Continuous Sludge Level Measurement – Seimens, Model :SITRANS LR200

ii. Pump Station pressure gauge – Ashcroft, Model 1279 Duragauge

iii. Magnetic Flow meter – Toshiba, Model LF654 and LF622F.

iv. Volume - The injection volume will be calculated by the supervisory control and data acquisition (SCADA) system based on the magnetic flow meter.

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%.

3. Material Analysis Plan (35 Illinois Admn. Code 704.187). The Permittee shall follow the written Waste Sampling and Analysis Plan, Form 4e, Permit Item I 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.

4. Groundwater Monitoring Plan (35 Ill. Adm. Code 730.113). The Illinois EPA approves herein a request for a waiver from the groundwater monitoring requirements based on information provided in Exhibit A of the approved UIC Permit Application. The waiver request approval may be terminated if: (1) the waste sludge is determined to be hazardous pursuant to Condition B.3 above, (2) the Illinois EPA acquires new information on the geology of the facility area, or (3) new regulations requiring groundwater monitoring are promulgated. If the Illinois EPA terminates the approval of the groundwater monitoring plan waiver based on determination that the sludge is hazardous, acquisition of new geologic information, or promulgation of new regulations, the modification procedures of 35 Ill. Adm. Code Part 702 will be followed.

5. Quarterly Reporting Requirements

   a. Report submittal date. Quarterly monitoring reports are due by April 15th (First Qtr.), July 15th (Second Qtr.), October 15th (Third Qtr.), and January 15th (Fourth Qtr.). After two years of submitting quarterly reports, the Permittee may submit an annual report containing the information required in Conditions 5.b and 5.c below. The annual report must be submitted by February 1st of each year.

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

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

      ii. Weekly averages for flow rate.

      iii. Total volume injected to date

      vi. Monthly summary of:

(a) maximum, minimum, and average values for pump station pressure, and flow rate

(b) total gallons of fluid injected

vii. Results of chemical analyses required by this permit.

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

i. 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.

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

e. Report submittal addresses. The cover letter for the quarterly 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
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

ii. Illinois Environmental Protection Agency
Division of Land Pollution Control
Field Operations Section
9511 Harrison St.
Des Plaines, IL 60016

C. **EFFECT OF PERMIT.** The existence of a UIC permit shall not constitute a defense to a violation of the Environmental Protection Act or 35 Ill. Adm. Code Subtitle G except for 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 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 702.183 through 702.186. The filing of a request by the Permittee for a permit modification or revocation, 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 Ill. Adm. Code 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 2 Ill. Adm. Code 1828 allows certain information submitted to the Illinois EPA may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. In addition, justification for the claim must also be made and all requirements of 2 Ill. Adm. Code 1828 must be followed. If no claim is made at the time of submission, the Illinois EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with Board and Agency procedures. (35 Ill. Adm. Code 130) (2 Ill.

Adm. Code 1828) Claims of confidentiality for the following information will not be approved:

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

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

3. Information, which deals with the existence, absence or level of contaminants in 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 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 Ill. Adm. Code 704.163. Any permit noncompliance constitutes a violation of the Illinois Environmental Protection 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 Ill. Adm. Code 702.141 and 35 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 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 Ill. Adm. Code 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 the permit. (35 Ill. Adm. Code 702.145)

6. Property Rights. Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege. (35 Ill. Adm. Code 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 Ill. Adm. Code 702.148)

8. Inspection and Entry (35 Ill. Adm. Code 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;

   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; and

   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 Ill. Adm. Code 702.150(a))

10. Records (35 Ill. Adm. Code 702.150(b),(c) & 704.181(b))

    a. 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 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.

    b. 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 Ill. Adm. Code 704.188 or under Subpart G of 35 Ill. Adm. Code 730, 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.

    c. 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 Ill. Adm. Code 702.126. (35 Ill. Adm. Code 702.151)

12. Reporting Requirements.

    a. Planned changes. The Permittee shall give written notice to the Permit Section, Division of Land Pollution Control within 15 days of any planned physical alterations or additions as to the permitted facility. (35 Ill. Adm. Code 702.152(a))

    b. Anticipated noncompliance. The Permittee shall give advance notice to the Permit Section, Division of Land Pollution Control, of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. (35 Ill. Adm. Code 702.152(b)).

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

    d. A summary of the reporting dates can be found in Attachment C 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 Ill. Adm. Code 704.193)

    a. The permitted well(s) shall be immediately shut-in and the Permit Section, Division of Land Pollution Control, shall be notified orally within twenty-four (24) hours if:

        i. 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

        ii. any problems developed with the casing or components of the Permittee's own injection well(s).

    Within five (5) days of an incident described above, the Permittee shall submit to the Permit Section, Division of Land Pollution Control a report containing the information specified by Conditions H.14.b. below.

b. Any improperly sealed, completed or abandoned wells within the injection well's area of review that penetrate the injection zone, the Permittee must also submit a plan consisting of such steps or modifications as necessary to prevent movement of fluid into USDWs ("corrective action"). 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 must be submitted to the Permit Section, Division of Land Pollution Control.

c. In case of well failure, the Permittee shall implement the contingency plan developed for the injection well. An investigation of the indicated well failure and plan of action to eliminate the problem must be conducted and the remedial work performed.

14. Twenty-four Hour Reporting. (35 Ill. Adm. Code 702.152(f))

a. The Permittee shall report to the Permit Section, Division of Land Pollution Control, 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 may cause an endangerment to underground sources of drinking water.

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 Permit Section, Division of Land Pollution Control, within 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.

15. 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 the appropriate Act. (35 Ill. Adm. Code 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 Sections 704.261 through 704.264) to identify the new Permittee and incorporate such other requirements as may be necessary under the appropriate 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 Ill. Adm. Code 704.260(a))

c. Automatic transfers. (35 Ill. Adm. Code. 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 15(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 Permittee;

iii. The notice demonstrates that the financial responsibility requirements of 35 Ill. Adm. Code 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 Ill. Adm. Code 704.264. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in condition 15(c)(ii).

16. Financial Responsibility. (35 Ill. Adm. Code 704.189) The Permittee shall maintain financial responsibility and resources to close, plug, and abandon all the underground injection wells and extraction well at this facility in a manner prescribed by the Illinois EPA, and Condition H.23 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 Ill. Adm. Code 704 and 40 CFR 144.

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

17. Cost Estimates for Plugging and Abandonment. (35 Ill. Adm. Code 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(s) and extraction well in accordance with the plugging and abandonment plan as identified in Condition H.23. 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 the four injection wells and extraction well is $243,000 (2015 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.

18. Incapacity (35 Ill. Adm. Code 702.160; 704.230)

a. An owner or operator shall notify the Waste Reduction and Compliance Section, Division of Land Pollution Control, 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 10 business days after the commencement of the proceeding. A guarantor of a corporate guarantee as specified in 35 Ill. Adm. Code 704.219 must make such a notification if the guarantor is named as debtor, as required under the terms of guarantee in 35 Ill. Adm. Code 704.240.

b. An owner or operator who fulfills the requirements of 35 Ill. Adm. Code 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.

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

a. The Permittee's violation of the Environmental Protection 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 or revocation.

20. 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)

21. 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 Permit Section, Division of Land Pollution Control within ten (10) days. (35 Ill. Adm. Code 702.152(h))

22. Restriction on Unpermitted Waste. Injection of waste other than those specified in the approved permit application is prohibited.

23. Plugging and Abandonment.

    a. The Permittee shall notify the Permit Section, Division of Land Pollution Control, 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 Ill. Adm. Code 704.181(e))

    b. The Permittee shall plug and abandon the injection well as provided in 35 Ill. Adm. Code 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 4g, Plugging and Abandonment of the approved permit

application, herein incorporated by reference and as modified by conditions of this permit. (35 Ill. Adm. Code 704.188).

c. No later than 60 days after plugging and abandonment of any injection or extraction well, the Permittee shall submit a plugging report required by 35 Ill. Adm. Code 704.181 (g) to the Permit Section, Division of Land Pollution Control. 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 underground sources of drinking water 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 Permit Section, Division of Land Pollution Control for approval. If approved, the revised plugging and abandonment plan shall be incorporated into the approved permit application as a permit modification.

24. Conversion of Wells (35 Ill. Adm. Code 704.181(e)) The Permittee shall notify the Permit Section, Division of Land Pollution Control, 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.

25. Inactive Wells. (35 Ill. Adm. Code 704.188) After cessation of injection for two (2) years, the Permittee shall plug and abandon the well in accordance with Condition H.23 of this permit and 35 Ill. Adm. Code 730.110, unless the Permittee has:

a. Provided notice to the Permit Section, Division of Land Pollution Control; and

b. Described actions or procedures, which are deemed satisfactory to the Illinois EPA, to ensure the well will not endanger underground sources of drinking water 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.

26. Duty to Establish and Maintain Mechanical Integrity (35 Ill. Adm. Code 704.181(h) and 704.190)

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

b. A demonstration of mechanical integrity in accordance with Section 12.4 of the approved permit application shall be conducted after construction of each well. The Permittee must establish mechanical integrity prior to any injection into or extraction from any well. A descriptive report interpreting the results all logs and tests must be prepared by a knowledgeable log analyst and submitted to the Permit Section, Division of Land Pollution Control. This report shall be signed by the analyst and shall include his/her phone number.

c. The Permittee shall demonstrate the absence of significant leaks in the injection tubing by use of a pressure test. The pressure test shall be conducted in accordance with procedures contained Section 12.4.1 of the approved permit application.

d. The Permittee shall provide a Cement Bond Log for each well (injection and extraction) to demonstrate protection of underground sources of drinking water. A descriptive report interpreting the results of the Cement Bond Log must be prepared by a knowledgeable log analyst and submitted as part of the Well Completion Report (Att. D) for each well required by Condition A.8.

e. The Permittee shall cease injection if an apparent loss of mechanical integrity as defined by 35 Ill. Adm. Code 730.108, becomes evident during operation of the injection system. 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.

f. All gauges used in mechanical integrity demonstrations or 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 Permit Section, Division of Land Pollution Control on January 15 of each year. In addition, recording devices are to be time synchronized at least quarterly.

g. 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.

27. Contingency Plan. The Permittee shall revise the contingency plan, as necessary, contained in Form 4e Permit Item IV of the approved permit application based on the final design of the injection well system. The finalized plan shall be submitted with the Well Completion Report required by Condition A.8. The contingency plan must address the procedures to be followed in the event of injection well or equipment failure. The plan must include, at a minimum, the following:

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

    b. A description of the automatic shut down of the forcemain pumps, including the pressure and flow rate which will trigger pumps to shut down.

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

28. 39i Certification. The Permittee shall submit a 39i certification and supporting documentation within 30 days of any of the following events:

    a. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has violated federal, State, or local laws, regulations, standards, or ordinances in the operation of waste management facilities or sites; or

    b. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has been convicted in this or another State of any crime which is a felony under the laws of this State, or conviction of a felony in a federal court; or

c. the owner or operator or officer of the owner, or operator, or any employee who has control over operating decisions regarding the facility has committed an act of gross carelessness or incompetence in handling, storing, processing, transporting or disposing of waste.

d. a new person is associated with the owner or operator who can sign the application or who has control over operating decisions regarding the facility, such as a corporate officer or a delegated employee.

The certification shall describe the violation(s), convictions, carelessness or incompetence as outlined in a, b, or c above and must include the date that a new person as described in d above began employment with the applicant.

The 39i certification and supporting documentation shall be submitted to the address specified below:

Illinois Environmental Protection Agency
Bureau of Land #33
39(i) Certification
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

29. 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 Division of Water Pollution Control, Illinois EPA Division of Public Water Supplies, Illinois EPA Bureau of Air, Illinois Department of Natural Resources or other federal, state, or local agencies.

ATTACHMENT A

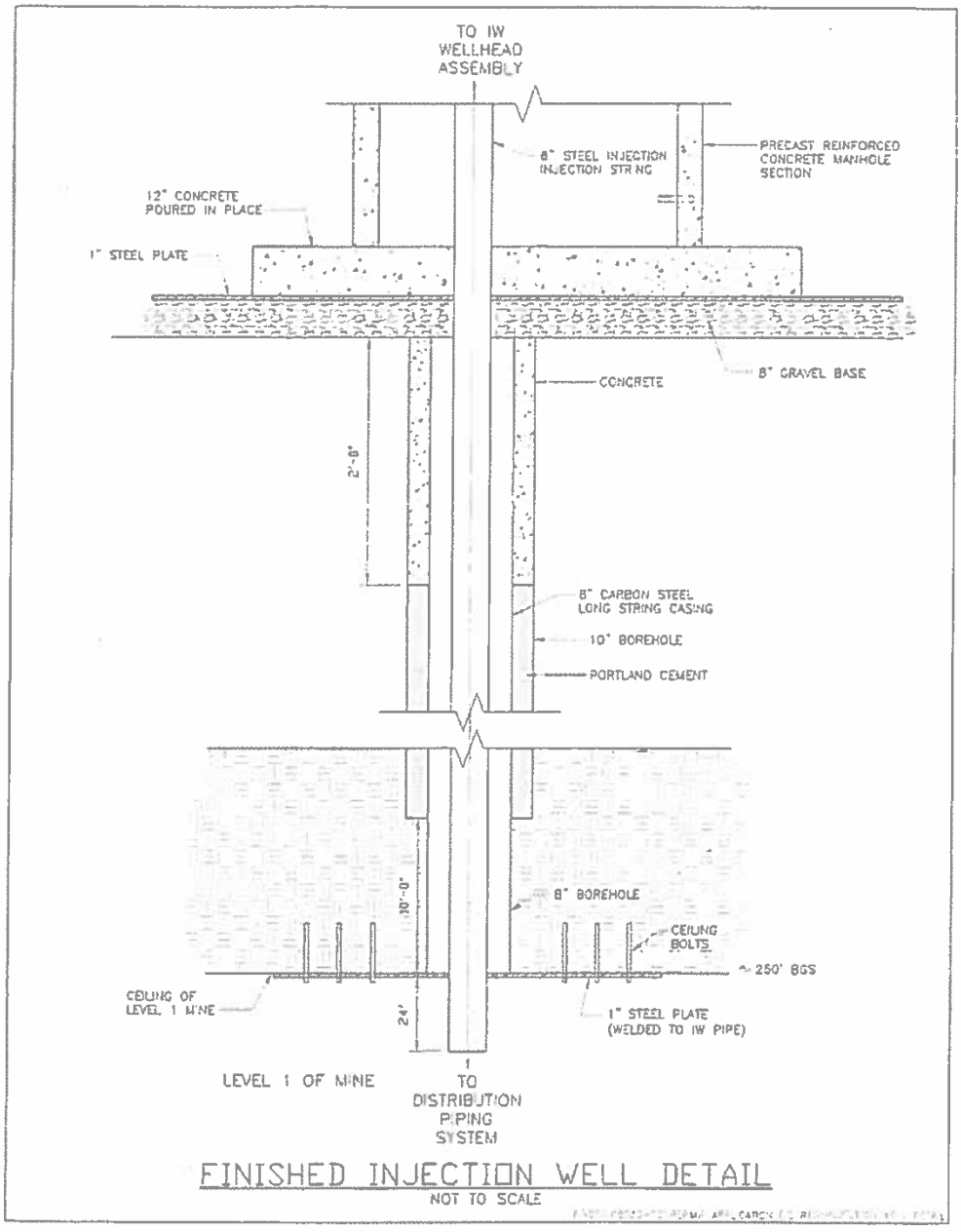
APPROVED PERMIT APPLICATION

APPROVED PERMIT APPLICATION

Document	Dated	Received
Initial Permit Application	February 19, 2013	February 26, 2013
Additional Information	October 29, 2013	October 31, 2013
Additional Information	September 30, 2014	October 1, 2014
Additional Information	April 29, 2015	April 30, 2015

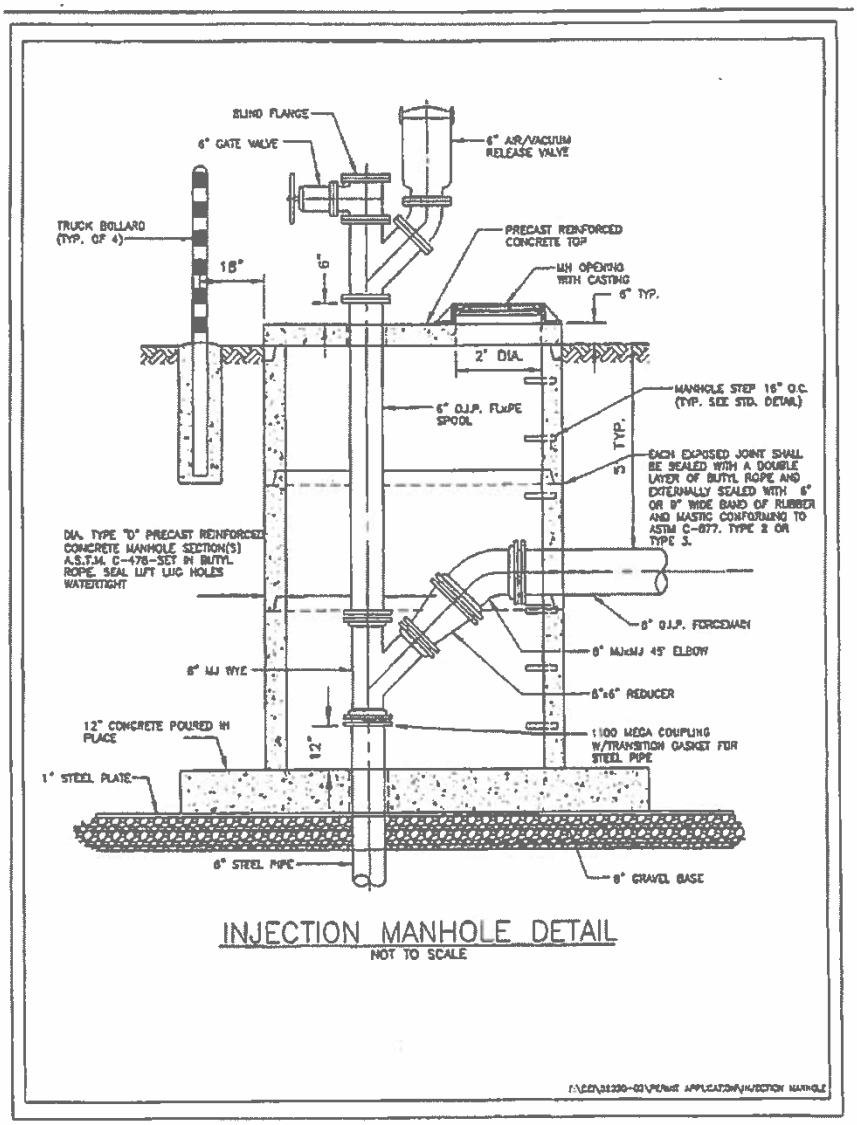
ATTACHMENT B

INJECTION WELL SCHEMATIC,
INJECTION MANHOLE DETAILS,
CASING AND CEMENTING SPECIFICATIONS
FOR
UNDERGROUND INJECTION WELLS UIC #1, #2, #3 & #4



FINISHED INJECTION WELL DETAIL

NOT TO SCALE



INJECTION MANHOLE DETAIL
NOT TO SCALE

Casing and Cementing Specifications for Underground Injection Well UIC #1, #2, #3, & #4

Long String Casing

8-inch diameter, schedule 40 carbon steel, coal tar epoxy exterior coating, with a weight of 28.5 lbs/ft.

Casing cemented from 290 ft. below ground surface to 2 feet below the bottom of the manhole excavation. The volume of cement to be used is 750 to 800 gallons of portland cement.

Cementing procedure: The portland cement will be installed via a tremie hose. The hose will be worked around the casing to insure even distribution and to avoid bridging.

Injection String

6-inch diameter, schedule 40 carbon steel, threaded, bead welded, with a weight of 19 lbs/ft.

ATTACHMENT C

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.8	Well Completion Report	After completion of injection well and extraction well
A. 9	Weekly Well Construction Reports	Weekly, during construction of injection well
B.5	Quarterly Operation Reports	April 15th, July 15th, Oct. 15th, Jan. 15th
B. 7(c)	Results of test, maintenance, and changes of equipment	Next quarterly 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)	Corrective Action Requirements by Telephone	24 hours after the discovery
H. 13(a)	Corrective Action Requirements by Letter	5 days after the discovery
H. 14	Oral Notification of Endangerment of Environment	Within 24 hours of time of endangerment
H.14	Notification by letter of Endangerment of Environment	Within 5 days of endangerment
H. 23(a)	Notice of well abandonment	60 days prior to abandonment
H. 23(c)	Certification of Plugging and Abandonment	60 days after plugging
H. 24	Plans for Conversion	180 days prior to actual conversion
H. 24	Notify before Conversion or Abandonment	45 days prior to conversion or abandonment
H. 26(g)	Gauge calibration	January 15 of each year

Condition	Submittal	Date Due
H. 27	Final Contingency Plan	Included with the Well Completion Report
H. 28	39i Certification	Within 30 days of any event described in Condition H.28

ATTACHMENT C

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.

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H. 13(a)	Corrective Action Requirements by Letter	5 days after the discovery
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H. 23(c)	Certification of Plugging and Abandonment	60 days after plugging
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H. 24	Notify before Conversion or Abandonment	45 days prior to conversion or abandonment
H. 26(g)	Gauge calibration	January 15 of each year

Condition	Submittal	Date Due
H. 27	Final Contingency Plan	Included with the Well Completion Report
H. 28	39i Certification	Within 30 days of any event described in Condition H.28

ATTACHMENT D

WELL COMPLETION REPORT INSTRUCTIONS
AND
WELL COMPLETION REPORT Form 4h

FORM 4h - WELL COMPLETION REPORT INSTRUCTIONS

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

Item I

Indicate the type of permit as either an individual or area permit, including whether it is an emergency, new or renewal request. For renewal requests, provide the permit number of the existing permit. 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). In addition, include the closest municipality name and county.

Items III, IV and V

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

Item VI

Provide the demonstrated fracturing pressure, if applicable, in psi or kg/cm2. 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

Attach a schematic or other appropriate drawing of the surface and subsurface details of the well. If the schematic is not attached, please explain.

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. Coefficient of annular fluid;
5. Packer(s), including;
   - type
   - name and model
   - setting depth, in both feet and meters
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 X

Include copies of all logs unless the logs have previously been submitted to the Agency. If the logs have been previously been submitted, indicate the date(s) the logs were submitted.

Item XI. A

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

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

Item XI. B

Provide the following information for the injection tubing:

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

Item XI. C

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

Item XII

Provide the following information for all filters and injection pumps:

- location
- type
- name
- model number
- capacity (g.p.m.)
- pore size in microns

Item XIII

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

Item XIV

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 XV

Attach a list of any changes in recording 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% from the devices approved in the approved permit, including:

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

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4h - WELL COMPLETION REPORT

USEPA ID NUMBER _____
IEPA ID NUMBER _____
WELL NUMBER _____

I. Type of Permit
Individual: _____
Emergency _____
New _____
Renewal _____
Permit Number _____
Area: _____
Number of well _____
Name of Field _____
Emergency _____
New _____
Renewal _____
Permit Number _____

Location in Application

_____ II. Location, see instructions
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ III. Surface Elevation
_____ IV. Well Depth
_____ V. Static Water Level
_____ VI. Demonstrated Fracturing Pressure, if applicable
_____ VII. Injection Well Completion
_____ 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. Coefficient of annular fluid
_____ 5. Packer(s)
_____ a. Setting depth
_____ b. Type

c. Name and model
6. Description of fluid spotting frequency, type and quantity
7. Information on well driller used for construction of this well

X. Tests and Logs
A. During Drilling
B. During and after casing installation
C. Demonstrate mechanical integrity prior to operation
D. Copies of logs and tests listed above
E. Description of well stimulation

XI. Well Design and Construction
A. Casings, see instructions
1. Conductive casing
2. Surface casing
3. Intermediate casing(s)
4. Long string casing
5. Other casing
B. Injection Tubing, see instructions
1. Maximum allowable suspended weight based on joint strength
2. Weight of injection tubing string (axial load) in air
C. Cement, see instructions
1. Conductive casing
2. Surface casing(s)
3. Intermediate casing
4. Long string casing
5. Other casing

XII. Surface Facilities, see instructions
A. Filters(s)
B. Injection pump(s)

XIII. Hydrogeologic Information
A. Revised UIC Form 4a
B. Revised UIC Form 4d using actual data on injection formation
C. Revised UIC Form 4g
D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
E. Copy of any plugging affidavits on injection well filed with Department of Natural Resources

XIV. Injection Fluid Compatibility, see instructions
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

_____ XV. Monitoring Program, see instructions
_____ A. Injection pressure gauge(s)
_____ B. Casing-tubing annular pressure gauge(s)
_____ C. Flow meter(s)
_____ D. pH recording device(s)
_____ E. Temperature

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Name & Official Title

_____ Phone Number

_____ Signature

_____ Date Signed

0894075971-UIC-UIC147-Draft.docx

E-mail Correspondence

EMAIL CORRESPONDENCE

TABLE OF CONTENTS

Huser, Kelly

From: Marc R Fisher <mfisher@deuchler.com>
Sent: Friday, May 22, 2015 2:27 PM
To: Huser, Kelly
Cc: 'Alex Alexandrou'; 'Dave Schumacher'; 'Alayne Weingartz'; 'Dennis Walsh'; 'John Frerich'; 'Philippe Moreau'
Subject: UIC Log No. UIC-147, Permit No. UIC-016-COA, LPC 0894075971 - City of Aurora Comments Regarding Preliminary Draft Permit
Attachments: Preliminary Draft Letter Comments.pdf; Preliminary Draft Hand Edits.pdf; INJECTION WELL DETAILrevised.pdf

Importance: High

Kelly,

Three files are attached:

- Preliminary Draft Letter Comments.pdf: Compilation of the City's comments
- Preliminary Draft Hand Edits.pdf: Hand edits to the preliminary draft. I thought it would be easier to follow the comments in the letter having our hand edits
- INJECTION WELL DETAILrevised.pdf: Revised figure to replace the figure on page 24 of the permit

Please review and feel free to contact me should you have any questions.

Sincerely,

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

Marc R. Fisher
Environmental Manager

230 Woodlawn Avenue
Aurora, Illinois 60506

Direct Line: (630) 423-0482
Main Phone: (630) 897-8380
Fax: (630) 897-5696
Cell: (630) 926-4083

mfisher@deuchler.com

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

230 Woodlawn Avenue • Aurora, Illinois 60506 • (630) 897-8380 • Fax (630) 897-5696

May 22, 2015

Ms. Kelly Huser
Illinois Environmental Protection Agency
Permit Section
Mail Code #33
1021 North Grand Avenue East
Springfield, IL 62794-9276

RE: 0894075971 – Kane County
City of Aurora
Permit No. UIC-016-COA
UIC Log No. UIC-147
Comments Regarding Class V Preliminary Draft Permit

Dear Ms. Huser:

On behalf of the City of Aurora ("COA"), Deuchler Environmental, Inc. ("DEI") provides the following comments regarding the Illinois Environmental Protection Agency ("Illinois EPA") preliminary draft permit for the above referenced site. The preliminary draft was received via e-mail on May 6, 2015.

The following comments are provided for your consideration:

1. Paragraph 2, first page of cover letter, second sentence: Change location for review to Aurora Public Library – West Branch, 233 South Constitution Drive, Aurora, Illinois, 60506; phone – 630-264-3600
2. Header, page 2 of cover letter: Change name to Alexandrou
3. Page 1 of Fact Sheet, Section I, first paragraph, last sentence: The COA sold the surface rights of the property, but maintain ownership of the mine and mineral rights. Delete "…and is currently owned by the COA." and replace with, "…of which the subsurface mine and mineral rights are owned by the COA."
4. Page 1 of Fact Sheet, Section I, paragraph 2, sentence 4: Delete, "…and magnesium" and delete the "s" from oxides. The parenthetical statement should read, "calcium oxide"
5. Page 1 of Fact Sheet, Section I, third paragraph, last sentence: Delete "…approximately 800…" and replace with "…up to 1,000…"
6. Fact Sheet, page 2, paragraph 3, first sentence: Change the word "form" to the word "from"

7. Same paragraph, sentence 2: The manholes are below ground, with wellhead assemblies that are above ground. Therefore, change "...above-ground..." to "...below-ground..."
8. Fact Sheet, page 2, Section II, end of first sentence: The minimum and maximum depths of the ceiling of Level 1 and the floor of Level 2 should read, "...approximately 240 – 365 feet bgs."
9. Fact Sheet, page 2, Section II, last sentence: Add the word "open" after the word "All" at the beginning of this sentence
10. Fact Sheet, page 3, item "1": The length of the long string casing should be 300 feet
11. Fact Sheet, page 3, item "1": The length of the injection tubing should be 290 feet
12. Fact Sheet, page 3, paragraph 2, last sentence: This sentence should read, "The annular space for this closed injection system will not be filled and will not be pressurized. The manhole structures will be monitored periodically for leaks during inspections."
13. Fact Sheet, page 4, Section V, sentence 2 (fourth line): Replace the word "waste" with the word "lime"
14. Fact Sheet, page 5: See comment #1
15. Permit, table of contents, page i: Section H.4 should be listed as being on page 8, not page 9
16. Permit, table of contents, page ii: Section H.11 should be listed as being on page 10, not page 11
17. Permit, page 1, Section A.3, first sentence: Delete the word "owned"
18. Permit, page 1, Section A.4, last sentence: Replace the word "Platville" with the word "Platteville"
19. Permit, page 1, Section A.5, first sentence: Replace the word "above" with the word "below"
20. Permit, page 2, Section A.7, first sentence: Delete "...OD (outer diameter)..." and add the word "pipe" between the words "steel" and "with"
21. Permit, page 3, Section B.1: Change subsection heading "c" with "b" and on the following page in the same subsection change "d" with "c"
22. Permit, page 3, Section B.1.b (formerly "c"): Replace the word "wastewaters" with the word "fluid"
23. Permit, page 4, Section B.1.b (formerly "c"), sentence 2: In the parentheses, delete the slash and the word "magnesium"; should read "calcium oxide"
24. Permit, page 4, Section B.1.c (formerly "d"), last sentence: Replace the word "annulus" with "IW manholes"
25. Permit, page 4, Section 2.b.iii: Delete the "s" on "meters" and change "Toshibia" to "Toshiba"
26. Permit, page 11, Section 13.a: We are unsure of what the term "shut-in" means in the context of this sentence. Should the phrase be "shut-off" instead?
27. Permit, page 12, Section 14.a.i: Replace the word "my" with the word "may"
28. Permit, page 18, Section 26.d: Replace the word "Bong" with the word "Bond"
29. Permit, page 19, Section 27.b: Replace the word "forecemain" with the word "forcemain"
30. Permit, page 20, Section 28.d: Replace the word "cooperate" with the word "corporate"

31. Permit, page 20, Section 29, sentence 2: Replace the word "Contorl" with the word "Control"
32. Permit, page 24: Replace the Figure on this page with the figure provided as an attachment to this document. The modifications made: 1) removed the words "GROUND SURFACE" from the figure, on the left hand side, under the steel plate, 2) changed the dimension for the concrete in the annulus from 5-feet to 2-feet and 3) replaced the word "GALVANIZED" with the word "CARBON"
33. Permit, page 31, paragraph 4, marked "Items III, IV and V, last line: Add the word "feet" between the words "both" and "and"
34. Permit, page 32, item 4 towards the top: Replace the word "annual" with the word "annular"
35. Permit, page 33, Item XIV: Question – wasn't the compatibility of the injection fluid established in the COA Permit Application and response submittals?
36. General Comment 1: Since this is a non-hazardous, Class V permit, it doesn't seem that all of the information outlined in Attachment D, pages 31 to 36 will be necessary. Will the COA be able to use "not applicable" or "NA" to those items which do not apply?

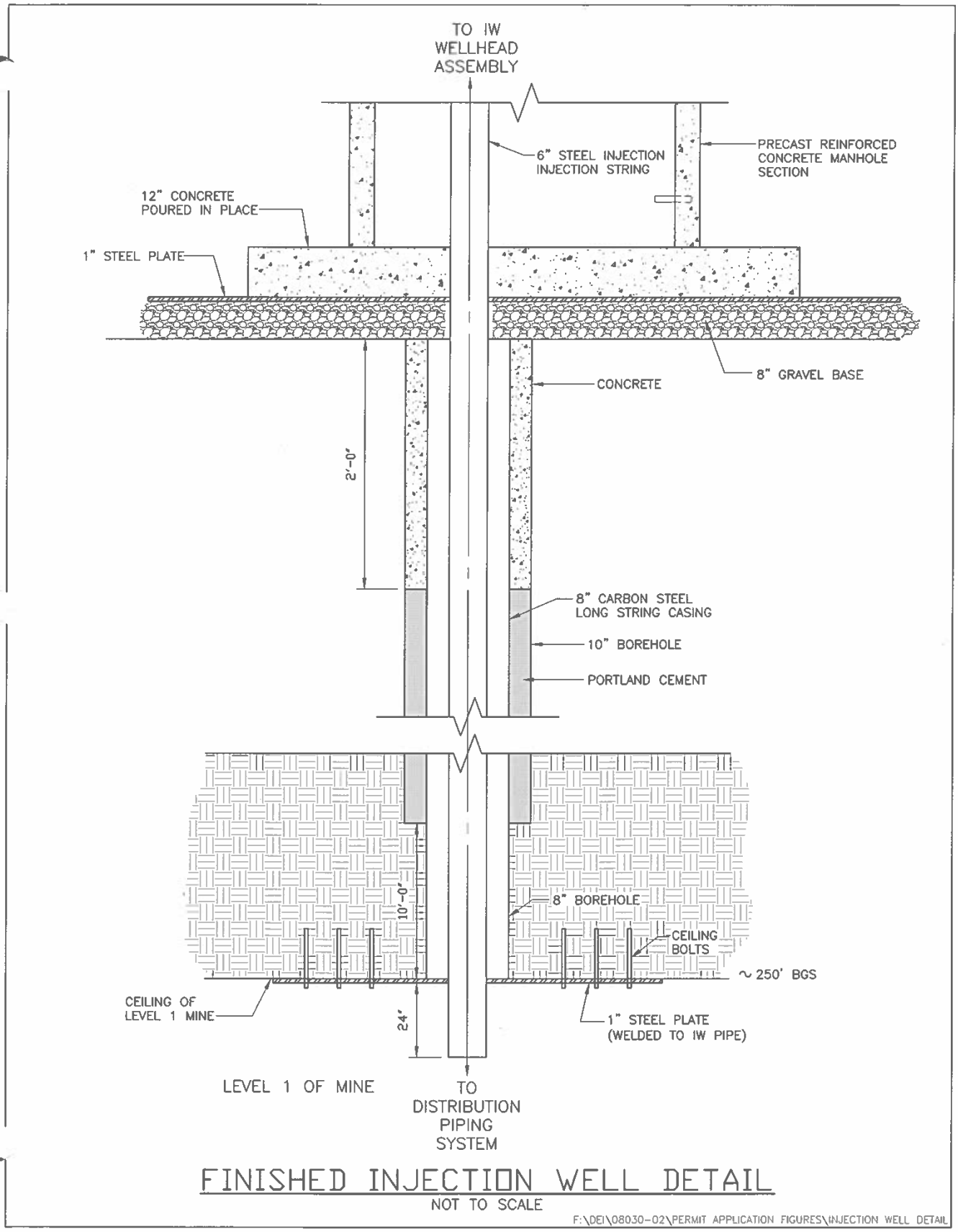
Please feel free to contact me should you have any questions.

Sincerely,

Marc R. Fisher
Environmental Manager
DEUCHLER ENVIRONMENTAL, INC.

MF/mf

cc: Alex Alexandrou, City of Aurora
Dave Schumacher, City of Aurora
Alayne Weingartz, City of Aurora
Dennis Walsh, Klein, Thorpe & Jenkins
John Frerich, P.E., DEI
Philippe Moreau, P.E., DEI



FINISHED INJECTION WELL DETAIL

NOT TO SCALE

F:\DEI\08030-02\PERMIT APPLICATION FIGURES\INJECTION WELL DETAIL

Huser, Kelly

From: Alexandrou, Alex <AAlexandrou@aurora-il.org>
Sent: Wednesday, May 13, 2015 1:46 PM
To: Huser, Kelly; 'Marc R Fisher'
Cc: Caputo, Brian
Subject: FW: Copy of Financial Assurance Letter to IEPA
Attachments: DOC051315-05132015124039.pdf

Copy of letter for your records. Original with attachments in mail today to Bob Mathis.

Alex

-----Original Message-----
From: hrtoshiba@aurora-il.org [mailto:hrtoshiba@aurora-il.org]
Sent: Wednesday, May 13, 2015 2:41 PM
To: Alexandrou, Alex
Subject: Send data from MFP07889077 05/13/2015 12:40

Scanned from MFP07889077
Date:05/13/2015 12:40
Pages:1
Resolution:300x300 DPI

City of Aurora

Administrative Services • Human Resources • Information Technology • Risk Management
44 E. Downer Place • Aurora, Illinois 60507 Website: www.aurora-il.org
Telephone: (630) 256-3430 Fax: (630) 256-3439 TDD: (630) 892-8858

Alex G. Alexandrou
Chief Administrative
Services Officer

May 13, 2015

Bob Mathis, Jr.
Financial Assurance Program
Bureau of Land
Illinois Environmental Protection Agency
1021 North Grand Ave. East
P.O. Box 19276
Springfield, IL 62794-9276

RE: Financial Assurance Documentation – IEPA ID #0894075971
City of Aurora Class V UIC

Dear Mr. Mathis:

Enclosed per our conversation is an original application for financial assurance for the above referenced project signed by the City's Chief Financial Officer which complies with your requirements.

In addition, enclosed please find a letter that provides an "unqualified opinion" from the City's auditor along with a copy of the latest audited financial statements. Both are contained in the enclosed 2013 Comprehensive Annual Financial Report.

Please confirm receipt and acceptance of the City's application. Thank you for your assistance in this regard.

Sincerely,

Alex G. Alexandrou
Chief Administrative Services Officer/Risk Manager
City of Aurora, IL

Enclosures

Cc: Kelly Huser, IEPA (Via Email/Letter only)
Brian W. Caputo, City of Aurora (Via Email/Letter only)
Marc Fisher, Deuchler Environmental (Via Email/Letter only)

Huser, Kelly

From: Marc R Fisher <mfisher@deuchler.com>
Sent: Tuesday, May 05, 2015 5:17 PM
To: Huser, Kelly
Cc: 'Alex Alexandrou'; 'Dave Schumacher'; Leible, Robert; 'John Frerich'; 'Mark Halm'; 'Philippe Moreau'
Subject: City of Aurora - Class V UIC PA - Log No. UIC-147
Attachments: UIC third response errata pages.pdf

Importance: High

Kelly,

As per your e-mails from this morning and from our conversation this afternoon, and on behalf of the City of Aurora, I have attached the following three errata pages to be replaced in the City's Class V UIC Permit Application ("PA"):

- Page 12-20: Additional fourth bullet at the top describing the interpretation of the cement bond log;
- Page 17-4: Revision of the closure cost for financial assurance to account for inflation; and
- Modification to Exhibit A, third paragraph, to include a reference to the IEMA Radium standard which will be included in the PA as Exhibit D.

Please let me know if you require any further modifications to the PA. Otherwise, we look forward to the issuance of the preliminary draft permit for our review and comment. Thank you for the prompt turn-around on the review of our submittal.

Sincerely,

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

Marc R. Fisher
Environmental Manager

230 Woodlawn Avenue
Aurora, Illinois 60506

Direct Line: (630) 423-0482
Main Phone: (630) 897-8380
Fax: (630) 897-5696
Cell: (630) 926-4083

mfisher@deuchler.com

- *A correlation curve (gamma ray) and travel time (μsec);*
- *Amplitude (mV);*
- *Attenuation (dB/ft) curves;*
- *Full wave form display (μsec); and*
- *The Cement Bond Log will be interpreted by a qualified log analyst and this report will be included in the Well Completion Report.*

12.4.3 *Manhole Structure Inspections*

On at least a semi-annual basis (twice per year), all well heads and manholes will be inspected for integrity. Valves and other components will be inspected. Additionally, the surface valving along the forcemain will also be inspected.

All test results will be presented in the Well Completion Report.

12.5 *Distribution Piping and Injection Points*

In order to deliver the lime sludge from the IW's into Level 2 of the mine a network of distribution piping will be constructed along the floor of Level 1 of the mine. The goal of this piping network is to dissipate the energy that will be imparted to the sludge as it drops from the forcemain just below the ground surface into the mine and to distribute the lime sludge as evenly and space-efficiently as possible by gravity.

The IW's, which will be anchored to the ceiling of Level 1, will have a minimum of two feet of pipe protruding into the mine. The IW pipe will be connected to a vertical pipe with a 10-foot radius bend. The bend will have support structures connected to it which will be anchored to the floor of Level 1 of the mine. Horizontal piping will be connected to the end of the radius bend, leading to clusters of 18 uncased, drilled holes (injection points) through the sill between Levels 1 and 2 of the mine.

Estimated cost of portland cement = $275/CY
SUBTOTAL = 5 CY x $275/CY = $1,375
Removal of stickup, bollards and concrete pad = $10,000
Estimated delivery, labor, material and other costs = $3,000
TOTAL = $14,375 or approximately $15,000

Subtotal = $190,000
Contingency 15% = $28,500
TOTAL = $218,000 or round up to $220,000
Inflation factor of 5% for two years = $22,550
TOTAL = $242,550 or round up to $243,000

The City of Aurora will provide financial assurance in amount of $243,000 using one of the methods acceptable to the Illinois EPA, but will most likely be using the financial statement method. The City will inform the Illinois EPA confirming this.

17.6 Reporting and Record Retention

The COA will comply with all monitoring, system closure and post-closure care requirements and all reporting requirements as well as all retention of record requirements as outlined in the permit issued by the Illinois EPA for this site.

- *Solid media: standards for the parameters listed in 721.124.b and the radium standard established by the Illinois Emergency Management Agency ("IEMA").*

In the unlikely event that the pH of the sludge exceeds the State standard of 12.5, the sludge from the WTP will be diverted into the dewatering lagoon at the WTP. The Illinois EPA will be notified of the exceedence and additional pH measurements will be taken. The diversion of the sludge will continue until sampling indicates that the pH standard is being met. Once the standard has been met, normal system operation will commence and the pumping of the sludge will resume.

Additionally, the standards that will be applied to evaluate the solid fraction of the sludge for toxicity characteristics are the levels as outlined in Section 721.124.b. If at any point one of the standards listed is exceeded in the routine TCLP testing, the sludge will be diverted as described above until it is demonstrated that the sludge meets the standards. Compliance will be demonstrated by either re-testing the sample at the laboratory for the parameter(s) of exceedence or by obtaining an additional sample for testing. Once it is demonstrated that the solid fraction meets the toxicity standards, then normal system operation will re-commence.

The solid media will also be subject to the radium standard established by IEMA in their memo dated April 7, 2014 (please refer to Exhibit D). The radium (total) standard established in the referenced memo is 25 pCi/g. If the average annual concentration of radium exceeds this standard, then injection will cease, the sludge will be diverted to the dewatering lagoon as described above and IEMA and the Illinois EPA will be notified.

~~In the event that one or more parameters exceed the State standards, the following shall apply:~~

- ~~If occurrence is during Bi-monthly sampling, continue sampling until 4 consecutive sampling events meet the standards; then proceed one year of quarterly sampling, 1 year of semi-annual sampling, and annual thereafter;~~
- ~~If occurrence is during quarterly sampling, then continue quarterly sampling until 4 consecutive quarters meet the standards, then proceed to semi-annual sampling for one year, then annual thereafter; and~~
- ~~If occurrence is either during the semi-annual or annual sampling, then sample quarterly until 4 consecutive quarters meet the standards, then semi-annual for 1 year and annual thereafter.~~

Huser, Kelly

From: Huser, Kelly
Sent: Monday, November 03, 2014 9:35 AM
To: Fisher, Marc
Cc: Kaufman, Scott
Subject: IEPA Comment on Sep 30 revisions.docx
Attachments: IEPA Comment on Sep 30 revisions.docx

Marc, here are our comments on your submittal. Please send revisions as soon as you can. If you have any questions, please call or email.

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax

Please consider the environment before printing this e-mail

Comments on September 30, 2014 Submittal

Marc, besides the typographical errors we discussed, the following sections of the application need to be revised.

1. Section 12.4.1, please include a reference for the guidance document you used for the proposed pressure test procedures for the pressure test on the injection tubing.

2. Section 12.4.2, please include that a report interpreting the results of the Cement Bond Log, by a qualified log analysts, will be submitted as part of the well completion reports for each injection well.

3. Financial assurance in the amount of $220,000 should be provided to the Illinois EPA at your earliest convenience. Please contact Bob Mathis for the proper forms at 217/785-7403. The Illinois EPA cannot issue a final Class V UIC permit, without the proper financial assurance.

4. Exhibit A, Section 2.2, please revise to include testing for characteristics of hazardous waste as found in 35 Ill. Adm. Code 721, including all TCLP parameters. Please also revise to include temperature as a parameter.

5. Exhibit A, Section 2.3 and 2.4, please revise "bi-monthly" to "once every two months".

6. Exhibit A, Section 2.4, the contingency plan should include re-sampling within 30 days of an exceedance. If the re-sample is also an exceedance, then describe the procedures that will be used to prevent the sludge from being injected until additional sampling can be obtained to determine when the sludge meets the parameters set by the permit and injection may resume. Also please be specific on what State standards you will be using. Also describe what steps will be taken to determine the nature and source of the contamination, and steps for mitigating that contamination.

7. Exhibit A, Section 2.5, please state a proposed time frame the sampling and analysis reports will be submitted to the Illinois EPA.

8. Please provide a facility mailing list that can be used by the Illinois EPA for public notice of the draft permit. You should contact Mara McGinnis, IEPA, to assist you with this. She can be reached at 217/524-3288.

COA Submittals

UIC-147 cc: DesPlaines IEPA

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

230 Woodlawn Avenue • Aurora, Illinois 60506 • (630) 897-8380 • Fax (630) 897-5696

April 29, 2015

Mr. Steve Nightingale
Section Manager
Illinois Environmental Protection Agency
Permit Section
Mail Code #33
1021 North Grand Avenue East
Springfield, IL 62794-9276

RE: 0894075971 - Kane County
City of Aurora
Permit No. UIC-016-COA
UIC Log No. UIC-147
REVISION INSERTS AND MODIFIED FORMS FOR PA
IEPA Comments Received 11/03/2014

Dear Ms. Huser:

On behalf of the City of Aurora, Deuchler Environmental, Inc. provides the following response packet based upon comments from the Illinois Environmental Protection Agency received in an e-mail dated November 3, 2014 from Kelly Huser.

Each insert page has been marked in the upper right hand corner as "**REVISION 2.0**" along with the date. The following materials have been provided:

- Form LPC-PA1
- Certificate of Authenticity
- UIC Form 4c
- UIC Form 4e
- Revised Table of Contents and References Cited in their entirety
- Revised Section 12.0 in its entirety
- Revised Exhibit A in its entirety
- New Exhibit D – Illinois Emergency Management Agency Radium Exemption Letter dated April 7, 2014

All of these materials should be replaced in the original Permit Application or added to the Permit Application if new.

Please feel free to contact me should you have any questions.

Sincerely,

Marc R. Fisher
Environmental Manager
DEUCHLER ENVIRONMENTAL, INC.

MF/mf

Cc: Alex Alexandrou, City of Aurora
Dave Schumacher, City of Aurora
Philippe Moreau, P.E., DEI

UIC-147 cc: Des Plaines IEPA

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

230 Woodlawn Avenue • Aurora, Illinois 60506 • (630) 897-8380 • Fax (630) 897-5696

September 30, 2014

Ms. Kelly Huser
Environmental Protection Engineer
Illinois Environmental Protection Agency
Permit Section
Mail Code #33
1021 North Grand Avenue East
Springfield, IL 62794-9276

RE: 0894075971 – Kane County
City of Aurora
Permit No. UIC-016-COA
UIC Log No. UIC-147
REVISION INSERTS AND MODIFIED FORMS FOR PA

Dear Ms. Huser:

On behalf of the City of Aurora, Deuchler Environmental, Inc. provides the following materials in response to the two letters of review by the Illinois Environmental Protection Agency dated June 19, 2013 and June 2, 2014:

- Log of Revisions sheets which summarize all revisions made;
- Modified forms:
  - LPC PA-1
  - Certificate of Authenticity
  - Form 1
  - 4b
  - 4c
  - 4e
  - 4f
  - 4g
- All pages modified to be inserted into the City of Aurora Class V UIC Permit Application
- Exhibit A: Ground Water Monitoring Waiver Request
- Exhibit B: Preliminary Piping and Instrument Diagram ("PID")
- Exhibit C: System Compatibility Table

RECEIVED
OCT 01 2014
IEPA-BOL
PERMIT SECTION

Each insert page has been marked in the upper right hand corner as "REVISION 1.0" along with the date. The Exhibits should be placed in front of Appendix A.

Robert Leible, the signatory for the City as the Operator, is recognized by the Illinois EPA Bureau of Water as the "Responsible Operator in Charge". This means that he and his staff are responsible for the day-to-day operation of the plant and will be responsible for the operation of the pumping system at the plant once it is constructed.

Please feel free to contact me should you have any questions.

Sincerely,

Marc R. Fisher
Environmental Manager
DEUCHLER ENVIRONMENTAL, INC.

MF/mf

Cc: Alex Alexandrou, City of Aurora
Philippe Moreau, P.E., DEI

LOG OF REVISIONS: City of Aurora, UIC Log No. UIC-147 **September 30, 2014**

EDIT/MODIFICATION	LOCATION	IN RESPONSE TO	COMMENT
Replace terms long string casing and injection string casing for outer casin and inner casing	multiple locations in Section 12.0, starting on p 12-7	Item 3	
Remove o-rings from design of IW and EW	p 12-7	Item 4a	
Added info about forces and stability of pipes	p 12-8	Item 2	
replaced galvanized pipe with carbon steel	P. 12-8	item 4b	
SAA	sec 12.3.2		
added language about logging the holes via drill cuttings	top p 12-10	as per conversation with Scott Kaufman	
in all instances I replace "grout" with portland cement	multiple locations in Section 12.0	item 7	
added pipe reducer	12.3.3	as per discussion	
added casing specs	p 12-11 and 12-12		
added contingency plan	p12-3	item 12	
added PID reference and attached as exhibit	p12-1 and Exhibit B	item 10	The three exhibits should go in front of the appendices
add coarse screen description for the "filter" part of the forms	sec 12.1.1	item 11	
added boring termination protocol just above 12.3.2	p12-10	item 16	
added mention of cement bond log and that it would be included in WCR	p12-11		
added language that welded tabs will not deform pipe	p12-11	item 6	
modified fig 12.2 to include long string, injection string and portland cement	p12-12		
added maximum allowable weight discussion	p12-14 and 12-15	Item 5	
modified fig 12.4 to include long string, injection string and portland cement	p12-16		

EDIT/MODIFICATION	LOCATION	IN RESPONSE TO	COMMENT
modified fig 12.5 showing the pipe reducer	p12-18	per discussion	
added new section 12.4, MIT	p12-19 to 12-20	Item 13	
added results of pilot test will be included in WCR	p12-30	per discussion	
added new section 12.9 injection fluid compatibility	p12-32	Item 14	
changed IW/EW abandonment procedures; now includes cementing of annulus and use of bridge plug	section 17.2 p17-1 and 17-2	Item 7, Item 15 and Item17	
added new section 17.5 cost estimate and financial assurance	p17-3 and 17-4	Item 18	
Complete revision of Section 16.0	All pages	Ground Water Waiver Request	
added reference to exhibits in TOC			
repaginated document and modifed TOC			
changed section reference	p4-12		
changed section reference	top of p4-12		
changed class of silurian dolomite aquifer to Class I	p6-2	Item 1 on Scott's letter	
Modified Figure 2.2 to include AOR	p2-6	Item 2 on Scott's Letter	
Added Ground Water Waiver Request	separate document	Item 3 on Scott's Letter	
Form LPC PA-1		Adding operator of WTP to form	
Certificate of Authenticity		Adding operator of WTP to form	
Form 1		IEPA comments and modificiations	
Form 4b		IEPA comments and modificiations	
Form 4c		IEPA comments and modificiations	

EDIT/MODIFICATION	LOCATION	IN RESPONSE TO	COMMENT
Form 4e		IEPA comments and modificiations	
Form 4f		IEPA comments and modificiations	
Form 4g		IEPA comments and modificiations	

BOL Permit Section RCRA Tracking Sheet

BOLSiteCode ***0894075971*** *Federal ID(s)* *Respond by:* ***7/3/2014***

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Review Status	PermitClass	AppType	Reviewers: RCRA, CAU, DAU, GAU			RCRA
Active	New UIC Pmt (Existing Facility)	UIC	KDH			DSK

DocTitle_Description	Submittal Type	Review Type	Agency Response
Cert form	Additional Info	Technical	

Date Received 05/13/2014 Date Due 07/12/2014 Date Mailed

Submittal Comment:

Resp to Completeness NOD	Resp-Completeness N	Technical	Technical NOD

Date Received 10/31/2013 Date Due 12/30/2013 Date Mailed 06/02/2014

Submittal Comment:

New UIC Permit	1st Submittal	Technical	Completeness NOD

Date Received 02/26/2013 Date Due 04/27/2013 Date Mailed 06/19/2013

Submittal Comment:

Final Action Data

For Log No: **UIC-147**

Units Addressed	Final Action Status	Date FA Issued	Date NFA	Date Closure Cert Accepted	Acres Remediated
					0

Closure Type:	Institutional Control	Clean Closed:	1 Institutional Control:	2 Institutional Control:
	☐			

JCD 14

BOL Permit Section RCRA Tracking Sheet

BOLSiteCode ***0894075971*** *Federal ID(s)* *Respond by:* ***6/14/2014***

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Review Status	PermitClass	AppType	Reviewers: RCRA, CAU, DAU, GAU			
Active	New UIC Pmt (Existing Facility)	UIC	KDH			DSK

DocTitle_Description	Submittal Type	Review Type	Agency Response
Cert form	Additional Info	Technical	

Date Received: 05/13/2014 Date Due: 07/12/2014 Date Mailed:

Submittal Comment:

Resp to Completeness NOD	Resp-Completeness N	Technical	

Date Received: 10/31/2013 Date Due: 12/30/2013 Date Mailed:

Submittal Comment:

New UIC Permit	1st Submittal	Technical	Completeness NOD

Date Received: 02/26/2013 Date Due: 04/27/2013 Date Mailed: 06/19/2013

Submittal Comment:

Final Action Data

For Log No: **UIC-147**

Units Addressed	Final Action Status	Date FA Issued	Date NFA	Date Closure Cert Accepted	Acres Remediated
					0

Closure Type:	Institutional Control	Clean Closed:	1 Institutional Control:	2 Institutional Control:
	☐			

UIC-147 cc: Des Plaines KDH

Illinois Environmental Protection Agency

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

General Application for Permit
(LPC - PA1)

This form must be used for any application for permit from the Bureau of Land, except for landscape waste composting or hazardous waste management facilities regulated in accordance with RCRA, Subtitle C. One original, and two copies, or three if applicable, of all permit application forms must be submitted. Attach the original and appropriate number of copies of any necessary plans, specifications, reports, etc. to fully support and describe the activities and modifications being proposed. Attach sufficient information to demonstrate the compliance with all regulatory requirements. Incomplete applications will be rejected. Please refer to the instructions for further guidance. **Note: Applicants must provide a physical address; the post office will not deliver a certified letter (final action letter) to a P.O. Box only. Please provide an extended ZIP+4 code for the site identification and owner/operator information.**

You may complete this form online, save a copy locally, print, sign and submit it to the Bureau of Land at the address below. Note: Hand-delivered permit applications must be delivered between 8:30 am and 5:00 pm, Monday through Friday (excluding State holidays) to:

Bureau of Land, Permit Section, Mail Code #33
1021 North Grand Avenue East, P.O. Box 19276
Springfield, IL 62794-9276

I. Site Identification:

Site Name: City of Aurora Class V UIC — IEPA BOL No.: 0894075971

Street Address: 44 East Downer Place — P.O. Box: _____

City: Aurora — State: IL — Zip + 4:* 60507-2067 — *Notification letters will not be sent without a 9-digit zip code. — County: Kane

Existing DE/OP Permit Numbers (if applicable): UIC-147

II. Applicant Identification:

	Owner	Operator (if Different)
Name:	City of Aurora	
Street Address:	44 East Downer Place	
PO Box:		
City:	Aurora	
State:	IL	
Zip + 4:	60507-2067	
Phone:	(630) 256-3441	
Contact:	Alex Alexandrou	
Email Address:	AAlexandrou@aurora-il.org	
FEIN ID No.	36-6005778	

Agency correspondence mailed to: Owner ☐ Operator ☐ Other - Explain ☐

TYPE OF SUBMISSION/REVIEW PERIOD:

- ☐ New Landfill/180 days (35 IAC Part 813)
- ☐ Landfill Expansion/180 days (35 IAC Part 813)
- ☐ Sig. Mod. to Operate/90 days (35 IAC Part 813)
- ☐ Other Sig. Mod./90 days (35 IAC Part 813)
- ☐ Renewal of Landfill/90 days (35 IAC Part 813)
- ☐ Development/90 days (35 IAC Part 807)
- ☐ Operating/45 days (35 IAC Part 807)
- ☐ Supplemental/90 days (35 IAC Part 807)
- ☐ Permit Transfer/90 days (35 IAC Part 807)
- ☐ Renewal of Experimental Permit (35 IAC Part 807)

TYPE OF FACILITY:

- ☐ Landfill
- ☐ Land Treatment
- ☐ Transfer Station
- ☐ Treatment Facility
- ☐ Storage
- ☐ Incinerator
- ☐ Composting
- ☐ Recycling/Reclamation
- ☑ Other (Specify) non-hazardous Class V injection

TYPE OF WASTE:

- ☐ General Municipal Refuse
- ☐ Hazardous
- ☑ Special (Non-Hazardous)
- ☐ Chemical Only (exec. putrescible)
- ☐ Inert Only (exec. chem. & putrescible)
- ☐ Used Oil
- ☐ Potentially Infectious Medical Waste
- ☐ Landscape/Yard Waste
- ☐ Other (Specify) Drinking water treatment byproduct - lime sludge

☑ ADDITIONAL INFORMATION DATED OCTOBER 29, 2013

RECEIVED
MAY 13 2014
IEPA BOL
PERMIT SECTION

This Agency is authorized to require this information under Section 4 and Title X of the Environmental Protection Act (415 ILCS 5/4, 5/39). Failure to disclose this information may result in: a civil penalty of not to exceed $50,000 for the violation and an additional civil penalty of not to exceed $10,000 for each day during which the violation continues (415 ILCS 5/42). This form has been approved by the Forms Management Center.

IL 532-1857
LPC 350 Rev. 5/2012

Description of this Permit Request: **(Note: The box below will expand as needed)**

A non-hazardous lime sludge generated by the treatment of drinking water (lime softening) by Aurora will be conveyed via a forcemain from the treatment plant approximately 1 mile north to a site for disposal into a former subterranean limestone/ dolomite mine (~250 feet deep) via 4 injection wells. The system includes a new pump station, forcemain, 4 injection wells, one extraction well and ancillary equipment and controls. Sludge solids will settle out and be retained in the mine and most of the water will be extracted from the mine and disposed in a sanitary sewer. The estimated storage life of the mine is >20 yrs

IV. Completeness Requirements

1. Have all required public notice letters been mailed in accordance with the LPC-PA16 instructions? Yes ☐ No ☐ N/A ☑

   (If so, provide a list of those recipients of the required public notice letters for Illinois EPA retention. Such retention shall not imply any Illinois EPA review and/or confirmation of the list.)

Public Notice Recipients

Name: _____ Title: _____

Street Address: _____ P.O. Box: _____

City: _____ State: _____ Zip Code: _____

		Yes	No	N/A
2.	Has the required Certification of Authenticity been completed and enclosed?	☑	☐	☐
3. a.	Is the Siting Certification Form (LPC-PA8) completed and enclosed?	☐	☐	☑
b.	Is siting approval currently under litigation?	☐	☐	☑
4. a.	Is a closure, and if necessary a post-closure plan covering these activities being submitted, or	☑	☐	☐
b.	has one already been approved?	☐	☑	☐
	If yes, provide the permit number: _____			
5. a.	For operating waste disposal sites, only: Has any employee, owner, operator, officer or director of the owner or operator had a prior conduct certification denied, canceled or revoked?	☐	☐	☑
b.	Have you included a demonstration of how you comply or intend to comply with 35 Ill. Adm. Code 745?	☐	☐	☑
6. a.	For waste disposal sites, only: Is the property for the facility held in a beneficial trust?	☐	☑	☐
b.	If yes, is a beneficial trust certification form (LPC-PA9) completed and enclosed?	☐	☐	☑
7. a.	Does the application contain information or proposals regarding the hydrogeology; groundwater monitoring, modeling or classification; a groundwater impact assessment; or vadose zone monitoring for which you are requesting approval?	☑	☐	☐
b.	If yes, have you submitted a third copy of the application (4 total) and supporting documents?	☑	☐	☐
8.	Has a 39(i) certification been submitted for each owner and operator business entity, and each person who signed for each entity, and each person who signed or may sign any application for this facility? Note: Only the original set of these forms need be submitted.	☑	☐	☐
	If no, then complete this certification as indicated.			

V. Signatures:

Original signatures are required. Signature stamps or applications transmitted electronically or by FAX are not acceptable.

All applications shall be signed by the person designated below as a duly authorized representative of the owner an/or operator. A printed name for each signature should also be provided.
Corporation - By a principal executive officer of the level of vice-president or above.
Partnership or Sole Proprietorship - By a general partner or the proprietor, respectively.
Government - By either a principal executive officer or a ranking elected official.

A person is a duly authorized representative of the owner and operator only if:
1. They meet the criteria above or the authorization has been granted in writing by a person described above; and
2. Is submitted with this application (a copy of a previously submitted authorization can be used).

I hereby affirm that all information contained in this application is true and accurate to the best of my knowledge and belief. I do herein swear that I am a duly authorized representative of the owner/operator and I am authorized to sign this permit application form.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Alex Alexandrou — Printed Name:
Chief Administrative Officer, COA — Title:
Owner Signature:
5/9/14 — Date:

Notary: Subscribed and Sworn before me this 9TH day of May 2014.

My commission expires on: 1-18-2016

OFFICIAL SEAL
KARI L. ULRICH
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 1-18-2016

Kari L. Ulrich
Signature & Stamp/Seal of Notary Public

Alex Alexandrou — Printed Name:
Chief Administrative Officer, COA — Title:
Operator Signature:
5/9/14. — Date:

Notary: Subscribed and Sworn before me this 9TH day of May 2014.

My commission expires on: 1-18-2016

OFFICIAL SEAL
KARI L. ULRICH
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 1-18-2016

Kari L. Ulrich
Signature & Stamp/Seal of Notary Public

Licensed Professional Engineer's Name: Philippe Moreau, P.E.

Licensed Professional Engineer's Title: President

Registration Number: 062.048508

Company: Deuchler Environmental, Inc.

Street Address: 230 Woodlawn Avenue — PO Box:

City: Aurora — State: IL — Zip + 4: 60506

Email Address: pmoreau@deuchler.com — Phone: 630-897-8380

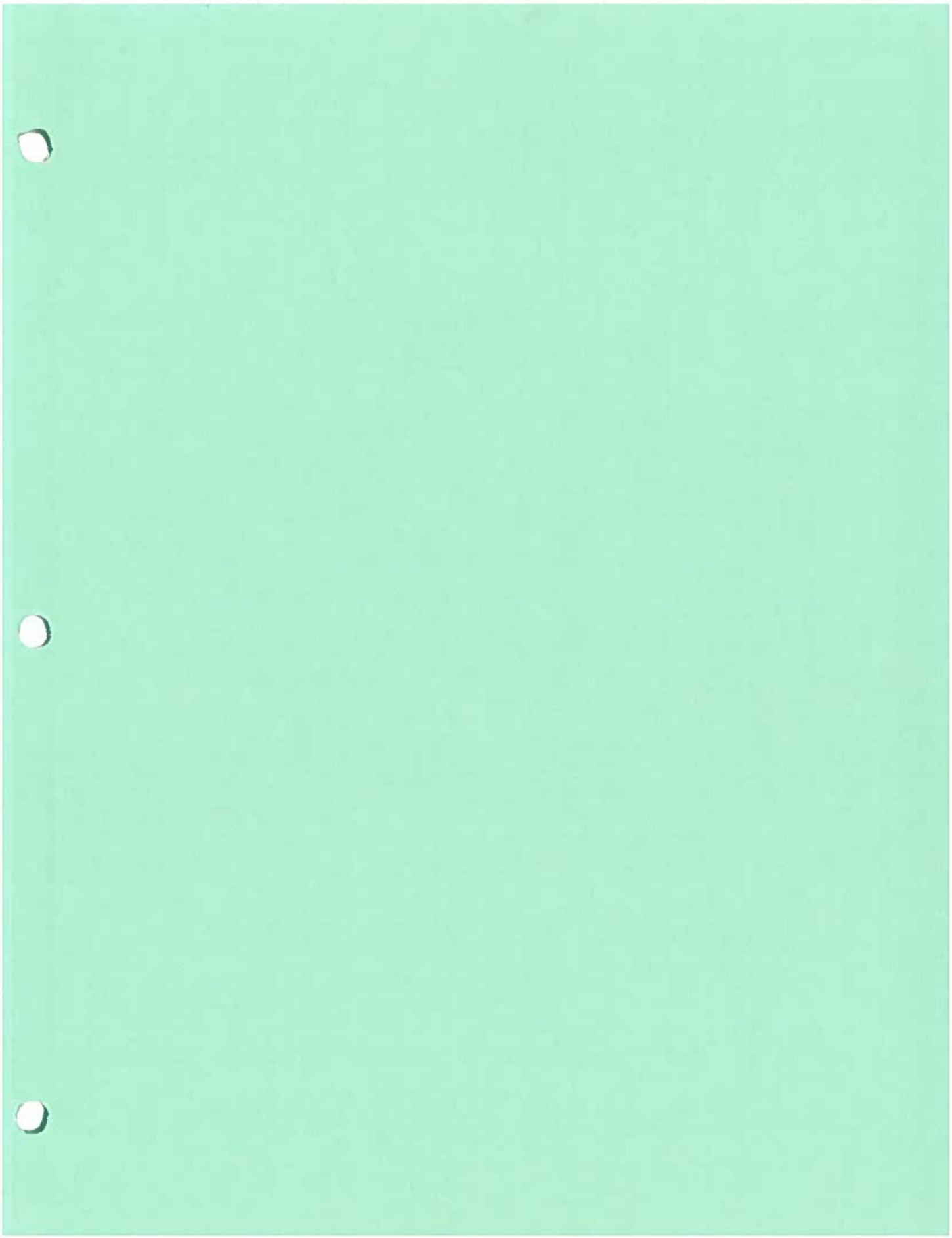
License Expiration Date: 11-30-2015

PHILIPPE F. MOREAU
062-048508
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

Licensed Professional Engineer's Seal

Signature:

Date: 05-07-14



KL

BOL Permit Section RCRA Tracking Sheet

BOLSiteCode **0894075971** *Federal ID(s)* *Respond by:* **12/4/2013**

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Review Status	PermitClass	AppType	Reviewers: RCRA, CAU, DAU, GAU
Active	New UIC Pmt (Existing Facility)	UIC	KL

DocTitle_Description	Submittal Type	Review Type	Agency Response
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Date Received 10/31/2013 Date Due 12/30/2013 Date Mailed

Submittal Comment:

New UIC Permit	1st Submittal	Technical	Completeness NOD

Date Received 02/26/2013 Date Due 04/27/2013 Date Mailed 06/19/2013

Submittal Comment:

Nstar EJ site.

Final Action Data

For Log No: **UIC-147**

Units Addressed	Final Action Status	Date FA Issued	Date NFA	Date Closure Cert Accepted	Acres Remediated
					0

Closure Type:	Institutional Control	Clean Closed:	1 Institutional Control:	2 Institutional Control:
	☐			

UIC-147 cc: Desplains KL

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

230 Woodlawn Avenue • Aurora, Illinois 60506 • (630) 897-8380 • Fax (630) 897-5696

October 29, 2013

Mr. Kevin Lesko
Illinois Environmental Protection Agency
Bureau of Land #33
Permit Section
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

RE: Response to Illinois EPA Comments Dated June 19, 2013
Class V UIC Permit Application
City of Aurora
0894075971
Permit No. UIC-016-COA
UIC Log No. UIC-147
DEI Project #07002-02

Dear Mr. Lesko:

Deuchler Environmental, Inc. ("DEI"), on behalf of the City of Aurora ("COA"), provides this response to the comments outlined in the Illinois Environmental Protection Agency ("Illinois EPA" or "Agency") letter dated June 19, 2013 regarding the Class V Underground Injection Control ("UIC") Permit Application ("PA") dated February 19, 2013. This response will be formatted citing the items listed in Attachments 1 and 2 of the Agency's letter, citing the specific references given. The responses to the Agency's comments are provided below.

ATTACHMENT 1

1. *Response to Comments Regarding Item 1, Attachment 1, from FORMS 4a, 4c and 4d:*

   a. **4a.IV.C.3 – Fracture pressure at the top of the injection zone**
   b. **4a.IV.C.4 – Effective porosity of the injection zone**
   c. **4a.IV.C.7 – Storage coefficient of the injection zone**
   d. **4a.IV.C.8 – Seepage velocity of the injection zone**

Response:

It was assumed that this information is related to the capacity of the injection zone formation to accept the injected fluid. Since the proposed injection will be occurring into a cavernous, subterranean mine at essentially atmospheric pressure and not within the pore spaces or secondary porosity features of a geologic formation as with a typical

Class I injection well, it was felt that this information wasn't applicable to this Class V UIC PA.

The fracture pressure, the effective porosity, storage coefficient and seepage velocity of the injection zone will have no bearing on the performance of the injection system nor can it be equated to the potential migration of injection fluids upward, into a Underground Source of Drinking Water ("USDW"). At the end of the effective disposal life of the system, Levels 1 and 2 of the mine will be filled with dewatered lime sludge solids, with small amounts of water. Under this scenario, there will be virtually no pressure exerted upward into overlying formations and therefore there is no reasonable scenario under which upper USDW's could be threatened by the injection.

Since the top of the injection zone will be the Galena-Platteville Groups, then the fracture pressure can be assumed to be analogous with the mechanical integrity tests conducted as part of the Feasibility Study for the PA. Compressive strength tests were conducted on core samples obtained from within the Dunleith and Wise Lake Formations of the Galena Group and from the upper portion of the Platteville Group. The summary of the test results is provided in Section 10.7, Page 10-7 of the PA and is also provided in Appendix A in the Agapito Associates, Inc. ("AAI") report (Table 4-1, Page 4-1 and in Appendix C of the AAI report). The mean value for unconfined compressive strength for the core samples is 15,894 psi.

Form 4a.IV.C.3 will be modified to cite the referenced data.

For a typical Class I injection well scenario (the scenario for which the Agency UIC forms were created), injection occurs within pore spaces or secondary porosity features of a geologic formation and therefore the parameters listed in Form 4a.IV.C.4 (effective porosity) and C.7 (storage coefficient) become an important indicator of the geologic formations' ability to accept and hold the injection fluid.

But since the proposed injection in this case will be into a cavernous mine, these characteristics of the injection zone are not applicable to the performance of the proposed injection system. This is due to the fact that these parameters become logarithmically larger than a typical injection scenario, since the capacity of the injection zone to accept the injection fluid is theoretically equivalent to the volume of Levels 1 and 2 of the Conco South Mine. The ability of the mine to accept the injected fluid is infinite, (meaning the "formation", i.e. the mine, can accept the injected fluid as quickly as the lime sludge delivery system and injection wells can place it in the mine) and only becomes limited once the maximum volume of storage space in the mine has been achieved (see Sections 13.3, 13.4 and 14.2 through 14.4 of the PA for a discussion). The capacity and the ability of the mine to accept the injection fluid is more accurately depicted by the discussion of system life calculations that can be found in Section 14 of the PA, rather than the effective porosity and storage coefficient of the geologic

formation in which the mine is located. Therefore, items 4a.IV.C.4 (effective porosity) and C.7 (storage coefficient) will be left as NA as they are not applicable to the performance, safety and regulatory compliance of the proposed injection.

e. **4a.IV.D – Characteristics of the injection zone formation water**
f. **4a.IV.D.1 - Temperature**
g. **4a.IV.D.2 - Pressure**
h. **4a.IV.D.3 - Density**
i. **4a.IV.D.4 - Viscosity**
j. **4a.IV.D.5 – Total Dissolved Solids**
k. **4a.IV.D.6 – Potentiometric Surface**

Response:

While regionally the injection zone formations (the limestone and dolomite of the Galena-Platteville Groups) are capable of producing water, they are not considered to be water bearing units within the Area of Review ("AOR"). As is stated in the PA, the Lafarge Conco mine has two distinct operating units. The first is located north of the I-88 tollway and is identified as the North Mine. The other, is located south of the I-88 tollway and is identified as the South Mine. Both the North and South Mines have two levels stacked on top of one another as is described in Section 11.0 of the PA. All injection activities will occur in the South Mine. The North Mine and the South Mine are connected to each other beneath the tollway by four drifts (tunnels). The first three drifts connect Level 1 of the North Mine to Level 1 of the South Mine. The fourth drift connects Level 1 of the North Mine with Level 2 of the South Mine (is inclined to connect the two levels of the mines). All four of these drifts will be completely sealed off from one another using the bulkheads (called Kennedy Stoppings) described in Sections 4.4 and 11.5 of the PA.

At the North Mine, there is an inclined access tunnel (called the decline) that connects the ground surface to Level 1 of the North Mine. The South Mine has no direct connection from the ground surface to Level 1. Therefore, the South Mine can only be accessed via the decline at the North Mine and then underground through the drifts that connect the North Mine to the South Mine.

Water accumulates in the North Mine into a sedimentation basin located within Level 1 of the mine. This water is generated from the contact between the base of the Silurian Dolomite formations (namely, the Wilhelmi and Elwood dolomite Formations) and the top of the Maquoketa Group (namely the Brainard shale Formation). Water is held primarily within the fractures and secondary porosity features of the Silurian Dolomites, with the Brainard Shale acting as an aquitard). Since the decline cuts through this geologic contact, water that is held here, stratigraphically above Level 1 of the North Mine, travels down the decline and into the sedimentation basin in Level 1 of the North Mine. The water is fully contained

within this sedimentation basin and is pumped to the surface for eventual discharge via Lafarge's National Pollutant Discharge Elimination System ("NPDES") permit.

None of this water travels to the South Mine and no water accumulates within the South Mine itself. It is categorized as a dry mine and no water pumping is conducted from either Levels 1 or 2 of the South Mine. This indicates two things. First, none of the water that is held in the aquifer unit at the base of the Silurian Dolomite formations enters into the South Mine. This is a clear indication that the Maquoketa Group Shales (the Brainard and Scales Formations) and the upper portions of the Galena-Platteville Groups are aquitards to the overlying Silurian Dolomite aquifer. Second, the Galena and Platteville Groups themselves do not bear water and are not aquifer units within the mine or within the AOR.

Since the Galena and Platteville Groups (which comprise the injection zone) have been demonstrated to not be aquifer units within the AOR associated with the PA, information regarding the injection zone formation water were marked NA on Form 4a (4a.IV.D through 4a.IV.D.6).

The following table represents the geology and ground water systems within the AOR for this permit application:

Table 1 – Summary of Hydrostratigraphic Units in AOR

Hydrostratigraphic Unit	Age	Unit Name	Rock Types	Type of Unit	Position Relative to Lime Sludge Placement
Prairie Aquigroup	Quaternary	Quaternary Sediments	Glacial Sediment	Aquifer	Above
Upper Bedrock Aquigroup	Silurian	Wilhelmi Formation	Dolomite	Aquifer	Above
Midwest Bedrock Aquigroup	Ordovician	Maquoketa Group	Primarily Shale, with some limestone	Confining	Above
	Ordovician	Galena Group	Limestone and Dolomite	Confining where Maquoketa Present; locally productive ground water unit	Partially above and within Injection Zone
	Ordovician	Platteville Group	Dolomite	Confining where Maquoketa Present; locally productive ground water unit	Partially within and below Injection Zone
	Ordovician	Ancell Group (St. Peter Formation since Glenwood Fm is thin or absent)	Sandstone	Aquifer	Below
	Ordovician and Cambrian	Knox Megagroup (Prairie du Chien, Eminence-Potosi and Franconia Formations)	Predominantly Dolomite with some Sandstone and Shale	Confining	Below
	Cambrian	Ironton-Galesville Formation	Sandstone	Aquifer	Below
	Cambrian	Eau Claire	Shale and Dolomite	Confining	Below
Basal Bedrock Aquigroup	Cambrian	Mt. Simon	Sandstone	Aquifer	Below
	Precambrian	Basement Rock	Granite	Confining	Below

According to Visocky et al. 1985, the Galena-Platteville Groups, while capable of producing water are not considered to water-bearing units in the areas of northeastern Illinois where these Groups are overlain by the Maquoketa Group shales, as is the case in the AOR for this PA. Furthermore, Bauer and Gross 1996 states that the Galena-Platteville Groups at Fermilab near Batavia, Illinois (approximately 4 miles northeast of the site) were chosen as a potential site for the Superconducting Super Collider ("SSC") because they are "non-aquifer units" and would greatly reduce potential ground water inflow into the subterranean tunnels.

Regionally, the Galena and Platteville Groups can, however, act as aquifer units. In a hydrogeological study associated with the SSC project by Visocky and Schulmeister 1988, a total of only 7 out of the 386 domestic water wells within the 36

township study area (in Kane County and in portions of Cook, De Kalb, Du Page, Kendall and Will Counties) were identified as being exclusively screened in the Galena-Platteville Units. These water wells were used to collect ground water elevation and ground water chemistry data and their locations are depicted on Figure 1 below:

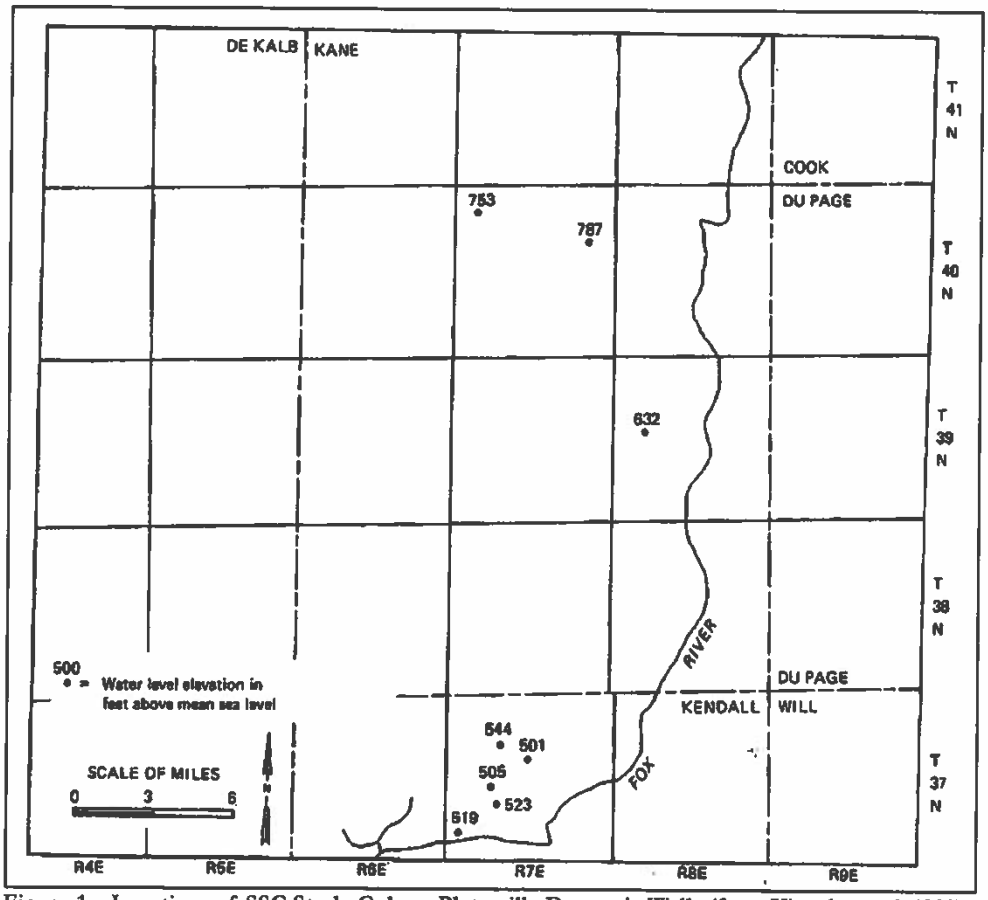

Figure 1 – Locations of SSC Study Galena-Platteville Domestic Wells (from Visocky et al. 1988)

In addition to the domestic wells, a total of 26 single piezometers and 9 nested piezometers were installed by the Illinois State Geological Survey ("ISGS") as part of this study. All of the piezometers were screen in the Maquoketa, Galena and/or Platteville Groups. The locations of these piezometers are provided on Figure 2 below:

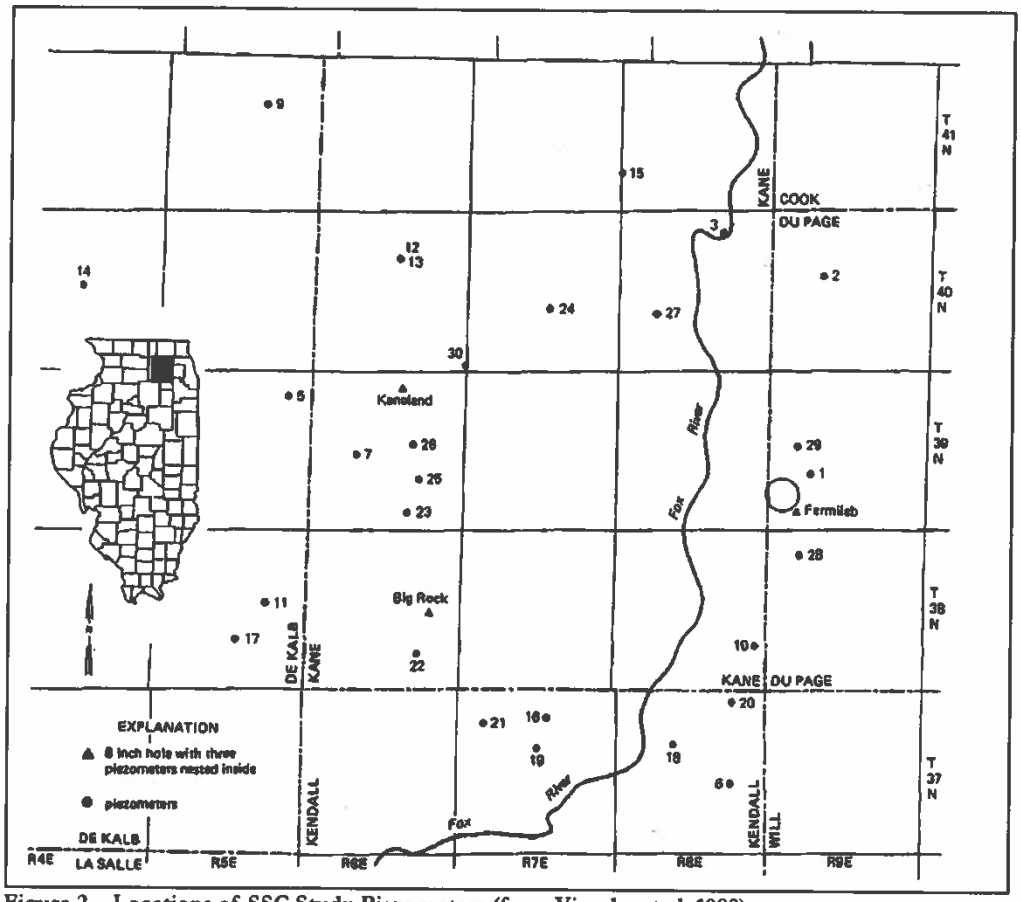

Figure 2 – Locations of SSC Study Piezometers (from Visocky et al. 1988)

Based upon water level measurements from the piezometers and domestic wells, the following potentiometric surface was interpreted:

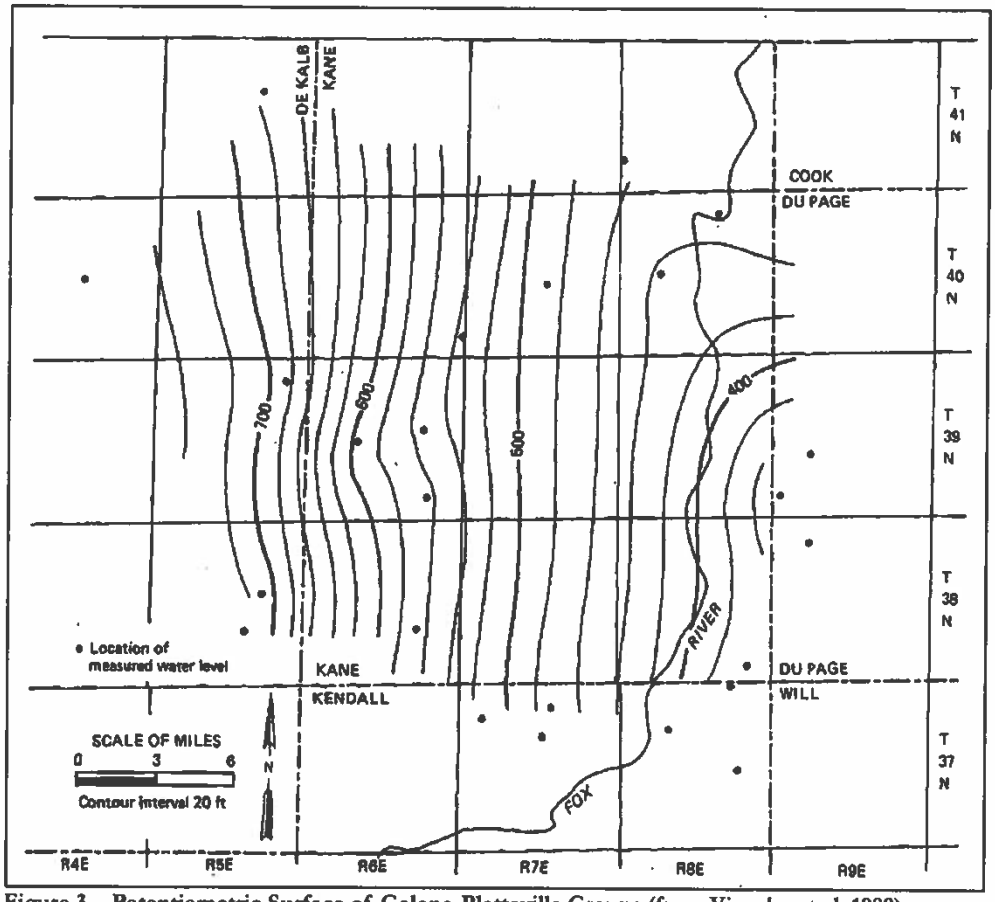

Figure 3 – Potentiometric Surface of Galena-Platteville Groups (from Visocky et al. 1988)

Ground water samples were obtained to test the ground water chemistry for major ions (iron, calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and total dissolved minerals (solids). The results of these analyses are depicted on Table 2 below:

Table 2 - Ground Water Analysis Results SSC Study (after Visocky et al 1988)

Sample	Well depth (ft)	Aquifer	Concentrations* Fe	Ca	Mg	Na+ K	Cl	SO4	Alk. (CaCO3)	Total diss. min.
A	216	Sil/Maq	0.61	2.52	2.50	1.85	0.23	1.04	5.76	381
B	305	Sil/Maq	0.37	3.09	2.63	0.99	0.14	0.83	6.08	373
C	282	Maq/Gal	0.05	2.64	2.06	4.03	0.99	1.87	5.60	486
D	200	Maq/Gal	6.77	4.49	3.70	0.27	0.23	2.08	6.56	487
E	305	Maq/Gal	0.55	3.14	2.79	0.99	0.23	<0.21	7.06	363
F	930	Gal/Anc	0.03	2.79	2.16	1.01	0.03	<0.28	6.08	318
G	420	Galena	0.02	2.49	1.70	1.98	0.25	0.21	5.76	336
H	600	Maq/Gal	0.01	1.56	1.24	4.61	0.31	1.04	6.16	414
I	440	Maq/Gal	0.31	2.39	3.21	0.75	0.03	<0.21	6.48	331
J	530	Galena	0.70	2.03	1.77	2.52	0.17	<0.21	6.24	343
K	946	Ancell	0.12	2.59	2.24	0.91	0.06	0.06	6.10	311

*All in meq/L except for iron and total dissolved minerals (mg/L)

Another study by Benson 1990 evaluated water well construction techniques in Campton Township in Kane County (approximately 12 miles northwest of the site) where residents have historically had difficulties obtaining sufficient ground water from domestic wells screened in the Galena-Platteville Groups. Two wells were constructed as part of this study: A large diameter bored well in the shallow glacial drift and a telescoped drilled borehole varying from 15-inches in diameter to 6 inches in diameter (which is the focus of this discussion).

The borehole was cased with 10-inch casing to a depth of 217 feet below ground surface ("bgs"), a 6-inch casing from 217 to 334 feet bgs. From 334 feet to 635 feet (the boring terminus) the borehole was left uncased so as to allow ground water for seep into the well. Therefore, the well was open to most of the thickness of the Galena-Platteville Groups at the study location.

A pump test was conducted and the chemistry of the ground water was tested in this well. The pump test was conducted at 10 gpm for a total of 300 minutes with a projected drawdown of 175 feet. The specific capacity was therefore calculated to be 0.057 gpm per foot. The maximum long-term yield was therefore calculated to be 14.25 gpm based upon an available drawdown of 250 feet. The long-term specific capacity was calculated to be 2.2×10^{-4} gpm/foot/foot. The author theorized based upon the results of the pump test that the well produces water "only from excessive depth, which acts as a storage sump where the water is stored and slowly replaced."

The following ground water chemistry was obtained from an analysis of the sample obtained from this well:

- Water temperature (during pump test) = 54°F;
- Total iron < 0.06 mg/L;
- Manganese < 0.02 mg/L;
- Calcium = 55.2 mg/L;
- Fluoride = 0.7 mg/L;
- Nitrate, as NO_3 = 0.1 mg/L;
- Chloride = 4.1 mg/L;
- Alkalinity = 297 mg/L;
- Hardness = 236 mg/L;
- TDS = 327 mg/L
- Turbidity = 5 NTU;
- pH = 8.1;

Information regarding Form 4a.VI.D.2 (pressure), D.3 (density) and D.4 (viscosity) could not be found in the references reviewed for the preparation of the PA and for this response to comments. For the reasons stated earlier, the injection zone in the AOR is not a water bearing unit and the values for these parameters will have no bearing on the success, safety or regulatory compliance of the proposed injection.

Form 4a.IV.D.1, D.5 and D.6 will be modified and appropriate Sections will be added to the PA to include this information.

l. 4a.IV.E – Additional or Alternative zones considered for injection

Response:

As it has always been the intent to inject the lime sludge into the subterranean mine, and the location and dimensions of the mine are fixed, no other zones were considered for injection as part of this Class V UIC PA.

m. 4a.V.C.2 – Fracture pressure of the upper confining zone
n. 4a.V.C.3 – Intrinsic permeability of the upper confining zone
o. 4a.V.C.4 – Hydraulic conductivity of the upper confining zone
p. 4a.V.C.5 – Alternative confining zones proposed
q. 4a.VI.C.3 – Intrinsic Permeability of the lower confining zone
r. 4a.VI.C.5 – Alternative confining zones proposed

Response:

The proposed injection will occur within the middle of the Galena-Platteville Groups. The injection is proposed to begin on Level 2 of the South Mine, and once Level 2 has reached its capacity, Level 1 will be filled. A survey of the mine was conducted by HLR (see Appendix R of the PA) whereby the floor and ceiling elevations of Levels 1 and 2 were determined. These elevations were correlated to the detailed boring log as depicted on Figure 11.2, page 11-6 of the PA to properly identify the portions of the Galena-Platteville Groups that will be receiving the injected lime sludge. The critical elevations and their data source are as follows (all in feet above mean seal level):

- Top of Galena Group (surveyed ground elevation and measured depth from detailed boring log): 463 feet
- Level 1 ceiling elevation (HLR survey): 430 feet
- Level 2 floor elevation (HLR survey): 300 feet
- Bottom of Platteville Group (surveyed ground elevation and measured depth from detailed boring log): 130 feet

Based upon this data, the sludge will be injected into an approximate 105 foot vertical portion (430 feet – 300 feet – 25 foot sill between Levels 1 and 2) of the Galena-Platteville Groups. There is approximately 33 feet of Galena-Platteville Group rock above the top of the injection zone and 170 feet of Galena-Platteville Group rock below the bottom of the injection zone. Therefore, it is contended, that the Galena-Platteville group represents not only the injection zone, but the upper and lower confining units as well.

Therefore, the fracture pressure of the upper confining zone is equivalent to the mechanical integrity tests conducted as part of the Feasibility Study for the PA as described earlier in this response. The summary of the test results are provided in Section 10.7, Page 10-7 of the PA and are also provided in Appendix A in the AAI report (Table 4-1, Page 4-1 and in Appendix C of the AAI report). The mean value for unconfined compressive strength for the core samples is 15,894 psi. Form 4a.V.C.2 will be modified to reference these data.

The intrinsic or matrix permeability of the limestone and dolomite of the Galena-Platteville Groups is very low as is stated on page 2-2 of the AAI report. Permeability characteristics of these rocks comes almost entirely from secondary porosity features such as vugs, voids, partings, fractures and joints. Table 5-3 on page 5-6 of the AAI report lists hydraulic conductivity values reported in literature.

Sections 10.8 and 10.9 of the PA summarize the characteristics of permeability and hydraulic conductivity used in the numerical hydromechanical model conducted as

part of the feasibility evaluation conducted by AAI for this PA. Form 4a.V.C.3 and C.4 and Form VI.C.3 will be modified to include the reference to this information.

Regarding Form 4a.V.C.5 and VI.C.5: As it has always been the intent to inject the lime sludge into the subterranean mine, and the location and dimensions of the mine are fixed, no other zones were considered for injection as part of this Class V UIC PA.

s. 4a.VII.A.2 - Potentiometric surface of overlying sources of drinking water
t. 4a.VII.A.3 - Total Dissolved Solids of overlying sources of drinking water
u. 4a.VII.A.6 - Specific gravity of overlying sources of drinking water

Response:

The items above were marked NA on the PA form because the proposed injection and lime sludge storage will be conducted under essentially atmospheric pressure. Because of this fact, there is no possibility for the injection fluid to migrate upward to overlying USDW's.

As is discussed in Section 6.2 on page 6-3 of the PA, there are two principal hydrostratigraphic units that overlie the injection zone. They are the Prairie Aquigroup and the Upper Bedrock Aquigroup. The Prairie Aquigroup is comprised primarily of glacial sediments (sand, gravel, silt and clay) within the water-bearing zone, with the Silurian System dolomite bedrock acting as the basal confining unit. Within the AOR, there is no water production from the Prairie Aquigroup, so this discussion will focus on the Upper Bedrock Aquigroup.

According to Visocky et al. 1985, the most significant and productive aquifer in this aquigroup is the Silurian Dolomite aquifer, with the shales of the Maquoketa Group acting as the basal confining unit. Due to the presence of the Maquoketa, this aquigroup is not connected to the Galena-Platteville Groups or to the Midwest Bedrock Aquigroup.

Water occurrence typically occurs within pore space, partings, bedding planes, vugs and fractures and, as a result, water production and well yields can vary significantly across the region. The thickness of the Silurian Dolomites is approximately 50 feet, as logged from the on-site deep monitoring well. According to Sasman et al. 1981, in Du Page County, in areas where the Silurian Dolomite is between 50 and 100 feet thick, wells can yield hundreds of gallons per minute.

Visocky et al. 1985 cites 6 aquifer tests that were conducted in Du Page County between 1955 and 1980 with transmissivity values ranging from 7.3 gpm/foot to 59 gpm/foot and storage coefficient values ranging from 9.0×10^{-5} to 3.5×10^{-4}. Zeizel et

al. 1962 cites similar values based upon pump tests conducted by the Illinois State Water Survey ("ISWS") and the United States Geological Survey ("USGS"). Additionally, they state that in western Du Page County where the thickness of the Silurian dolomite is 50 feet or less, transmissivity values less than 20 gpm/ft should be expected. In this study it is also stated that under site conditions similar to those that exist within the AOR for this PA, a maximum potential yield of less than 250 gpm should be expected.

As part of the Kane County Water Resource Investigation conducted by the ISWS, Locke et al. 2007 evaluated water level data across the county from the Silurian Dolomite aquifer. The potentiometric map of the shallow Silurian Dolomite aquifer is presented in Figure 4 below:

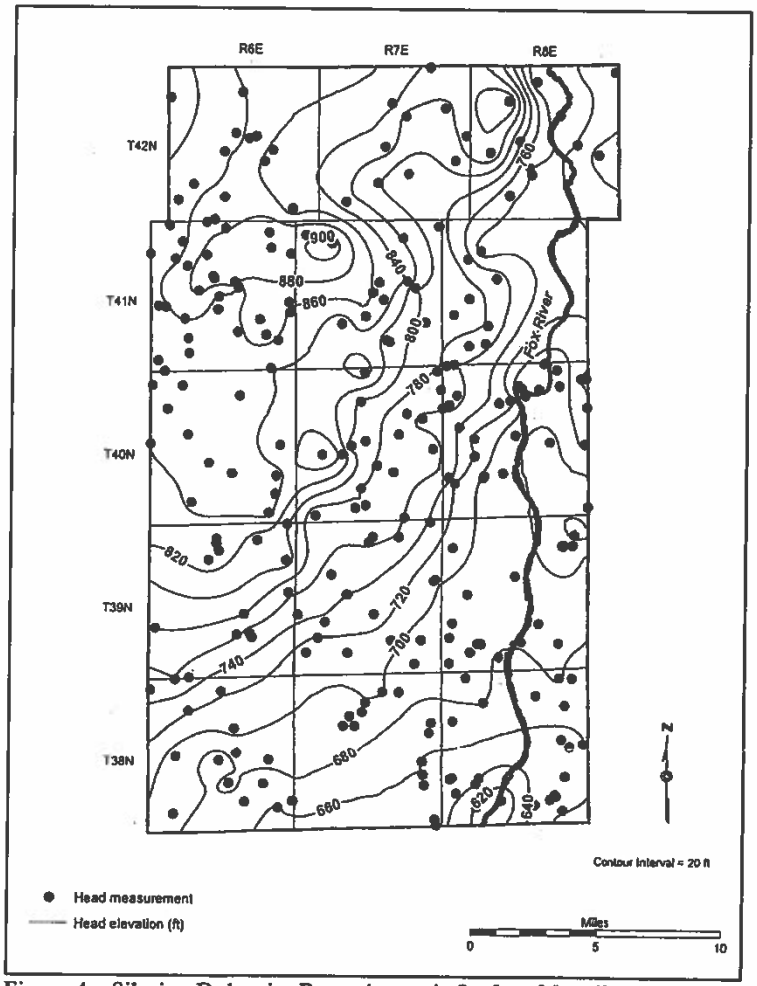

Figure 4 – Silurian Dolomite Potentiometric Surface Map (from Locke et al. 2007)

Additionally, as part of the Kane County Water Resource Investigation (Kelly 2005) a total of 75 shallow water wells were sampled to provide information regarding the ground water quality in shallow aquifers across the county. The wells sampled were a combination of bedrock wells and wells constructed in unconsolidated glacial sediments and all were less than 250 feet deep. The bedrock wells correlate to the Silurian Dolomite aquifer (the Upper Bedrock Aquigroup) and the shallow wells correlate to the Prairie Aquigroup.

The results of the sampling, which was conducted in October 2003, are summarized below. This list represents the median values for each parameter from the Silurian Dolomite aquifer wells (results in mg/L unless otherwise indicated):

- Temperature = 53°F
- pH = 6.95
- Oxidation-reduction potential (mv) = 135
- Specific conductance (uS/cm) = 663
- Dissolved oxygen = 0.53
- Arsenic (ug/L) = 2.07
- Boron = 0.119
- Barium = 0.074
- Calcium = 76.2
- Iron = 1.13
- Magnesium = 41.0
- Manganese = 0.017
- Sodium = 26.9
- Silicon = 7.96
- Strontium = 0.690
- Alkalinity = 335
- Fluoride = 0.455
- Chloride = 5.79
- Sulfate = 16.3
- TOC = 1.20
- Nitrate as N = 0.536
- TDS concentrations were calculated from specific conductance data and ranged from 250 to 1000 mg/L

Information regarding Form 4a.VII.A.6 (specific gravity) could not be found in the references reviewed for the preparation of the PA and for this response to comments. For the reasons stated earlier, the proposed injection and lime sludge storage will occur under atmospheric conditions, with no upward pressure exerted on overlying formations. Therefore, the value for this parameter will have no bearing on the success, safety or regulatory compliance of the proposed injection.

Form 4a.IV.D.1, D.5 and D.6 will be modified and appropriate Sections will be added to the PA to include this information.

v. 4a.VIII – Minerals and Hydrocarbons
w. 4a.VIII.A – Mineral or natural resources beneath or within 5 miles of site

Response:

There is no hydrocarbon production within 5 miles of the site. However, in Kane County significant quantities of mineral aggregates are produced. The principal aggregate types produced are sand and gravel from Quaternary glacial deposits and limestone and dolomite surface quarrying (Silurian System) and subsurface mines (Galena-Platteville Groups).

x. 4c.I.B.10 – Number of injection zone monitoring wells

Response:

This item was marked NA on form 4c because the permit will be an area injection permit as there are anticipated to be 4 different injection wells used for the project over its life. Additionally, item I.A.6, which was inadvertently marked NA on the form indicating the number of injection wells that will be used for the project. The number of injection wells is referenced in at least 6 different places in the PA. This item on the form will be modified to reference Section 12.3 and Figure 4.6 on page 4-9 of the PA.

The project includes one monitoring well located at the northwest corner of the site, as is discussed in Section 7.0 and as depicted on Figure 4.6, page 4-9 of the PA. Item 4c.I.B.10 will be modified with these references. Since the injection fluid contains no natural or man-made contaminants, and the fluid itself meets both the Ground Water Quality Standards and the Drinking Water Standards, no additional monitoring wells are necessary.

As described in Section 9.0 of the PA, the injection fluid has been fully characterized through laboratory sampling of the solids and supernatant. Furthermore, as described in Section 16.0, the injection fluid influent, extraction system effluent and the on-site ground water will be sampled for the routine parameters listed in Section 16.4 of the PA at a frequency required by the Illinois EPA Permit, once it is issued by the Agency. Historically, the chemistry of the injection fluid has been very constant over time and since the lime powder, the blended raw water quality and the water treatment process are anticipated to remain the same over the life of the injection system, this consistency of the chemistry of the injection fluid is anticipated to continue into the future. Additionally, the proposed injection system is completely

self-contained, and there are no points through which outside contamination could be introduced into the system.

y. 4d.V.C – Plugging affidavits for all plugged wells.

Response:

As stated in Section 2.5.2, page 2-7 of the PA, no abandoned or plugged wells were identified within the AOR. The form will be modified to include this citation.

z. 4d.V.D – Proposed Corrective Action for unplugged wells penetrating the injection zone.

Response:

No unplugged wells screened in the injection zone were identified within the AOR, therefore, a corrective action plan was deemed to be unnecessary. The on-site monitoring well is approximately 60 feet from any mined areas, and since the well is properly sealed from the ground surface to its terminus, there will be no potential impact from the well to drinking water sources above or below the zone of injection. Furthermore, since the physical limits of the mine act as the zone of injection and since the packer testing conducted and the results of the hydrogeologic modeling conducted by AAI both indicate that very little, if any, of the fluid injected into the mine will migrate laterally, no corrective action plan is needed for this project.

2. *Response to Comments Regarding Item 2, Attachment 1, from FORMS 4b, 4e, 4f and 4g*

a. 4b.VII.B.2 and 4 - Conductive casing should be marked N/A as it should be identified as the long string casing.

Response:

The form will be corrected as indicated. The following discussion is to provide clarification regarding the use of terms to describe well casing between the PA and the regulations and UIC forms.

There will be three casings for each of the four injection wells and for the extraction well: a surface casing, an outer casing and an inner casing. Surface casing will be installed in each of the wells to a depth of 5 feet or to the top of the Silurian bedrock, whichever is less. The surface casing will be 12-inch diameter steel and the purpose of installation is to simply keep the unconsolidated sediment from sloughing into the hole. The outer casing will be 8-inch diameter and is necessary to provide stability to the injection/extraction wells and to provide a platform to hold the annular seal in place against the rock shoulder since the main injection string will be placed into the

cavernous mine. The annular space between the outer casing and the native rock formations is the primary mechanism that will be used to seal the well from downward migration of water. The inner casing will be 6-inch diameter and is the casing that the will actually provide injection from the COA Water Treatment Plant ("WTP") to the mine.

In order to avoid confusion with the use of terminology, the following correlations will be made:

- PA "surface casing" will be changed to "protective casing"
- PA "outer casing" will be changed to "long string casing"
- PA "inner casing" will be changed to "injection tubing" or "injection string"

The UIC forms will be modified to be reflective of these changes and appropriate references will be indicated.

b. 4b.VII.C - Information regarding the injection tubing.

Response:

The requested information regarding the injection tubing is included below in the response to Items 4 through 6 in Attachment 2.

c. 4b.VII.D – Information regarding cement.

Response:

The requested information regarding the annular materials is included below in the response to Item 7 in Attachment 2.

d. 4b.VIII - Information on the drilling company should be provided when known.

Response:

Agreed. The drilling company information will be forwarded to the Illinois EPA once the bid(s) have been awarded by the City.

e. **4e.II.A.1 - Provide justification for not monitoring injection pressure.**
Response:

A discussion of the monitoring of the system injection pressure is discussed below in the response to Item 12 in Attachment 2.

f. 4e.III - Provide justification for not providing a Mechanical Integrity Testing ("MIT") program.

Response:

A discussion of the MIT program is discussed below in the response to Item 13 in Attachment 2.

g. 4f.V - Provide justification for not evaluating the compatibility of the injection fluid and the components of injection system.

Response:

A discussion regarding the compatibility of the system components is discussed below in the response to Item 14 in Attachment 2.

h. 4g.I.A - Provide justification for not including a plan for abandonment during construction.

Response:

A discussion of the injection/extraction well abandonment plan during construction is discussed below in the response to Item 16 in Attachment 2.

i. 4g.I.E - Provide justification for not including a cost estimate for plugging and abandonment.

Response:

A discussion of the system closure plan and cost estimate is discussed below in the response to Item 17 and 18 in Attachment 2.

3. *Response to Comments Regarding Attachment 2*

a. FORM 1, Section II. D - This item marked yes indicating that the facility will discharge to waters of the State. Section 12.6.4, page 12-21, of the application indicates that the supernatant extraction system will discharge to the Fox Metro Water Reclamation District ("FMWRD") sanitary sewer system. This item should be marked yes if the facility will directly discharge wastewater to surface waters of the State under the NPDES program. This item should not be checked yes for stormwater runoff from the facility.

Response:

Since the proposed extraction system will be discharging directly to the FMWRD sanitary sewer, the form will be modified as indicated above.

b. **FORM 4b, Section VII - The proposed design of the injection well does not appear to include installation of centralizers on the injection string. This will allow the injection string to move freely within the cased borehole as the string is only connected at the floor of the injection well manhole and the ceiling of Level I of the mine. Unrestrained movement of the injection string due to the dynamic nature of the lime sludge injection would seem to be detrimental to the integrity of the injection well casing and injection string. The steel tabs installed to facilitate installation of the injection string will result in a relatively small contact point load on the well casing that, over long periods of operation, could result in substantial wear on the casing even with minimal movement of the injection string. Provide additional information to address this concern.**

Response:

While forces will be generated on the injection string during times of injection, the injection string itself will remain relatively stable throughout the operating life of the injection system. The injection string will be connected to and stabilized at the following points:

- To the forcemain via megacouplings (see Figure 12.5 on page 12-12 of the PA);
- Welded to a steel plate where the injection string pipe protrudes above the ground surface (see Section 12.3.2, page 12-9 of the PA) which will be buried under a concrete pad;
- A steel plate which will be bolted to the ceiling of Level 1 of the mine and welded around the injection string pipe as it protrudes into the mine; and
- At the base of the injection string pipe to the energy dissipater/long radius bend. The energy dissipater/long radius bend will be anchored to the floor of Level 1 of the mine so as to absorb the force generated as the lime sludge drops within the injection string.

The force at the top of the injection string where it is connected to the forcemain will be based upon the velocity that the lime sludge is traveling within the forcemain. Based upon the current preliminary design, the velocity of the lime sludge in the forcemain will be 4.64 feet/second at the design flow rate of 800 gpm.

This will create a force of 0.14 psi, which will have no impact on the stability of the connection of the injection string to the forcemain or on the injection string itself.

Based upon data supplied by the pipe manufacturer, the long string casing (8-inch) and the injection string casing (6-inch) will have the following strengths:

- Tensile Strength: 60,000 psi minimum for both strings
- Yield: 35,000 psi minimum for both strings
- Burst Pressure: 17,080 psi for the injection string and 15,070 for the long string

Recall, the lime sludge will be pumped from the wet well at the WTP when blowdowns occur. As per Section 3.2 of the PA, blanket blowdowns on average occur once every 3 hours (6 to 8 times in a 24-hour period) and grit blowdowns occur twice in a 24-hour period. Therefore, the flow of lime sludge from the wet well to the injection well will be intermittent. Once the lime sludge enters into the injection string from the forcemain, it will drop by gravity into the mine. As the lime sludge reaches the connection, the pressure will increase and as the "slug" of lime sludge passes from the forcemain to the injection string. As the end of the slug passes, a vacuum will be created in the pipe. Each injection well will have an air/vacuum release valve installed at the well-head. This will allow air to either be released as the lime sludge approaches the injection well or be allowed to enter the pipe as the last of the lime sludge from a particular blowdown passes into the mine. Due to this, there will be very little if any force exerted on the injection string pipe as the lime sludge is delivered into the mine.

Much greater force will be generated once the lime sludge reaches the floor of Level 1 of the mine. Calculations conducted by the energy dissipater manufacturer estimate that at the floor of Level 1 of the mine approximately 9,000 pounds of force will be generated. The energy dissipater will be able to absorb and release most of the energy created by this force. When going to final design of the project, the design may or may not incorporate the large radius pipe at the floor of the mine. If this pipe is used, energy will be further dissipated so that the lime sludge can be conveyed by gravity to the injection points within the mine.

The large radius bend, if incorporated into the final design, will be constructed of schedule 80 carbon steel and the lateral distribution pipes will be constructed of schedule 40 carbon steel. The entire assembly will be secured and anchored so that all of the forces can be dissipated and absorbed at the bottom of the mine. Due to the vectors of force that will be generated, and due to the energy dissipating features of the design, very little, if any force will be translated upward into the injection string to cause the phenomena described in this comment.

Once in the final design phase of the project, if concerns arise regarding potential movement of the injection string, the annulus between the injection string casing and the long string casing will be grouted, potentially with an air foam type grout (Please see **Attachment 1** to this correspondence for typical specifications for this type of grout).

c. **FORM 4b, Section VII.B - The well casing is an 8 inch schedule 40 galvanized or carbon steel pipe with an exterior coal tar epoxy coating. This should be identified as the long string casing for the well rather than the surface casing.**

Response:

Agreed. Please see comment above.

d. **FORM 4b, Section VII.C - The injection string is to be constructed of six inch galvanized steel pipe with threaded connections utilizing o-rings seals. After sections of pipe are threaded together they will be bead welded. Several concerns are raised by the welding of the pipe joints:**

   i. **What effect does the heat generated during welding of the pipe joints have on the o-rings?**
   ii. **What are the procedures welding of the galvanized piping? What effect does this have on the corrosion resistance of the piping joints?**

Response:

Upon consideration of this comment, the injection string pipe will not include o-rings. The pipe will be completely water-tight with the threads and welding that is proposed.

In consideration of the difficulties of welding galvanized pipe, it is proposed that the injection string will be constructed of schedule 40 carbon steel pipe. Therefore, no impact on the corrosion resistance of the injection string is anticipated due to welding.

e. **FORM 4b, Section VII.C - The item 1, Maximum allowable suspended weight based on joint strength of injection tubing, and item 2, weight of injection tubing string (axial load) in air, are marked N/A. This basic information should be provided in the application.**

Response:

As stated in the response to Item 3.b above, the strengths of the long string casing and the injection string casing are as follows:

- Tensile Strength: 60,000 psi minimum for both strings
- Yield: 35,000 psi minimum for both strings
- Burst Pressure: 17,080 psi for the injection string and 15,070 for the long string

Additionally, the weight of the pipe is as follows:

- 6-inch injection string pipe: 19 pounds per foot
- 8-inch long string pipe: 28.5 pounds per foot

Based upon a maximum injection string length of 300 feet (the depth to the top of ceiling of Level 1 of the mine is about 240 feet bgs) the axial injection string load in air will be approximately 5,700 pounds. The nominal wall thickness for schedule 40 steel pipe is 0.28-inches. Therefore, the joint force of the entire 300 foot string across the cross-sectional area of the pipe results in the following:

- Wall thickness = 0.28 inches
- ID = 5.44 inches
- OD = 6.0 inches
- Cross sectional area of steel pipe material = 5.02 square inches
- Force exerted on the pipe at joints = 5,700 pounds/5.02 in^2 = 1,133 psi for entire injection string

Therefore, at the top of the injection string where the highest weight and stress will occur at the uppermost pipe joint, the force exerted on that joint will be 1,133 psi. The threaded and welded joints will have a tensile strength equal to or greater than the tensile strength of the pipe. This is because during the welding process, the steel that comprises pipe is melted and incorporated into the welded material that will be holding the pipe sections together. The maximum allowable stress, which is 33% of the tensile strength of the pipe, is approximately 20,000 psi. Therefore, the maximum allowable joint stress of 20,000 psi is approximately 17.5 times greater than the maximum force of 1,133 psi that will be exerted at the upper-most pipe joint based upon the total suspended weight of the injection string.

Using the 20,000 psi maximum allowable joint stress and the total cross sectional area of the pipe of 5 in^2, the maximum allowable suspended weight of the string is approximately 100,000 pounds.

Although the pipe and the welded connections would be water tight and strong enough to be used in the design without threading, threading was incorporated into the design as a factor of safety and to provide structural stability to the pipe sections.

Additionally, the drill rig that is proposed to be used in this project must have a hold back rating that is higher than the maximum axial load of the injection string pipe. For instance, an air rotary Drill Tech T40 drill rig has a rated hold back of 26,500 pounds. Therefore, the drill rig itself can suspend the entire maximum axial load of the injection string with a comfortable factor of safety. Considering this fact, and considering the fact that the pipe sections will be threaded and welded together, the drill rig would be able to hold the entire string in place without the use of the welded steel tabs. Upon conversations with drilling contractors, it is preferable from an efficiency and safety stand point to construct the injection string pipe sections using the welded steel tabs and the notched steel plate as is currently described in the PA.

f. **FORM 4b, Section VII.C - Page 12-7 of the application describes the installation of steel tabs a few inches down from the shoulder of the injection string pipe to facilitate installation of the injection string. As the weight of the injection string increases these tabs may result in the deformation of the end of the injection string. Will this deformation hinder the connection of the piping? How does the welding of the steel tabs affect the corrosion resistance of the pipe?**

Response:

Discussions with the drilling contractor that installed the on-site deep monitoring well for this project has stated that they strongly feel this will not be an issue. As discussed in the response 3.e above, the tensile strength, the yield and the burst pressure rating are all several times higher than the maximum load of the entire 300 foot injection string. Based upon this evaluation, there should be no deformation at the end of the injection string.

g. **FORM 4b, Section VII.D - All items of this section are marked N/A. According to the description on page 12-7 of the application, the 8-inch diameter pipe (long string casing) will be grouted using bentonite or neat cement from depth to 5 feet below manhole floor followed by 3 feet of**

bentonite and 2 feet of cement. At a minimum the application should include the specification of the material that may be used to cement the long string casing and the method of placement.

Response:

Although the PA specified the use of a bentonite slurry grout and bentonite clay well seal, the final design may call for the use of a Portland cement grout in this application. Discussing the issue with the drilling contractor, a Portland cement grout will set faster and would be easier to apply.

If a Portland cement grout is used, the specifications will comply with ASTM International ("ASTM") standard C150/C150M-12.

If a bentonite grout and bentonite clay seal are used, then it will be similar in specification to the grout and seal used for the on-site deep monitoring well. The specification sheets are included in **Attachment 2** of this correspondence. The materials will be as listed below (or similar):

- CETCO Puregold® High Solids Grout; and
- CETCO 3/8 inch coated bentonite tablets.

Please refer to Section 7.2 of the PA for the method of annular material placement as these procedures are anticipated to be used in the construction of the injection and extraction wells for this project.

h. **FORM 4b, Section VIII- Information on the well drilling company is marked N/A. This information should be provided when it becomes available.**

Response:

Agreed. The drilling company information will be forwarded to the Illinois EPA once the bid(s) have been awarded by the City.

i. **FORM 4c, Section I.A.6 - The name and location of injection wells is marked N/A, however, the name and location of the proposed wells is identified on page 4.9 of the application.**

Response:

The proper references will be incorporated into the Form to be reflective of this comment. The number and locations of the injection wells is depicted on Figure 4.6 on page 4-9 of the PA and described in Section 12.3. These references will be incorporated into the amended form.

j. **FORM 4c, Section II.C- The location of the PID is identified as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of a PID for the system should be identified. The PID should identify the control systems for the operation of the well system.**

Response:

A PID has been prepared in response to this comment and will be incorporated into the Memorandum of Design ("MOD") as requested. A copy of the PID is included in **Attachment 3** of this correspondence.

k. **FORM 4c, Section II.D -The location of each item in this section is indicated as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of the information required for each item should be identified.**

Response:

In actuality, the original forms in the PA had each of these items as marked NA. Filters will not be used as part of the delivery and injections systems and thus this section was marked NA. The blowdown from the claricones will enter into a coarse screen chamber by gravity. The coarse screen will have a 1-inch spacing to block any large deposits of lime scale from entering the wet well that could potentially damage the pumps. As the system is completely self-contained, foreign objects cannot enter into the wet well. A bypass has been incorporated into the design so that if the bar screen becomes completely blocked, the flow will enter the wet well prior to screening. This information is included in the MOD, Section C.2 on page 19. Form 4c.II.D will be modified to include this reference.

l. **FORM 4e, Section II - Item I, Injection pressure gauges is marked N/A. How will the injection pressure of the system be monitored? What is the maximum allowable pressure for the various system components? How will problems with the injection system be identified if the injection pressure is not monitored?**

Response:

This information is included in Section C.3, page 23 and in Exhibit A-3, Sheet 3 of the MOD. The highest pressure in the entire lime sludge delivery and injection system will occur at the pumps at the WTP. Once the lime sludge is delivered to the injection well via the forcemain, the entire system operates under the force of gravity. The forces within the injection tubing will be nominal. Pressure gages will be installed at the WTP to monitor the pressure as the sludge is pumped from the wet well into the forcemain as described in the MOD. Any issues with the pressure of the system will manifest itself at the WTP and any problems can be quickly corrected. Due to this, monitoring of the pressure at the injection wells is not needed. As was stated earlier, each injection well will incorporate an air/vacuum release valve that will equalize the pressure in the injection string as the lime sludge enters the injection well from the forcemain (increased pressure is released to the atmosphere through the valve) and as it passes down the injection string and into the mine (vacuum is created in the pipe as this occurs, and the pressure is equalized by allowing air to enter the injection string from the atmosphere). The pressure in the injection string will be so small, that there is no need to monitor the pressure at this point in the system.

m. FORM 4e, Section III- This Item is marked N/A. The applicant should propose a program for Mechanical Integrity Testing (MIT) of the wells. An MIT program should take into account:

- **i. The physical characteristics of the lime sludge, including the probability that it is more abrasive than a filtered liquid typically seen in injection well systems;**
- **ii. The compatibility of the high pH lime sludge with galvanized steel injection string;**
- **iii. The injection wells do not have sealed annuluses that can be monitored to detect leaks in the injection string; and**
- **iv. The length of operation of the injection well system of up to 59 years.**

Internal pressure testing of the injection string and caliper logs would appear to be reasonable test to run on a periodic basis. This program should also take into account the lack of a sealed annulus that could be monitored to detect leaks in the injection string. The frequency of integrity testing should be justified.

Response:

An MIT will be incorporated into the PA as requested. Regarding the specific items raised above:

- The characteristics of the lime sludge indicate that it will not act in any way as an abrasive against any of the system components. The primary component of the lime powder used at the WTP is CaO which has a hardness of 4 on Moh's scale of hardness. In order for the lime sludge to act as an abrasive, it would have to be harder on this scale than the components of the system. The system components are all either designed to deliver and carry sludge with the same abrasive qualities of the lime sludge in this case (pumps, valves, seals, etc.) or have a hardness that is higher on the scale than the lime sludge has. For instance, the iron in the ductile iron pipe for the forcemain and injection well connecting pipes has a hardness of 6 to 7 and steel in the Kennedy Stoppings and injection/ejection strings has a hardness of 7 to 8 on the same scale. The only component of the lime powder that could potentially act as an abrasive is SiO_2 which has a hardness of 7. This only comprises 0.7% of the lime powder that is used at the WTP and therefore is not going to detrimentally abrade the system. Therefore, the system as is proposed in the preliminary design will not be subject to inordinate wear and tear due to abrasion of the lime sludge.
- Regarding the compatibility of the pH of the lime sludge with the injection string, see response for item 3.n below.

The entire system will be designed and constructed so that it will be completely functional throughout the almost 60-year anticipated operating life. There is no anticipated effect of the characteristics of the lime sludge that would require additional mechanical integrity testing, other than normal wear and tear over the operating life of the system.

Since the functionality of the injection wells over time is a critical issue to the effectiveness of the entire system, it is proposed that the integrity of the injection string be tested. One of the primary challenges of this project is that once the mine is sealed, there is no ability to access the mine to effect repairs on the system once it is constructed and becomes operational. With this thought in mind, the system has been designed to operate under the conditions present at the WTP and inside the mine throughout its operation life.

The integrity of the injection string will be tested every 5 years via air pressure tests. The test will be performed by installing pneumatic plugs or packers at the bottom and top of the injection string. The plug/packer assembly will be lowered through the blind flange located at the top of the well head. The sealing length of the plug will be equal to or greater than the diameter of the injection string pipe. The plugs or packers will be inflated to

25 psig. The now sealed pipe will then be pressurized and the air pressure will be allowed to stabilize for at least two minutes. After the pressure has stabilized, the pipe shall be pressurized to 3.5 psig and all pressure drops will be recorded to determine the integrity of the pipe. All air testing methods will be conducted in accordance with the most recent ASTM standard.

n. **FORM 4f, Section V - The Injection Fluid Compatibility section is marked N/A. The compatibility of the lime sludge with components of the system, including the Kennedy stop bulkheads and the formation should be discussed. This discussion should take into account the operating life of the project. It appears as though some of the required information is included in Appendix A of the application.**

Response:

A table is included in **Attachment 4** of this correspondence that lists all of the sludge delivery, injection and extraction system components. All of the system components are compatible with the lime sludge injection fluid. This fluid (solids and supernatant) has an average pH of approximately 10, which is the primary factor when considering the compatibility of the lime sludge with the various components of the delivery and injection system.

The WTP has used carbon steel piping inside of the plant and ductile iron pipe in each of the dewatering lagoons for the 30-plus years of operation. In that time, there has been virtually no corrosion of the pipes or unusual operational issues with the pumps, valves or other system components (other than normal wear and tear). This empirical evidence suggests that the carbon steel components (injection string casing, long string casing, extraction string casing and Kennedy Stoppings) and ductile iron components (suction piping, pump discharge piping and fittings, check and plug valves, forcemain piping and fittings and extraction piping) are all compatible with the injection fluid and will not be adversely affected by the pH of the injection fluid solids or supernatant nor will have a decrease in their normal life expectancy.

The evaluation conducted indicates that all system components are compatible with the lime sludge and the characteristics of the lime sludge will not represent a threat to the integrity of the delivery and injection systems.

All of the system components that come into contact with the injection fluid that will be incorporated into the final design of the system will be insured to be compatible with the characteristics of the lime sludge.

o. **FORM 4g, Section I - The plugging and abandonment plan does not address plugging of the annular space between the injection string and the "surface" casing. In order to prevent the migration of fluids this annulus must be plugged during closure of the injection wells. It would be preferable to remove as much of the injection string as possible from the borehole, install a bridge plug within the casing and cement the well to the surface.**

Response:

In the event that the annular space between the long string casing and the injection string casing will be grouted, it is assumed that this concern will be addressed. If, in the final design of the system, it is determined that grouting the annular space is not needed, then upon abandonment the space between the injection string and the long string will be filled with a bentonite or Portland cement slurry with specifications as provided in the response to item 3.g above.

Since the injection string will be anchored to the floor of Level 1 of the mine and since the mine will be inaccessible at the time of system closure, it will be difficult to remove a significant amount of the injection string. As much of the injection string as possible will be removed prior to abandonment.

The abandonment plan will be modified to include the removal of the surface casing referred to in the PA. This casing, now referred to as the protective casing is unnecessary once the injection well has been constructed. It will be removed from the ground and the space will be backfilled with clean soil or other material deemed to be appropriate as part of the final design of the system.

p. **FORM 4g, Section I, Item A - The application should include a plan on how a well will be plugged should it not be completed due to unforeseen circumstances.**

Response:

In the event that a boring must be abandoned for reasons as deemed to be necessary, drill string shall be removed from the hole and it will immediately be abandoned by filling the hole with a bentonite slurry and will comply with all state and local regulatory requirements.

q. **FORM 4g, Section I, Item D - The plan indicates that an inflatable bladder will be used as a temporary plug above which bentonite grout will be placed. Once the bentonite grout is in place air pressure to the bladder will**

be discontinued and the bladder will deflate. The applicant should demonstrate that the bentonite grout column will have adequate support/strength to stay in place without permanent support below it that a cement retainer/bridge plug would provide.

Response:

This item will be modified. In order to hold the bentonite grout in place during abandonment, either permanent pneumatic bladder fitted with a bridge plug will be placed at the bottom of the injection string, just above the ceiling elevation of Level 1 of the mine. Once in place at the desired depth interval within the injection string, the bladder will be inflated to seal the well and hold the grout permanently in place so that the entire length of the injection string pipe will be sealed to prevent intrusion of fluids the subsurface.

Since the bladder remains permanently inflated, the concern raised in this comment is addressed. Please see **Attachment 5** for the specification sheet for an example of the type of bladder and down-hole assembly that will be used in this application.

r. **FORM 4g, Section I, Item E- This item is marked N/A. A cost estimate for plugging and abandonment of the injection well system should be provided in order to establish the necessary financial assurance for closure of the injection well system.**

Response:

According to 35 IAC 730, *Underground Injection Control Operating Requirements*, Subpart B, *Criteria and Standards Applicable to Class I Non-Hazardous Wells*, no financial assurance requirements are listed in this Subpart similar to those listed in Subpart G, Section 730.173 for Class I Hazardous Wells.

Furthermore, Section 730.114.a.16 references the requirements of 35 IAC 704, *UIC Permit Program*, Section 189 and states that, "a certificate that the applicant has assured, through a performance bond or other appropriate means, the resources necessary to close, plug, or abandon the (injection) well(s)." Section 704.189 states that the permittee must show evidence of financial responsibility to the Agency by the submission of a surety bond or financial statements. It was assumed that since the City of Aurora is a self-insured and bonded governmental subdivision that it would be exempt from this requirement.

The purpose of Section 17.0 in the PA was to demonstrate to the Agency that, upon completion of the operation life of the delivery, injection and extraction systems,

they will be properly and safely closed, sealed and abandoned such that the entire system would pose no threat to human health or the environment.

Therefore, it is the City's interpretation that it is not subject to the regulatory financial assurance requirements based upon the above evaluation.

The revised forms and PA sections will be finalized and forwarded to the Agency upon receipt of the detailed comments from the Ground Water Section. Please feel free to contact me should you have any questions regarding this correspondence.

Sincerely,

Marc R. Fisher
Environmental Manager
DEUCHLER ENVIRONMENTAL, INC.

MF/mf

Cc: Alex Alexandrou, COA
Alayne Weingartz, COA
Dennis Walsh, Klein, Thorpe and Jenkins

Attachments: (1) - Typical Foam Grout Specifications
(2) - Bentonite Grout and Seal Specifications
(3) - PID
(4) - Compatibility Table
(5) - Pneumatic Bladder Specifications

REFERENCES CITED

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ATTACHMENT 1:

FOAM GROUT SPECIFICATIONS

Geofill LD

Specifically formulated for geotechnical and underground applications, Geofill LD is a low density cementitious material that contains no aggregates. Densities and strengths can be formulated to match individual project needs.

- **Low Density** – With Geofill LD, load reduction can be achieved without sacrificing strength or stability making it ideal for reducing vertical loads over weak soils or underlying structures and lateral loads against MSE Panels and retaining walls.
- **Highly Flowable** – Geofill LD can be pumped for long distances at low pressures. This is an excellent material for completely filling abandoned lines or annular spaces due to its self leveling characteristic.
- **High Bearing Capacity** – Lightweight, yet stronger than many soils or compacted fills, Geofill LD is frequently used as an embankment and bridge approach fill on highway projects.
- **Excavatable** – Ease of re-excavation makes Geofill LD an ideal choice for open cut backfill projects when weight is an important consideration.
- **Extremely Pumpable** – High air content makes it easy to pump Geofill LD long distances at low pressures.
- **Compaction** – No compaction is necessary. Use this product when future settlement cannot be tolerated.

News & Press

VIEW ALL »

There are currently no news articles.

Density by Design

Class	Density (As Cast PCF)	Density (Air Dry PCF)	Comprehensive Strength (Min. PSI)	K Thermal Value (Approx.)
I	18-24	14-20	20	.50
II	24-30	19-25	40	.60
III	30-36	24-30	80	.67
IV	36-42	30-36	120	.76
V	42-48	35-38	160	.90
VI	48+	41+	300	1.00

Click here for freeze / thaw, permeability and water absorption specification »

Geofill LD Physical Properties

CO EFFICIENCY OF PERMEABILITY

	CLASS II	CLASS IV
Maximum Cast Density, PCF	30	42
Co efficiency of Permeability, k, cm/sec		
@ Effective Confining Stress, 2.5 PSI	4.7 x 10 -5	1.5 x 10 -6
@ Effective Confining Stress, 18 PSI	1.9 x 10 -5	5.4 x 10 -7

*As determined by method of U.S. Army Corps of Engineers, EDM, 1110-2-1906 and ASTM D2434

WATER ABSORBTION

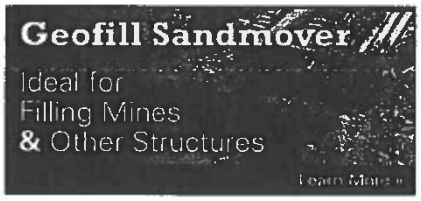
	CLASS II	CLASS III	CLASS IV
Maximum Cast Density, PCF	30	36	42
% Water Absorbtion After 120 Days	20	16	14

*Long term total immersion as percent of cast density per method of ASTMC796

RESISTANCE TO RAPID FREEZING & THAWING

NUMBER OF FREEZE - THAW CYCLES	CLASS II (30 PCF)	CLASS IV (40 PCF)
30	98	98
80	90	95
120	86	90
330	70	79
	Relative "E" Percent at Cast Density	

* As determined by methods of ASTM C 666 modified to allow for the insulating properties of GeoCell



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Referenced Standards & Reports

ASTM C796-97
Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam

ASTM C869-91
Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete

ASTM C495
Standard Test Method for Compressive Strength of Lightweight Insulating Concrete

ACI 523.1R-06
Guide for Cast-in-Place Low Density Cellular Concrete

ACI 523.3R-93
Guide for Cellular Concretes above 50 PCF and for Aggregate Concretes above 50 PCF with Compressive Strengths less than 2500 PSI

ACI 229R-99
Controlled Low Strength Materials

News & Press

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There are currently no news articles

ATTACHMENT 2:

Bentonite Grout and Seal Specifications

TECHNICAL DATA

PUREGOLD® GROUT

HIGH-SOLIDS GROUT

NSF Certified to NSF/ANSI 60

DESCRIPTION

PUREGOLD GROUT is an easy mixing, organic-free, high-solids bentonite grout engineered to form a contaminant resistant seal without affecting groundwater chemistry. PUREGOLD GROUT is a technically superior replacement for traditional cement grouts. PUREGOLD GROUT is certified to NSF/ANSI Standard 60, Drinking Water Treatment Chemicals - Health Effects.

RECOMMENDED USE

PUREGOLD GROUT should be used for sealing the annular space in monitoring wells to control contaminate infiltration and preserve ambient groundwater quality.

CHARACTERISTICS

- Chemically stable. Results from TCLP Metals Analysis are below RCRA limits for hazardous constituents
- Contaminant free. All 116 priority pollutants tested for were below TCLP detection limits
- Generates no heat during mixing or curing and will not damage well casing
- Low permeability, laboratory test results range from 1×10^{-7} to 1×10^{-8} cm/sec
- pH range from 5-6 standard units
- Remains flexible, maintains putty-like consistency over time and will re-hydrate
- Thermal Conductivity 0.45 Btu/hr/ft/F (0.75 watts/meter K)

MIXING AND APPLICATION

PUREGOLD GROUT should be mixed with a paddle mixer or a mud rotary recirculation system and pumped with a positive displacement pump. It can be mixed in a slurry up to 30% solids. PUREGOLD GROUT remains placeable for up to two hours and sets in eight hours.

To achieve a 30% solids slurry, add one 50 lb bag of grout to 14 gallons (22.7 kg bag of grout to 53 liters) of freshwater. This ratio will yield approximately 2.2 ft³ (62.2 liters).

BULK DENSITY

75.55 lbs/ft³ (1.21 kg/L) when mixed with water to a 30% solids grout.

PACKAGING

50 lb (22.7 kg) bag, 48 per pallet. All pallets are plastic wrapped.

PUREGOLD®

2870 Forbs Avenue, Hoffman Estates, IL 60192
847.851.1800 | 800.527.9948 | cetco.com/dpg

CETCO®

TECHNICAL DATA

NSF
Certified to NSF/ANSI 60

CETCO® COATED TABLETS

BENTONITE TABLETS - TIME RELEASED FOR SEALING AND PLUGGING

DESCRIPTION

CETCO COATED TABLETS are coated using an aqueous carrier to apply the coating. The coating allows the tablets to reach a discrete depth within the water well, piezometer, monitoring well, or annular space. These untreated organic tablets are compressed into 1/4" (0.64 cm) and 3/8" (0.95 cm) sizes. CETCO COATED TABLETS are certified to NSF/ANSI Standard 60, Drinking Water Treatment Chemicals - Health Effects.

RECOMMENDED USE

CETCO COATED TABLETS are designed to fall through standing water columns of up to 500 vertical feet without bridging. CETCO COATED TABLETS form a chemically resilient, low-permeability, flexible seal.

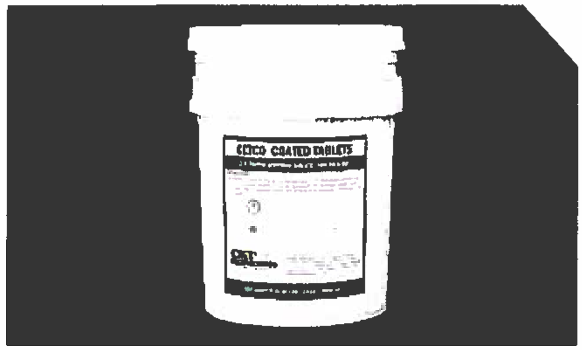
- Isolate screen intervals, subsurface instrumentation, and sampling zones
- Plug abandoned boreholes and cavities
- Provide a protective barrier between gravel pack and high solids grout
- Seal or grout plastic or steel casing

Build a stable, permanent below-grade seal in:

- Caisson holes
- Mineral exploration holes
- Monitoring/observation wells
- Piezometer/water sampling wells
- Soil/geotechnical sampling holes
- Water wells

PACKAGING

50 lb (22.7 kg) plastic pails, 36 per pallet. All pallets are plastic wrapped.



MIXING AND APPLICATION

1/4" (0.64 cm) CETCO COATED TABLETS REQUIRED FOR SEALING AND PLUGGING APPLICATIONS

Hole Diameter (in)	Hole Volume ft³/ft	Lbs/linear ft	Hole Diameter (cm)	Hole Volume m³/m	Kg/linear meter
2	0.02	1.61	5	0.001	0.72
4	0.09	7.26	10	0.003	3.27
6	0.20	16.14	15.2	0.006	7.26
8	0.35	28.25	20.3	0.011	12.7
10	0.55	44.40	25.4	0.017	20.0
12	0.79	63.77	30.5	0.024	28.7
16	1.40	113.01	40.6	0.040	50.9
36	7.07	570.69	91.4	0.212	256.8

3/8" (0.95 cm) CETCO COATED TABLETS REQUIRED FOR SEALING AND PLUGGING APPLICATIONS

Hole Diameter (in)	Hole Volume ft³/ft	Lbs/linear ft	Hole Diameter (cm)	Hole Volume m³/m	Kg/linear meter
2	0.02	1.59	5	0.001	0.72
4	0.09	7.15	10	0.003	3.22
6	0.20	15.88	15.2	0.006	7.15
8	0.35	27.80	20.3	0.011	12.5
10	0.55	43.68	25.4	0.017	19.7
12	0.79	62.74	30.5	0.024	28.2
16	1.40	111.19	40.6	0.040	50.0
36	7.07	561.50	91.4	0.212	252.7

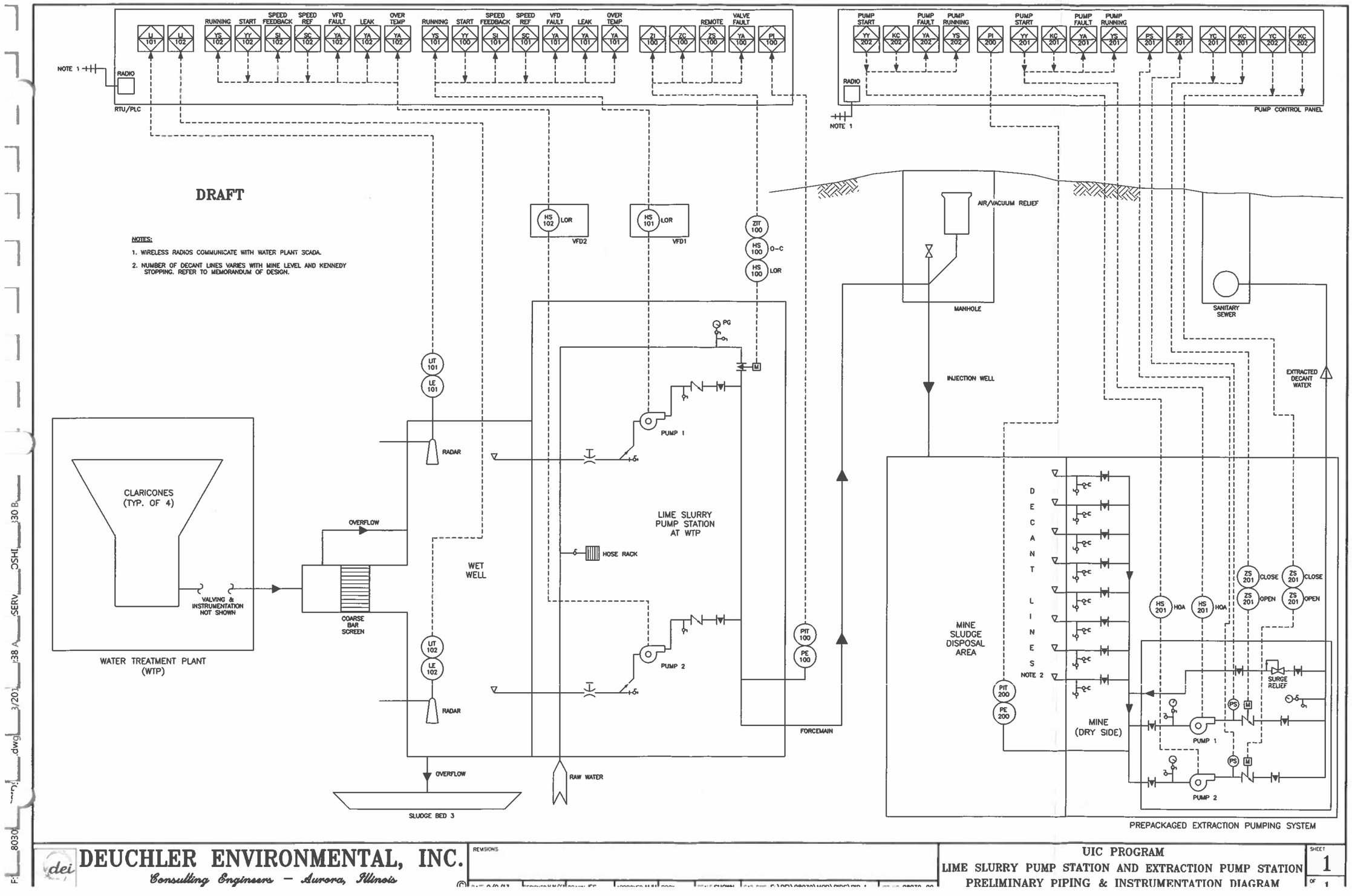
GROUTS & SEALANTS

2870 Forbs Avenue, Hoffman Estates, IL 60192
847.851.1800 | 800.527.9948 | cetco.com/dpg

CETCO

ATTACHMENT 3:

Preliminary Piping and Instrument Diagram



DEUCHLER ENVIRONMENTAL, INC.
Consulting Engineers – Aurora, Illinois

REVISIONS

UIC PROGRAM
LIME SLURRY PUMP STATION AND EXTRACTION PUMP STATION
PRELIMINARY PIPING & INSTRUMENTATION DIAGRAM

SHEET 1 OF 1

ATTACHMENT 4:

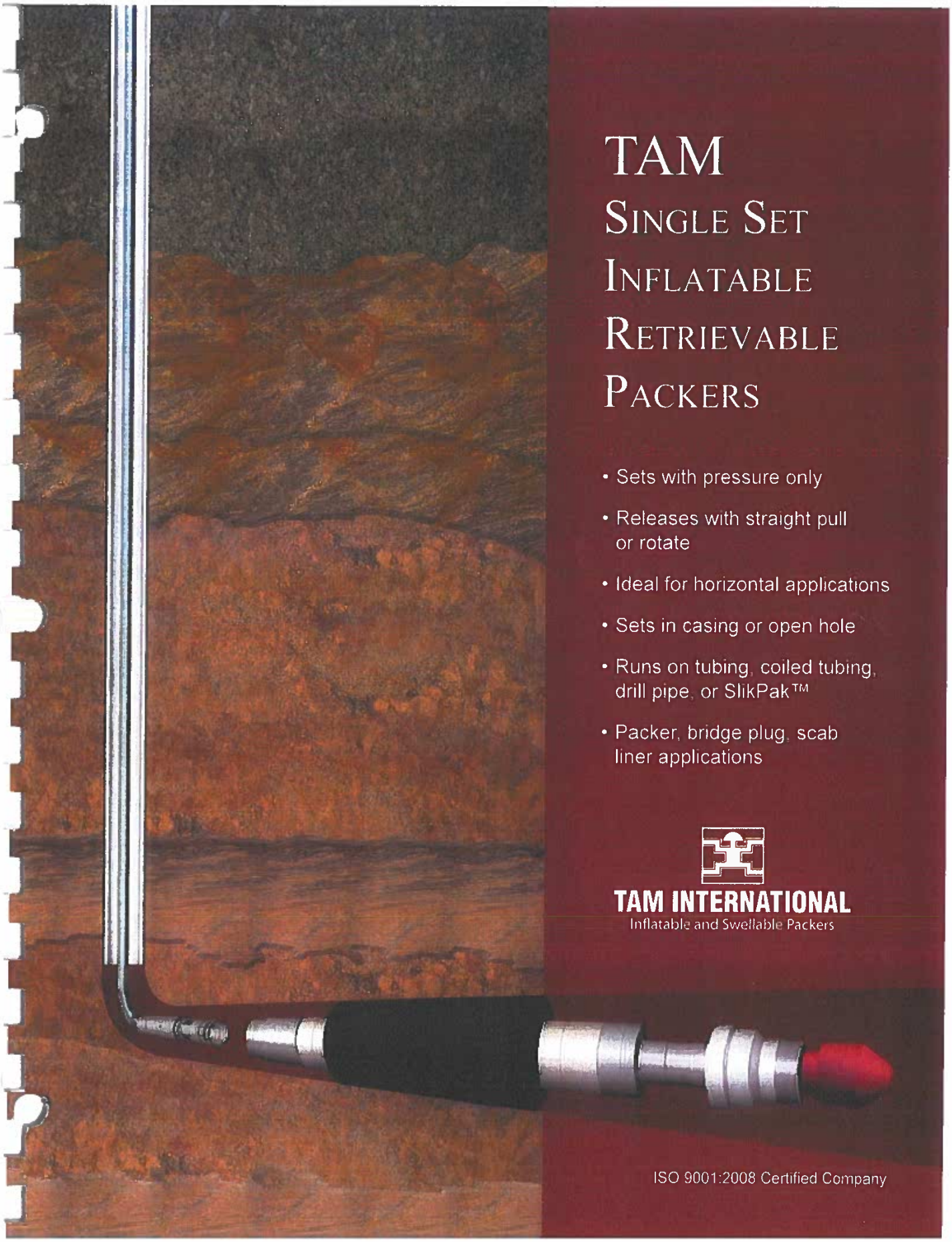
Compatibility Table

SYSTEM COMPONENT TABLE

UIC Lime Sludge Handling Components	Materials					
Wet Well	Concrete					
Pump Suction Piping	Ductile Iron	Std. Cement Lining	SBR Gasket	Std. Asphaltic Coating		
Suction Pinch Valve	Cast Iron Body	BUNA-N Rubber Sleeve				
Suction Pressure Ring	Stainless Steel	BUNA-N elastomer				
Suction Piping Water Flush piping and valves	304 Stainless Steel					
Lime Sludge Pump	White Iron					
Pump Discharge Piping and Fittings	Ductile Iron	Std. Cement Lining	SBR Gasket	Std. Asphaltic Coating		
Suction and Discharge Expansion Joint	BUNA-N elastomer					
Discharge Pressure Gauge Piping	304 Stainless Steel					
Pump Discharge Check Valve	Ductile Iron Body and Disc	BUNA-N Disc Seat	Stainless Steel Pivot Shaft			
Pump Discharge Plug Valve	Ductile Iron Body	BUNA-N Plug				
Force main piping	Ductile Iron	Std. Cement Lining	SBR Gasket	Std. Asphaltic Coating		
Megalug Restraining Joints	Powder-coated ductile iron		SBR Gasket			
Force main Gate Valves	Epoxy Coated Ductile Iron	Ductile Iron Wedge Encapsulated in EPDM Rubber				
Force main Fittings	Ductile Iron	Std. Cement Lining	SBR Gasket	Std. Asphaltic Coating		
Air Release Valves	304/316 Stainless Steel	UHMW-PE	HDPE			
Gate Valves for Flushing	Epoxy Coated Ductile Iron	Ductile Iron Wedge Encapsulated in EPDM Rubber				
Injection Well Piping and Fittings	ASTM A53 B, Schedule 40 Carbon Steel	ASTM A53 B, Schedule 80 Carbon Steel	No Interior Lining	Coal Tar Epoxy Coating	Std. Welding at Joints	
Energy Dissipater	304 Stainless Steel					
Pipe Supports	ASTM A992, Grade 50 Carbon Steel 'W' and 'WT' shapes, Epoxy Coated	ASTM A36 Carbon Steel Channel and Angles, Epoxy Coated	ASTM A36 Carbon Steel Plates and Bars, Epoxy Coated	ASTM F1554, Grade 36 Carbon Steel Threaded Rods	Non-Shrink, Non-Metallic grout	Chemical Epoxy for Anchor Bolts
Kennedy Stoppings	Coated Steel Panels					
Extraction Piping Through Kennedy Stopping	Ductile Iron	Std. Cement Lining	SBR Gasket	Std. Asphaltic Coating		

ATTACHMENT 5:

Pneumatic Bladder Specifications


TAM
SINGLE SET
INFLATABLE
RETRIEVABLE
PACKERS
• Sets with pressure only
• Releases with straight pull or rotate
• Ideal for horizontal applications
• Sets in casing or open hole
• Runs on tubing, coiled tubing, drill pipe, or SlikPak™
• Packer, bridge plug, scab liner applications
TAM INTERNATIONAL
Inflatable and Swellable Packers
ISO 9001:2008 Certified Company

General Descriptions

The TAM Single Set product line enhances the advantages of the inflatable packer element with a positive sealing mechanism that requires only hydraulic pressure to set the packer. As pipe movement is not required to set the tool, it is ideal for running on slickline/electric line with SlikPak™, or with coiled tubing. It is also widely utilized for work string applications in highly deviated and horizontal wells.

The product line consists of the Single Set, Full Bore/Setting Head, Retrievable Plug and Retrievable Scab Liner tools as well as a variety of accessories to release from the packer, control flow through the tool and re-latch for retrieval.

All Single Set products are capable of a single set when run into the well and can be released for retrieval.

Superior Setting Mechanism Field Proven Reliability

Unlike traditional inflatable packer setting mechanisms, TAM Single Set tools do not rely on a check valve to retain inflation pressure. Oftentimes, debris can be caught in a check valve impairing the seal, causing the packer to deflate.

The TAM Single Set tools utilize a pressure actuated sliding sleeve with redundant seals that wipe any debris from the sealing surfaces when setting the packer. When the setting sleeve slides over the packer inflation ports, pressure is locked in the packer element. The setting superiority of the TAM Single Set product line has been proven in over 20 years of field applications.

The 7-1/2" OD Single Set Tools utilize TAM's Safelok™ Valve System. For more information refer to the TAM 7-1/2" Single Set Brochure.

Inflation Elements

TAM offers four (4) types of inflatable elements to satisfy the wide range of application requirements, in vertical, horizontal, cased or open hole, 3:1 expansion capability and up to 300° F operating temperature. For specific element data and application analysis refer to the TAM Element Selection Brochure.

Simple Setting Procedure

Once the tool has been run to the desired depth, a ball or dart is pumped to a seat in the tool, diverting pressure applied to the work string into the inflation chamber. Shear pin settings, determined prior to running into the well, define the pressure at which the tool is locked in the set position.

Once the desired setting pressure is achieved by applying pressure to the work string, the set sleeve shifts down, closing the tool bypass and locking the tool in the inflated position. Differential pressure can be applied from either side of the packer without releasing the tool.

Flexible Configuration for Varying Applications

TAM Single Set products are our "work horse" tool line and can be easily configured for use in a wide variety of applications from single packers for Production, Treating or Squeezing to temporary or permanent Bridge Plugs. Multiple packers can be configured as scab liners for selective production control.

Each product provides various features that optimize the success of each application.

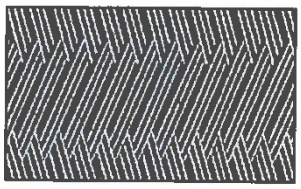
The Full Bore/Setting Head (FB-SH) tool provides the largest ID of any comparable tool OD in the industry and therefore is the typical selection for use in Scab Liner applications to modify a well's production flow profile.

The Setting Head can be adapted to a releasable/retrievable Casing Annulus Packer.

The Retrievable Plug (RP) tool is specifically designed as a through-tubing Bridge Plug. The RP can be run on work string, slickline/electric line with SlikPak™, or with coiled tubing in highly deviated wells.

The Retrievable Scab (RS) tool provides a large ID and can be run in sections to allow installation of a long length assembly into a well with surface tubing pressure. This tool is also configured to run and/or retrieve on work string, slickline/electric line with SlikPak™, or with coiled tubing.

Optional Element Reinforcement Styles



Weave Type Element (IE)

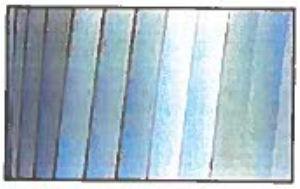
- Multiple-set applications
- Sets in perforations, slots, fractures, or open hole
- Seldom leaves rubber in the hole

Weave Type Element (HE)

- Combination of Slat element for extrusion resistance, and Weave element for multi-set capabilities

Slat Type Element (TE & SE)

- Single and multi-set applications
- Exposed slats function as slips



Canted Slat Dual Layer (VE)

- Single and multi-set applications
- Cased or open hole
- Benefit of Slat type for HPHT
- Sets in perforations, slots, fractures, or open hole

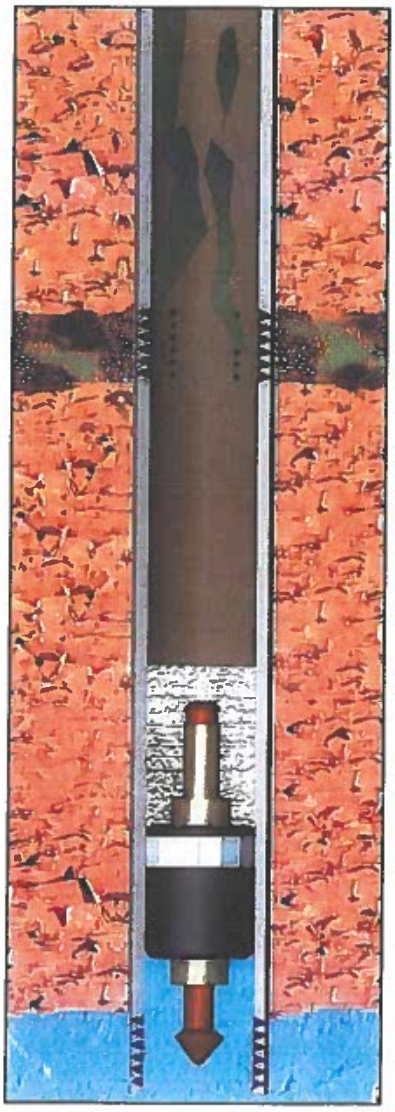
Single Set Applications–Vertical

Problem:

- Lower perforations producing excess water

Solution:

- Run Inflatable Bridge Plug on SlickPak set above lower zone
- Dump bail cement on top of plug

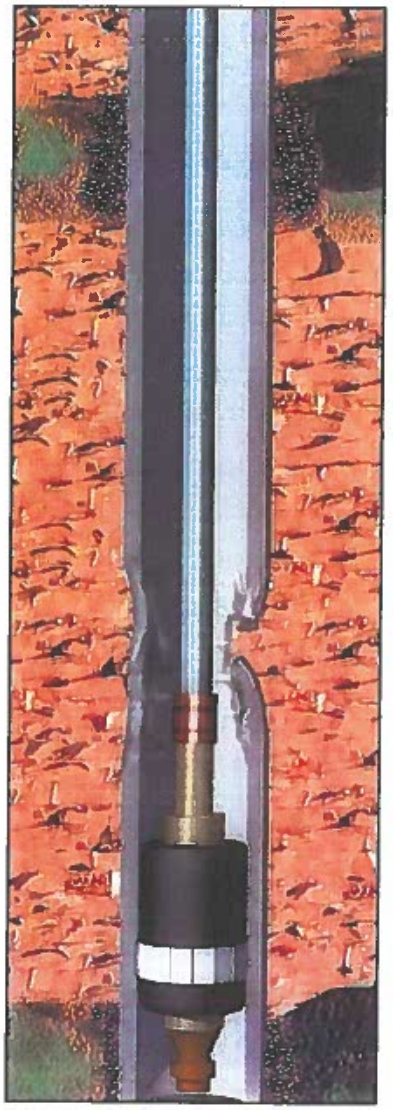


Problem:

- Collapsed casing
- Well requires production packer

Solution:

- Run Inflatable Single Set production packer and set below damaged or collapsed casing



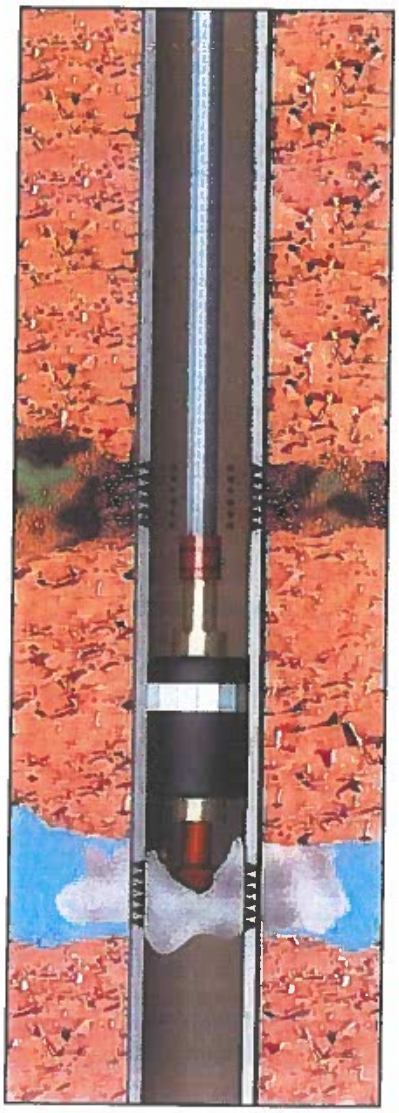
Single Set Applications–Vertical

Problem:

- Lower perforations producing excess water
- Requires squeezing

Solution:

- Run Inflatable Single Set packer on coiled tubing and set above lower perforations
- Squeeze as required



Problem:

- Shoe requires squeeze in large OD or odd sized casing in deep water drilling program

Solution:

- Run Inflatable Single Set on drill pipe and set near casing shoe
- Squeeze cement as required

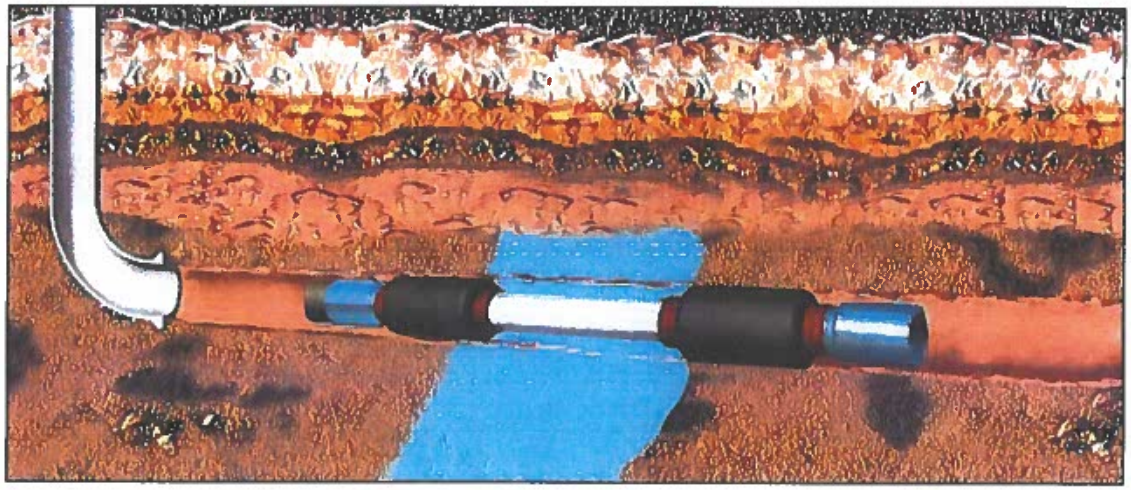
Single Set Applications–Horizontal

Problem:

- Excess water production from middle of horizontal well

Solution:

- Run Inflatable Scab Liner and set across water producing section

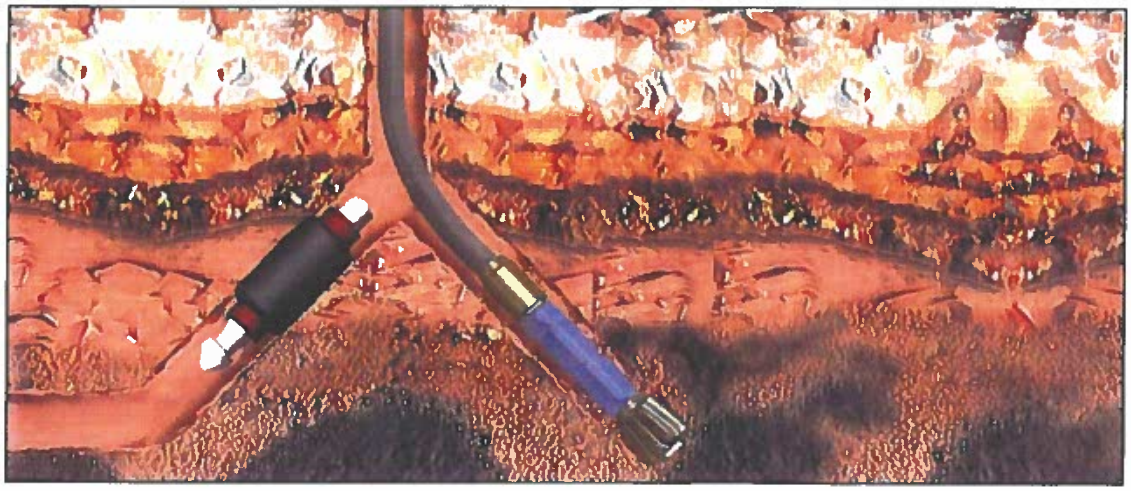


Problem:

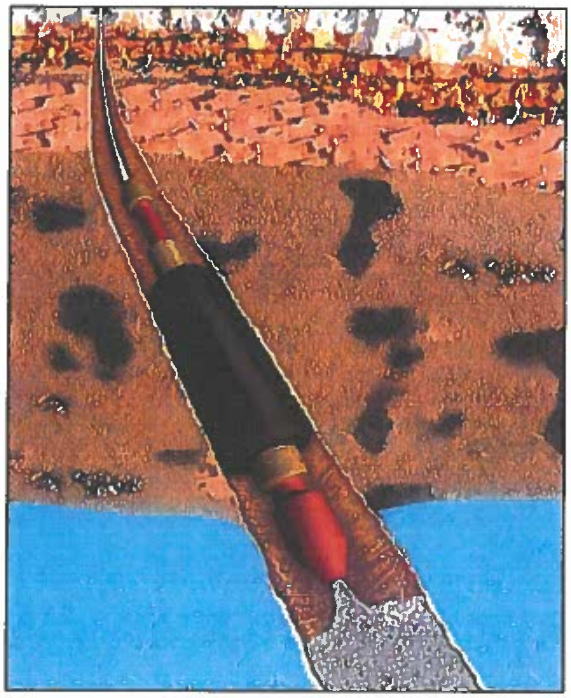
- Need to protect first lateral while drilling additional lateral

Solution:

- Run Inflatable Single Set as Bridge Plug and set near exit point of first lateral
- Retrieve packer after drilling additional lateral



Single Set Applications–Horizontal



Problem:

- Excess water production from toe of horizontal well

Solution:

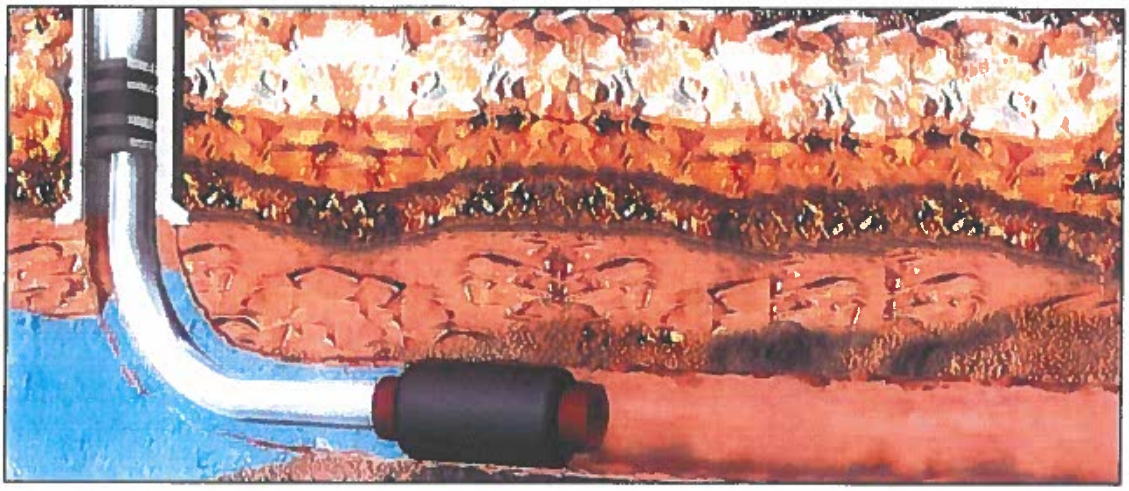
- Run Inflatable Bridge Plug and set above toe of lateral, or run Inflatable Packer and squeeze cement if desired.

Problem:

- Heel of lateral requires isolation due to excessive gas (or water) production

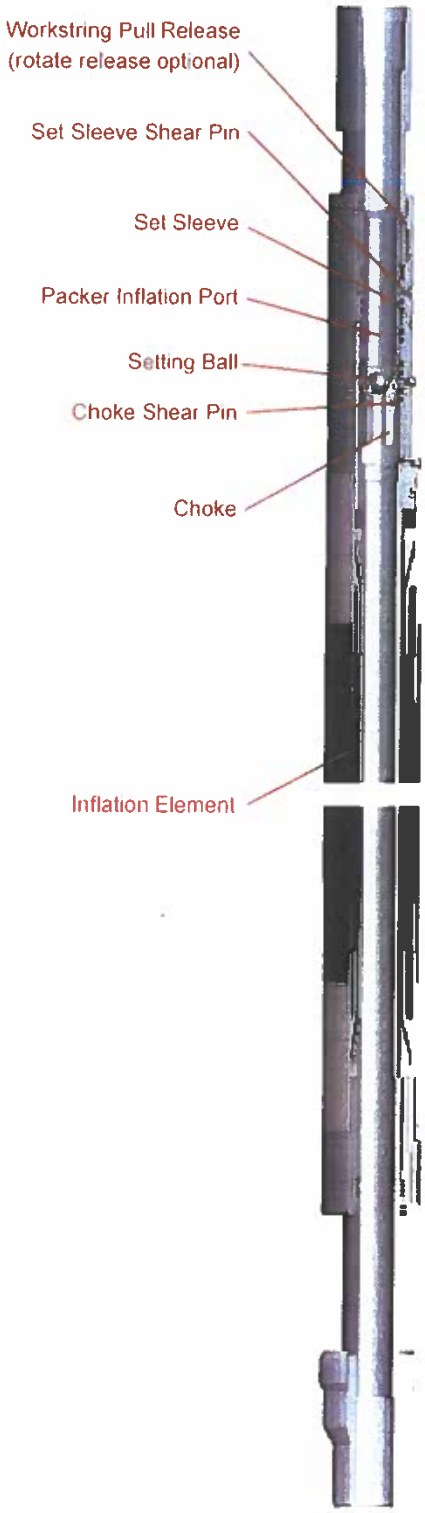
Solution:

- Run Inflatable Full Bore Single Set below hydraulic set production packer



Single Set Inflatable Packers and Release Options

Single Set



Hydraulic Release (HR)

Rotationally locked – can transmit torque thru the tool.

Adjustable activation pressure via shear pin quantity.

Two release options:

- No ball release, which is achieved by pressuring the workstring.
- Ball release, which requires a ball to be dropped through the workstring to land on internal seat in tool.

Bypass ports are opened when the tool is released, allowing circulation of workstring being retrieved.

TAMCON (CN)

Can be used to latch onto & retrieve an inflatable packer.

Once the overshot with seal assembly is released, a fishable profile with latching lugs/ pins is left above the set packer (for latching & retrieving at a later date).

Set down weight and left-hand torque to release.

Re-latching is automatic via J-track profile and latching lugs. The seal stack is engaged on O.D. of stem allowing pressure to be applied in tool string.

Tool can be shear pinned to prevent accidental disconnect when running.

TAMCONs have an optional hydraulic release profile cut in the top of the stem to allow running the tool in horizontal or deep water wells, without requiring left-hand rotation to release.

Tool Sizes and Configurations

Tool Type:

SS – Single Set
RP – Retrievable Plug
RS – Retrievable Scab Liner
SH – Setting Head

Tool OD		Tool Type	Minimum ID		Deflation Mechanisms			Run On	
(in)	(mm)		(in)	(mm)	Rotate	Pull	Ball	Work String	Wireline
1.69	42.9	SS	0.48	12.2		X	X	X	
2.13	54.1	SS	0.88	22.4		X	X	X	
2.13	54.1	RP	0.53	13.5		X		X	X
2.13	54.1	RS	0.88	22.4		X		X	X
2.56	65.0	RS	1.25	31.8		X		X	X
2.63	66.8	SS	0.94	23.9		X		X	
3.44	87.4	SS	1.21	30.7	X	X		X	
3.50	88.9	RP	0.53	13.5		X		X	X
3.53	89.7	RP	0.53	13.5		X		X	X
3.63	92.2	SH	1.99	50.5	X	X		X	
3.88	98.6	SS	1.88	47.8	X			X	
4.13	104.9	SH	2.45	62.2	X	X		X	
4.25	108.0	SS	1.82	46.2	X			X	
4.63	117.6	SS	2.28	57.9	X			X	
4.63	117.6	SH	2.95	74.9	X	X		X	
7.50	190.5	SS	2.25	57.2	X			X	

*5.50 RS is available. Consult TAM for more information
*Element Range; $1^{11}/_{16}$" up to $14^{1}/_{2}$"

Multiple-Release Options

TAM Single Set tools can be released in a variety of methods depending on tool size. Releasing Mechanisms include rotation, straight pull and ball seat. The chart above defines the optional release mechanism available by tool size.

TAM INTERNATIONAL
Inflatable and Swellable Packers
800.462.7617
713.462.7617
713.462.1536 Fax
info@tamintl.com

Worldwide sales and service contacts at www.tamintl.com

Items Removed from Application

Items removed from the permit application based on the 4-29-15 submittal. KDH. 5-5-15

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c – OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER
IEPA ID NUMBER 0894075971
WELL NUMBER

Location in Application		
4.0/12.0	I.	Operation Program
4.0/12.0	A.	Area Injection Project (if applicable)
4.8/14.3	1.	Maximum fluid to be injected per day
14.4	2.	Years remaining in area injection project
4.0/12.0/13.0	3.	Anticipated total number of injection wells required
4.0/12.0	4.	Injection wells operate with/without common manifold
5.4/App B	5.	Number of injection zone monitoring wells, include list and schematics
fig 4.6/12.3	6.	Number of, name and location of injection wells currently in project, see instructions
NA	B.	Single Injection Well (if area permit is applied for, provide for typical well)
NA	1.	Number or name of well
NA	2.	Location, see instructions
NA	3.	Expected service life
NA	4.	Operation during 24 hour period
NA	5.	Operation days per month
NA	6.	Injection pressure, average and maximum
NA	7.	Injection rate, average and maximum
NA	8.	Casing-tubing annulus pressure, average and maximum
NA	a.	During operation, average and maximum
NA	9.	Other annulus pressure
NA	10.	Number of injection zone monitoring wells, include schematics
12.0/App D	II.	Surface Facilities
12.1.1/App D	A.	Injection fluid storage
12.1.1/App D	1.	Storage capacity in days and gallons
12.1.1/App D	2.	Type of storage facility(s)
4.11	3.	Storage capacity in case of well failure, describe
12.0/App D	B.	Holding tanks and flow lines, describe
Exhib B	C.	Process and Instrumentation Diagram attachment
12.1.1	D.	Filter(s)
12.1.1	1.	Location
12.1.1	2.	Type

UIC Permit Form 4c

NA		3.	Name
NA		4.	Model Number
NA		5.	Capacity, gallons per minute
NA		6.	Pore size, microns
12.1.2	E.	Injection Pumps(s)	
App D		1.	Location
App D		2.	Type
App D		3.	Name
App D		4.	Model Number
App D		5.	Capacity, gallons per minute

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Alex Alexandrou, Chief Administrative Officer, City of Aurora
Name & Official Title

(630) 256-3441
Phone Number

Signature

9/29/14
Date Signed

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e – MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application		
16.0	I.	Waste Sampling and Analysis
16.1/16.2	A.	Sampling frequency
16.1/16.2	B.	Analysis parameters
16.1/16.2	C.	Sampling location
16.1/16.2	D.	Detailed waste analysis plan
16.0	II.	Monitoring Program
16.5	A.	Recording devices, see instructions
12.1.3/p12-4	1.	Injection pressure gauges
NA	2.	Casing-tubing annulus pressure gauges
12.1.3/p12-3	3.	Flow meters
NA	4.	pH recording devices
NA	5.	Temperature
16.3/16.4	B.	USDW Monitoring in Area of Review
16.3/16.4	1.	Number of wells
16.3/16.4	2.	Type of wells
16.3/16.4	3.	Frequency of monitoring
16.3/16.4	4.	Type of sample
16.3/16.4	5.	Parameters
Fig 4.6, App B	6.	Map of well location and logs
16.3/16.4	C.	Detailed Groundwater Monitoring Plan
NA	III.	Mechanical Integrity Tests During Service Life of Well, see instructions
12.1.3/4.11	IV.	Contingency Plan for Well Failure or Shut In, see instructions
12.1.3/4.11	A.	Detailed contingency plan

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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9/29/14
Date Signed

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REFERENCES CITED

Burch, S. L. (2002), "A Comparison of Potentiometric Surfaces for the Cambrian-Ordovician Aquifers of Northeastern Illinois, 1995 and 2000," Data/Case Study 2002-02, Illinois State Water Survey, Champaign, Illinois, 63 p.

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12.0 SYSTEM DESIGN SUMMARY

In order to determine the parameters, efficacy and feasibility of the project, DEI has completed a Memorandum of Design ("MOD") for the system which is included in **Appendix D** of this permit application. The MOD provides for the preliminary design of the system and system components. Upon approval of the Class V UIC permit application by the Illinois EPA, final design of the system will be conducted, permits to construct will be applied to the Illinois EPA and specifications for public bidding will be completed. Slight alterations of the design may occur between the MOD and the final design stages, but the major system concepts, features and components will likely remain the same. This section summarizes the MOD, broken out into the following elements:

- Delivery System – WTP improvements, pump station and forcemain;
- Injection System – IW's, distribution piping and injection points;
- Extraction System – Supernatant inlet pipes, pump system, EW, forcemain;
- Surface completion and power feed;
- Securing vent shaft.

The Piping and Instrument Diagram for the system has been included as Exhibit B to the PA.

12.1 Lime Sludge Delivery System

In order to deliver the lime sludge to the site, a lime sludge delivery system must be constructed. This system will include improvements made at the WTP along with the construction of an underground forcemain.

12.1.1 New Pump Station and Wet Well

A pump station will be constructed adjacent to the north of the existing WTP building. The pump station building will be constructed directly adjacent to and slightly overlapping existing dewatering lagoon #3. The pump station will house the pumping system for the forcemain, a wet well and all electrical and control systems.

The WTP claricones will be connected to the wet well via a gravity sewer. ***The sludge will first enter the coarse screen chamber by gravity prior to entering the wet well. The inclined screen with a 1-inch spacing will block any large deposits of lime scale from entering the wet well and potentially damaging the pumps. An overflow has been provided upstream of the bar screen so that, in the rare event the bar screen would be completely blocked, the flow would enter the wet well prior to screening.*** The wet well will provide a screening mechanism to remove solids from the sludge that could

damage the pumps. This will allow for the more even and uniform pumping of the lime sludge to the site for injection and to eliminate the need to synchronize the pumps with the blowdowns at the WTP. The wet well will have enough storage capacity to accommodate the blowdown flow volume to be pumped to the site.

Blowdown data over a 2.5 year period (2010 through July 2012) was evaluated and modeled to determine the sizing of the system and to determine the volume of lime sludge that will be injected into the South Mine over time. This data is applicable for the basis of system design because of the drought that occurred in the summer of 2012, resulting in unprecedented water demand. These data are representative of historic maximum lime sludge generation at the WTP. Based upon these data, the average percent solids were approximately 6% by weight and the average flow rate during blowdowns is approximately 800 gpm.

The WTP claricones will be connected to the wet well in the pump station by an 8-inch underground, gravity fed blowdown line. This line will be connected to the wet well which will have a hopper design and plan dimensions of 20-feet by 15-feet to accommodate a blowdown flow rate of 800 gpm. The wet well provides approximately 2,240 gallons per foot of active storage or 9,632 gallons of volume available to be pumped to the site.

An emergency overflow structure has also been incorporated into the wet well design that will bypass the forcemain and divert flow directly into dewatering lagoon #3 in the event that a need would arise.

Additionally, a tap with a back flow preventer to a water transmission main will be connected to the wet well to flush the forcemain periodically for maintenance purposes.

12.1.2 Forcemain Pumping System

The basis of design for the forcemain pumps will be the Wilfley Model K solids-handling centrifugal pump. This pump was chosen because it is specifically designed for application with abrasive materials and is easier to maintain compared to other pumps. The preliminary design calls for two pumps to be installed, each having the following performance characteristics:

- Flow rate of 800 gpm;
- Total dynamic head of 162 feet;
- Speed of 1,440 rpm; and
- Motor size of 125 HP.

The pump station will have a new motor control center ("MCC") which will be

integrated into the WTP Supervisory Control and Data Acquisition ("SCADA") system.

12.1.3 Contingency Plan

Several systems will be in place at the pump station to manage issues and problems that may arise during the operation of the system.

There will be two radar level instruments which will continuously measure the level of sludge in the wet well. The level will be recorded by the plant supervisory control and data acquisition ("SCADA") system. Through the SCADA graphical user interface, the operator will be able to select which pump is the lead pump and which is the lag pump, the lead pump start level, lag pump start level, all-off pump level and the speed at which the pumps are to run.

A magnetic flowmeter is included on the discharge forcemain and will continually measure the volume pumped. This will also be recorded in the SCADA system. An analog pressure gauge is included on the discharge forcemain and can be manually read by the operators.

The variable frequency drives that control the speed of the pumps will be specified with over-current and under-current alarms. The under-current alarm may indicate blockage in the pump or forcemain.

If there is a blockage in the forcemain or if the pumps fail to run, the high level in the wet well will provide an alarm via the SCADA system. If the level continues to rise in the wet well, there will be a gravity overflow into the adjacent sludge dewatering lagoon.

The exact nature of the problem can then be assessed and appropriate corrective actions taken. The forcemain and wet well can be flushed with raw water, the pump can be serviced or replaced, etc.

The following instrumentation (or equivalent) is proposed:

Continuous Sludge Level Measurement:

- *Manufacturer: Seimens*
- *Model: SITRANS LR200*
- *Process: Radar, continuous reading*
- *Frequency: 6 GHz*
- *Measuring range: 1 to 65 feet*

Magnetic Flowmeter:

- ***Manufacturer: Toshiba***
- ***Model: LF654 and LF622F***
- ***Measurement range: 0 to 39.4 ft/s***
- ***Accuracy: +/- 0.2% of rate***

Pressure Gauge:

- ***Manufacturer: Ashcroft***
- ***Model: 1279 Duragauge***
- ***Range: 0 to 100 PSI***

12.1.4 Forcemain

The underground forcemain will be connected to the pump system to deliver the lime sludge to the site. The forcemain will be 8-inches in diameter and will be constructed of class 52 DIP with interior cement lining. The forcemain will be constructed at an average depth of 5.5 feet bgs from the pump station to the site.
The forcemain will also have the following design criteria:

- Velocity of 4.64 ft/sec at 800 gpm;
- Approximately 7,600 linear feet from the WTP to the site and on the site to the IW's;
- Asphaltic exterior coating with polyethylene encasement;
- Push-on style pipe joints;
- Fittings to have restrained mechanical Mega-Lug joints; and
- Pipe gaskets to be SBR material.

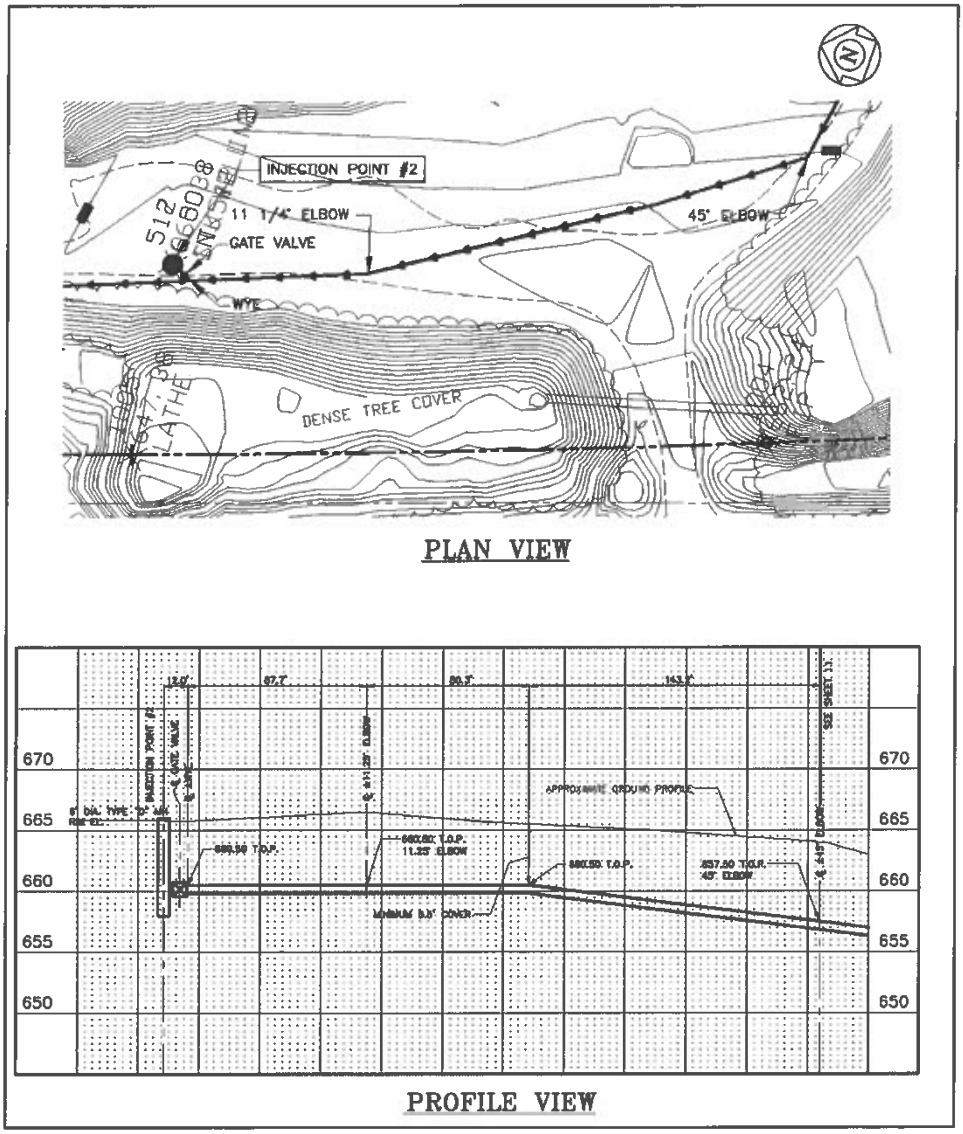

Figure 12.1 – Typical forcemain cross section

The forcemain will have a combination air/vacuum release valve at its topographically highest point as well as at each IW connection. At each IW, the forcemain will be connected to the top section of the IW pipe and will exit the manhole assembly, above the ground surface. In addition to the air/vacuum release valves, the forcemain will have gate valves as well.

The purpose of the air/vacuum release valves is to release air from inside of the forcemain while the lime sludge is pumping, but also to let air back into the vertical IW piping after the pumping has stopped so that the momentum of the falling sludge does

not create a vacuum to potentially collapse the vertical piping. The purpose of the gate valves is to control the flow to the four IW's and to open and close the system, if needed, from the WTP. In addition, each IW will have a blind flange to connect to a fire hose for the purpose of flushing the underground distribution pipes, if needed.

12.2 *Injection System*

The injection system is designed to convey the lime sludge from the forcemain for deposition inside of the mine. The injection system includes the following components:

- Injection wells including forcemain connection, manhole access and associated valving;
- Ceiling connections to an energy dissipater;
- Distribution piping network;
- 18 injection points; and
- Three sedimentation basins.

The injection system will convey the lime sludge into the distribution piping on the floor of Level 1 of the mine, to the injection points through the sill between Levels 1 and 2 for deposition directly into Level 2 of the mine.

12.3 *Injection Wells*

The forcemain from the WTP will be connected to 4 different IW's at the site located as depicted on **Figures 4.1, 4.6 and 12.7**. The IW's will be connected at the ceiling of Level 1 of the mine to the distribution piping system.

Since the IW's are Class V and since the lime sludge will be deposited into the empty space of the mine and not forced under pressure into pore spaces of a geologic formation, there will be no back pressure against the annulus and casing of the IW's. The mine will be vented to the atmosphere using the 9-foot diameter air shaft located at the north end of the mine (on both Levels 1 and 2). This airshaft was used to supply air to the mine when it was in operation. The airshaft is constructed from the ground surface through the ceiling of Level 1 of the mine. Air was supplied to Level 2 of the mine through a hole in the rock sill between Levels 1 and 2, approximately 15 feet by 20 feet in size. Based upon this construction, both Levels 1 and 2 of the mine are under atmospheric pressure conditions.

Because of this, as the lime sludge is deposited into the mine by the IW's, air within the mine will be displaced through the large diameter airshaft, as the air escape pathway of least resistance and virtually no pressure will be exerted on the IW annulus or casing.

Therefore, the pressures taken into account in the design of the IW's are those created by the lime sludge as it travels through the IW pipe. As the "slug" of lime sludge drops through the pipe, pressure will be exerted against the pipe pushing outward on the IW casing pipe. Once the slug has passed, pressure will be exerted inward against the casing pipe.

There were several considerations when evaluating the construction material, diameter and wall thickness of the IW pipe, such as:

- Pressure exerted on the pipe from the conveyance of the lime sludge into the mine;
- The depth to which the IW's will be constructed;
- The length of time that the IW's will be in service;
- The pressure that will be exerted on the radius of the IW's at the floor of Level 1, using the diameter of the IW's to decrease the pressure at the radius due to pipe friction; and
- The maximum flow rate of the sludge from the WTP into the mine;

Taking these factors into consideration, the IW's will have the following specifications:

- Each IW will be double cased;
- The ***long string*** casing will be 8-inch diameter schedule 40 carbon steel with threaded connections;
- The ***injection string*** casing will be 6-inch diameter schedule 40 ***carbon*** steel casing with threaded connection;
- All threaded joints ***for the injection string*** will be bead welded; and
- Filled annulus between the 10-inch diameter borehole and the 8-inch diameter ***long string casing***. Annulus will be sealed using (from bottom to top) ***portland*** cement grout, bentonite seal and poured concrete.

The IW's will be able to accommodate the flow rates (800 gpm) from the forcemain and the pressure calculated to be exerted on the pipe as the lime sludge is dropped from the surface into the mine.

There is a significant amount of potential energy from the IW drop into Level 1 of the mine. A vortex energy dissipater will likely be used to reduce the energy and the velocity of the lime sludge to 5 to 6 feet/sec. The energy dissipater will be stiffened using steel plates due to the large dynamic forces that will develop in the drop. The location of the energy dissipater will be determined during the final design phase of the project. It may be located at the end of the 10-foot radius bend in the distribution piping or the bend may be eliminated and the IW may terminate vertically into the energy dissipater. The MOD incorporates the 10-foot radius bend into the preliminary

design.

While forces will be generated on the injection string during times of injection, the injection string itself will remain relatively stable throughout the operating life of the injection system. The injection string will be connected to and stabilized at the following points:

- *To the forcemain via megacouplings (see Figure 12.5 on page 12-18 of the PA);*
- *Welded to a steel plate where the injection string pipe protrudes above the ground surface (see Figure 12.2 on page 12-12 of the PA) which will be buried under a concrete pad;*
- *A steel plate which will be bolted to the ceiling of Level 1 of the mine and welded around the injection string pipe as it protrudes into the mine; and*
- *At the base of the injection string pipe to the energy dissipater/long radius bend. The energy dissipater/long radius bend will be anchored to the floor of Level 1 of the mine so as to absorb the force generated as the lime sludge drops within the injection string.*

The force at the top of the injection string where it is connected to the forcemain will be based upon the velocity that the lime sludge is traveling within the forcemain. Based upon the current preliminary design, the velocity of the lime sludge in the forcemain will be 4.64 feet/second at the design flow rate of 800 gpm. This will create a force of 0.14 psi, which will have no impact on the stability of the connection of the injection string to the forcemain or on the injection string itself.

Based upon data supplied by the pipe manufacturer, the long string casing (8-inch) and the injection string casing (6-inch) will have the following strengths:

- *Tensile Strength: 60,000 psi minimum for both strings*
- *Yield: 35,000 psi minimum for both strings*
- *Burst Pressure: 17,080 psi for injection string and 15,070 psi for long string*

The lime sludge will be pumped from the wet well at the WTP when blowdowns occur. As per Section 3.2 of the PA, blanket blowdowns on average occur once every 3 hours (6 to 8 times in a 24-hour period) and grit blowdowns occur twice in a 24-hour period. Therefore, the flow of lime sludge from the wet well to the injection well will be intermittent. Once the lime sludge enters into the injection string from the forcemain, it will drop by gravity into the mine. As the lime sludge reaches the connection, the pressure will increase and "slug" of lime sludge will pass from the forcemain to the injection string. As the end of the slug passes, a vacuum will be created in the pipe. Each injection well will have an air/vacuum release valve installed at the well-head. This will allow air to either be released as the lime sludge approaches the injection well or be allowed to enter the pipe as the last of the lime sludge from a particular

blowdown passes into the mine. Due to this, there will be very little if any force exerted on the injection string pipe as the lime sludge is delivered into the mine.

Much greater force will be generated once the lime sludge reaches the floor of Level 1 of the mine. Calculations conducted by the energy dissipater manufacturer estimate that at the floor of Level 1 of the mine approximately 9,000 pounds of force will be generated. The energy dissipater will be able to absorb and release most of the energy created by this force. When going to final design of the project, the design may or may not incorporate the large radius pipe at the floor of the mine. If this pipe is used, energy will be further dissipated so that the lime sludge can be conveyed by gravity to the injection points within the mine.

The large radius bend, if incorporated into the final design, will be constructed of schedule 80 carbon steel and the lateral distribution pipes will be constructed of schedule 40 carbon steel. The entire assembly will be secured and anchored so that all of the forces can be dissipated and absorbed at the bottom of the mine. Due to the vectors of force that will be generated, and due to the energy dissipating features of the design, very little, if any force will be translated upward into the injection string to cause any stress or vibration between the long string casing and the injection string casing.

12.3.1 IW Drilling Method

The wellhead for each IW will be contained within a reinforced concrete manhole. The IW's will be constructed after the manhole excavation and prior to placement of the concrete slab. Each manhole will be 6-feet in diameter. The excavation will be conducted such that IW location is in its approximate center. At the bottom of the excavation, an 8-inch layer of gravel or crushed rock will be laid and leveled and a 1-inch steel plate will be placed on top. The steel plate will have a hole in the center through which the borehole will be constructed. The hole in the steel plate will have notches at opposite ends, as depicted on **Figure 12.2**. The purpose of the notches is to allow for the 6-inch diameter IW pipe to be suspended during construction.

The elevation of the steel plate, directly adjacent to the hole will be surveyed using NAVD 88 to establish the surface elevation for the construction of the IW's. All depths recorded while drilling will be based upon this elevation. The surface elevation for the four IW's is anticipated to range between approximately 670 to 700 feet above MSL.

Each IW will be constructed inside of a drilled borehole to an approximate depth of 250 feet bgs, drilling through the ceiling of Level 1 of the mine. The borehole will be 10-inches in diameter to a depth of approximately 240 feet bgs, or 10 feet above the ceiling elevation of Level 1. Each IW location will be surveyed by an Illinois registered land surveyor in the state plane coordinate system and using NAVD 88. This information

will be used, along with the surveyed ceiling elevations obtained from the mine survey, to insure that the 10-inch diameter borehole extends to the proper depth. Starting at an approximate depth of 240 feet bgs, the borehole will continue at a diameter of 8-inches until it breaks through the ceiling of Level 1. The 8-inch diameter borehole will be drilled at the center of the 10-inch diameter borehole.

Both the 10-inch diameter and 8-inch diameter boreholes will likely be drilled using an air rotary wire line drill rig as described in **Section 5.0** of this narrative. Drill cuttings will ***be logged for determination of the geology and this information will be recorded and submitted as part of the Well Completion Report.*** Drill cuttings will accumulate within the manhole excavation and will be removed as needed during the drilling process. Drill cuttings will be stored on-site for later disposal or reuse.

If, for any reason, the boring needs to be stopped and the location abandoned, the drill rig will be pulled off the location and a new satisfactory drilling location will be located in the immediate vicinity. The abandoned borehole will be filled from the bottom to the ground surface with portland cement.

12.3.2 Injection Well Design, Specifications and Construction Methodology

Each IW will be doubled-cased and will be connected at the bottom to the distribution piping system within Level 1 of the mine. The ***long string*** casing will be 8-inch diameter schedule 40 carbon steel pipe a coal tar epoxy exterior coating. The sections of pipe will be threaded and placed within the 10-inch diameter borehole at its center. The annulus between the borehole and the 8-inch galvanized steel pipe will be ***sealed using portland cement*** from the bottom of the borehole to a depth that is ***2-feet*** below the elevation of the bottom of the manhole excavation. The remaining 2 feet will be filled with concrete (as depicted on **Figure 12.1** below). ***The portland cement in the annulus of the long string casing will be place via a tremie hose. The hose will be worked around the casing to insure even distribution and to avoid bridging. The anticipated depth is 290 feet and the anticipated volume of cement to be used is 750 to 800 gallons.***

The specifications for the long string casing and the injection string casing are as follows:

Long string casing:

- ***Depth: 290 feet***
- ***OD: 6-inches*** ✳
- ***ID: 5.44-inches***
- ***Weight: 19 lbs/ft***
- ***API Grade and thermal conductivity: TBD information will be included in the***

Well Completion Report
- *NO couplings will be used*

Injection String Casing:

- *Depth: 300 feet*
- *OD: 8-inches*
- *ID: 7.356-inches*
- *Weight: 28.5 lbs/ft*
- *API Grade and thermal conductivity: TBD information will be included in the Well Completion Report*
- *NO couplings will be used*

After the 8-inch diameter *long string casing* has been installed, *cemented* and sealed, the drilling assembly will be lowered into the pipe to drill the remaining 10 feet of rock between the bottom of the borehole and the ceiling of Level 1 of the mine at a diameter of 8-inches. The timing of the breakthrough into the mine will be communicated in advance with Lafarge to insure that personnel are kept out of the area.

Additionally, as part of the specifications for the project, a cement bond log will be conducted on every well constructed as part of the project (four IW's and one EW). This data will be included as part of the Well Completion Report.

Once the drilling has been completed, construction of the 6-inch diameter *injection string casing* will begin. The *injection string casing* will be 6-inch diameter schedule 40 *carbon* steel. The sections of pipe will be threaded together will be placed between the pipe sections to provide a seal. Once treaded together, the pipe sections will be bead welded to provide an additional seal and to enhance the integrity of the pipe during construction and during the operational life of the IW's.

Each section of *injection string casing* will have welded steel tabs toward the top of the flight, a few inches down from the shoulder. *Drillers widely use these welded tabs because they greatly increase the efficiency of the installation of the injection string. The tensile strength, the yield and the burst pressure rating are all several times higher than the maximum load of the entire 300 foot injection string. Based upon this evaluation, there should be no deformation at the end of the injection string.* The section of pipe will be rotated such that the steel tabs will rest on the steel plate to hold the *injection sting casing* in place during construction.

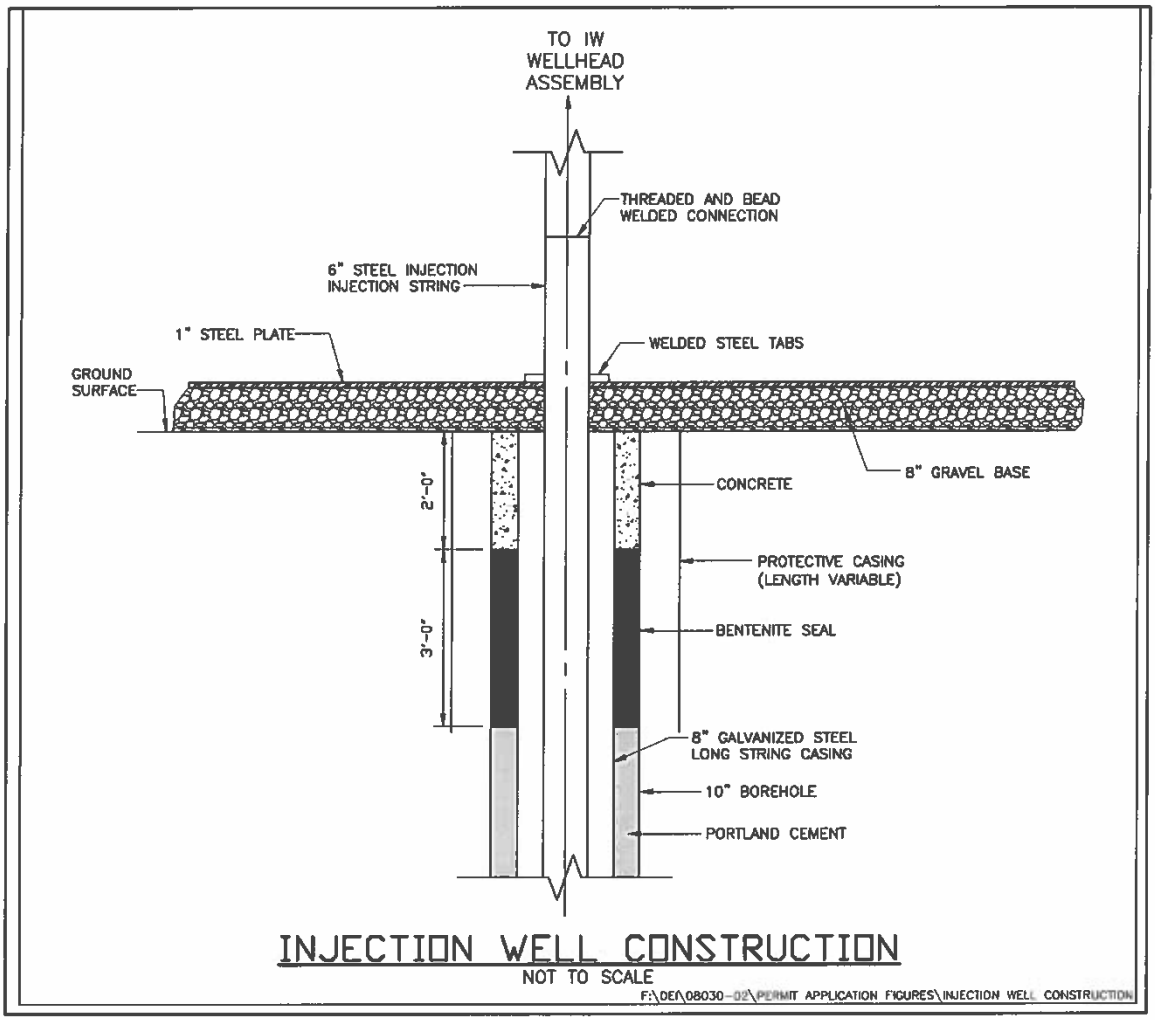

Figure 12.2 – Conceptual Diagram of IW Construction

Once the new section of pipe is threaded and welded to the preceding pipe section, the entire pipe length will be rotated so that the tabs can move through the grooves on opposite sides of the hole through the steel plate (see **Figure 12.2** below). This allows for the new section of pipe to be lowered into the hole. The entire pipe length will be rotated again, so that the steel tabs on the newly attached section of the pipe is rotated 90° from the grooves on the steel plate so that the tabs rest on the steel plate, holding the pipe length in place to attach a new section of pipe. This process will be repeated until the 6-inch pipe protrudes at least 24-inches below the ceiling of Level 1 of the mine.

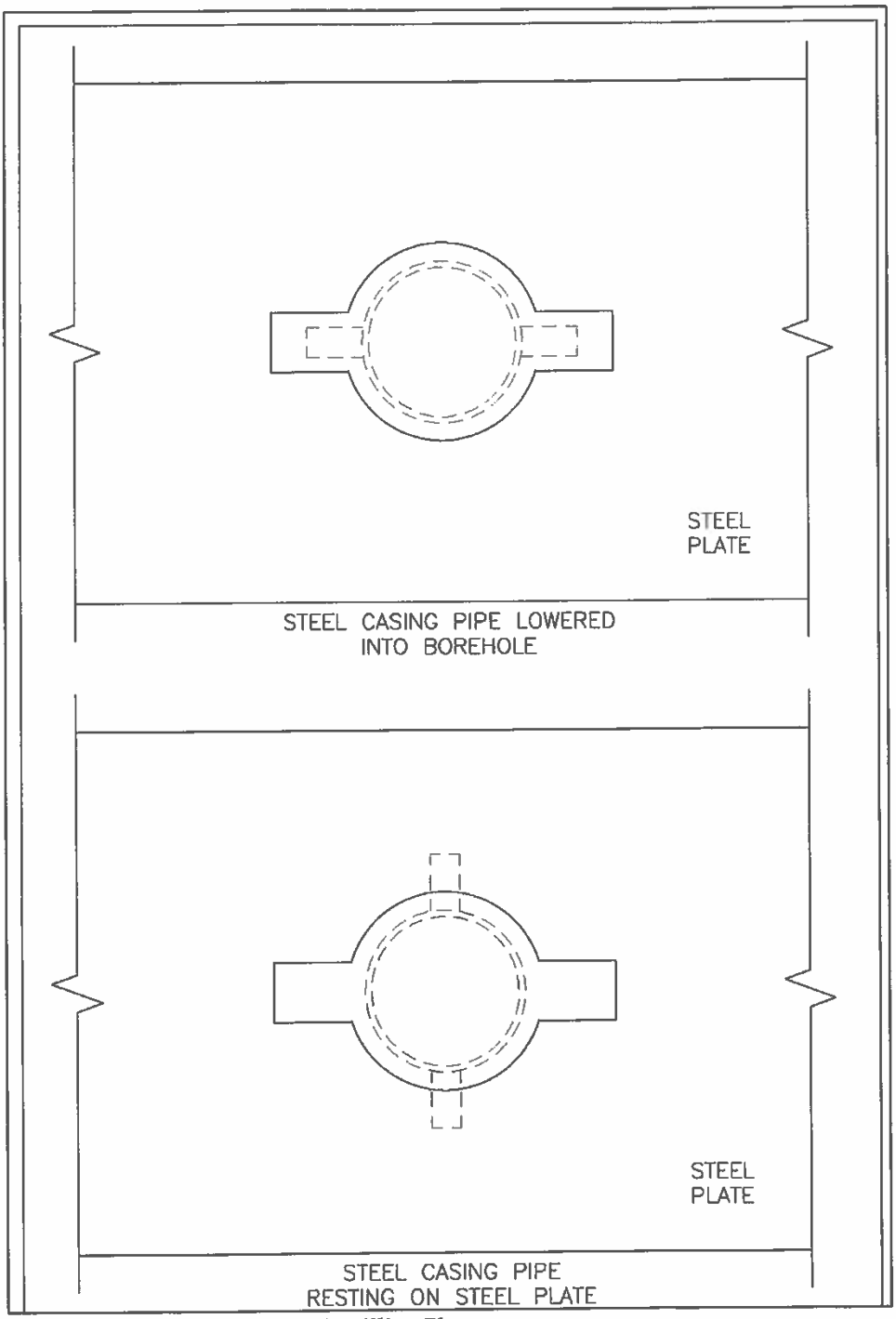

Figure 12.3 – Plan View of Steel Drilling Plate

During the construction of the injection string, the maximum allowable loads will need to be considered. As previously stated, the strengths of the long string casing and injection string casing are:

- *Tensile Strength: 60,000 psi minimum for both strings*
- *Yield: 35,000 psi minimum for both strings*
- *Burst Pressure: 17,080 psi for injection string and 15,070 psi for long string*

Additionally, the weight of the pipe is as follows:

- *6-inch injection string pipe: 19 pounds per foot*
- *8-inch long string pipe: 28.5 pounds per foot*

Based upon a maximum injection string length of 300 feet (the depth to the top of ceiling of Level 1 of the mine is about 240 feet bgs) the axial injection string load in air will be approximately 5,700 pounds. The nominal wall thickness for schedule 40 steel pipe is 0.28-inches. Therefore, the joint force of the entire 300 foot string across the cross-sectional area of the pipe results in the following:

- *Wall thickness = 0.28 inches*
- *ID = 5.44 inches*
- *OD = 6.0 inches*
- *Cross sectional area of steel pipe material = 5.02 square inches*
- *Force exerted on the pipe at joints = 5,700 pounds/5.02 in^2 = 1,133 psi for entire injection string*

Therefore, at the top of the injection string where the highest weight and stress will occur at the uppermost pipe joint, the force exerted on that joint will be 1,133 psi. The threaded and welded joints will have a tensile strength equal to or greater than the tensile strength of the pipe. This is because during the welding process, the steel that comprises pipe is melted and incorporated into the welded material that will be holding the pipe sections together. The maximum allowable stress, which is 33% of the tensile strength of the pipe, is approximately 20,000 psi. Therefore, the maximum allowable joint stress of 20,000 psi is approximately 17.5 times greater than the maximum force of 1,133 psi that will be exerted at the upper-most pipe joint based upon the total suspended weight of the injection string.

Using the 20,000 psi maximum allowable joint stress and the total cross sectional area of the pipe of 5 in^2, the maximum allowable suspended weight of the string is approximately 100,000 pounds.

Although the pipe and the welded connections would be water tight and strong enough to be used in the design without threading, threading was incorporated into the design

as a factor of safety and to provide structural stability to the pipe sections.

Additionally, the drill rig that is proposed to be used in this project must have a hold back rating that is higher than the maximum axial load of the injection string pipe. For instance, an air rotary Drill Tech T40 drill rig has a rated hold back of 26,500 pounds. Therefore, the drill rig itself can suspend the entire maximum axial load of the injection string with a comfortable factor of safety. Considering this fact, and considering the fact that the pipe sections will be threaded and welded together, the drill rig would be able to hold the entire string in place without the use of the welded steel tabs. Upon conversations with drilling contractors, it is preferable from an efficiency and safety stand point to construct the injection string pipe sections using the welded steel tabs and the notched steel plate as is currently described in the PA.

Once the construction of the injection string has been completed an additional steel plate will be placed around the section of pipe protruding above the bottom of the manhole excavation, on top of the steel drilling plate (see **Figure 12.4** below). The pipe will be welded to the steel plate.

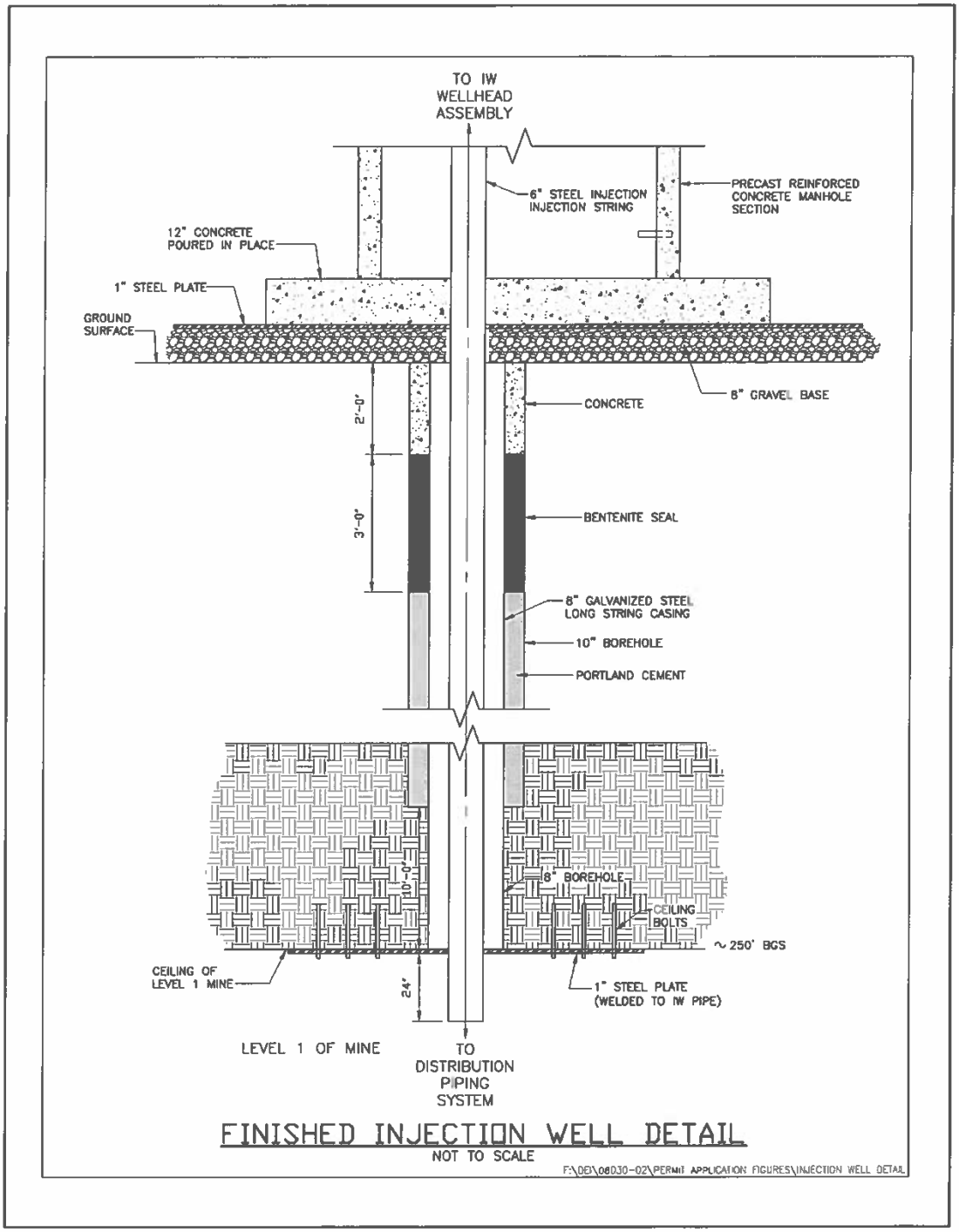

Figure 12.4 – Finished IW Detail

Concrete will then be poured across the entire bottom of the manhole excavation to

form a pad 12-inches thick. Another steel plate will be welded to the bottom of the 6-inch ***injection string casing*** that is protruding into Level 1 of the mine. This steel plate will be bolted to the ceiling for the purpose of securing the bottom of the IW to the ceiling of Level 1. The bottom of the ***injection casing*** will later be connected to the distribution piping system.

12.3.3 Connection of IW to Forcemain and IW Wellhead Completion

Once the concrete in the bottom of the excavation has cured, the manhole sections will be lowered and secured to the concrete pad. The 8-inch diameter forcemain from the WTP with a Y mechanical fitting will be connected to the top section of the ***injection casing connected to a pipe reducer***, and will exit the manhole assembly, above ground surface, with a gate valve and air vacuum release valve. The gate valve will allow the COA to connect a fire hydrant hose for the purpose of flushing the ***injection casing*** and distribution pipes, if needed. The air vacuum release valve will provide air balancing during pumping of the lime sludge into the mine (see **Figure 12.5** below).

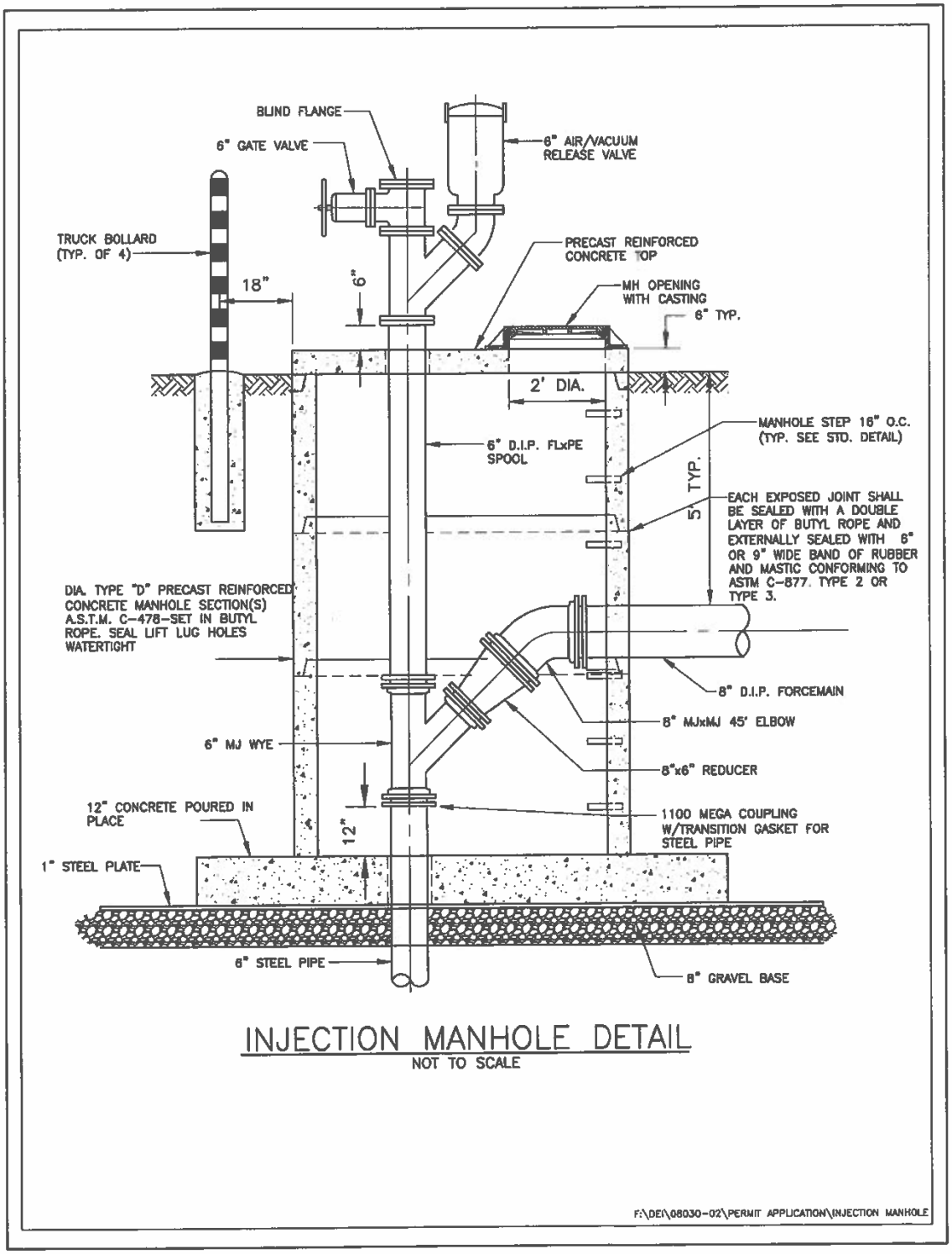

Figure 12.5 – IW Well Head Detail

12.4 Mechanical Integrity Testing

Mechanical Integrity Testing ("MIT") program will include the following elements:

- *Pressure testing on the IW's and the EW;*
- *Cement bond logging on the IW's and the EW; and*
- *Manhole and IW wellhead inspections.*

12.4.1 Pressure Testing

Air pressure testing will be conducted on the casing for the IW's and EW to test for mechanical integrity ("MI"). The testing will have the following general elements:

- *As much of the 300-foot length of casing will be tested;*
- *Inflatable packers will be used to seal the injection string at the top and the bottom;*
- *The packers will be inflated and the test will begin;*
- *The test duration will be 30 minutes;*
- *Pressure measurements will be made every 5 minutes;*
- *The casing will be pressurized to 125 psig;*
- *A pressure loss of greater than 10% will initiate a response; and*
- *A pressure loss of 10% or less, and the casing would be deemed to have MI.*

In the event of a pressure loss of greater than 10%, the following actions will be taken:

- *All equipment will be inspected and tested for defects;*
- *The test will be conducted again;*
- *If the results are the same, then the packers will be pulled and the source of the leak will be identified and potential corrective actions will be evaluated;*
- *If the results are 10% loss or less, then the casing will be deemed to have passed the test.*

12.4.2 Cement Bond Logging

As part of the bid specifications for the project, cement bond logging will be required for all wells. A qualified subcontractor will be retained and the presentation in the log will minimally include:

- *A correlation curve (gamma ray) and travel time (µsec);*
- *Amplitude (mV);*
- *Attenuation (dB/ft) curves; and*
- *Full wave form display (µsec)*

12.4.3 *Manhole Structure Inspections*

On at least a semi-annual basis, all well heads and manholes will be inspected for integrity. Valves and other components will be inspected. Additionally, the surface valving along the forcemain will also be inspected.

All test results will be presented in the Well Completion Report

12.5 *Distribution Piping and Injection Points*

In order to deliver the lime sludge from the IW's into Level 2 of the mine a network of distribution piping will be constructed along the floor of Level 1 of the mine. The goal of this piping network is to dissipate the energy that will be imparted to the sludge as it drops from the forcemain just below the ground surface into the mine and to distribute the lime sludge as evenly and space-efficiently as possible by gravity.

The IW's, which will be anchored to the ceiling of Level 1, will have a minimum of two feet of pipe protruding into the mine. The IW pipe will be connected to a vertical pipe with a 10-foot radius bend. The bend will have support structures connected to it which will be anchored to the floor of Level 1 of the mine. Horizontal piping will be connected to the end of the radius bend, leading to clusters of 18 uncased, drilled holes (injection points) through the sill between Levels 1 and 2 of the mine.

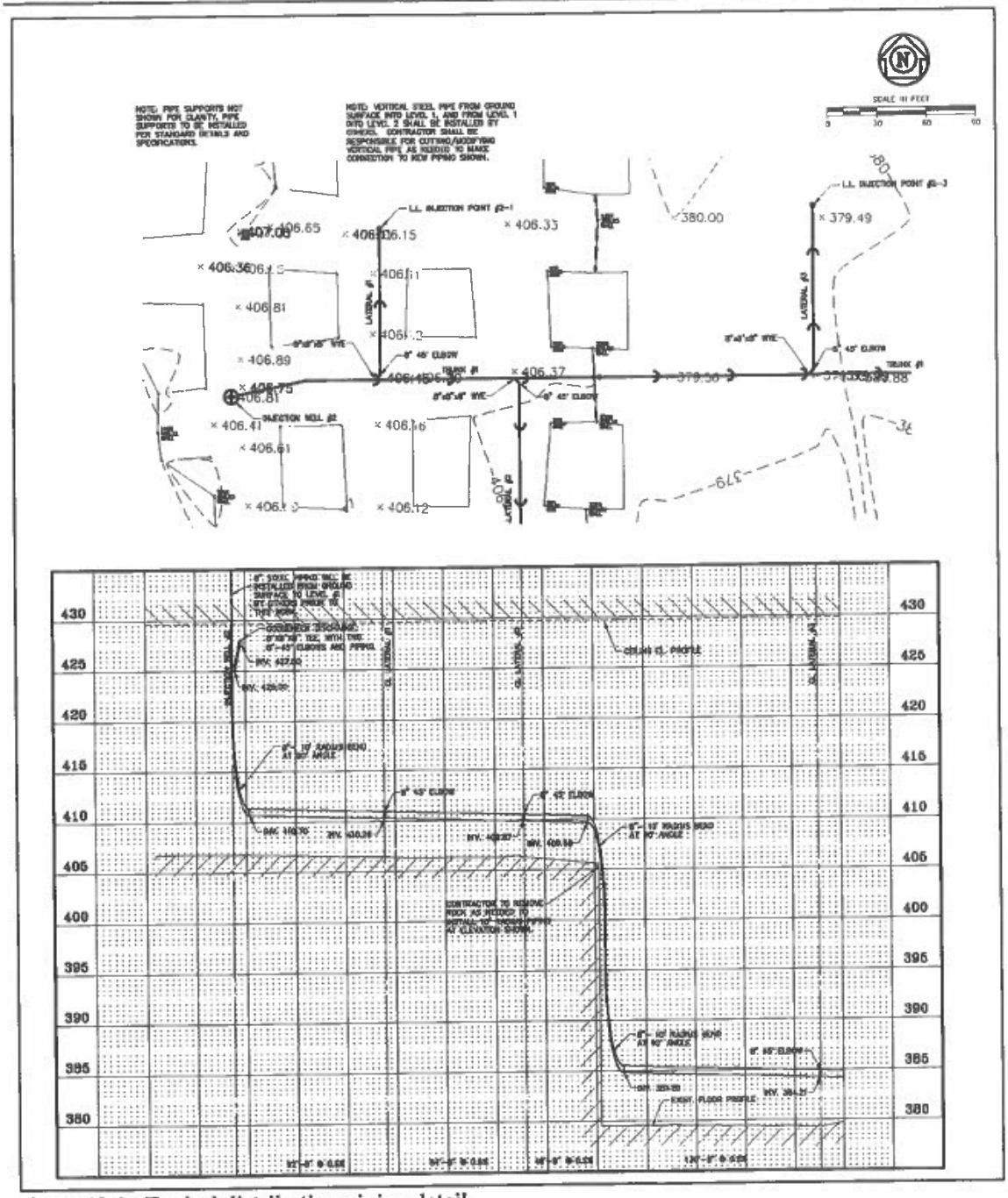

Figure 12.6 – Typical distribution piping detail

The injection points will likely be 10-inch diameter drilled holes and will be uncased. There will be a 90-degree connection from the pipe along the floor of Level 1 of the mine into the injection points. This connection may be anchored to the native rock to enhance

its stability. A vertical pipe will be connected to the 90-degree connection that will protrude through the ceiling into Level 2 of the mine. A fitting may be connected to the end of the pipe with 4, 90-degree openings to enhance the distribution of the lime sludge as it enters Level 2 of the mine, if determined to be optimal. The openings of the fitting will be parallel to the floor of Level 2, suspended approximately 2 feet from the ceiling. From this fitting, the lime sludge will deposit into the second level of the mine. The flow of lime sludge into the distribution piping network will be modeled using XP-SWMM or a similar program in order to properly size the pipes in the final design phase in order to equally distribute the flow of lime sludge to the various injection points. Based upon preliminary modeling, the diameter of the distribution piping will range from 8-inches to 4-inches.

The 10-foot radius sections connecting the IW's to the horizontal distribution pipes will be constructed from 8-inch diameter, schedule 80 carbon steel pipe. Additionally, approximately 50-feet of 8-inch, schedule 80 carbon steel pipe will be connected to the end of the radius bend section (as stated above, vortex energy dissipaters will be fitted at the ends of the four radius bend sections and based upon the final design calculations, this may or may not allow for the radius bend section to be eliminated from the design). The horizontal distribution piping will be 4- to 8-inch diameter schedule 40 carbon steel. The pipe and fitting joints for all of the pipes described above will be fully welded and the fittings will either be Y joints or 45-degree elbows. The horizontal piping will have a minimum slope of 0.5% to drain by gravity to the injection points. Each radius section and each injection point will have air vent pipes incorporated into the design.

The top of the distribution pipes, near where they connect to the bottom of the IW's will have an air vent pipe connected to it. This is the point at which lime sludge will eject in order to fill Level 1 of the mine once Level 2 has been filled to its maximum capacity. Please see **Section 12.7** of this narrative for a more detailed description of this process.

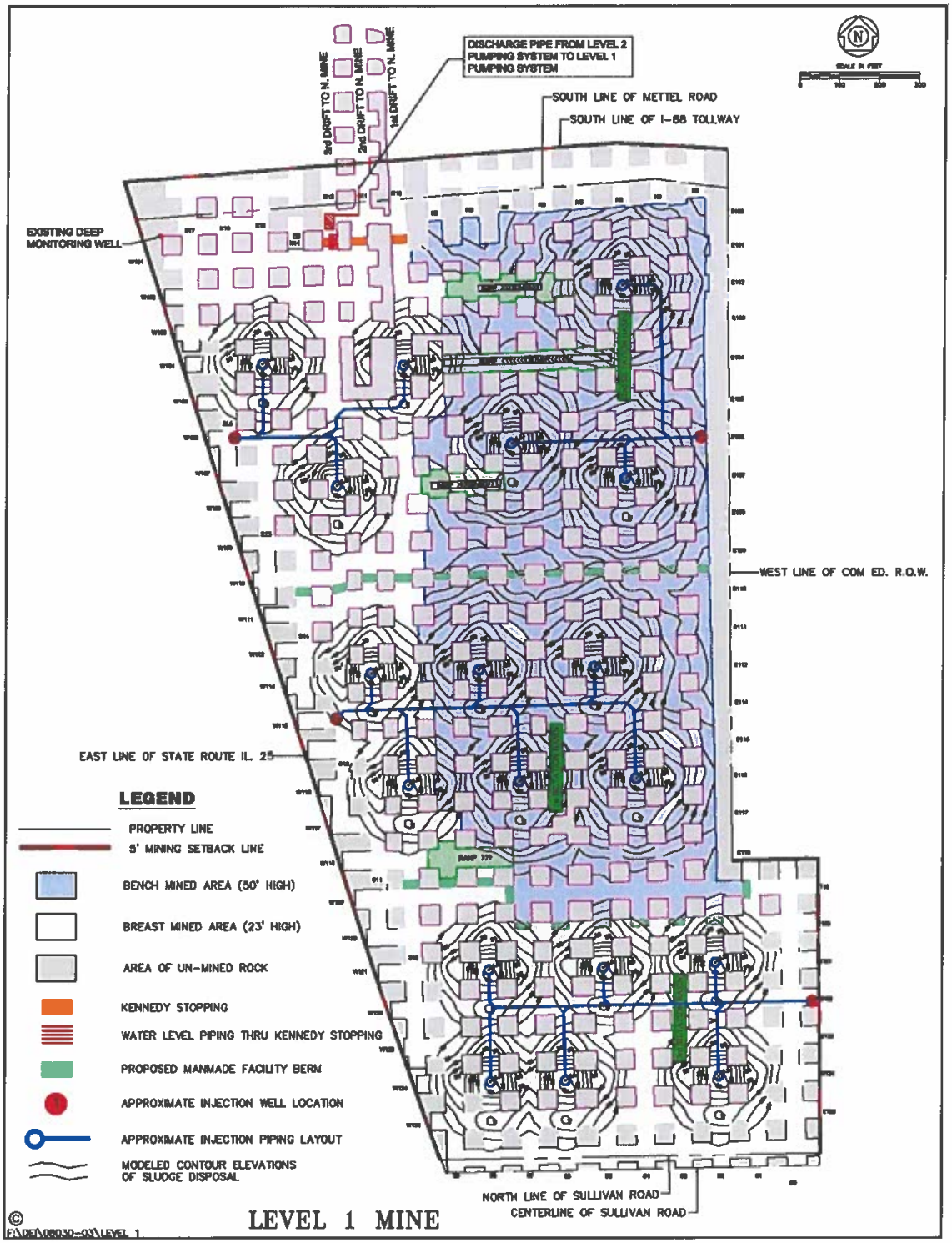

Figure 12.7 – Map showing Level 1 mine configuration and distribution piping system layout

12.6 *Siltation Basins and System Operation*

The system will be constructed so that each of the 4 IW's will have dedicated distribution piping and injection points connected to it. This is done to direct the lime sludge to evenly distribute within each of the three siltation basins that will be created on Level 2 of the mine. The IW's will be connected in the following manner:

- IW-1 will be connected to 6 injection points at the south end of the mine and will deposit sludge into Siltation Basin #1;
- IW-2 will also be connected to 6 injection points and will deposit sludge into Siltation Basin #2; and
- IW-3 and IW-4 will both be connected to 3 injection points each and will deposit sludge into Siltation Basin #3.

By constructing berms between certain pillars on Level 2 of the mine, three siltation basins will be created, such that each injection well will deposit sludge into these siltation basins. The purpose of the basins is to insure that the solids deposit from the south end of the mine, progressing to the north end, while allowing the decant water to travel through the berms to the north end of the mine for extraction to the surface.

Each injection well will be initially operated one at a time, in sequence, starting with IW-1 at the south end of the mine, progressing in order to IW-4 at the north end of the mine. During this initial period, each well will be operated for a limited period of time (currently anticipated to be 3 to 6 months per well) to create a "blanket" of lime sludge on the floor of the mine. The purpose of this initial operational stage is to allow the lime sludge solids to fill any unfilled joints that may exist on the floor of Level 2 of the mine. After this initial operation period, each injection well will be operated in sequence for approximately one year or more each for the purpose of exercising valves and filling the mine in approximate equal volume until that area of the mine on Level 2 has reached its maximum sludge storage capacity.

Routine maintenance and inspection of the delivery, injection and extraction systems will be conducted in accordance with all procedures specified. Also, the bulkheads will be routinely monitored, repaired and maintained by Lafarge for any evidence of leakage and overall integrity.

Additionally, the lime sludge influent into the forcemain from the wet well will be routinely sampled and analyzed for chemical parameters along with the supernatant discharge from the extraction well and the chemistry of the ground water from the on-site monitoring well. Please refer to **Section 16.0** for a more detailed description of the system monitoring that is proposed.

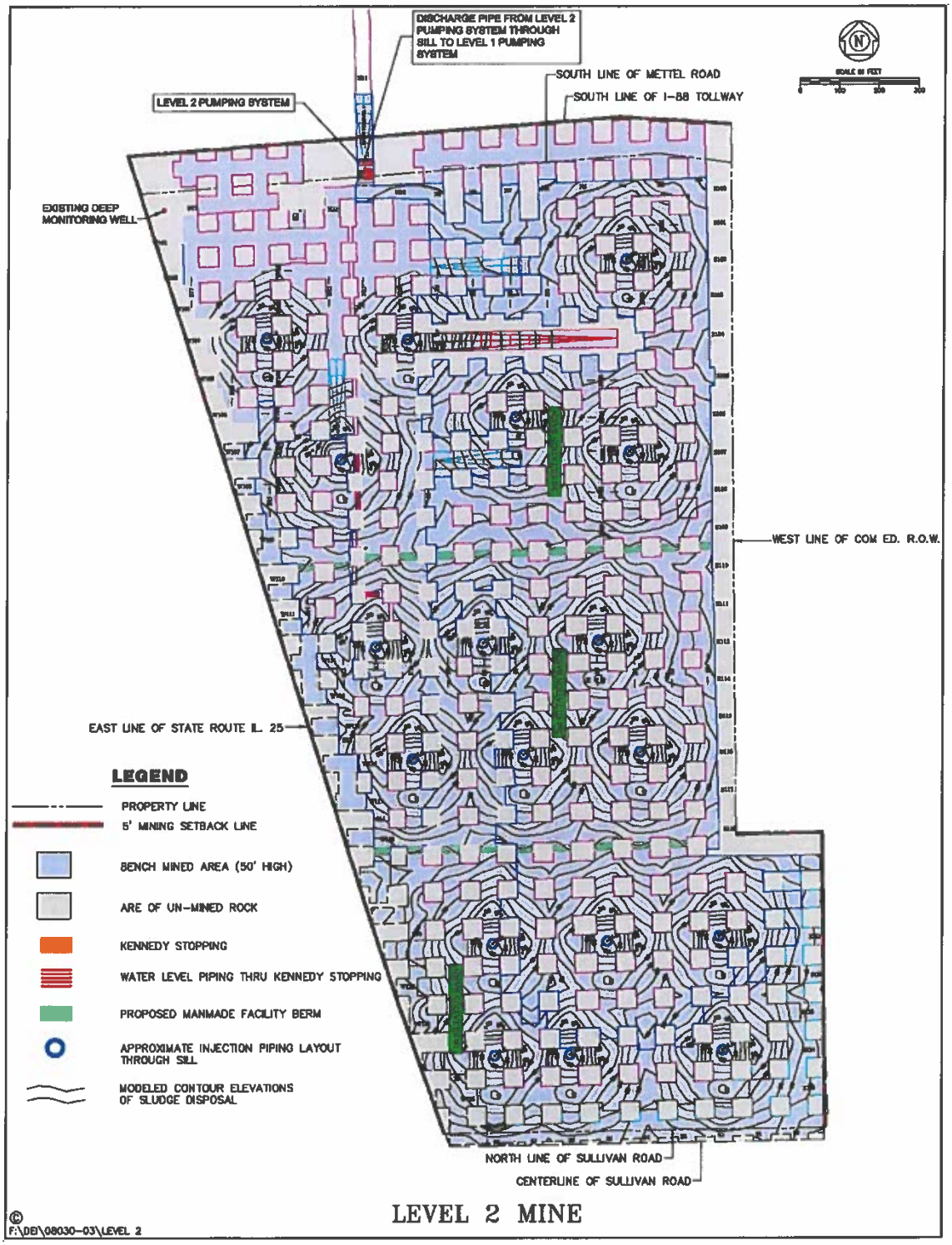

Figure 12.8 – Map showing Level 2 mine configuration, injection points and modeled lime deposition

12.7 *Extraction System*

As discussed in **Section 11.0**, the bulkhead on Level 2 and one of the bulkheads on Level 1 of the mine will be constructed with piping through it in order the extract the supernatant that will form on top of the lime sludge solids as the sludge dewaters after injection. The supernatant will be then be pumped to the surface via a single extraction well and discharged to a nearby FMWRD sanitary sewer.

12.7.1 Supernatant Inlet Piping

The level of the decant water, or supernatant, will be maintained at a maximum head of 5-feet. This maximum head level will be maintained by creating supernatant inlets constructed through the bulkheads. Each of the flanged inlets on the end of the pipe into the lime sludge storage area will be spaced 5-feet apart, starting with the first inlet approximately 5-feet from the floor of the mine. As the solids level rises, the valve on the lower inlet pipe will be closed and the valve on the next highest inlet pipe will be opened. This will progress until the storage area is completely filled with solids. The supernatant inlets will have sludge monitoring devices to detect the elevation of the solids prior to reaching the inlet pipe in order to determine the proper time to open the next highest inlet valve.

The inlet pipes will be connected together to a discharge line that will connect to the pumping system that will be located north of the bulkhead on the dry side of the mine. The pumping, electrical and control systems will be housed in a prefabricated building. The building will be transported into the mine and will be anchored in place adjacent to the bulkhead on a concrete slab. The discharge line from the inlet pipes will be connected directly to the pumping system inside of the building. In order to prevent potential damage to the pumps, each inlet pipe on the wet side of the bulkhead will have an inverted elbow to prevent any debris from entering the pipes.

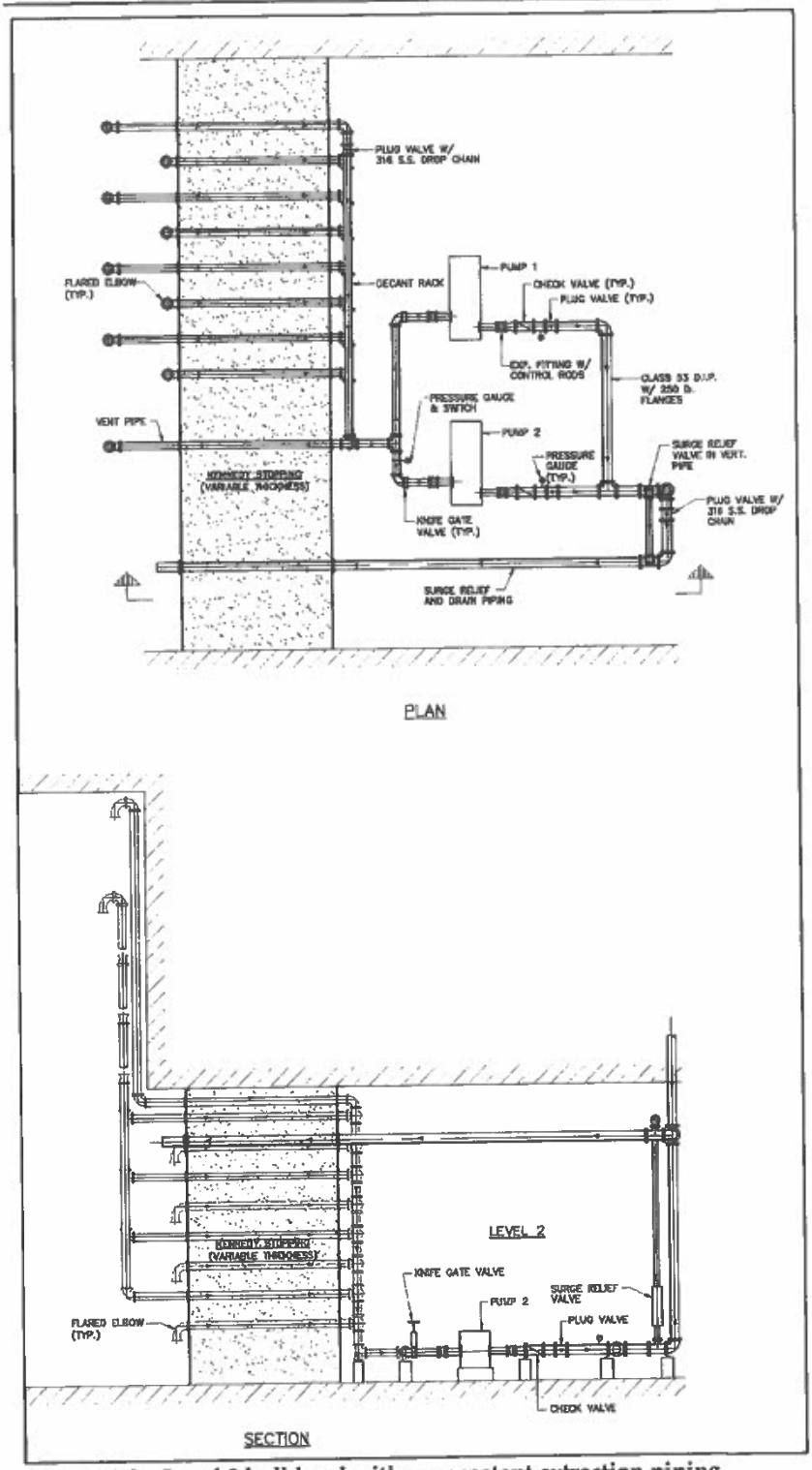

Figure 12.9 – Level 2 bulkhead with supernatant extraction piping

12.7.2 Extraction Pumps, Valves and Controls

The supernatant must be collected from the lime sludge detention area and pumped from the floor of Level 2 of the mine to the ground surface. The elevation of the floor of Level 2 of the mine in the area where the pumping system will be located is approximately 300 feet above MSL (NAVD 88). The surface elevation at the proposed location of the EW is approximately 670 feet. The vertical distance that the supernatant needs to be pumped is therefore approximately 370 feet.

The extraction pumps proposed in the preliminary design will be end-suction, horizontal, close coupled cast iron construction with the following performance specifications:

- Flow rate: 250 gpm
- Total Dynamic Head: 380 feet (minimum)
- Speed: 3,550 rpm
- Motor size: 50 HP

The pumping system will include gate valves, surge relief valves and control check valves to control potential backflow into the system. The system will include an MCC and control panels. The system will have pressure gauges to read the suction and discharge pressures of the system.

A new electrical feed will be supplied to the mine. There is an existing Commonwealth Edison line that currently feeds the air venting system for the Lafarge mining operations. A new 15 kV line will feed down to a point near the extraction pumping station. A fusible primary switch, a 480-volt transformer and a MCC will be installed and housed in the pumping system walk-in type enclosure. The MCC will be a 600-volt class suitable for operation on a three-phase, 60 Hz system. The MCC will provide the electrical power to the pumps, control valves and the air compressor that comprise the extraction pumping system.

12.7.3 Extraction Well

The EW will be designed, drilled, constructed and surface completed in the exact manner as the 4 IW's. Therefore, please refer to **Section 12.3** for the specifications of the IW design and construction.

12.7.4 Discharge to Sanitary Sewer

The EW will be connected to a forcemain as depicted on **Figure 12.5**. The forcemain will be designed and constructed with the same specifications as the blowdown

forcemain. The discharge forcemain will be connected to the FMWRD sanitary sewer for supernatant disposal. All necessary permits for this connection and discharge will be obtained prior to the operation of the lime sludge injection system.

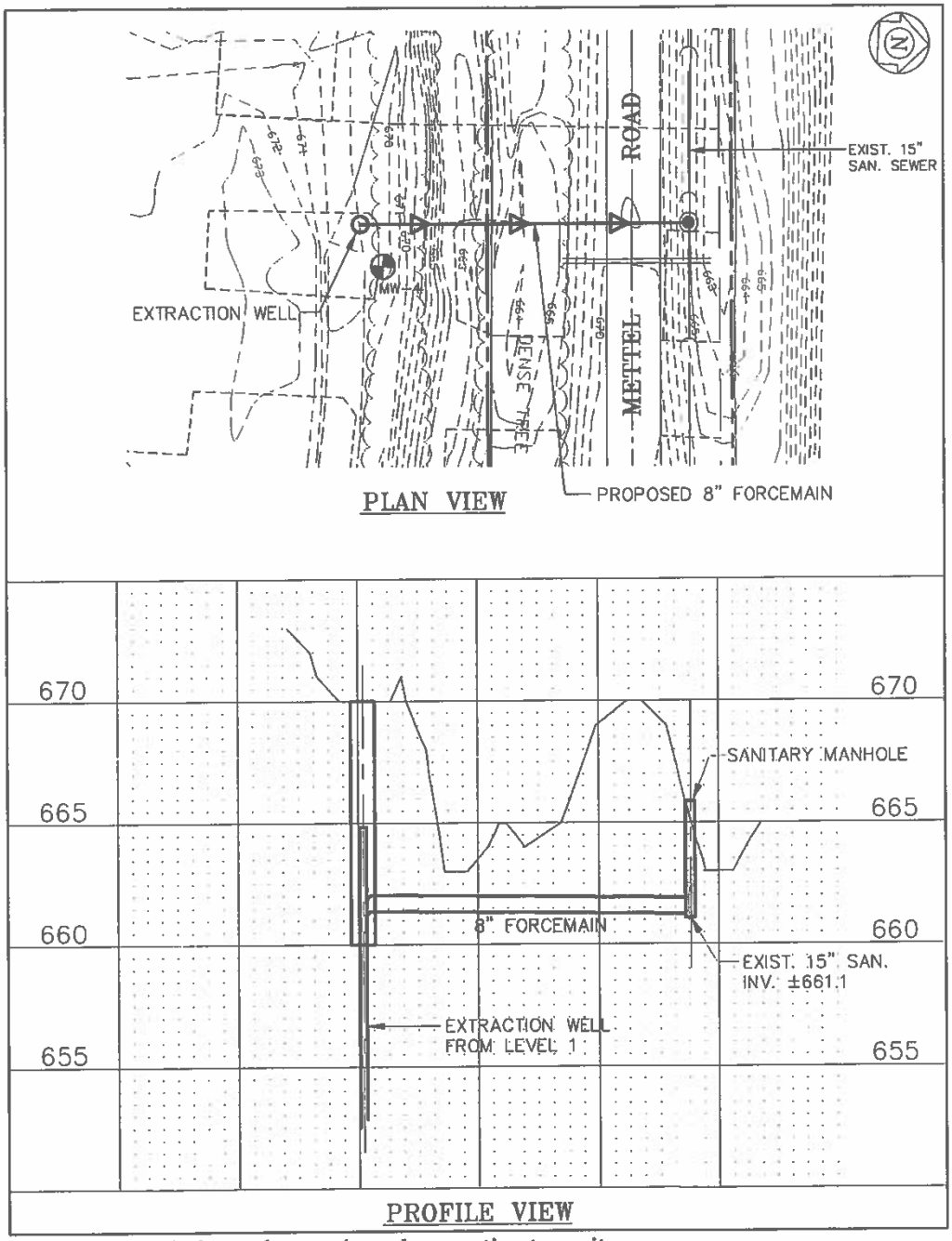

Figure 12.10 – Discharge forcemain and connection to sanitary sewer

12.8 *System Pilot Testing, Operation and Maintenance*

This subsection discusses the pilot testing, operation and maintenance of the system.

12.8.1 System Pilot Testing

Once the entire system is constructed, a pilot test will be conducted using water. The test will be conducted while the mine is still and accessible and all safety structures are still in place so that the function of the injection system and distribution piping can be directly observed. The mine will be cleaned and debris removed and all of the mapped, unfilled joints will be sealed around the perimeter of and floors of Levels 1 and 2 prior to the initiation of the test.

Water will be introduced into the system through the wet well so that the blowdown forcemain pumping system can be tested including the SCADA, electrical and pumping system and all associated valves. The distribution piping and their connection to both the bottom of the injection wells and the injection points will be tested to be sure that there are no leaks in the pipe joints and connections and to observe the structural stability of the system. The extraction system will also be testing using a water supply connected to the inlet pipes since there will not be enough water at the bottom of the bulkhead to reach the first inlet pipe from the injection system testing.

All observations and data will be recorded and evaluated and all necessary system modifications will be made until its operation is optimal and is performing as it was designed. The pilot testing will be conducted over a period of a few months and once completed, the mine will be cleaned, sealed and the remaining system will be completed in preparation of full-scale operation.

All of the results of the pilot test results will be incorporated into the Well Completion Report.

12.8.2 System Operation and Maintenance

Once all tasks associated with system construction have been completed, the IW's will be initially operated one at a time, in sequence, starting with IW-1 at the south end of the mine, progressing in order to IW-4 at the north end of the mine. During this initial period, each well will be operated for a limited period of time (currently anticipated to be 3 to 6 months per well) to create a blanket of lime sludge solids on the floor of the mine. The purpose of this initial operational stage is to create a blanket of lime sludge on the floor of the mine so that the solids have an opportunity, early in the operational life of the system, to infill any unfilled joints that may exist on the floor of Level 2 of the

mine that haven't been sealed by Lafarge.

After this initial operation period, each injection well will be operated in sequence as described above for approximately one year or more for each well for the purpose of exercising the valves and filling the mine in approximate equal volumes for each siltation basin, until that area of the mine on Level 2 has reached its maximum sludge solids storage capacity.

The performance of all system components will be monitored and the entire system will be maintained, and wear parts replaced as needed and in accordance with the manufacturers recommendations.

12.8.3 Filling of Level 1

As previously stated, Level 1 of the mine will fill with lime sludge after Level 2 has reached its maximum storage capacity. As previously stated, cones and beaches will form on Level 2 directly under the injection points. As the level of the lime sludge solids reach the ceiling of Level 2, it will eventually block the end of the distribution pipe in the injection hole. As sludge continues to build, it will eventually be forced through the injection point and into the end of the distribution pipe. Continued injection of sludge at this point will eventually cause the distribution pipe to fill with sludge and it will be ejected out of the air vent pipe at the top of the distribution pipe, near its connection to the bottom of the IW.

At this point the air venting will occur at the air vent at the IW well head and Level 1 of the mine will begin filling with lime sludge. This will be monitored by sensors installed in the lowest inlet pipe on the bulkhead on Level 1. Once it is known that Level 1 of the mine is beginning to fill with sludge, the pumping system will be moved from Level 2 and reinstalled on Level 1. This will be completed by cutting and capping the discharge manifold line from the supernatant inlet pipes on Level 2. Then, the discharge line from the pumping system to the EW will be cut and capped and the entire pumping system (which is self-contained and mobile) will be moved to the dry side of the Level 1 bulkhead. The pumping system will then be connected to the supernatant discharge line and to the EW in the same manner as it was connected to the analogous structures on Level 2, the system will be tested and will be ready to extract supernatant from Level 1 of the mine well in advance of the supernatant starting to flow into the lowest inlet pipe. It should be noted that the EW pipe will be exposed from the ceiling to the floor on both Levels 1 and 2 of the mine allowing for the easy disconnection of the pumping system from the EW.

Filling Level 1 of the mine in this manner will add approximately 10 to 15 years to the effective operational life of the system.

12.9 *Injection Fluid Compatibility*

All of the system components are compatible with the lime sludge injection fluid. This fluid (solids and supernatant) has an average pH of approximately 10, which is the primary factor when considering the compatibility of the lime sludge with the various components of the delivery and injection system.

The WTP has used carbon steel piping inside of the plant and ductile iron pipe in each of the dewatering lagoons for the 30-plus years of operation. In that time, there has been virtually no corrosion of the pipes or unusual operational issues with the pumps, valves or other system components (other than normal wear and tear). This empirical evidence suggests that the carbon steel components (injection string casing, long string casing, extraction string casing and Kennedy Stoppings) and ductile iron components (suction piping, pump discharge piping and fittings, check and plug valves, forcemain piping and fittings and extraction piping) are all compatible with the injection fluid and will not be adversely affected by the pH of the injection fluid solids or supernatant nor will have a decrease in their normal life expectancy.

The evaluation conducted indicates that all system components are compatible with the lime sludge and the characteristics of the lime sludge will not represent a threat to the integrity of the delivery and injection systems.

All of the system components that come into contact with the injection fluid that will be incorporated into the final design of the system will be insured to be compatible with the characteristics of the lime sludge. Please refer to Section 9.0 for the complete characterization of the injection fluid. Please refer to the System Compatibility Table, in Exhibit C.

1.0 GROUND WATER MONITORING WAIVER REQUEST

Due to the conditions present in the mine (injection zone), the nature of the geology in the AOR and due to the characteristics of the lime sludge generated by the WTP, the City respectfully requests a waiver from ground water monitoring requirements as per instructions outlined on form 4e.

The basis of this request is as follows:

- The geology of the injection zone as visually inspected within the mine;
- Mine characteristics and sealing;
- Full modeling conducted using empirical data collected from within the mine and from the adjacent Deep Monitoring Well;
- Data collected on the lime sludge solids and the supernatant over a 12 year period consistently establishing that it is a non-contaminated waste material.

1.1 Potential for Fluid Flow

Potential fluid movement within the types of rocks comprising the injection zone can only occur along bedding planes and along post-lithification secondary porosity features (fractures/joints and dissolution features). The rock mass itself is essentially impermeable. The subsections below will discuss the geology and these potential pathways of fluid movement.

1.1.1 Geology

In most circumstances the geology of an injection zone can only be determined by vertical boreholes, with interpretation conducted between them. This case is unique in that the geology of the entire injection zone has been inspected from floor to ceiling as exposed inside of the mine. This allowed the City to map and identify fractures and joints, bedding planes and joint apertures, infillings and all other physical feature present within the injection zone.

Agapito Associates, Inc. ("AAI") was retained by Deuchler Environmental, Inc. ("DEI") to assist in the mapping of the geologic features of the mine and to collect specific data that would be required to run the hydromechanical model, with the goal being to use as much actual data from the site as possible. All of this work is outlined in Appendix A of the PA, and is also summarized in **Section 10.0** of the PA. The mine is comprised of standard room and pillar design, with each averaging about 50 feet square.

The injection zone is comprised of limestone of the Dunleith Formation of the Galena Group in Level 2 of the mine. Level 2 has a ceiling elevation of approximately 300 feet above mean sea level. DEI and AAI conducted field mapping of the mine with the following summary of results:

- Rock was comprised of limestone, with bedding planes of variable thickness;
- No faulting or vertical or horizontal off-sets, or folding was observed within the mine
- The rock mass exhibited 4 sets of through-going joints: J1 (northeast-southwest), J2 (northwest-southeast), J3 (east-west) and J4 (north-south).

The primary joint sets are J1 and J2 and the complimentary joint sets are J3 and J4. The complimentary joint sets are minor, localized and limited in size and length.

1.1.2 Joint Sets

The primary joint sets (J1 and J2) had an average length of 80 feet on Level 2. The maximum observed joint length was approximately 200 feet. The spacing of the joints (as measured perpendicular to the joint faces) averages approximately 110 feet on Level 2, with the maximum observed joint spacing ranging from 350 to over 500. AAI noted that this information is consistent with for other locations in northeast Illinois for both the Silurian System dolomite and the Galena and Platteville Groups.

Each joint set observed was speciated based upon the type of infilling presented, the speciation was as follows:

- Closed Joints with small aperture and no infilling: 69 total (23%);
- Simple clay infilling: 227 total (75.4%);
- Clay pods: 2 total (0.60%); and
- Calcite/Breccia: 3 total (1.0%).

For these types of joints, the following results were obtained through field measurement of laboratory measurement of infilled material:

- Samples that were predominately clay had a mean hydraulic conductivity of 2.7 x 10^{-8} cm/s;
- Samples with clay with dolomite and calcite fragments had a mean hydraulic conductivity of 2.5 x 10^{-7} cm/s; and
- The aperture size was measured on 15% of the joints with no infilling using a feeler gauge. All of the joints tested were smaller than the smallest gauge. Making the aperture size 0.0015-inches with an assumed hydraulic conductivity

of 6.16 x 10^{-2} cm/s. Note that for an average joint spacing of 116 ft (Table 3-1), a joint hydraulic conductivity of 6.16E-02 cm/s is equivalent to a hydraulic conductivity in a porous medium of 1.74E-05 cm/s, which is comparable to the highest hydraulic conductivities estimated from the packer tests.

1.1.3 Bedding Planes

A monitoring well was constructed on the property but outside of the mine area. The purpose of this well was to characterize the geology of the injection area from the ground surface into the USDW of concern, the St. Peter formation. As part of this process, a series of packer test were conducted within the bore hole as depicted on Figure 11.2 on page 11-6. A total of 20 tests were conducted at 20 foot intervals from the top of the Galena Group to the bottom of the Platteville Group. The average hydraulic conductivity was 9.26 x 10^{-6} cm/s. This is approximately the same as the values from within the injection zone.

1.1.4 Hydromechanical Modeling

AAI conducted hydromechanical modeling using the UDEC 4.0 model. UDEC 4.0 is a two-dimensional numeric program based upon the distinct element method for discontinuum modeling. The UDEC model was chosen because the potential flow of fluids out of the storage area in the mine will be along bedding planes and secondary porosity features and not through the rock matrix itself. This is consistent with field studies of the Galena-Platteville Groups.

Because, as discussed in **Section 9.0** of the PA narrative, the lime sludge contains no contaminants, fate and transport modeling was determined to not be necessary in order to evaluate the feasibility of the project. Therefore, the primary purposes of the modeling were to characterize and predict:

- Potential fluid flow through a solid rock matrix with secondary porosity features;
- The overall stability of the rock system in the presence of the stored lime sludge.

UDEC models fluid flow through the joints and bedding planes within the system of impermeable blocks. All of the assumptions listed in Section 1.1.2 were used in the model. Additionally, as the sludge deposits and thickens in the mine, additional sludge will be deposited and some of the water may seep downward. Therefore the hydraulic conductivity of the sludge solid was also taken into account in the model. The hydraulic conductivity of the solids was averaged to be 1.0 x 10-5 cm/sec.

The primary assumptions and boundary conditions used were:

- An assumed maximum supernatant head elevation of 6 feet above the settled lime sludge solids within the mine;
- A blanket of lime sludge solids will be allowed to deposit across the floor of the mine by alternating the injection from the four IW's;
- Lime sludge solids are assumed to eventually reach a 50-foot thickness;
- The lime sludge is assumed to have a bulk density of 144 pcf;
- Assumes no fluid flow within the rock matrix, which is assumed to be impermeable;
- Bedding planes are repeated at 20-foot vertical intervals corresponding with the spacing of the packer tests at the average measured hydraulic conductivity of the packer tests;
- Joints are assumed to be vertical;
- Based upon field mapping, lateral joint spacings are assumed to be 120-feet and joint lengths are assumed to be 200-feet (both based upon field observation and mapping;
- Joints are assumed to repeat in the same vertical plane separated by 100-feet between joint ends;
- Fluid flow is assumed to be along joints, taking into account the populational breakdown and hydraulic conductivity of the 3 different joint types mapped in the mine as listed above;
- An assumed potentiometric surface elevation of 180.40 feet above MSL;

Model results and discussion:

- The model predicts a worse case flow of 0.9 to 1.5 GPM across the entire mine. To put this in perspective, if the amount of flow predicted by the model is taken as a function of the total surface area of the floor of the mine (assuming a floor surface area of 43 acres), the worst case flow would be approximately 0.021 to 0.035 GPM/acre.
- The model predicted very low flow horizontally, and contributed almost nothing to the total flow.
- The model predicts flow will decrease over time;
- The model assumes a full 50 foot thickness of sludge on the first level of the mine; this will not occur;
- The mining company is going to seal all unfilled joints along all perimeter walls and on the floor with shotcrete or a similarly performing material;
- The aperture size of the joints is larger than the particle size of the lime solids with an average D_{50} grain size was 0.0129 mm versus the aperture of 0.038 mm;

- The mining company is planning on constructing a new Level 3 below Level 2 concurrent with the operation of sludge deposition operations. They have stated that they plan on commencing on 2019 and it will take approximately 10 years to complete the mining. Agapito states: "Only negligible flow, on the order of a few gallons *per day*, is expected to reach the water table (once Level 3 has been completed)" (AAI Report, page ix).

1.2 Characteristics of the Lime Sludge

The lime sludge once inside the mine will almost immediately separate into a solid fraction and a liquid fraction (supernatant). As the solids settle, the supernatant forms at the top. At the dewatering lagoon, samples of supernatant were obtained prior to its evaporation. After the solids had sufficient dried, samples were obtained for laboratory analysis.

The lime sludge solids have been tested a total of 15 times between June 1999 and July 2012. During this time, the following organic parameters were detected above the laboratory reporting limit:

- Benzene in the April 24, 2012 sample;
- cis-1,2 Dichloroethene in the April 24, 2012 sample;
- MTBE in the April 24, 2012 sample; and
- Phenol in the October 20, 2008, April 24, 2012, July 3, 2012 and July 19, 2012 samples.

There are no sources in the waste stream generation process that have been identified (raw river/well water or the lime powder) that can introduce these chemicals into the lime sludge. The lime sludge is stored outside of the WTP in the dewatering lagoons for several weeks at a time and these chemicals were likely imparted to the sludge from a surface source outside of the WTP or could be representative of cross contamination either in the field sampling or at the laboratory.

The supernatant has been tested a total of 7 times between August 2002 and July 2012. In that time, the following organic parameters were detected above the laboratory reporting limit:

- Chloroform in the April 24, 2012 sample; and
- 2,4-D in the July 3, 2012 sample.

All other parameters for VOC's, SVOC's, PAH's, pesticides, herbicides or PCB's were below the laboratory reporting limit in every sampling event for the sludge solids and the supernatant.

As with the lime sludge solids, there are no sources in the waste stream generation process that have been identified (raw source water or the lime powder) that can introduce these chemicals into the supernatant and is likely from a surface source while the sludge was in the dewatering lagoon.

In all sampling events on the solids and supernatant, none of the parameters that were detected exceeded any of the standards set forth in 620.410 as well as 35 IAC 611.

1.3 Characteristics of the System

The City of Aurora uses a lime treatment process. They have a blended water system that is usually 60% Fox River water and 40% well water. Once the water enters the plant, it enters the claricones which contain the lime power used in the treatment process. Lime sludge is created and is blown out of the cone at regular intervals. Currently, the lime sludge is diverted to dewatering lagoons.

Under this system proposed in the PA, the sludge will be discharged to a covered wet well, and will be pumped into a forcemain which will be fed to one of four different injection wells at the site (see **Figure 4.1**). The sludge will fall by gravity into a series of distribution pipes on the floor of Level 1 of the mine, and then will be dropped into Level 2 of the mine. From the Water Treatment Plant to the deposition into the mine, the injection system is completely closed and at no point along the length of the system is it possible for contaminants to be introduced (as opposed to the dewatering lagoons). For a more complete description of the proposed system, please refer to **Section 4.0**. Therefore, any sample taken at the pump discharge port within the proposed pump house, will represent the exact composition of the material entering the mine.

2.0 PROPOSAL FOR VARIANCE REQUEST

As was defined above, the proposed system is inherently safe and would be protective of ground water and comply with both 35 IAC 620 and 611. This is due to the following:

- The geology of the area;
- Mine preparation activities, including sealing of all unfilled joints;
- The very small amount of flow as predicted by modeling;
- The method of injection into the mine through a closed system; and
- The fact that the lime sludge isn't contaminated.

It is understood that the Illinois EPA considers monitoring as an important part of the Permit in this case. As such, the City is prepared to monitor the system, but believes

that it is more prudent to do so by sampling and analyzing samples of the lime sludge as it enters the mine, gaining a very quick feedback on these data, rather than indirectly monitoring what chemicals MAY be reaching the aquifer, perhaps decades later. There is approximately 175 feet of dolomite of the Platteville Group between the floor of the injection zone and the top of the aquifer. A network of monitoring wells would have years of delay in determining if the system is adversely impacting the aquifer.

Also, given the configuration of the site to the property boundaries, it would be very difficult to create a monitoring well network considered approvable to the Illinois EPA.

We propose installing a sampling port to the discharge line of the pump in order to facilitate the collection of representative samples of the sludge for laboratory analysis. From the sampling port location the lime sludge will be fed into the forcemain. Since the system is completely closed, the sample obtained at this point will be directly representative of the material entering the mine.

2.1 Sampling Method

The proposed sampling method is very simple. The sample will be analyzed as a sludge under United States Environmental Protection Agency ("USEPA") SW-846. The laboratory will supply two sterile 8 ounce glass jars. The sampling port will be controlled by a manual valve. During the day of sampling, after a sludge blowdown occurs it will fill the wet well at the pump house. Once the sludge reaches a certain height within the wet well level, the pumps will be activated and will begin pumping the sludge into the forcemain. At the time of sampling, one end of a plastic hose will be attached to the sampling port and the other end will be inserted into one of the jars, which will be held at an approximate 45° angle. The valve will then be slowly opened so that a manageable stream of sludge is produced and the jar will be filled. The cap will be replaced tightly, and the jar will be labeled, wrapped and placed in an ice-filled cooler for transport to a NELAC laboratory for analysis.

Jars will be labeled with the following information:

- Date
- Time sample obtained
- Sampler(s)
- Project Number
- Sampled Media
- Sample ID
- Project ID

The process will be repeated identically for each jar.

Custody tape will be wrapped around the cooler and chain of custody sheet will be completed prior to leaving the plant. The samples will be transported immediately to the laboratory, where they will be relinquished to the laboratory for analysis.

2.2 *Parameter List and Analysis Methods*

After consultation with the Illinois EPA Permit Section, it was agreed that the parameter list would be the compounds listed in 620.410 for Class I aquifers.

The most recent corresponding SW-846 test methods will be used by the laboratory and all of the parameter suites and individual parameters will be indicated on the chain of custody.

- Volatile Organic Compounds ("VOC's"): 5030B/8260B/8011;
- Semi-volatile Organic Compounds ("SVOC's"): 3510C/8270C;
- Pesticides and Polychlorinated Biphenyls ("PCB's"): 3510C/8081A/8082;
- Herbicides: 8321A;
- Metals: 3010A/6010B;
- Mercury: 7470A;
- Radium 226 and 228: 903.1/Ra-05;
- Cyanide: 335.4R1;
- Nitrate, as N: 353.2R2.0;
- Sulfate: 375.2R2.0;
- Total Dissolved Solids: 2540C;
- pH: 4500H+, B;
- Chloride: 4500Cl, E; and
- Fluoride: 4500F, C
- Perchlorate
- Total Solids Analysis

Total solids analysis is necessary because the sample will be analyzed as a sludge. Additionally, a note will be added to the notes section on the COC form saying "As received basis".

The percent total solids analysis is critical to know because the presence of the solids will skew the analysis results higher. The results can then be adjusted accurately using the percent solids as the conversion factor. All results will be reported in mg/kg.

2.3 *Tiered Sampling Frequency*

In lieu of ground water monitoring, the City proposes to analyze for all parameters listed in 620.410 on the following sampling schedule:

- Bi-monthly for the first year;
- Quarterly for years 2 through 6;
- Semi-annual for years 7 and 8; and
- Annually thereafter.

Therefore, for the anticipated initial permit cycle of 10 years, there will be 1 year of Bi-monthly sampling, 5 years of quarterly sampling, 2 years of semi-annual sampling and 2 years of annual sampling.

2.4 *Contingency Plan*

In the event that one or more parameters exceed the State standards, the following shall apply:

- If occurrence is during Bi-monthly sampling, continue sampling until 4 consecutive sampling events meet the standards; then proceed one year of quarterly sampling, 1 year of semi-annual sampling, and annual thereafter;
- If occurrence is during quarterly sampling, then continue quarterly sampling until 4 consecutive quarters meet the standards, then proceed to semi-annual sampling for one year, then annual thereafter; and
- If occurrence is either during the semi-annual or annual sampling, then sample quarterly until 4 consecutive quarters meet the standards, then semi-annual for 1 year and annual thereafter.

2.5 *Reporting*

For each sampling event, a report will be generated and submitted to the Illinois EPA for review. Each report will include the following:

- A cover letter summarizing the event, with notations of any significant results
- All laboratory analysis reports
- Data in tabular form (updated)

3.0 CONSLUSIONS

The ultimate goal of any monitoring program is to protect a resource; in this case the Ancell Group, specifically, the St. Peter Formation. The City feels strongly, that as presented in the Permit Application the project would have no chance to adversely impact this aquifer. The City is submitting this waiver request based upon what are felt to be the intrinsic elements of the project that make it protective of human health and the environment while maintaining compliance with state regulations.

The benefits of this project to the City and the State of Illinois are clear; drastic cost reduction, reduces carbon emissions through the elimination of transportation and use of heavy equipment and saves landfill space to name but a few.

The supports of this proposal are:

- In all of the sampling events conducted on the solids and supernatant, over 90% were not detected and those that were detected were below both the 620.410 and 611 standards;
- The hydromechanical model predicted very little flow out of the mine under worst case assumptions; under realistic assumptions, actual flow will most likely be much less than predicted;
- The characteristics of the mine and the mine preparation activities that will be conducted prior to the initiation of injection activities (e.g. sealing the unfilled joints); and
- The City's proposal for an aggressive sampling program for monitoring the sludge prior to its entry into the mine so that any issues that are identified can be proactively addressed.

Items removed from application.

10-29-14. KDH

Due to revisions

TABLE OF CONTENTS

Items removed from application

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES

REFERENCES CITED

Burch, S. L. (2002), "A Comparison of Potentiometric Surfaces for the Cambrian-Ordovician Aquifers of Northeastern Illinois, 1995 and 2000," Data/Case Study 2002-02, Illinois State Water Survey, Champaign, Illinois, 63 p.

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION
Form 1 – GENERAL INFORMATION

USEPA I.D. NUMBER _____
IEPA I.D. NUMBER 0894075971
UIC Well Number _____

I. This application is (check one) New ✓ Renewal ____ Permit Number _____

II. POLLUTANT INFORMATION

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the IEPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the form attached line if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements.

Yes	No	Form Attached	
___	✓	___	A. Is this facility a publicly owned treatment works which results in a discharge to waters of the State or US? (Form 2A)
___	✓	___	B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic production facility which results in a discharge to the waters of the State? (Form 2B)
___	✓	___	C. Is this a facility which currently results in discharges to waters of the State other than those described in A or B above? (Form 2C)
✓	___	___	D. Is this a proposed facility (other than described in A or B above) which will result in a discharge to waters of the State? (Form 2D)
___	✓	___	E. Does or will this facility treat, store or dispose of hazardous waste? (RCRA)
___	✓	___	F. Do you or will you inject at this facility industrial or municipal effluent below the lower most stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (Form 4)
___	✓	___	G. Do you or will you inject at this facility and produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (Form OG3)
___	✓	___	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (Form 4)

UIC Permit Form 1

___ ✓ ___ I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may effect or be located in an attainment area? (Form 5)

___ ✓ ___ J. Is this facility a proposed stationary source which is NOT one of the 28 industrial Categories listed in the instructions and which will potentially emit 250 tons per year of and air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (Form 5)

III. NAME OF FACILITY City of Aurora Class V UIC

IV. FACILITY INFORMATION

CONTACT (Name and Title) Alex Alexandrou, Chief Administrative Officer, City of Aurora
PHONE (630) 256-3441
MAILING ADDRESS 44 East Downer Place
Aurora, IL 60507-2067

LOCATION SE Corner IL Route 25 and Mettel Road
Aurora, IL

COUNTY KANE
SIC CODES (First) 1623
(Second) 1629
(Third) 4941
(Fourth) 4953
OPERATOR (Name) City of Aurora
Is the operator also the owner Yes ✓ No_____
STATUS OF OPERATOR
____ Federal ✓ Public (Specify)
____ State ____ Other (Specify)
____ Private
OPERATOR PHONE (630) / 256 - 3441
STREET or PO BOX 44 E. Downer Place
(City/Town) Aurora
(State & Zip Code) IL 60507-2067

V. EXISTING ENVIRONMENTAL PERMITS
NPDES NA
UIC NA
RCRA NA
OTHER (Specify) _____
OTHER (Specify) _____

UIC Permit Form 1

VI. MAP (Location) Fig 2.3, p.2-7
Attach a topographic map of the area extending to at least 2.5 miles beyond property boundary. Refer to instructions for precise requirements.

VII. NATURE OF BUSINESS (Location) Sec 3.0
(Provide a brief description)

CERTIFICATION (see instructions)
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME & OFFICIAL TITLE Alex Alexandrou, Chief Admin Officer, City of Aurora PHONE (630) 256-3441

SIGNATURE [signature] DATE 2/18/13

FACILITY OWNER* _____ PHONE _____

SIGNATURE _____ DATE _____

*Required if owner is different than operator.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4b – INJECTION WELL DESIGN, CONSTRUCTION, TESTS and LOGS

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application		
12.3.1	I.	Well Depth
NA	II.	Anticipated fracturing pressure
8.3/14.0	III.	Static Water level and type of fluid
14.0	IV.	Expected service life of well
12.3.2	V.	Injection well completion, see instructions
Fig 12.2 to 12.5	VI.	Schematic or other appropriate drawing of the surface and subsurface construction details of well
12.3	VII.	Well Design and Construction
12.3.1		A. Well hole diameters and corresponding depth intervals
12.3.2		B. Casing, see instructions
NA		1. Conductive casing
12.3.2		2. Surface casing
NA		3. Intermediate casing(s)
NA		4. Long string casing
NA		5. Other casing
NA		C. Injection tubing, see instructions
NA		1. Maximum allowable suspended weight based on joint strength of Injection tubing
NA		2. Weight of injection tubing string (axial load) in air
NA		D. Cement, see instructions
NA		1. Conductive casing
NA		2. Surface casing
NA		3. Intermediate casing
NA		4. Long string casing
NA		5. Other casing
NA		6. Cementing techniques, equipment positions and staging depths
NA		7. Perforation depths
12.3.2		E. Annulus Protection System
12.3.2		1. Annular space(s), specify ID and OD
12.3.2		2. Type of annular fluid(s)
NA		3. Specific gravity of annular fluid(s)
NA		4. Type of additive(s) and Inhibitor(s)
NA		5. Coefficient of annulus fluid(s)
12.3.2		6. Packer or fluid seal, see instructions

UIC Permit Form 4b

NA		a.	Packer(s), see instructions
NA		b.	Fluid spotting procedure, frequency and quantity
NA	VIII.	Information on well drilling company used during construction, see instructions.	
5.4 to 5.6	IX.	Tests and Logs, see instructions	
NA		A.	During drilling
NA		B.	During and after casing installation
NA		C.	Demonstration of mechanical integrity
App B&C		D.	Copies of the logs and tests listed above

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Alex Alexandrou, Chief Administrative Officer, City of Aurora
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2/18/13
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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c – OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application		
4.0/12.0	I.	Operation Program
4.0/12.0	A.	Area Injection Project (if applicable)
4.8/14.3	1.	Maximum fluid to be injected per day
14.4	2.	Years remaining in area injection project
4.0/12.0/13.0	3.	Anticipated total number of injection wells required
4.0/12.0	4.	Injection wells operate with/without common manifold
5.4/App B	5.	Number of injection zone monitoring wells, include list and schematics
NA	6.	Number of, name and location of injection wells currently in project, see instructions
NA	B.	Single Injection Well (if area permit is applied for, provide for typical well)
NA	1.	Number or name of well
NA	2.	Location, see instructions
NA	3.	Expected service life
NA	4.	Operation during 24 hour period
NA	5.	Operation days per month
NA	6.	Injection pressure, average and maximum
NA	7.	Injection rate, average and maximum
NA	8.	Casing-tubing annulus pressure, average and maximum
NA	a.	During operation, average and maximum
NA	9.	Other annulus pressure
NA	10.	Number of injection zone monitoring wells, include schematics
12.0/App D	II.	Surface Facilities
12.1.1/App D	A.	Injection fluid storage
12.1.1/App D	1.	Storage capacity in days and gallons
12.1.1/App D	2.	Type of storage facility(s)
4.11	3.	Storage capacity in case of well failure, describe
12.0/App D	B.	Holding tanks and flow lines, describe
App D	C.	Process and Instrumentation Diagram attachment
NA	D.	Filter(s)
NA	1.	Location
NA	2.	Type

UIC Permit Form 4c

NA		3.	Name
NA		4.	Model Number
NA		5.	Capacity, gallons per minute
NA		6.	Pore size, microns
12.1.2	E.	Injection Pumps(s)	
App D		1.	Location
App D		2.	Type
App D		3.	Name
App D		4.	Model Number
App D		5.	Capacity, gallons per minute

Certification

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e – MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER
IEPA ID NUMBER 0894075971
WELL NUMBER

Location in Application		
16.0	I.	Waste Sampling and Analysis
16.1/16.2		A. Sampling frequency
16.1/16.2		B. Analysis parameters
16.1/16.2		C. Sampling location
16.1/16.2		D. Detailed waste analysis plan
16.0	II.	Monitoring Program
16.5		A. Recording devices, see instructions
NA		1. Injection pressure gauges
NA		2. Casing-tubing annulus pressure gauges
16.5		3. Flow meters
NA		4. pH recording devices
NA		5. Temperature
16.3/16.4		B. USDW Monitoring in Area of Review
16.3/16.4		1. Number of wells
16.3/16.4		2. Type of wells
16.3/16.4		3. Frequency of monitoring
16.3/16.4		4. Type of sample
16.3/16.4		5. Parameters
Fig 4.6, App B		6. Map of well location and logs
16.3/16.4		C. Detailed Groundwater Monitoring Plan
NA	III.	Mechanical Integrity Tests During Service Life of Well, see instructions
4.11	IV.	Contingency Plan for Well Failure or Shut In, see instructions
4.11		A. Detailed contingency plan

CERTIFICATION

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4f – CHARACTERISTICS, COMPATIBILITY and PRE-INJECTION TREATMENT of INJECTION FLUID

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

9.0/9.5	I.		Component Streams Forming Injection Fluid
3.3	II.		Source and Generation Rate of Component Streams
3.3/14.1/14.3	III.		Volume of Injection Fluid Generated Daily and Annually
9.3 to 9.5	IV.		Physical and Chemical Characteristics of Injection Fluid, see instructions
9.3 to 9.5		A.	Generic waste/Fluid name
9.3 to 9.5		B.	Fluid phase
9.3 to 9.5		C.	Complete waste analysis
9.3 to 9.5		D.	Flash point
9.3 to 9.5		E.	Organics
9.3 to 9.5		F.	TDS
9.3 to 9.5		G.	pH
NA		H.	Temperature
9.5.3		I.	Density
14.3		J.	Specific gravity
NA		K.	Compressibility
NA		L.	Micro organisms
NA		M.	Chemical persistence
9.5		N.	Key component name(s)
9.0	V.		Injection Fluid Compatibility
NA		A.	Compatibility with injection zone
NA		B.	Compatibility with minerals in the injection zone
NA		C.	Compatibility with minerals in the confining zone
NA		D.	Compatibility with injection well components
NA			1. Injection tubing
NA			2. Long string casing
NA			3. Cement
NA			4. Annular fluid
NA			5. Packer(s)
NA			6. Well head equipment
NA			7. Holding tanks(s) and flow lines
NA		E.	Compatibility with filter and filter components
NA		F.	Full description of compatibility concerns
NA	VI.		Pre-Injection Fluid Treatment, see instructions

UIC Permit Form 4f

Certification

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4g – PLUGGING AND ABANDONMENT PROCEDURE

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

17.0	I.	Description of Plugging procedures, see instructions
NA	A.	Abandonment during construction
17.0	B.	Abandonment after injection
17.0	C.	Type and quantity of plugging materials, depth intervals
17.0	D.	Detailed plugging and abandonment procedures
NA	E.	Cost estimate for plugging and abandonment

Certification

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12.0 SYSTEM DESIGN SUMMARY

In order to determine the parameters, efficacy and feasibility of the project, DEI has completed a Memorandum of Design ("MOD") for the system which is included in **Appendix D** of this permit application. The MOD provides for the preliminary design of the system and system components. Upon approval of the Class V UIC permit application by the Illinois EPA, final design of the system will be conducted, permits to construct will be applied to the Illinois EPA and specifications for public bidding will be completed. Slight alterations of the design may occur between the MOD and the final design stages, but the major system concepts, features and components will likely remain the same. This section summarizes the MOD, broken out into the following elements:

- Delivery System – WTP improvements, pump station and forcemain;
- Injection System – IW's, distribution piping and injection points;
- Extraction System – Supernatant inlet pipes, pump system, EW, forcemain;
- Surface completion and power feed;
- Securing vent shaft.

12.1 Lime Sludge Delivery System

In order to deliver the lime sludge to the site, a lime sludge delivery system must be constructed. This system will include improvements made at the WTP along with the construction of an underground forcemain.

12.1.1 New Pump Station and Wet Well

A pump station will be constructed adjacent to the north of the existing WTP building. The pump station building will be constructed directly adjacent to and slightly overlapping existing dewatering lagoon #3. The pump station will house the pumping system for the forcemain, a wet well and all electrical and control systems.

The WTP claricones will be connected to the wet well via a gravity sewer. The wet well will provide a screening mechanism to remove solids from the sludge that could damage the pumps. This will allow for the more even and uniform pumping of the lime sludge to the site for injection and to eliminate the need to synchronize the pumps with the blowdowns at the WTP. The wet well will have enough storage capacity to accommodate the blowdown flow volume to be pumped to the site.

Blowdown data over a 2.5 year period (2010 through July 2012) was evaluated and modeled to determine the sizing of the system and to determine the volume of lime sludge that will be injected into the South Mine over time. This data is applicable for

the basis of system design because of the drought that occurred in the summer of 2012, resulting in unprecedented water demand. These data are representative of historic maximum lime sludge generation at the WTP. Based upon these data, the average percent solids were approximately 6% by weight and the average flow rate during blowdowns is approximately 800 gpm.

The WTP claricones will be connected to the wet well in the pump station by an 8-inch underground, gravity fed blowdown line. This line will be connected to the wet well which will have a hopper design and plan dimensions of 20-feet by 15-feet to accommodate a blowdown flow rate of 800 gpm. The wet well provides approximately 2,240 gallons per foot of active storage or 9,632 gallons of volume available to be pumped to the site.

An emergency overflow structure has also been incorporated into the wet well design that will bypass the forcemain and divert flow directly into dewatering lagoon #3 in the event that a need would arise.

Additionally, a tap with a back flow preventer to a water transmission main will be connected to the wet well to flush the forcemain periodically for maintenance purposes.

12.1.2 Forcemain Pumping System

The basis of design for the forcemain pumps will be the Wilfley Model K solids-handling centrifugal pump. This pump was chosen because it is specifically designed for application with abrasive materials and is easier to maintain compared to other pumps. The preliminary design calls for two pumps to be installed, each having the following performance characteristics:

- Flow rate of 800 gpm;
- Total dynamic head of 162 feet;
- Speed of 1,440 rpm; and
- Motor size of 125 HP.

The pump station will have a new motor control center ("MCC") which will be integrated into the WTP Supervisory Control and Data Acquisition ("SCADA") system.

12.1.3 Forcemain

The underground forcemain will be connected to the pump system to deliver the lime sludge to the site. The forcemain will be 8-inches in diameter and will be constructed of class 52 DIP with interior cement lining. The forcemain will be constructed at an average depth of 5.5 feet bgs from the pump station to the site.

The forcemain will also have the following design criteria:

- Velocity of 4.64 ft/sec at 800 gpm;
- Approximately 7,600 linear feet from the WTP to the site and on the site to the IW's;
- Asphaltic exterior coating with polyethylene encasement;
- Push-on style pipe joints;
- Fittings to have restrained mechanical Mega-Lug joints; and
- Pipe gaskets to be SBR material.

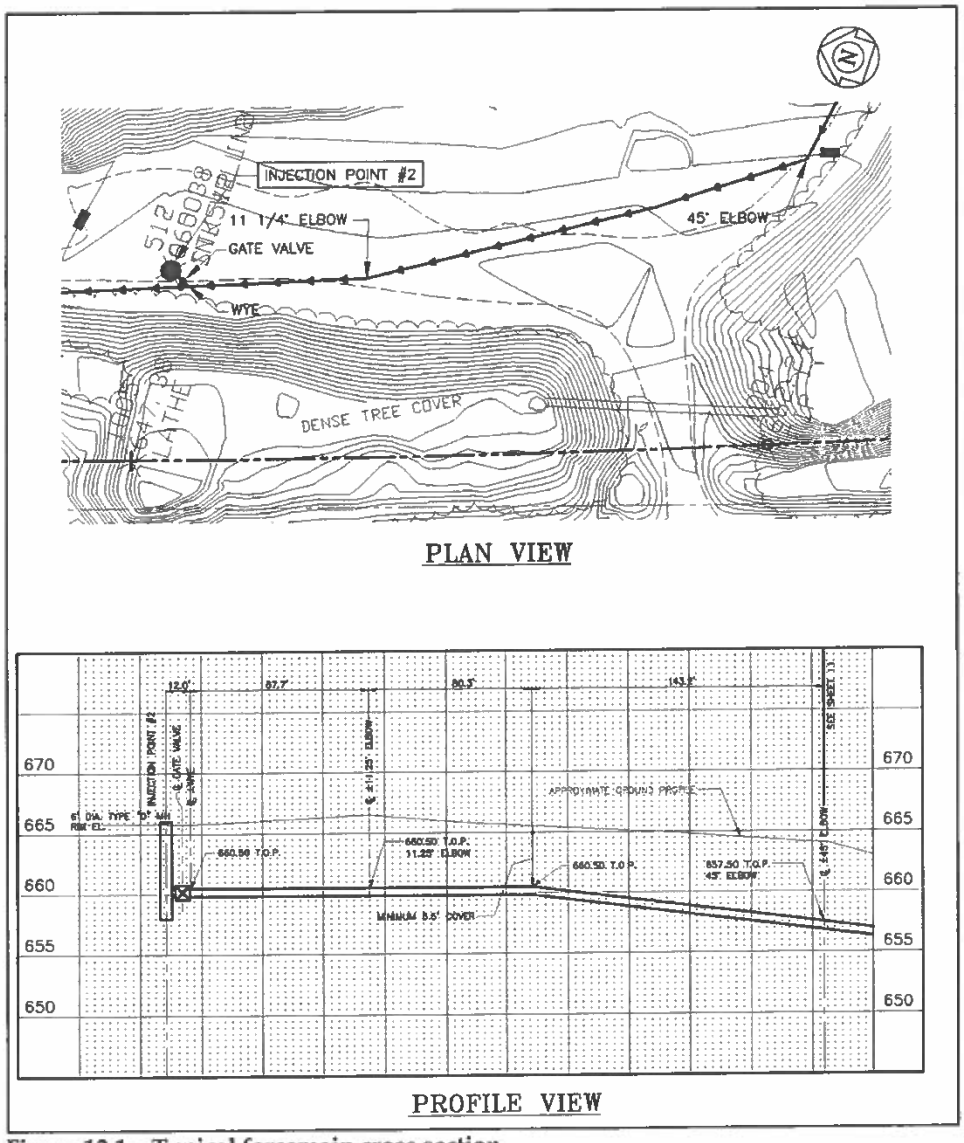

Figure 12.1 – Typical forcemain cross section

The forcemain will have a combination air/vacuum release valve at its topographically highest point as well as at each IW connection. At each IW, the forcemain will be connected to the top section of the IW pipe and will exit the manhole assembly, above the ground surface. In addition to the air/vacuum release valves, the forcemain will have gate valves as well.

The purpose of the air/vacuum release valves is to release air from inside of the forcemain while the lime sludge is pumping, but also to let air back into the vertical IW piping after the pumping has stopped so that the momentum of the falling sludge does not create a vacuum to potentially collapse the vertical piping. The purpose of the gate valves is to control the flow to the four IW's and to open and close the system, if needed, from the WTP. In addition, each IW will have a blind flange to connect to a fire hose for the purpose of flushing the underground distribution pipes, if needed.

12.2 Injection System

The injection system is designed to convey the lime sludge from the forcemain for deposition inside of the mine. The injection system includes the following components:

- Injection wells including forcemain connection, manhole access and associated valving;
- Ceiling connections to an energy dissipater;
- Distribution piping network;
- 18 injection points; and
- Three sedimentation basins.

The injection system will convey the lime sludge into the distribution piping on the floor of Level 1 of the mine, to the injection points through the sill between Levels 1 and 2 for deposition directly into Level 2 of the mine.

12.3 Injection Wells

The forcemain from the WTP will be connected to 4 different IW's at the site located as depicted on **Figures 4.1, 4.6 and 12.7**. The IW's will be connected at the ceiling of Level 1 of the mine to the distribution piping system.

Since the IW's are Class V and since the lime sludge will be deposited into the empty space of the mine and not forced under pressure into pore spaces of a geologic formation, there will be no back pressure against the annulus and casing of the IW's. The mine will be vented to the atmosphere using the 9-foot diameter air shaft located at the north end of the mine (on both Levels 1 and 2). This airshaft was used to supply air to the mine when it was in operation. The airshaft is constructed from the ground

surface through the ceiling of Level 1 of the mine. Air was supplied to Level 2 of the mine through a hole in the rock sill between Levels 1 and 2, approximately 15 feet by 20 feet in size. Based upon this construction, both Levels 1 and 2 of the mine are under atmospheric pressure conditions.

Because of this, as the lime sludge is deposited into the mine by the IW's, air within the mine will be displaced through the large diameter airshaft, as the air escape pathway of least resistance and virtually no pressure will be exerted on the IW annulus or casing.

Therefore, the pressures taken into account in the design of the IW's are those created by the lime sludge as it travels through the IW pipe. As the "slug" of lime sludge drops through the pipe, pressure will be exerted against the pipe pushing outward on the IW casing pipe. Once the slug has passed, pressure will be exerted inward against the casing pipe.

There were several considerations when evaluating the construction material, diameter and wall thickness of the IW pipe, such as:

- Pressure exerted on the pipe from the conveyance of the lime sludge into the mine;
- The depth to which the IW's will be constructed;
- The length of time that the IW's will be in service;
- The pressure that will be exerted on the radius of the IW's at the floor of Level 1, using the diameter of the IW's to decrease the pressure at the radius due to pipe friction; and
- The maximum flow rate of the sludge from the WTP into the mine;

Taking these factors into consideration, the IW's will have the following specifications:

- Each IW will be double cased;
- The outer casing will be 8-inch diameter schedule 40 galvanized or carbon steel with threaded connections and o-rings;
- The inner casing will be 6-inch diameter schedule 40 galvanized steel casing with threaded connection and o-rings;
- All threaded joints will be bead welded; and
- Filled annulus between the 10-inch diameter borehole and the 8-inch diameter outer casing. Annulus will be sealed using (from bottom to top) bentonite or neat cement grout, bentonite seal and poured concrete.

The IW's will be able to accommodate the flow rates (800 gpm) from the forcemain and the pressure calculated to be exerted on the pipe as the lime sludge is dropped from the surface into the mine.

There is a significant amount of potential energy from the IW drop into Level 1 of the mine. A vortex energy dissipater will likely be used to reduce the energy and the velocity of the lime sludge to 5 to 6 feet/sec. The energy dissipater will be stiffened using steel plates due to the large dynamic forces that will develop in the drop. The location of the energy dissipater will be determined during the final design phase of the project. It may be located at the end of the 10-foot radius bend in the distribution piping or the bend may be eliminated and the IW may terminate vertically into the energy dissipater. The MOD incorporates the 10-foot radius bend into the preliminary design.

12.3.1 IW Drilling Method

The wellhead for each IW will be contained within a reinforced concrete manhole. The IW's will be constructed after the manhole excavation and prior to placement of the concrete slab. Each manhole will be 6-feet in diameter. The excavation will be conducted such that IW location is in its approximate center. At the bottom of the excavation, an 8-inch layer of gravel or crushed rock will be laid and leveled and a 1-inch steel plate will be placed on top. The steel plate will have a hole in the center through which the borehole will be constructed. The hole in the steel plate will have notches at opposite ends, as depicted on **Figure 12.2**. The purpose of the notches is to allow for the 6-inch diameter IW pipe to be suspended during construction.

The elevation of the steel plate, directly adjacent to the hole will be surveyed using NAVD 88 to establish the surface elevation for the construction of the IW's. All depths recorded while drilling will be based upon this elevation. The surface elevation for the four IW's is anticipated to range between approximately 670 to 700 feet above MSL.

Each IW will be constructed inside of a drilled borehole to an approximate depth of 250 feet bgs, drilling through the ceiling of Level 1 of the mine. The borehole will be 10-inches in diameter to a depth of approximately 240 feet bgs, or 10 feet above the ceiling elevation of Level 1. Each IW location will be surveyed by an Illinois registered land surveyor in the state plane coordinate system and using NAVD 88. This information will be used, along with the surveyed ceiling elevations obtained from the mine survey, to insure that the 10-inch diameter borehole extends to the proper depth. Starting at an approximate depth of 240 feet bgs, the borehole will continue at a diameter of 8-inches until it breaks through the ceiling of Level 1. The 8-inch diameter borehole will be drilled at the center of the 10-inch diameter borehole.

Both the 10-inch diameter and 8-inch diameter boreholes will likely be drilled using an air rotary wire line drill rig as described in **Section 5.0** of this narrative. Drill cuttings will accumulate within the manhole excavation and will be removed as needed during the drilling process. Drill cuttings will be stored on-site for later disposal or reuse.

12.3.2 Injection Well Design, Specifications and Construction Methodology

Each IW will be doubled-cased and will be connected at the bottom to the distribution piping system within Level 1 of the mine. The outer casing will be 8-inch diameter schedule 40 galvanized or carbon steel pipe a coal tar epoxy exterior coating. The sections of pipe will be threaded and placed within the 10-inch diameter borehole at its center. The annulus between the borehole and the 8-inch galvanized steel pipe will be grouted (using bentonite or neat cement grout) from the bottom of the borehole to a depth that is 5-feet below the elevation of the bottom of the manhole excavation. A 3-foot thick bentonite seal will be placed above the grout and the remaining 2 feet will be backfilled with concrete (as depicted on **Figure 12.1** below).

After the 8-inch diameter pipe has been installed, grouted and sealed, the drilling assembly will be lowered into the pipe to drill the remaining 10 feet of rock between the bottom of the borehole and the ceiling of Level 1 of the mine at a diameter of 8-inches. The timing of the breakthrough into the mine will be communicated in advance with Lafarge to insure that personnel are kept out of the area.

Once the drilling has been completed, construction of the 6-inch diameter IW pipe will begin. The IW pipe will be 6-inch diameter schedule 40 galvanized steel. The sections of pipe will be threaded together and o-rings will be placed between the pipe sections to provide a seal. Once treaded together, the pipe sections will be bead welded to provide an additional seal and to enhance the integrity of the pipe during construction and during the operational life of the IW's.

Each section of IW pipe will have welded steel tabs toward the top of the flight, a few inches down from the shoulder. The section of pipe will be rotated such that the steel tabs will rest on the steel plate to hold the IW pipe in place during construction.

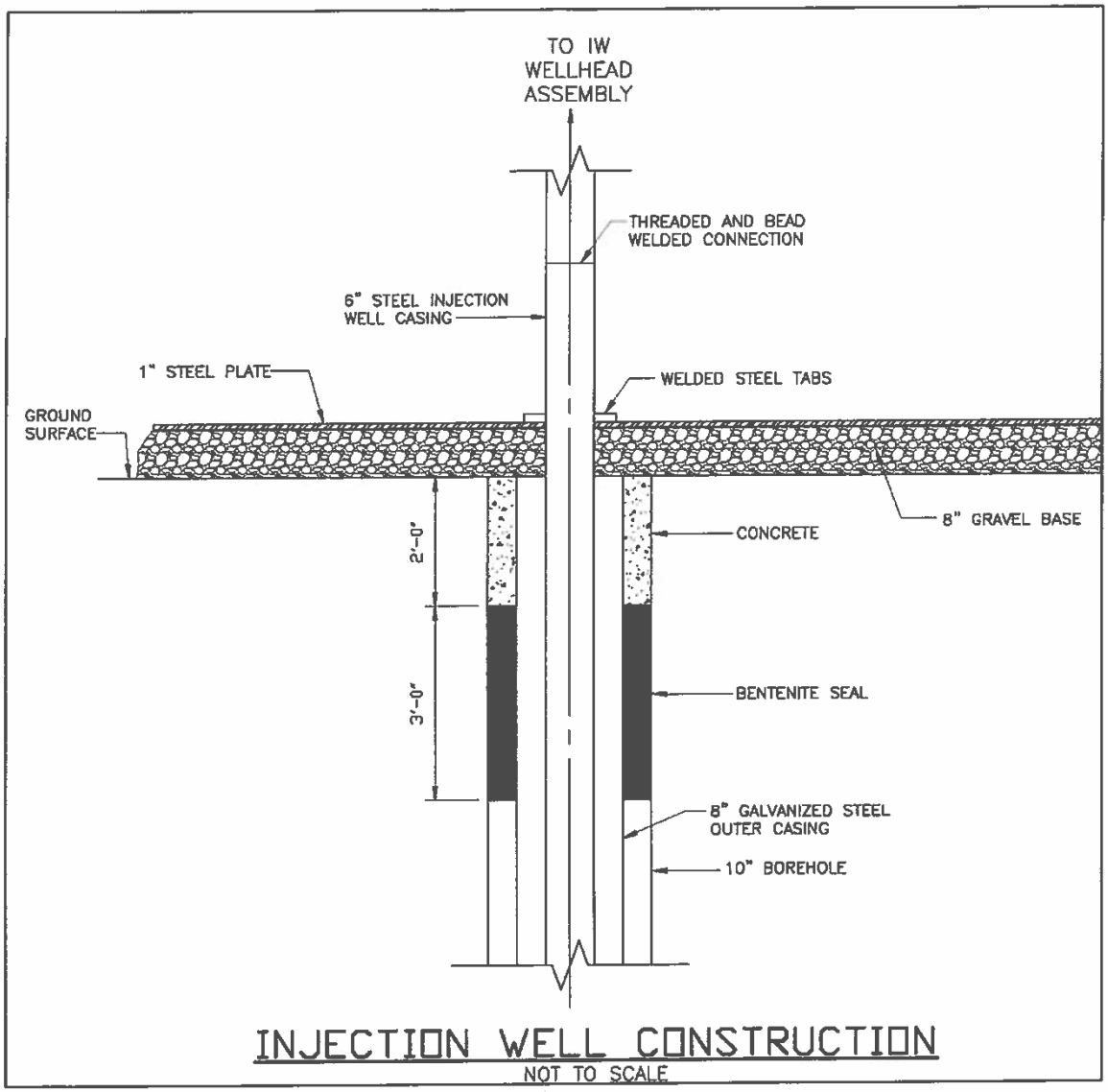

Figure 12.2 – Conceptual Diagram of IW Construction

Once the new section of pipe is threaded and welded to the preceding pipe section, the entire pipe length will be rotated so that the tabs can move through the grooves on opposite sides of the hole through the steel plate (see **Figure 12.2** below). This allows for the new section of pipe to be lowered into the hole. The entire pipe length will be rotated again, so that the steel tabs on the newly attached section of the pipe is rotated 90° from the grooves on the steel plate so that the tabs rest on the steel plate, holding the pipe length in place to attach a new section of pipe. This process will be repeated until the 6-inch pipe protrudes at least 24-inches below the ceiling of Level 1 of the mine.

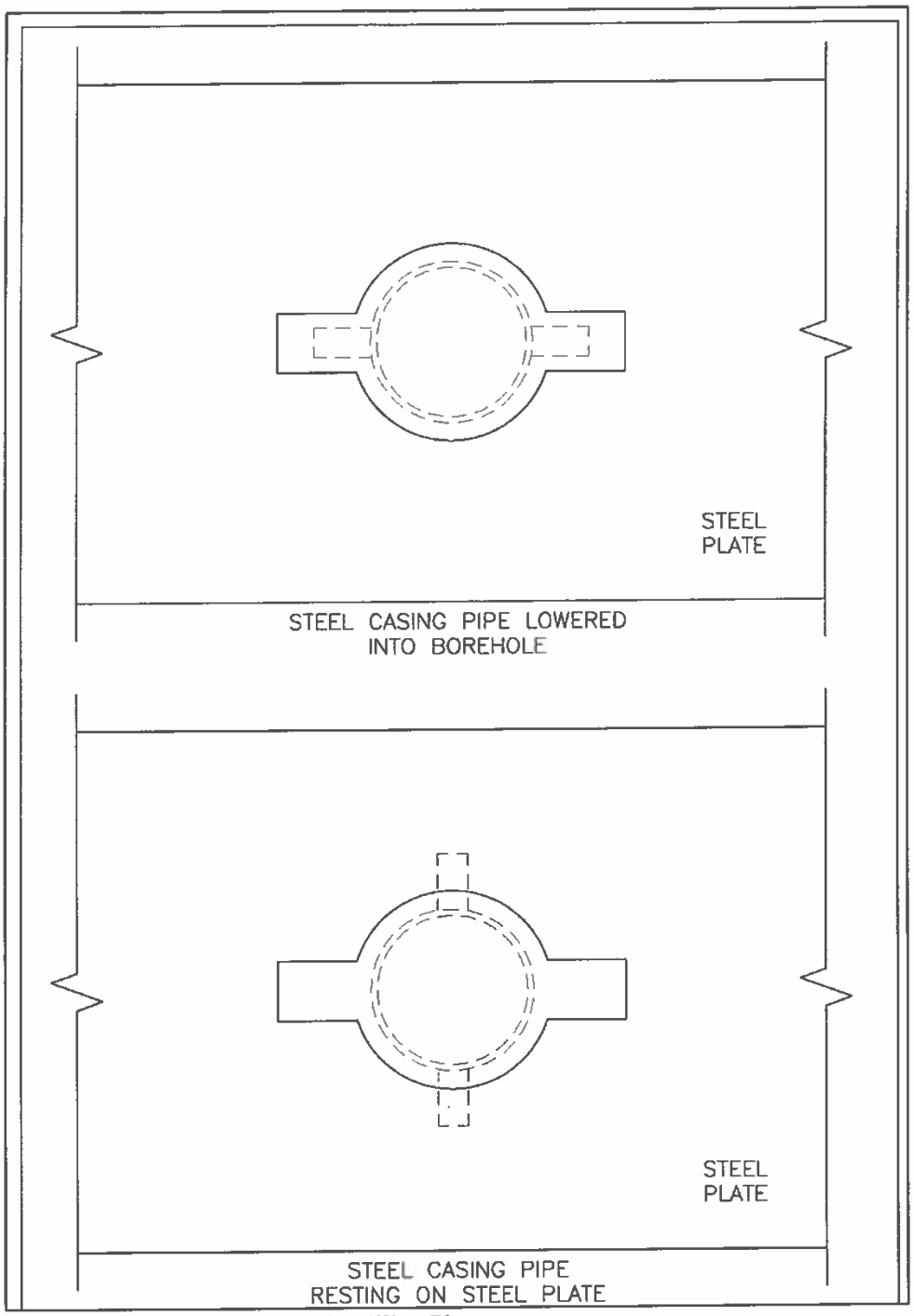

Figure 12.3 – Plan View of Steel Drilling Plate

Then an additional steel plate will be placed around the section of IW pipe protruding above the bottom of the manhole excavation, on top of the steel drilling plate (see

Figure 12.4 below). The pipe will be welded to the steel plate.

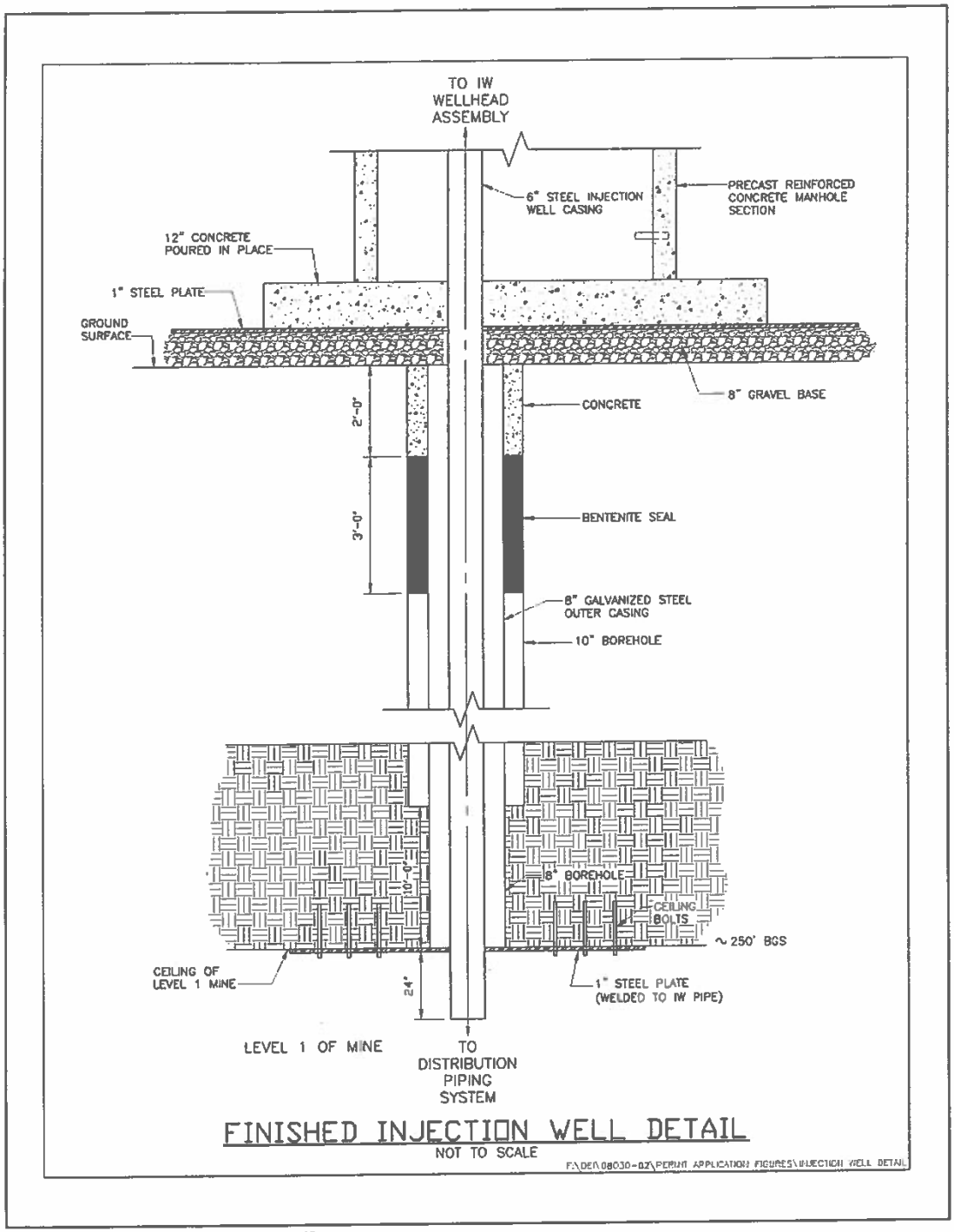

Figure 12.4 – Finished IW Detail

Concrete will then be poured across the entire bottom of the manhole excavation to form a pad 12-inches thick. Another steel plate will be welded to the bottom of the 6-inch IW pipe that is protruding into Level 1 of the mine. This steel plate will be bolted to the ceiling for the purpose of securing the bottom of the IW to the ceiling of Level 1. The bottom of the IW pipes will later be connected to the distribution piping system.

12.3.3 Connection of IW to Forcemain and IW Wellhead Completion

Once the concrete in the bottom of the excavation has cured, the manhole sections will be lowered and secured to the concrete pad. The 8-inch diameter forcemain from the WTP with a Y mechanical fitting will be connected to the top section of the IW pipe, and will exit the manhole assembly, above ground surface, with a gate valve and air vacuum release valve. The gate valve will allow the COA to connect a fire hydrant hose for the purpose of flushing the IW pipe and distribution pipes, if needed. The air vacuum release valve will provide air balancing during pumping of the lime sludge into the mine (see **Figure 12.5** below).

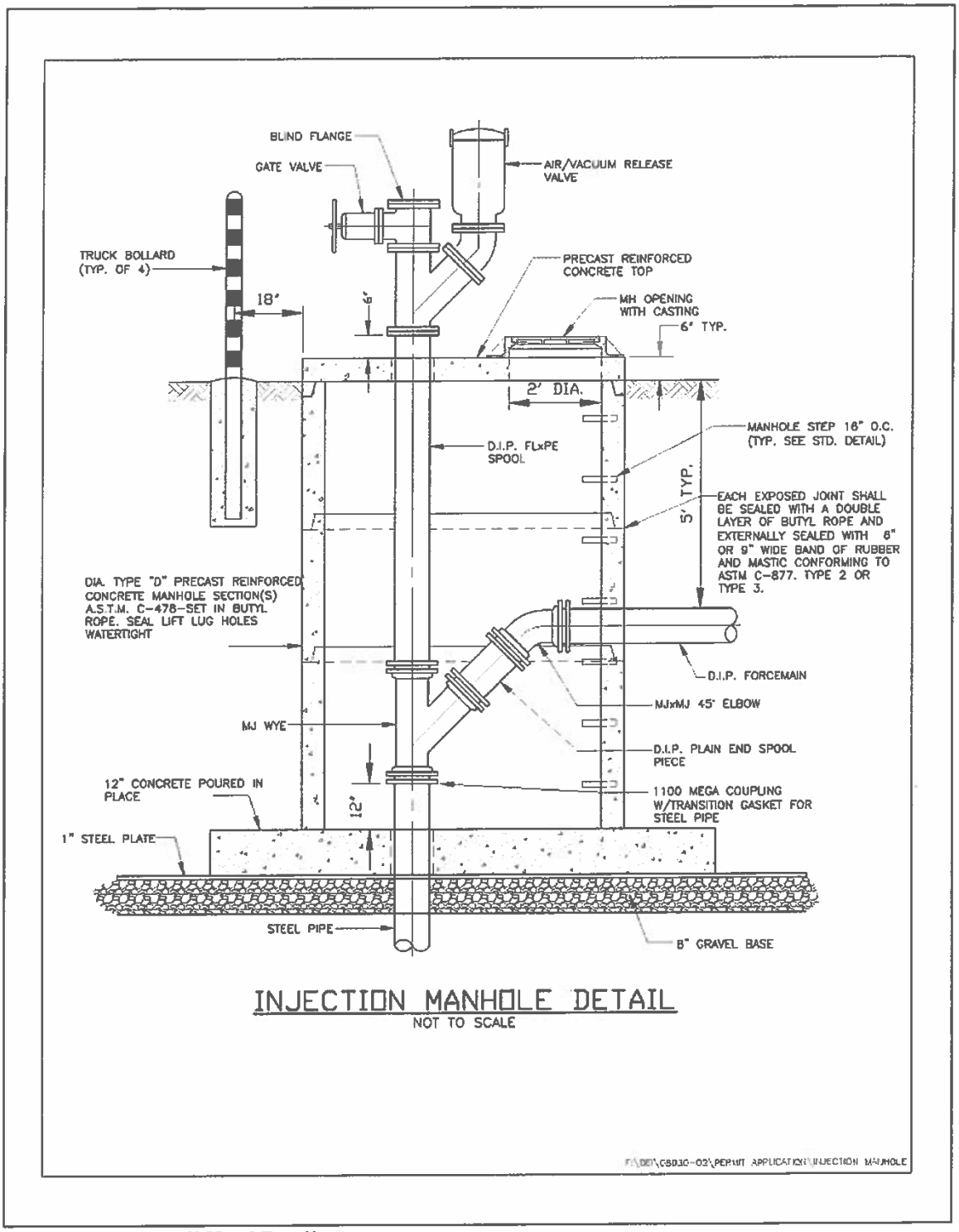

Figure 12.5 – IW Well Head Detail

12.4 *Distribution Piping and Injection Points*

In order to deliver the lime sludge from the IW's into Level 2 of the mine a network of distribution piping will be constructed along the floor of Level 1 of the mine. The goal of this piping network is to dissipate the energy that will be imparted to the sludge as it drops from the forcemain just below the ground surface into the mine and to distribute the lime sludge as evenly and space-efficiently as possible by gravity.

The IW's, which will be anchored to the ceiling of Level 1, will have a minimum of two feet of pipe protruding into the mine. The IW pipe will be connected to a vertical pipe with a 10-foot radius bend. The bend will have support structures connected to it which will be anchored to the floor of Level 1 of the mine. Horizontal piping will be connected to the end of the radius bend, leading to clusters of 18 uncased, drilled holes (injection points) through the sill between Levels 1 and 2 of the mine.

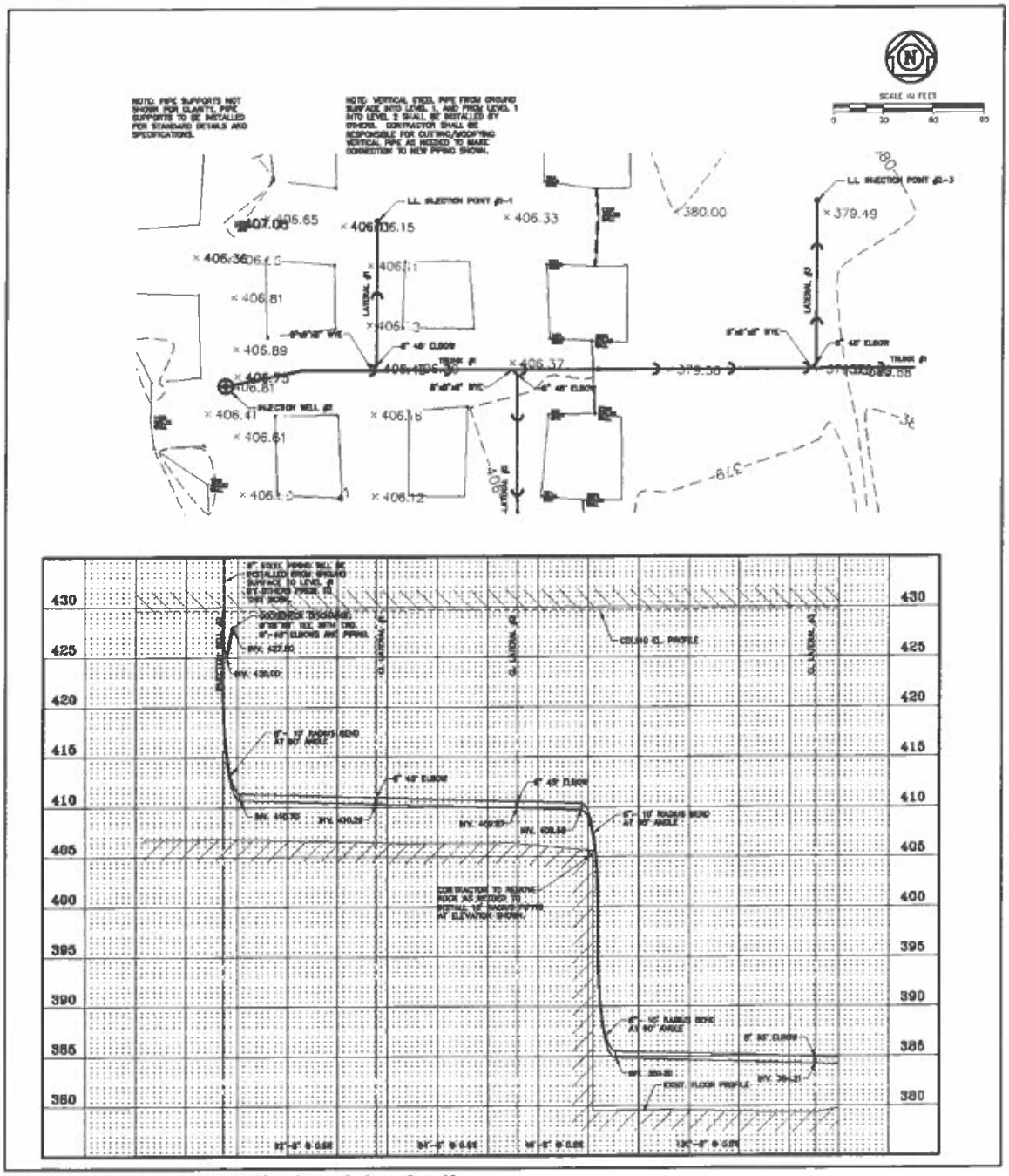

Figure 12.6 – Typical distribution piping detail

The injection points will likely be 10-inch diameter drilled holes and will be uncased. There will be a 90-degree connection from the pipe along the floor of Level 1 of the mine into the injection points. This connection may be anchored to the native rock to enhance

its stability. A vertical pipe will be connected to the 90-degree connection that will protrude through the ceiling into Level 2 of the mine. A fitting may be connected to the end of the pipe with 4, 90-degree openings to enhance the distribution of the lime sludge as it enters Level 2 of the mine, if determined to be optimal. The openings of the fitting will be parallel to the floor of Level 2, suspended approximately 2 feet from the ceiling. From this fitting, the lime sludge will deposit into the second level of the mine. The flow of lime sludge into the distribution piping network will be modeled using XP-SWMM or a similar program in order to properly size the pipes in the final design phase in order to equally distribute the flow of lime sludge to the various injection points. Based upon preliminary modeling, the diameter of the distribution piping will range from 8-inches to 4-inches.

The 10-foot radius sections connecting the IW's to the horizontal distribution pipes will be constructed from 8-inch diameter, schedule 80 carbon steel pipe. Additionally, approximately 50-feet of 8-inch, schedule 80 carbon steel pipe will be connected to the end of the radius bend section (as stated above, vortex energy dissipaters will be fitted at the ends of the four radius bend sections and based upon the final design calculations, this may or may not allow for the radius bend section to be eliminated from the design). The horizontal distribution piping will be 4- to 8-inch diameter schedule 40 carbon steel. The pipe and fitting joints for all of the pipes described above will be fully welded and the fittings will either be Y joints or 45-degree elbows. The horizontal piping will have a minimum slope of 0.5% to drain by gravity to the injection points. Each radius section and each injection point will have air vent pipes incorporated into the design.

The top of the distribution pipes, near where they connect to the bottom of the IW's will have an air vent pipe connected to it. This is the point at which lime sludge will eject in order to fill Level 1 of the mine once Level 2 has been filled to its maximum capacity. Please see **Section 12.7** of this narrative for a more detailed description of this process.

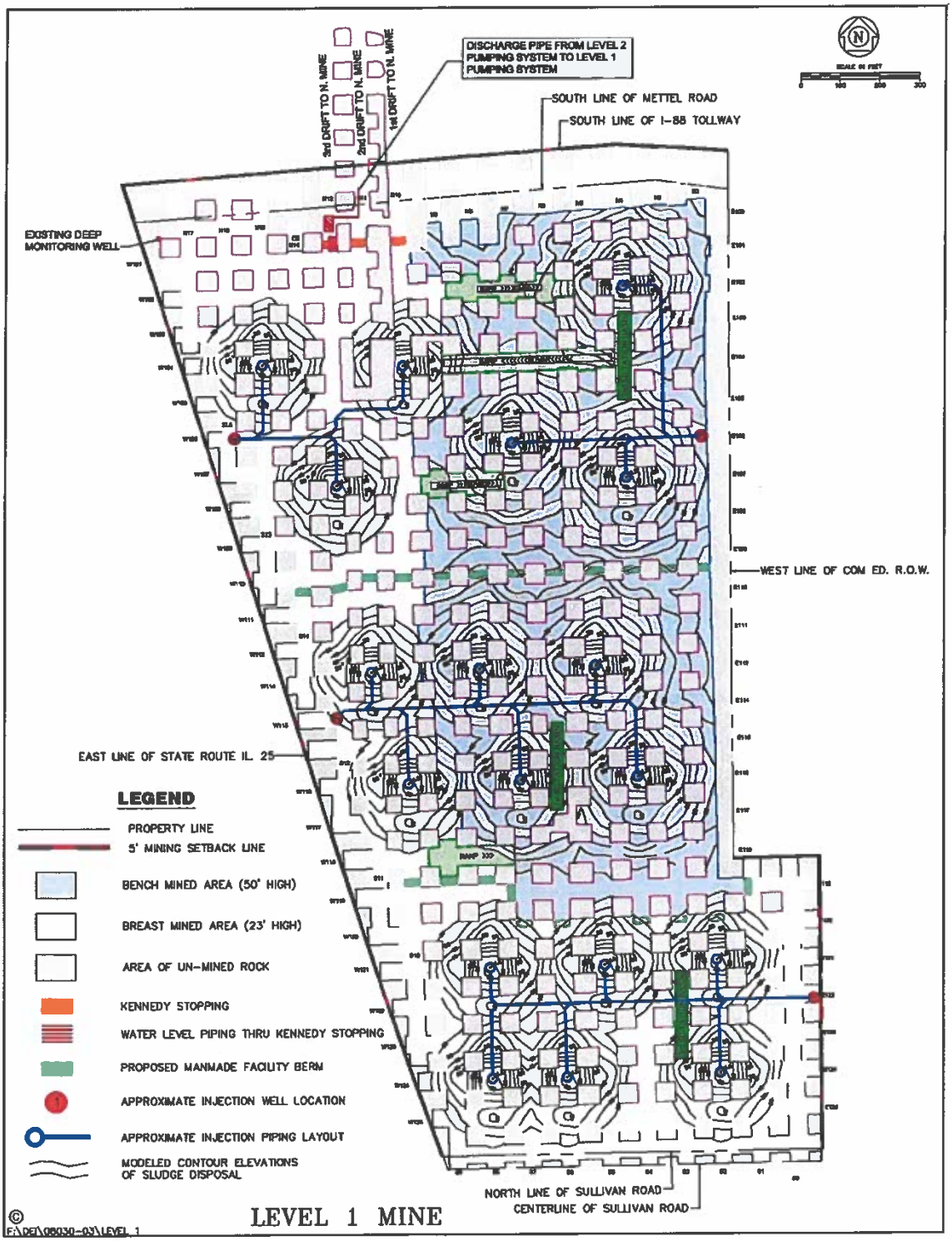

Figure 12.7 – Map showing Level 1 mine configuration and distribution piping system layout

12.5 *Siltation Basins and System Operation*

The system will be constructed so that each of the 4 IW's will have dedicated distribution piping and injection points connected to it. This is done to direct the lime sludge to evenly distribute within each of the three siltation basins that will be created on Level 2 of the mine. The IW's will be connected in the following manner:

- IW-1 will be connected to 6 injection points at the south end of the mine and will deposit sludge into Siltation Basin #1;
- IW-2 will also be connected to 6 injection points and will deposit sludge into Siltation Basin #2; and
- IW-3 and IW-4 will both be connected to 3 injection points each and will deposit sludge into Siltation Basin #3.

By constructing berms between certain pillars on Level 2 of the mine, three siltation basins will be created, such that each injection well will deposit sludge into these siltation basins. The purpose of the basins is to insure that the solids deposit from the south end of the mine, progressing to the north end, while allowing the decant water to travel through the berms to the north end of the mine for extraction to the surface.

Each injection well will be initially operated one at a time, in sequence, starting with IW-1 at the south end of the mine, progressing in order to IW-4 at the north end of the mine. During this initial period, each well will be operated for a limited period of time (currently anticipated to be 3 to 6 months per well) to create a "blanket" of lime sludge on the floor of the mine. The purpose of this initial operational stage is to allow the lime sludge solids to fill any unfilled joints that may exist on the floor of Level 2 of the mine. After this initial operation period, each injection well will be operated in sequence for approximately one year or more each for the purpose of exercising valves and filling the mine in approximate equal volume until that area of the mine on Level 2 has reached its maximum sludge storage capacity.

Routine maintenance and inspection of the delivery, injection and extraction systems will be conducted in accordance with all procedures specified. Also, the bulkheads will be routinely monitored, repaired and maintained by Lafarge for any evidence of leakage and overall integrity.

Additionally, the lime sludge influent into the forcemain from the wet well will be routinely sampled and analyzed for chemical parameters along with the supernatant discharge from the extraction well and the chemistry of the ground water from the on-site monitoring well. Please refer to **Section 16.0** for a more detailed description of the system monitoring that is proposed.

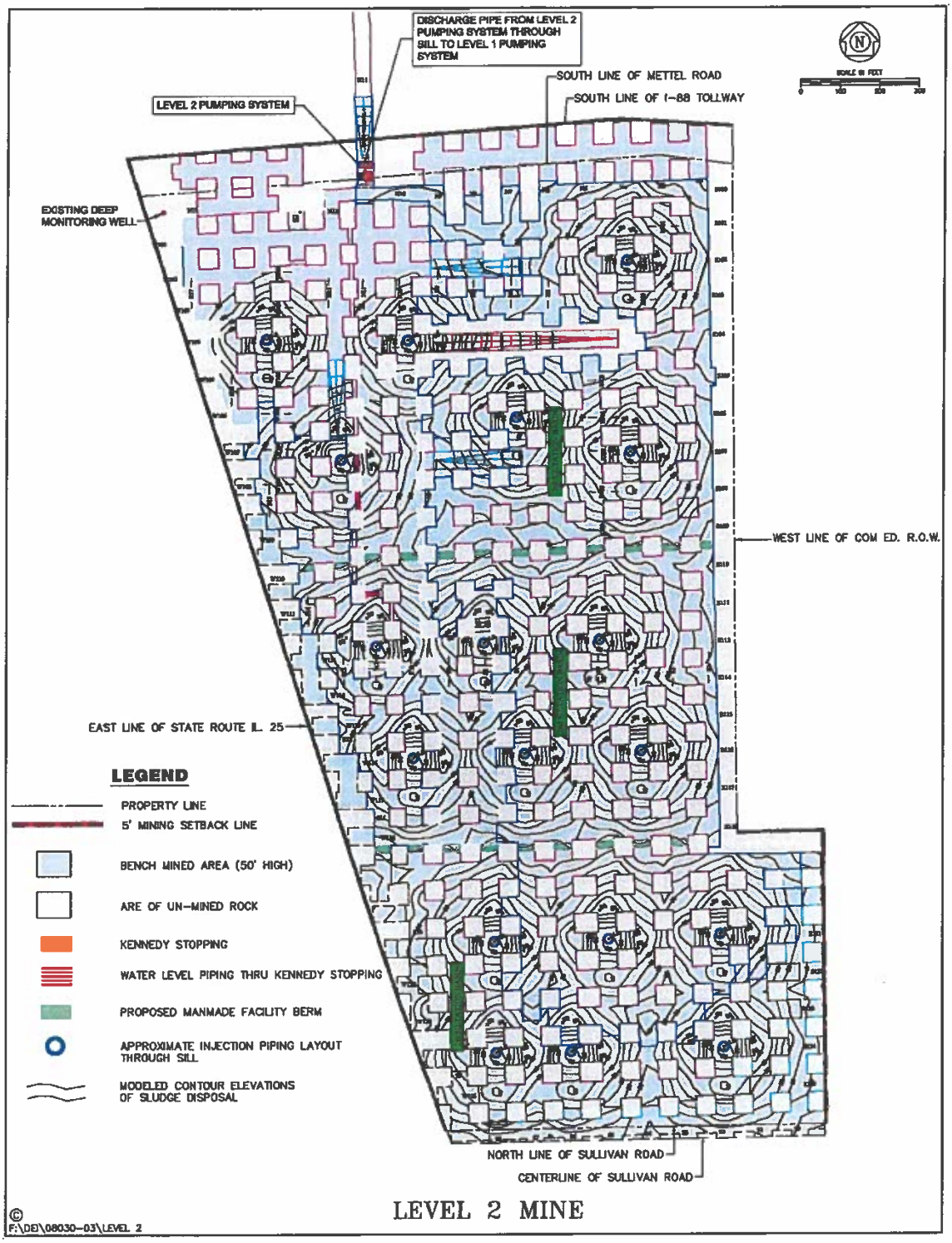

Figure 12.8 – Map showing Level 2 mine configuration, injection points and modeled lime deposition

12.6 *Extraction System*

As discussed in **Section 11.0**, the bulkhead on Level 2 and one of the bulkheads on Level 1 of the mine will be constructed with piping through it in order the extract the supernatant that will form on top of the lime sludge solids as the sludge dewaters after injection. The supernatant will be then be pumped to the surface via a single extraction well and discharged to a nearby FMWRD sanitary sewer.

12.6.1 Supernatant Inlet Piping

The level of the decant water, or supernatant, will be maintained at a maximum head of 5-feet. This maximum head level will be maintained by creating supernatant inlets constructed through the bulkheads. Each of the flanged inlets on the end of the pipe into the lime sludge storage area will be spaced 5-feet apart, starting with the first inlet approximately 5-feet from the floor of the mine. As the solids level rises, the valve on the lower inlet pipe will be closed and the valve on the next highest inlet pipe will be opened. This will progress until the storage area is completely filled with solids. The supernatant inlets will have sludge monitoring devices to detect the elevation of the solids prior to reaching the inlet pipe in order to determine the proper time to open the next highest inlet valve.

The inlet pipes will be connected together to a discharge line that will connect to the pumping system that will be located north of the bulkhead on the dry side of the mine. The pumping, electrical and control systems will be housed in a prefabricated building. The building will be transported into the mine and will be anchored in place adjacent to the bulkhead on a concrete slab. The discharge line from the inlet pipes will be connected directly to the pumping system inside of the building. In order to prevent potential damage to the pumps, each inlet pipe on the wet side of the bulkhead will have an inverted elbow to prevent any debris from entering the pipes.

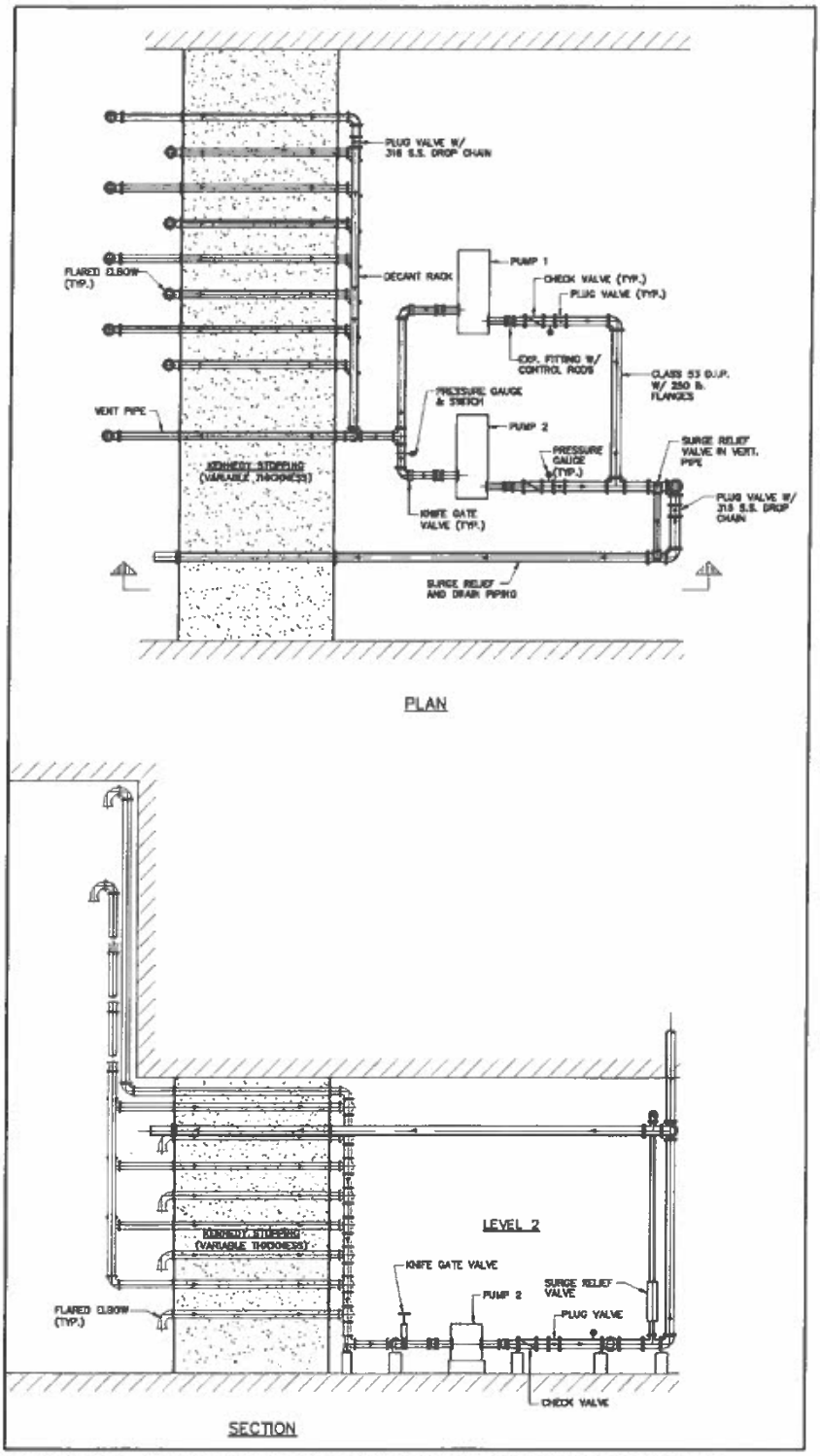

Figure 12.9 – Level 2 bulkhead with supernatant extraction piping

12.6.2 Extraction Pumps, Valves and Controls

The supernatant must be collected from the lime sludge detention area and pumped from the floor of Level 2 of the mine to the ground surface. The elevation of the floor of Level 2 of the mine in the area where the pumping system will be located is approximately 300 feet above MSL (NAVD 88). The surface elevation at the proposed location of the EW is approximately 670 feet. The vertical distance that the supernatant needs to be pumped is therefore approximately 370 feet.

The extraction pumps proposed in the preliminary design will be end-suction, horizontal, close coupled cast iron construction with the following performance specifications:

- Flow rate: 250 gpm
- Total Dynamic Head: 380 feet (minimum)
- Speed: 3,550 rpm
- Motor size: 50 HP

The pumping system will include gate valves, surge relief valves and control check valves to control potential backflow into the system. The system will include an MCC and control panels. The system will have pressure gauges to read the suction and discharge pressures of the system.

A new electrical feed will be supplied to the mine. There is an existing Commonwealth Edison line that currently feeds the air venting system for the Lafarge mining operations. A new 15 kV line will feed down to a point near the extraction pumping station. A fusible primary switch, a 480-volt transformer and a MCC will be installed and housed in the pumping system walk-in type enclosure. The MCC will be a 600-volt class suitable for operation on a three-phase, 60 Hz system. The MCC will provide the electrical power to the pumps, control valves and the air compressor that comprise the extraction pumping system.

12.6.3 Extraction Well

The EW will be designed, drilled, constructed and surface completed in the exact manner as the 4 IW's. Therefore, please refer to **Section 12.3** for the specifications of the IW design and construction.

12.6.4 Discharge to Sanitary Sewer

The EW will be connected to a forcemain as depicted on **Figure 12.5**. The forcemain will be designed and constructed with the same specifications as the blowdown

forcemain. The discharge forcemain will be connected to the FMWRD sanitary sewer for supernatant disposal. All necessary permits for this connection and discharge will be obtained prior to the operation of the lime sludge injection system.

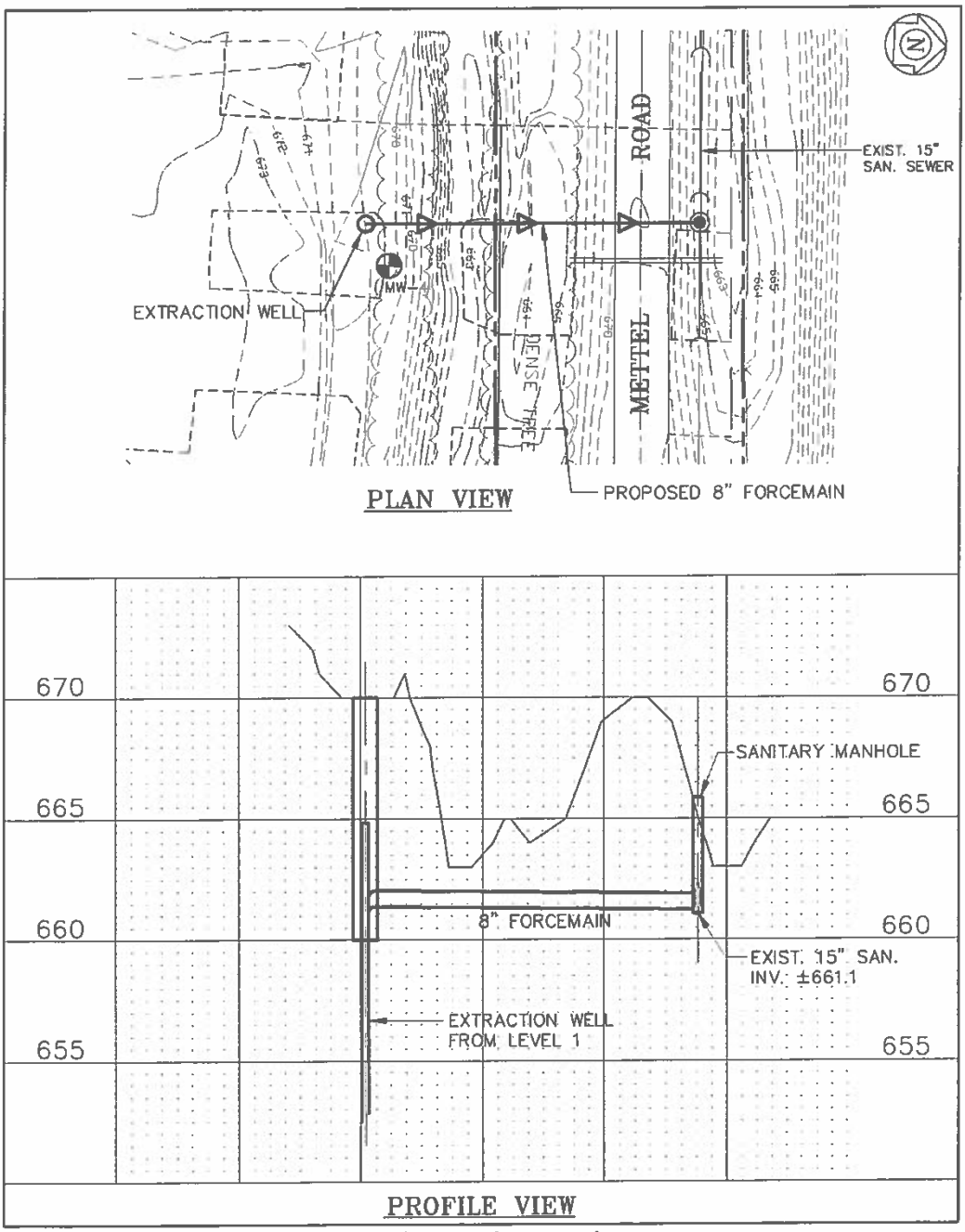

Figure 12.10 – Discharge forcemain and connection to sanitary sewer

12.7 *System Pilot Testing, Operation and Maintenance*

This subsection discusses the pilot testing, operation and maintenance of the system.

12.7.1 System Pilot Testing

Once the entire system is constructed, a pilot test will be conducted using water. The test will be conducted while the mine is still and accessible and all safety structures are still in place so that the function of the injection system and distribution piping can be directly observed. The mine will be cleaned and debris removed and all of the mapped, unfilled joints will be sealed around the perimeter of and floors of Levels 1 and 2 prior to the initiation of the test.

Water will be introduced into the system through the wet well so that the blowdown forcemain pumping system can be tested including the SCADA, electrical and pumping system and all associated valves. The distribution piping and their connection to both the bottom of the injection wells and the injection points will be tested to be sure that there are no leaks in the pipe joints and connections and to observe the structural stability of the system. The extraction system will also be testing using a water supply connected to the inlet pipes since there will not be enough water at the bottom of the bulkhead to reach the first inlet pipe from the injection system testing.

All observations and data will be recorded and evaluated and all necessary system modifications will be made until its operation is optimal and is performing as it was designed. The pilot testing will be conducted over a period of a few months and once completed, the mine will be cleaned, sealed and the remaining system will be completed in preparation of full-scale operation.

12.7.2 System Operation and Maintenance

Once all tasks associated with system construction have been completed, the IW's will be initially operated one at a time, in sequence, starting with IW-1 at the south end of the mine, progressing in order to IW-4 at the north end of the mine. During this initial period, each well will be operated for a limited period of time (currently anticipated to be 3 to 6 months per well) to create a blanket of lime sludge solids on the floor of the mine. The purpose of this initial operational stage is to create a blanket of lime sludge on the floor of the mine so that the solids have an opportunity, early in the operational life of the system, to infill any unfilled joints that may exist on the floor of Level 2 of the mine that haven't been sealed by Lafarge.

After this initial operation period, each injection well will be operated in sequence as described above for approximately one year or more for each well for the purpose of

exercising the valves and filling the mine in approximate equal volumes for each siltation basin, until that area of the mine on Level 2 has reached its maximum sludge solids storage capacity.

The performance of all system components will be monitored and the entire system will be maintained, and wear parts replaced as needed and in accordance with the manufacturers recommendations.

12.7.3 Filling of Level 1

As previously stated, Level 1 of the mine will fill with lime sludge after Level 2 has reached its maximum storage capacity. As previously stated, cones and beaches will form on Level 2 directly under the injection points. As the level of the lime sludge solids reach the ceiling of Level 2, it will eventually block the end of the distribution pipe in the injection hole. As sludge continues to build, it will eventually be forced through the injection point and into the end of the distribution pipe. Continued injection of sludge at this point will eventually cause the distribution pipe to fill with sludge and it will be ejected out of the air vent pipe at the top of the distribution pipe, near its connection to the bottom of the IW.

At this point the air venting will occur at the air vent at the IW well head and Level 1 of the mine will begin filling with lime sludge. This will be monitored by sensors installed in the lowest inlet pipe on the bulkhead on Level 1. Once it is known that Level 1 of the mine is beginning to fill with sludge, the pumping system will be moved from Level 2 and reinstalled on Level 1. This will be completed by cutting and capping the discharge manifold line from the supernatant inlet pipes on Level 2. Then, the discharge line from the pumping system to the EW will be cut and capped and the entire pumping system (which is self-contained and mobile) will be moved to the dry side of the Level 1 bulkhead. The pumping system will then be connected to the supernatant discharge line and to the EW in the same manner as it was connected to the analogous structures on Level 2, the system will be tested and will be ready to extract supernatant from Level 1 of the mine well in advance of the supernatant starting to flow into the lowest inlet pipe. It should be noted that the EW pipe will be exposed from the ceiling to the floor on both Levels 1 and 2 of the mine allowing for the easy disconnection of the pumping system from the EW.

Filling Level 1 of the mine in this manner will add approximately 10 to 15 years to the effective operational life of the system.

16.0 MONITORING PROGRAM

The following are proposed to be included in the monitoring program associated with the Class V UIC permit for this site:

- Sampling and analysis of the influent lime sludge from the pump station wet well at the WTP;
- Sampling and analysis of the supernatant effluent from a sampling port at the extraction wellhead; and
- Monitoring of the chemistry of the nearest USDW (the St. Peter Formation) from the existing deep monitoring well at the site.

The fluid to be injected into the mine is generated at the COA WTP as a byproduct of the lime softening water treatment process. The waste stream that generates the injection fluid is as follows:

- Water extracted from a network of municipal water supply wells;
- Surface water from the Fox River; and
- Lime powder within the WTP claricones.

As outlined in **Section 9.0** of this permit application narrative, the lime sludge solids, supernatant and raw source water have been extensively tested prior to the preparation of this application. During this testing, VOC's, SVOC's, PAH's, pesticides, herbicides or PCB's have rarely been identified above the laboratory reporting limits. Due to this fact and based upon the fact that none of these parameters are neither used nor generated in the process that creates the injection fluid, the COA requests that they be excluded from the parameter list in the monitoring program, except as noted in the subsections below.

16.1 Influent Monitoring

It is proposed that the lime sludge be sampled at the WTP wet well because it is representative of the influent going into the injection system. Since the sludge has two components (solids and water), the sample obtained from the wet well will be dried by the lab and the solids will be tested as outlined below. The representative samples of the lime sludge will be obtained directly from the wet well using sterile sampling equipment and containers supplied by an accredited laboratory.

As previously stated, no VOC's, SVOC's, PAH's, pesticides, herbicides or PCB's have been detected above the laboratory reporting limit in any of the lime sludge solids samples obtained from the dewatering lagoons at the site, except for the following:

- Benzene in the April 24, 2012 sample;

- cis-1,2 Dichloroethene in the April 24, 2012 sample;
- MTBE in the April 24, 2012 sample; and
- Phenol in the October 20, 2008, April 24, 2012, July 3, 2012 and July 19, 2012 samples.

As previously discussed, there are no sources in the waste stream generation process that have been identified (raw river/well water or the lime powder) that can introduce these chemicals into the lime sludge. The lime sludge is stored outside of the WTP in the dewatering lagoons for several weeks at a time and these chemicals were likely imparted to the sludge from a surface source outside of the WTP or could be representative of cross contamination either in the field sampling or at the laboratory.

In the injection process proposed in this permit application, the entire system is closed, with no points at which these types of chemicals can be introduced into the waste stream. Therefore, it isn't anticipated that these chemicals will show up in the monitoring program once the system is operational.

The COA realizes that the Agency may wish to have empirical evidence of this, so it is proposed that the following parameters be analyzed on a quarterly basis for a one year period:

- Benzene;
- cis-1,2 Dichloroethene;
- MTBE; and
- Phenol

It is also proposed, that if these parameters are below the laboratory reporting limit after the end of the quarterly sampling, then they should be tested on an annual basis for a period of four years. If after this four year annual testing period these parameters are still below the laboratory reporting limit, then they should be excluded from the routine parameter list for the permit.

The laboratory analysis methodology will be consistent with the methods outlined in the permit issued by the Illinois EPA.

16.2 Effluent Monitoring

It is proposed that the injection fluid effluent be sampled directly from the sampling port attached to the extraction well. This sampling port will be readily accessible and will provide representative samples of the supernatant being extracted from the lime sludge storage area in the mine.

As previously stated, no VOC's, SVOC's, PAH's, pesticides, herbicides or PCB's have been detected above the laboratory reporting limit in any of the supernatant samples obtained from the dewatering lagoons at the site, except for the following:

- Chloroform in the April 24, 2012 sample; and
- 2,4-D in the July 3, 2012 sample;

As with the lime sludge solids, there are no sources in the waste stream generation process that have been identified (raw source water or the lime powder) that can introduce these chemicals into the supernatant and is likely from a surface source while the sludge was in the dewatering lagoon.

It is proposed that these two chemicals not be included in the effluent sampling for the site because:

- The proposed injection process is a closed system with no potential sources for these chemicals to be introduced into the waste stream; and
- Although detected, these chemicals were both well below both the 620 Class I ground water standards and the 611 MCL's and MCLG's.

The supernatant effluent will also be subject to the testing that will be required by FMWRD as part of the discharge permit that will be obtained upon approval of the Class V UIC permit by the Illinois EPA.

16.3 Ground Water Monitoring

It is proposed that no additional parameters be added to the routine quarterly parameter list for the ground water at the site. This is due to the fact that the supernatant is representative of the fluid that is available for potential transport to the nearest USDW. The supernatant did not exhibit any levels for any parameters that exceeded the 620 Class I Ground Water Standards nor the 611 Drinking Water MCLG's or MCL's in any of the sampling events conducted.

Therefore, it is felt that considering the water stream that the routine parameter sampling list will be sufficient to monitor for potential impacts from the storage of the lime sludge solids within the mine.

16.4 Routine Monitoring

It is proposed that the following parameters be analyzed on a quarterly basis for the lime sludge influent at the WTP wet well, the supernatant effluent at the extraction well and the nearest USDW from the on-site deep monitoring well:

- pH
- Cyanide, total
- Nitrate, as N
- Nitrite, as N
- Sulfate
- Ammonia, as N
- Fluoride
- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Iron
- Lead
- Manganese
- Nickel
- Selenium
- Silver
- Thallium
- Vanadium
- Zinc
- Radium 226
- Radium 228

The laboratory analysis methods employed will be consistent with those methods identified in the Class V UIC permit issued by the Illinois EPA.

16.5 Other System Monitoring

Other monitoring of the system will be conducted as follows:

- Monitoring of bulkheads: Lafarge is required to monitor the bulkheads on a regular basis for leakage. This will include data from pressure transducers that will be installed in the bulkheads to warn against excessive pressures being exerted against the wall. Lafarge is also required to maintain the integrity of the bulkheads and to make repairs and respond to any emergencies that may arise associated with the performance of the bulkheads.
- Supernatant inlet monitoring: The supernatant inlets will have sludge monitoring devices to detect the elevation of the solids prior to reaching the inlet pipe. At such time, the valve for that inlet will be closed, and the next vertically higher inlet will be opened.
- System influent flow monitoring: The system will include flow monitoring devices located at the WTP pump station that will record flow rate data that will be available for reporting to the Illinois EPA.
- System effluent flow monitoring: The extraction system will include flow monitoring devices that will be constructed on the line for the extraction pumping system. These meters will record the supernatant flow out of the lime sludge storage area and into the sanitary sewer. This data will be recorded and will be available for reporting to the Illinois EPA.

16.6 Assessment and Corrective Action

In the unlikely event that the proposed injection was to impact the environment, the COA will conduct assessment and corrective actions as agreed upon with the Illinois EPA.

17.0 SYSTEM CLOSURE POST CLOSURE CARE

When the system has reached the end of its operational life, or if the COA wishes to discontinue the use of the system, it will be closed. It is anticipated that due to compression of the lime sludge, supernatant may continue to be drawn out of the lime sludge detention area for a period of time after injection has ceased.

It isn't possible at this point in time to determine the exact length of this "lag" period, but it isn't anticipated to be longer than 12 months after cessation of injection. Pumping of the supernatant will continue until such time that the pumping becomes ineffective. Once the extraction system withdrawal has reached its practical extent, all elements of the system will be closed. The system closure will include the following:

- Plugging the blowdown forcemain at the WTP wet well;
- Disconnection and removal of the blowdown forcemain pumping system;
- Abandonment of the injection wells;
- Disconnection and removal of the extraction pumping system;
- Abandonment of the extraction well;
- Disconnection of the extraction forcemain from the extraction well and the sanitary sewer; and
- Securing the vent shaft.

Each of these elements are discussed below.

17.1 Closure of the Pumping System

Closure of the pumping system will include:

- Plugging the blowdown forcemain at the WTP wet well pump. The end of the forcemain will be capped where it is exposed at the pump house.
- Removal of the pumping system including all electrical and control systems.
- Disconnection of the blowdown forcemain at each injection well. The forcemain will be cut and capped inside of the manhole access and will be left in place.

The pump station building will be left in place for potential reuse by the COA.

17.2 Injection Well Abandonment

Each of the 4 IW's at the site will be abandoned in place as follows:

- The IW wellhead assembly will be removed (for reuse or disposal) from the well

and the forcemain will be cut and capped at a point just inside of the wall of the manhole structure;

- An inflatable bladder will be inserted into the IW and placed at a depth that is just above the floor elevation of Level 1 of the mine;
- The well pipe will be filled with bentonite grout to a depth that is 8 feet below the floor of the manhole structure;
- Once the grout has had a chance to set, the well pipe will then be filled with a bentonite well seal to a depth that is 5 feet below the floor of the manhole structure;
- Once the bentonite seal has set, the hose to the inflatable bladder will be cut and the remaining space in the well pipe will be filled with concrete; and
- The manhole structure will be abandoned

17.3 Closure of Extraction System

The extraction system closure will include the following:

- Disconnection of the pumping system from the supernatant inlet piping manifold;
- Capping of the inlet piping manifold;
- Disconnection of pumping system from the EW pipe. It will likely be cut off at the EW pipe joint and the joint end of the EW will be capped;
- Removal of pumping system, excess piping, electrical feed and MCC for reuse, recycling or disposal;
- Abandonment of the EW in place as described for the IW's except that an inflatable bladder will not be required as the end (bottom) of the EW will be capped and all materials used for well abandonment will be supported; and
- Disconnection of the extraction forcemain from the EW to the FMWRD sanitary sewer will be capped.

17.4 Securing the Vent Shaft

The vent shaft and the immediate area around the vent shaft are currently protected with a 10-foot high security fence that will remain in place and will be monitored during the time that the proposed system is operating. Once the system has reached its effective operating life, it is proposed that the vent shaft be permanently closed in the following manner:

- The vented hatch on top of the steel collar at the surface of the vent shaft will be removed and recycled or disposed;
- A reinforced concrete pad 16-inches thick will be constructed over the shaft

opening and anchored to the existing concrete slab;

- The security fence will be removed;
- The area surrounding the sealed vent shaft will be landscaped; and
- The COA will retain title of the vent shaft area in perpetuity.

17.5 Reporting and Record Retention

The COA will comply with all monitoring, system closure and post-closure care requirements and all reporting requirements as well as all retention of record requirements as outlined in the permit issued by the Illinois EPA for this site.

supernatant, will be maintained at a maximum head of 5-feet by spacing of inlet pipes that will be constructed through the bulkhead on Level 2 and through one of the bulkheads on Level 1. The supernatant will be collected via the inlet pipes and will be pumped out of the mine via a single EW and discharged into a nearby sanitary sewer.

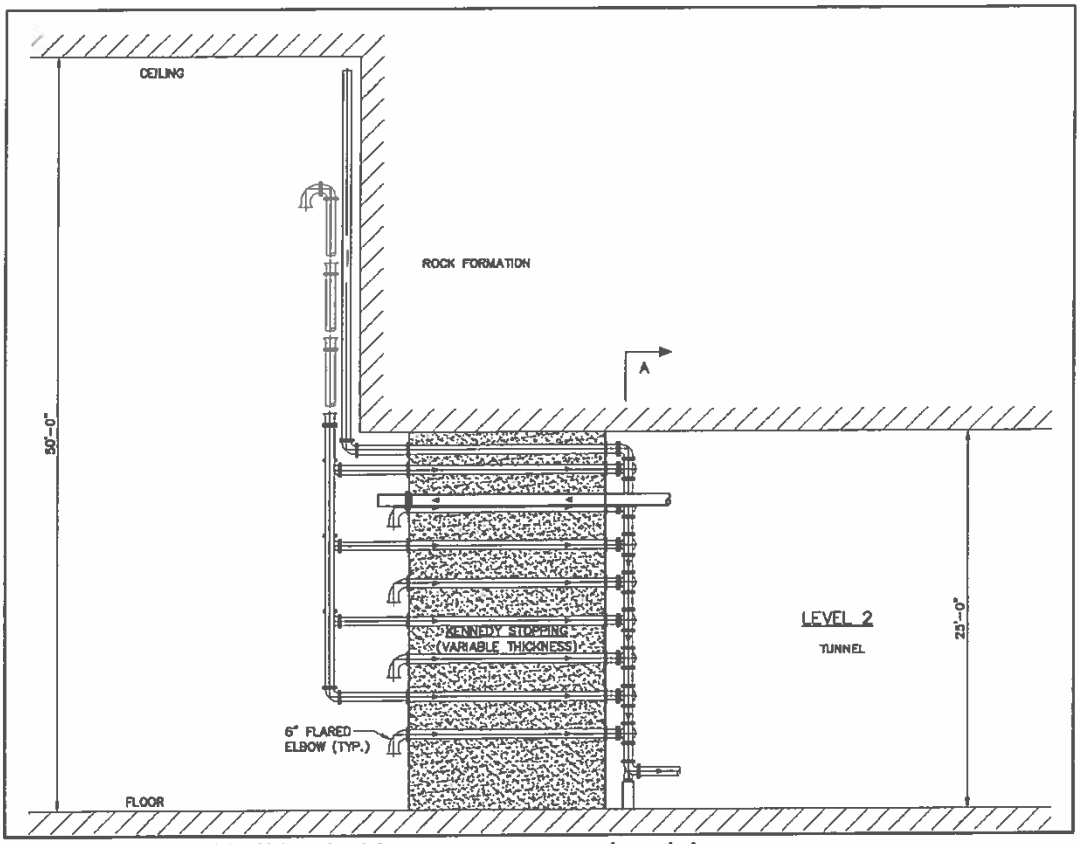

Figure 4.8 – Typical bulkhead with supernatant extraction piping

On the "dry" side of the Kennedy Stoppings, the supernatant will be pumped through inlet pipes, in progression from the bottom to the top, to a single discharge pipe that will be connected to the EW. The EW will extend from Level 2 of the mine to the ground surface (approximately 360 feet vertical distance). The extraction well will be connected to a forcemain approximately 5.5-feet below ground surface that will discharge the supernatant to a nearby sanitary sewer.

Please refer to **Section 12.6** of this narrative for a more detailed discussion of the lime sludge extraction elements of the system.

Once the bulkheads are constructed and the system is operational, the disposal area will be sealed and no access will be possible for the duration of system operation. It is

as structural component of the design.

Please refer to **Section 12.6** of this narrative for additional description of the bulkhead and extraction system design.

11.5.3 Sealing of Host Rock

The bulkheads as proposed will provide a water-tight seal against the rock, and the rock mass itself is essentially impermeable. It is possible that the rock surrounding the bulkhead may contain pathways of fluid movement along secondary porosity features that could potentially flow around the bulkhead and through the rock from the side where the lime sludge will be stored to the "dry" side of the bulkhead. In order to prevent this from occurring, Lafarge has agreed to seal any secondary permeability structures identified in the host rock. The openings in the mine that will be sealed have been inspected and no visible dissolution features were identified, so the secondary porosity features that will be sealed would be large bedding planes, partings and joints.

Lafarge has stated that they will closely inspect the host rock in these areas to identify such features and seal them. Lafarge has also stated that the likely method of sealing will be pressure grouting, but other methods will be considered so that the entire system (the host rock and the bulkheads) together will be resistant to the flow of fluids from the storage side to the dry side of the stoppings.

11.5.4 Long-term Monitoring and Maintenance

Lafarge will be responsible for the long-term monitoring and maintenance of the bulkheads. The monitoring will include regular visual inspection of the bulkheads and monitoring for leakage. The bulkheads will include a series of pressure transducers to monitor the load on the bulkheads over time and will be equipped with alarms to warn against excessive loads.

11.6 Berms and Sedimentation Basins

The final aspect of the preparation of the mine for lime sludge disposal is to create three sedimentation basins on Level 2 of the mine. The purpose of these sedimentation basins is to:

- Decrease the energy and velocity of the lime sludge slurry in order to enhance the deposition of the lime sludge solids within the mine;
- Enhance the uniformity of the deposition of the lime sludge solids and to direct such deposition in the desired areas of the mine;
- Insure that the solids are taken out of suspension in the slurry prior to reaching

Table 6.1 – Summary of USDW's and Confining Units

GW/Aquifer Unit	Anticipated Depth (ft.)	Unit Thickness (ft.)	Contact/Confining Unit	Position Relative to Lime Sludge Placement	Comment
Quaternary Sediments	12	12	Silurian Joliet/Kankakee Formation Dolomite	Above	Class II aquifer; generally not used for industrial or potable purposes in the AOR
Silurian Wilhelmi Formation Dolomite	53	10	Ordovician Brainard Formation Shale	Above	Class I aquifer used for industrial and potable purposes
Ordovician St. Peter Formation Sandstone	540	231	Knox Dolomite Megagroup	Below	Class I aquifer used for industrial and potable purposes
Cambrian Ironton-Galesville Formation Sandstone	900	160	Eau Claire Formation Dolomite/Shale	Below	Class I aquifer used for industrial and potable purposes
Cambrian Mt. Simon Formation Sandstone	1280	2000+	Pre-Cambrian Granite Basement Rock	Below	Class I aquifer used for industrial and potable purposes

Each of the ground water units listed in this table are discussed in more detail in the subsections below.

6.1 *Prairie Aquigroup (Quaternary Aquifer)*

In the vicinity of the site, ground water is generally encountered the sandy outwash unit at the contact between the unconsolidated sediments and the Silurian Dolomite bedrock. The upper units of Silurian bedrock beneath the site are the undifferentiated Joliet and Kankakee Formations. Although these bedrock formations are fractured, their hydraulic conductivities are significantly less than those of the sand unit within the sediments and form the confining unit to this shallow ground water unit.

The ground water within the AOR is typically Class II in accordance with 35 IAC 620, Sections 210 and 220 and is not generally used for industrial or potable purposes. According to the well survey conducted by DEI, there are no water use wells screened in this ground water unit within the AOR for the site.

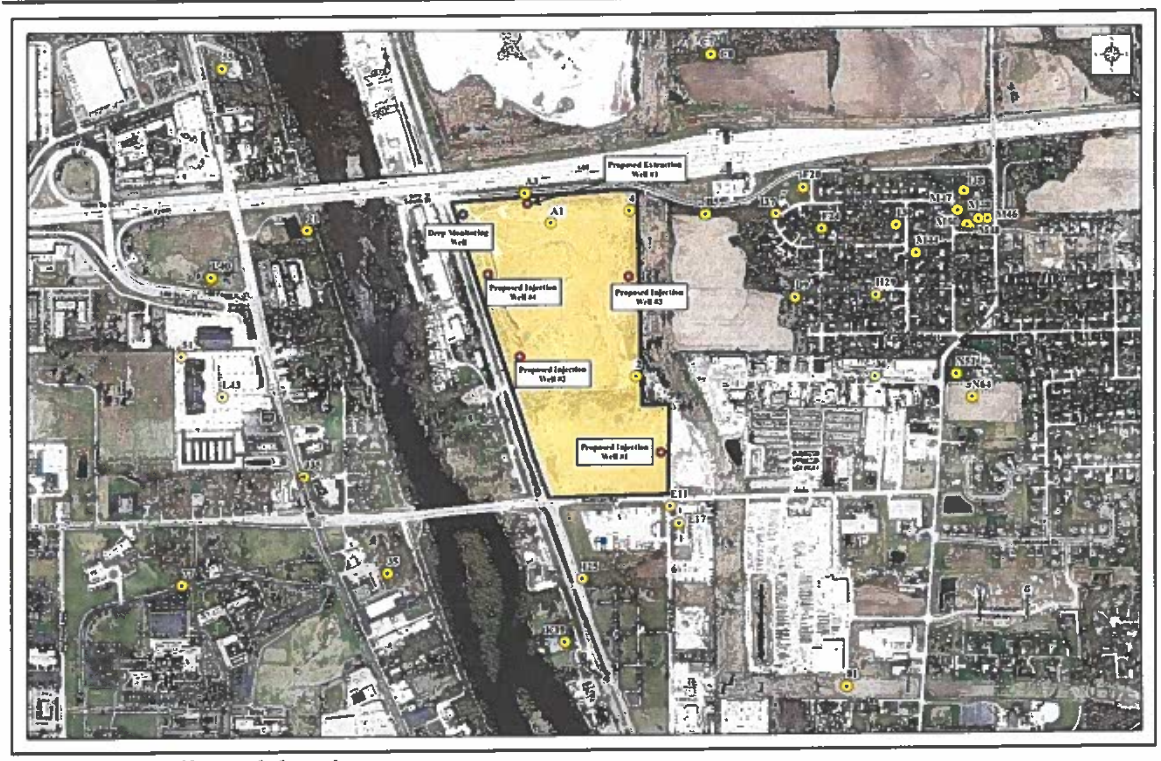

Figure 2.2 – Well search location map

The well information is summarized in the table below:

Table 2.1 – AOR Well List

MAP REF. #	OWNER	TYPE	API NUMBER	DISTANCE*	DEPTH	LIKELY UNIT	LOG
2	IDOT	Outcrop	120893315400	0′	50	NA	Y
21	George P. Hawkinson	Private	120890065300	1185′	83	Silurian	Y
35/ E13/E14	Springbrook Sanitarium	Private	120890021300 (same as 071930?)	1705′	772	St. Peter	Y
36	Jim Popp Builders	Commercial	120890101700	1883′	115	Silurian	Y
4	IDOT	Outcrop	120893315300	0′	50	NA	Y
51	A.M. Bugbee	Private	120890064600	2454′	80	Silurian	Y
55	Fox Gardens	Private	120890064300	2154′	610	St. Peter	Y
81/S83	John O'Malley	Private	120892894500	2826′	160	Silurian	Y
A1	Conco Western Stone Co.	Test	120893541900	0′	239	No screen	N
A3	Conco Western Stone Co.	Test	120893414400	0′	92	No screen	N
B5/B6	Ill. Toll Highway Comm. EP-1	Private	120890016900	564′	215	Silurian	Y
C7/G26	Charles Feltes	Private	120892201500	1255′	133	Silurian	Y

IEMA Info

FEMA

Information

Huser, Kelly

From: Horn, Kelly <Kelly.Horn@illinois.gov>
Sent: Thursday, July 03, 2014 2:24 PM
To: Nightingale, Steve; Huser, Kelly
Cc: Khayyat, Adnan; Forsee, Gary E
Subject: RESRAD model for the City of Aurora
Attachments: Aurora IEMAtoIEPA RESRAD Response.pdf

Steve/Kelly –

Let me know if you need anything else on our end.

Regards,

Kelly Horn
Section Head, Environmental Management
Bureau of Radiation Safety
Illinois Emergency Management Agency
217.558-5135
Kelly.Horn@illinois.gov

IEMA
Illinois Emergency Management Agency

Jonathon E. Monken, Director
Joseph Klinger, Assistant Director

To: Steve Nightingale, Permit Section Manager/BOL,
Illinois Environmental Protection Agency

Kelly Huser, Engineer/BOL,
Illinois Environmental Protection Agency

From: Kelly Horn, Head of Environmental Management, KH
Illinois Emergency Management Agency

Date: July 3, 2014

Re: IEMA's RESRAD model of the City of Aurora's request for a Class V Underground Injection Control permit

As you are aware, in its April 7, 2014 letter to the City of Aurora IEMA granted the City an exemption from 32 Ill. Adm. Code 330.40(d)(A) for alternative disposal of low activity radium residuals it generates as a result of treating groundwater provided the following conditions are met:

> **If prior to injection, a dose assessment model specific to the geological parameters of the proposed injection site conducted by IEMA indicates the City's proposed disposal method is protective of public health and the environment and Pursuant to 32 Ill. Adm. Code 310.30(a), the IEMA would like to grant an exemption from the disposal options currently allowed in Section 330.40(d)(4)(A) to the City thus allowing the City to utilize the UIC process provided the following conditions are met: the alternative disposal method is a Class V UIC; the IEPA grants the City a UIC permit for a Class V well(s); radium sludge injected into the Class V well(s) under the IEPA approved UIC will not exceed an annual average concentration of 25 pCi/g of total radium (the sum of Ra-226 and Ra-228); if the average annual concentration of total radium exceeds 25 pCi/g the City will cease well injection activities and notify the IEMA; all other applicable provisions currently in 32 Ill. Adm. Code 330.40(d) are met.**

As such, IEMA has completed its RESRAD dose model specific to the geological parameters of the proposed injection site and finds, with respect to radiological dose, this disposal method protective of public health and the environment.

The IEMA appreciates working with the IEPA on this issue and should you have any further questions or concerns please contact me at 217-558-5135.

EMAP Accredited

1035 Outer Park Drive • Springfield, Illinois • 62704 • Telephone (217) 785-9900 • http://www.iema.illinois.gov

Huser, Kelly

From: Horn, Kelly <Kelly.Horn@illinois.gov>
Sent: Tuesday, April 15, 2014 3:07 PM
To: Marc R Fisher (mfisher@deuchler.com)
Cc: Khayyat, Adnan; Huser, Kelly; Nightingale, Steve
Subject: Exemption
Attachments: Director's Exemption for the City of Aurora.pdf

Mr. Fisher,

As the City of Aurora's point of contact please find attached an Illinois Emergency Management Agency Director's Exemption for the City. In summary, the exemption allows the City of Aurora to utilize the Underground Injection Control process, as permitted by the Illinois Environmental Protection Agency, for its radium residuals generated as a result of treating groundwater contingent upon the stipulations stated in the exemption.

Please contact me should you have questions or concerns regarding to this matter.

Regards,

Kelly Horn
Section Head, Environmental Management
Bureau of Radiation Safety
Illinois Emergency Management Agency
217.558-5135
Kelly.Horn@illinois.gov

IEMA
Illinois Emergency Management Agency

Jonathon E. Monken, Director
Joseph Klinger, Assistant Director

TO: Jonathon E. Monken
Director

THRU: Jenifer L. Johnson
Chief Legal Counsel

FROM: Adnan Khayyat, Chief AK
Bureau of Radiation Safety

DATE: April 7, 2014

SUBJECT: Exemption allowing for Alternative Disposal of radium residuals for the City of Aurora.

Approximately 481 municipalities throughout the State of Illinois, in the course of treating groundwater to meet applicable drinking water standards, may concentrate radium in their treatment residuals. The resulting concentrations are dependent upon the treatment technology employed, as well as the local hydrogeology. Among other regulatory requirements, when both of these factors contribute to elevated concentrations of radium, 32 Ill. Adm. Code 330.40(d)(4)(A) allows for two disposal options: landfill disposal and land application.

Section 330.40(d)(4)(A) specifies that radium residuals and sludge less than or equal to 100 pCi/g (dry weight basis) may be sent to an Illinois Environmental Protection Agency (IEPA) approved landfill or may be used for soil conditioning purposes on agricultural crop land provided certain conditions are met. This provision does not allow for an alternative disposal analysis by IEMA as does Section 330.40(d)(4)(B).

Disposal of this type of waste by means of an underground injection control (UIC) permit is regulated by IEPA under, 35 Ill. Adm. Subtitle G, Part 702, 704, and 730. Under these regulations non-hazardous special waste, which includes low-level radioactive waste, may be discarded by injection with a Class V UIC permit. As part of the IEPA approved permit, groundwater monitoring, including limitations for radioactive components, would generally be included.

As a result of treating groundwater, the City of Aurora, Illinois (City) produces an average radium sludge concentration less than 10 pCi/g and currently disposes the material through the landfill and land application processes. The City has submitted a Class V UIC permit application to the IEPA which would allow the City to inject the water treatment sludge into a subterranean limestone and dolomite mine through a Class V UIC well as defined in the IEPA regulations. However, this means of disposal is not provided for in 32 Ill. Adm. Code 330.40(d)(4)(A).

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If prior to injection, a dose assessment model specific to the geological parameters of the proposed injection site conducted by IEMA indicates the City's proposed disposal method is protective of public health and the environment and Pursuant to 32 Ill. Adm. Code 310.30(a), the IEMA would like to grant an exemption from the disposal options currently allowed in Section 330.40(d)(4)(A) to the City thus allowing the City to utilize the UIC process provided the following conditions are met: the alternative disposal method is a Class V UIC; the IEPA grants the City a UIC permit for a Class V well(s); radium sludge injected into the Class V well(s) under the IEPA approved UIC will not exceed an annual average concentration of 25 pCi/g of total radium (the sum of Ra-226 and Ra-228); if the average annual concentration of total radium exceeds 25 pCi/g the City will cease well injection activities and notify the IEMA; all other applicable provisions currently in 32 Ill. Adm. Code 330.40(d) are met.

Request for exemption approved:

_____ Date: 4/11/14

Jonathon E. Monken
Director

Request for exemption denied:

_____ Date: _____

Jonathon E. Monken
Director

Huser, Kelly

Subject:	Conference call about City of Aurora UIC Application
Location:	EPA.Land.Hickory.Conference
Start:	Mon 3/17/2014 10:00 AM
End:	Mon 3/17/2014 11:00 AM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Huser, Kelly
Required Attendees:	Huser, Kelly; Nightingale, Steve; Kaufman, Scott; Horn, Kelly; Khayyat, Adnan
Optional Attendees:	Myers, Terri; Moore, James K.; Lesko, Kevin
Resources:	EPA.Land.Hickory.Conference

We will be participating in a conference call with IEMA, Deuchler Env. (consultant) and City of Aurora to discuss the 2/21/14 memorandum from IEMA.

Call #:888-494-4032
Access Code: 5646203698
Host Password: 974772

Huser, Kelly

From: Nightingale, Steve
Sent: Monday, February 24, 2014 10:14 AM
To: Horn, Kelly; Huser, Kelly
Cc: Khayyat, Adnan; Moore, James K.
Subject: RE: City of Aurora's Permit Request

Hi Kelly:

Thanks for getting back to us so quickly. And yes I need to discuss our next move with you. Kelly Huser just came by and said you will be calling me tomorrow.

My preference would probably be to set up a conference call between IEPMA staff, IEPA staff and the City of Aurora. At that point we could jointly lay out the issues with the City. What I would hope for here is that once the City hears the issues we have they would be willing to withdraw the application. Withdrawing the application would eliminate the need to go through the denial process which requires a public notice. The process is quite costly and time consuming. Withdrawing the application may be more acceptable to the City as well.

Please give me a call when you get a chance.

Steve Nightingale
IEPA
Bureau of Land
Permit Section Manager
217/558-6213

From: Horn, Kelly [mailto:Kelly.Horn@illinois.gov]
Sent: Friday, February 21, 2014 4:28 PM
To: Nightingale, Steve; Huser, Kelly
Cc: Khayyat, Adnan
Subject: City of Aurora's Permit Request

Steve/Kelly – I will be out of the office next week on travel but will be checking my email frequently. Should you need to speak with me please send me an email and I will contact you as soon as possible.

Regards,

Kelly Horn
Section Head, Environmental Management
Bureau of Radiation Safety
Illinois Emergency Management Agency
217.558-5135
Kelly.Horn@illinois.gov

IEMA
Illinois Emergency Management Agency

Jonathon E. Monken, Director
Joseph Klinger, Assistant Director

To: Steve Nightingale, Permit Section Manager/BOL,
Illinois Environmental Protection Agency

Kelly Huser, Engineer/BOL,
Illinois Environmental Protection Agency

From: Kelly Horn, Head of Environmental Management,
Illinois Emergency Management Agency

Date: February 21, 2014

Re: City of Aurora's request for an Area Class V Underground Injection Control permit

32 Illinois Administrative Code (IAC) 330.40 (d) exempts from licensure persons producing or in possession of residuals or sludge resulting from the treatment of water or sewage and containing naturally occurring radium from groundwater with concentrations of total radium less than 200 pCi/g. The exemption also specifies two disposal options for the exempted radium residuals or sludges, landfilling and/or land application.

The City of Aurora's request to inject radium sludges into a Class V Well does not meet the 32 IAC 330.40 (d) requirements for disposal. Therefore, IEMA request the Illinois Environmental Protection Agency (IEPA) deny the City of Aurora's Class V UIC permit request.

The IEMA appreciates working with the IEPA on this issue and should you have any further questions or concerns please contact me at 217-558-5135.

1035 Outer Park Drive • Springfield, Illinois • 62704 • Telephone (217) 785-9900 • http://www.iema.illinois.gov

Huser, Kelly

From: Huser, Kelly
Sent: Tuesday, February 11, 2014 11:20 AM
To: 'Horn, Kelly'
Cc: Nightingale, Steve; Moore, James K.
Subject: Memorandum to IEMA.docx
Attachments: Memorandum to IEMA.docx

Kelly,
Please see attached memorandum.

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax

Please consider the environment before printing this e-mail

Memorandum

To: Kelly Horn, Illinois Emergency Management Association

From: Kelly Huser, RCRA Unit, Illinois EPA Bureau of Land KOH

CC: Steve Nightingale, Permit Section Manager, Illinois EPA Bureau of Land
Jim Moore, RCRA Unit Manager, Illinois EPA Bureau of Land

RE: Request for IEMA's opinion on City of Aurora–Underground Injection Control Application

Date: February 11, 2014

The City of Aurora (COA) has submitted an Area Class V Underground Injection Control (UIC) permit application for review and consideration by the Illinois EPA. The COA operates a Community Water Supply in which their drinking water is treated by a lime softening treatment process at the COA Water Treatment Plant (WTP).

During IEPA's review of this application, it appeared that sludge generated from the treatment process may be NORM/TENORM as shown in the facilities analytical data. At that point, Kelly Huser verified that the City of Aurora was registered with IEMA in regards to their NORM/TENORM sludge, which is currently being sent to a landfill or land applied.

The City or Aurora is proposing to inject the lime sludge directly from the WTP to a proposed point of injection approximately 3500 feet north of the WTP that is owned by COA. The proposed injection area is within a subterranean limestone and dolomite mine located approximately 250 feet below ground surface at the injection area. The mine will serve as a permanent detention area for the lime sludge. COA estimates the storage life of the mine to be approximately 48-59 years.

The Illinois EPA is requesting IEMA's opinion on this proposal. In regards to IEMA's regulations that apply to this sludge material are there any restrictions that should be included in IEPA's draft decision? Please note, if COA is issued a Class V UIC permit, it will be regulated under IEPA's Underground Injection Control Program which is a means for disposal, however be advised this should not be considered disposal in a landfill.

Illinois EPA has been working with Marc Fisher, Deuchler Environmental, Inc. as COA's consultant. He may be contacted at 630-897-8380 or mfisher@deuchler.com, if you have any questions for COA or you may contact me directly at 524-3867 if you have any questions for Illinois EPA.

Additional Information to Memorandum dated February 11, 2014 in Regards to City of Aurora UIC Permit Application

- Supernatant will be removed from the lime sludge (that is place in the underground cavern) and disposed into a Fox Metro Water Reclamation District sanitary sewer.
- The City of Aurora estimates a total air space volume of 93.5 million cubic feet at the proposed injection site.
- The analytical testing showed the following average concentrations for radioactive components:

Lime Sludge		Supernatant	
Gross Alpha	18.69 pCi/g	Gross Alpha	1.11 pCi/g
Gross Beta	12.44 pCi/g	Gross Beta	5.53 pCi/g
Radium 226	4.26 pCi/g	Radium 226	0.90 pCi/g
Radium 228	3.55 pCi/g	Radium 228	1.91 pCi/g

Summary of USDW's at the site

GW/Aquifer Unit	Anticipated Depth (ft.)	Unit Thickness (ft.)	Confining Unit	Position Relative to Lime Sludge Placement	Comment
Quaternary Sediments	12	12	Silurian Joliet/Kankakee Formation Dolomite	Above	Class II aquifer
Silurian Wilhelmi Formation Dolomite	53	10	Ordovician Brainard Formation Shale	Above	Class I aquifer
Ordovician St. Peter Formation Sandstone	540	231	Knox Dolomite Megagroup	Below	Class I aquifer
Cambrian Ironton-Galesville Formation Sandstone	900	160	Eau Claire Formation Dolomite/Shale	Below	Class I aquifer
Cambrian Mt. Simon Formation Sandstone	1280	2000+	Pre-Cambrian Granite Basement Rock	Below	Class I aquifer

NODs

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
PAT QUINN, GOVERNOR LISA BONNETT, DIRECTOR

Bureau

217/524-3300

June 2, 2014

CERTIFIED MAIL
7012 0470 0001 3000 1242

City Of Aurora
Attn: Alex Alexandrou
44 East Downer Place
Aurora, IL. 60507

RE: 0894075971 – Kane County
City Of Aurora - Route 25 Repository Site
Permit No. UIC-015-COA
UIC Log No. UIC-147
UIC Admin Record
Permit NOD

Dear Mr. Alexandrou:

The Illinois EPA received your application for an Underground Injection Control area permit for four (4) Class V injection wells for disposal of lime sludge generated at the Aurora Community Water Supply facility. The injection well site is located at the corner of Route 25 and Mettel Road in Aurora, Illinois. The lime sludge is to be injected into a former limestone and dolomite mine which ranges from 240 feet to 370 feet below ground surface at this location. This injection zone is above an underground source of drinking water. The subject application, dated February 19, 2013, was received by the Illinois EPA on February 26, 2013.

A letter from Illinois EPA dated June 19, 2013 addressed the completeness of your application and some preliminary technical comments (groundwater portions of the application not included). On October 29, 2013, Deuchler Environmental Inc. (DEI), on behalf of City of Aurora, submitted a response to Illinois EPA's completeness review and preliminary technical comments. This submittal was received by the Illinois EPA on October 31, 2013.

On May 15, 2014, a conference call was held between DEI and Illinois EPA to discuss the information in DEI's October 29, 2013 submittal (not including the groundwater portions). Based on the discussions in that conference call, DEI will revise your permit application to include the information that was in the October 29, 2013 submittal.

A review of the groundwater portions of your permit application and the information submitted by DEI dated October 29, 2013 has been completed. During Illinois EPA's review of the groundwater portions of the permit application and DEI's submittal, some technical comments were identified and are listed as Attachment 1 to this letter.

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

Each of the comments listed in Attachment 1 must be addressed and the revisions to the permit application discussed in the May 15, 2014 conference call must be submitted before the Illinois EPA can continue the review of your permit application. Revisions to your application should include an original and four (4) copies and be in a format which allows incorporation of the new information into the appropriate sections of your application. To allow for a proper review of this new information, the location of the response to each comment should be identified in a list cross-referencing these items. Each revised page or drawing must have the revision date identified on them for tracking purposes. Responses should be mailed to the following address:

Illinois Environmental Protection Agency
Bureau of Land #33
Permit Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

All applications shall be signed in accordance with the requirements of 35 Ill. Adm. Code 702.126(a) and be accompanied by a completed Illinois EPA Form LPC-PA-1 which can be obtained at the following web site:

www.epa.state.il.us/land/regulatory-programs/permits-and-management/forms/pa1.html

Work required by this letter, your submittal or the regulation may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

If you have any questions concerning the groundwater related aspects of this letter, please contact Scott Kaufman at 217/785-6869. Questions regarding other aspects of this letter should be directed to Kelly Huser 217/524-3867.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

Attachments: Attachment 1- Technical Review Comments (Groundwater)

cc: Deuchler Environmental, Inc. – Marc Fisher

SFN:JKM:KDH:0894075971-UIC-UIC147-NOD.docx
KDH OSC KBM JKM

bcc: UIC Admin Record
Steve Nightingale
Jim Moore
Terri Blake Myers
Des Plaines Region – FOS
Scott Kaufman – GU
Kelly Huser

ATTACHMENT 1

Technical Review Comments

Groundwater

City Of Aurora - Route 25 Repository Site
0894075971 – Kane County
Permit No. UIC-015-COA
UIC Log No. UIC-147

The Illinois EPA has determined that some groundwater portions of the subject permit application are not technically adequate at this time. Information must be submitted to address the technical comments as discussed below. If you have any questions concerning these items, please contact Scott Kaufman at 217-785-6869.

1. Checklist Section 4a.VII.A – The Illinois EPA does not concur with the facility's statement in Section 6.1 that the shallow most groundwater (encountered in the Quaternary sediments) in the AOR is 35 Ill. Adm. Code 620, Class II Groundwater. If a continuous zone of groundwater begins within ten feet of the ground surface and extends greater than ten feet below the ground surface it will not be considered Class II Groundwater if an additional criteria is met under 35 Ill. Adm. Code 620.210, which in that case it will be considered Class I groundwater. The shallow most groundwater at the facility is hydraulically connected to the Silurian Dolomite, which is a fractured carbonate unit greater than 15 ft thick. It therefore meets the additional Class I criteria of 35 Ill. Adm. Code 620.210(a)(3) and must be considered Class I Groundwater. Section 6.1 of the Permit Application must be revised accordingly.

2. Checklist Section 4d.III – Figure 2.2 of the application must be revised to depict the outline of the Area of Review, an appropriate scale, and a key to all symbols used on the map.

3. Checklist Section 4e.II.B – In order to meet the requirements of 35 Ill. Adm. Code 704.122 and 704.282, and pursuant to 35 Ill. Adm. Code 704.149(a) and (b), and 704.282(d), the facility must propose the installation of additional wells to monitor groundwater in the USDW (Glenwood/St. Peter Formations) directly underlying the injection zone. The proposed monitoring well network must consist of a minimum of three monitoring wells capable of determining groundwater flow direction and must be capable of determining if there is release from the injection zone into the underlying USDW in the vicinity of the facility. Section 16 of the application must be revised accordingly.

4. Checklist Section 4e.II.C – Section 16 of the application must be revised to include detailed information regarding the following:

    a. Procedures that will be used for the following:

i. Groundwater sample collection:

ii. Monitoring well purging;

iii. Groundwater sample chain of custody;

iv. Field quality control:

v. Laboratory quality control;

vi. Data review and validation;

b. The facility must propose a statistical analysis plan that will be utilized to determine if there has been release to groundwater. This must include, but not be limited to, the following:

i. A list of groundwater parameters for which background values will be established;

ii. Statistical methods that will be used to calculate background values including the determination of data distribution and the handling of non-detects;

iii. The facility must propose what will constitute the baseline data set(s).

iv. Methods that will be used to compare appropriate compliance well data to the established background values;

v. Criteria that will determine when a statistically significant increase has been observed, the confidence level at which it will be determined, and the actions that will result from that determination;

vi. The Illinois EPA strongly recommends that the facility develop a statistical analysis flow chart to be submitted as part of the Permit Application, and which may be included in the Permit;

vii. The Illinois EPA recommends referring to the document entitled, "EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance". This document has now been finalized by USEPA and may be used as a reference.

BOL Permit Section RCRA Tracking Sheet

BOLSiteCode ***0894075971*** *Federal ID(s)* *Respond by:* ***7/21/2013***

Site: ***Aurora, City Of*** *Region:* ***Des Plaines***

City: Aurora *County:* Kane

Data Regarding Logged Submittal(s) per Log # ***UIC-147***

Review Status	PermitClass	AppType	Reviewers: RCRA, CAU, DAU, GAU
Active	New UIC Pmt (Existing Facility)	UIC	KL

DocTitle_Description	Submittal Type	Review Type	Agency Response
New UIC Permit	1st Submittal	Technical	Completeness NOD

Date Received 02/26/2013 **Date Due** 04/27/2013 **Date Mailed** 06/19/2013

Submittal Comment:

Final Action Data

For Log No: UIC-147

Units Addressed	Final Action Status	Date FA Issued	Date NFA	Date Closure Cert Accepted	Acres Remediated
					0

Closure Type:	Institutional Control	Clean Closed:	1 Institutional Control:	2 Institutional Control:
	☐			

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY Bureau

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PAT QUINN, GOVERNOR LISA BONNETT, DIRECTOR

217/524-3300

June 19, 2013

CERTIFIED MAIL
7012 0470 0001 2997 3581

City Of Aurora
Attn: Alex Alexandrou
44 East Downer Place
Aurora, IL. 60507

RE: 0894075971 – Kane County
City Of Aurora - Route 25 Repository Site
Permit No. UIC-016-COA
UIC Log No. UIC-147
UIC Admin Record

Dear Mr. Alexandrou:

The Illinois EPA received your application for an Underground Injection Control area permit for four (4) Class V injection wells for disposal of lime sludge generated at the Aurora Community Water Supply facility. The injection well site is located at the corner of Route 25 and Mettel Road in Aurora, Illinois. The lime sludge is to be injected into a former limestone and dolomite mine which ranges from 240 feet to 370 feet below ground surface at this location. This injection zone is above an underground source of drinking water. The subject application, dated February 19, 2013, was received by the Illinois EPA on February 26, 2013.

In accordance with 35 Ill. Adm. Code 702.122 the Illinois EPA reviewed the application for completeness. This review found that the items identified in Attachment 1 to this letter must be addressed in order for the application to be considered to be complete. Attachment 2 to this letter identifies preliminary technical deficiencies identified during the initial review of the application.

Each of the deficiencies must be addressed before the Illinois EPA can continue the review of your permit application. Revisions to your application should include five (5) copies and be in a format which allows incorporation of the new information into the appropriate sections of your application. To allow for a proper review of this new information, the location of the response to each deficiency should be identified in a list cross-referencing these items. Each revised page or

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
5407 N. University St., Arbor 113, Peoria, IL 61614 (309) 693-5462
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

drawing must have the revision date identified on them for tracking purposes. Responses should be mailed to the following address:

Illinois Environmental Protection Agency
Bureau of Land #33
Permit Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

All applications shall be signed in accordance with the requirements of 35 IAC 702.126(a) and be accompanied by a completed Agency Form LPC-PA-1 which can be obtained at the following web site:

www.epa.state.il.us/land/regulatory-programs/permits-and-management/forms/pa1.html

Work required by this letter, your submittal or the regulation may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

If you have any questions concerning the groundwater related aspects of this letter, please contact Scott Kaufman at 217/785-6869. Questions regarding other aspects of this letter should be directed to Kevin Lesko at 217/524-3271.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

Attachments: Attachment 1- Incomplete Items
Attachment 2 - Preliminary Technical Comments

cc: Deuchler Environmental, Inc. – Marc Fisher

SFN:KL:0894075971-UIC-UIC146-Completeness.docx

bcc: UIC Admin Record
Steve Nightingale
Jim Moore
Terri Blake Myers
Des Plaines Region – FOS
Scott Kaufman – GU
Kevin Lesko

ATTACHMENT 1

Incomplete Items

City Of Aurora - Route 25 Repository Site
0894075971 – Kane County
Permit No. UIC-016-COA
UIC Log No. UIC-147

The subject application consisted of the following forms and associated supporting information:

- LPC-PA1
- Certificate of Authenticity of Official Forms
- 39i Certification for a Legal Entity and for a person
- UIC Permit Application Forms 1, 4, 4a, 4b, 4c, 4d, 4e, 4f, and 4g.

This document identifies the items that need to be addressed in your Class V permit application in order to continue the technical review of the subject application.

1. The following groundwater-related aspects of a UIC permit application were found to be incomplete:

Form	Location in Application	Deficiency
4a	IV.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.7	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.8	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.1	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.6	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.E	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	VI.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	VI.C.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	VII.A.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	VII.A.3	Explanation must be provided as to why this information is not applicable (N/A).

Form	Location in Application	Deficiency
4a	VII.A.6	Explanation must be provided as to why this information is not applicable (N/A).
4a	VIII	Explanation must be provided as to why this information is not applicable (N/A).
4a	VIII.A	Explanation must be provided as to why this information is not applicable (N/A).
4c	I.B.10	Explanation must be provided as to why this information is not applicable (N/A).
4d	V.C	Explanation must be provided as to why this information is not applicable (N/A).
4d	V.D	Explanation must be provided as to why this information is not applicable (N/A).

2. The following items regarding the design, operation and ultimate plugging aspects of a UIC permit application were found to be incomplete:

Form	Location in Application	Deficiency
4b	VII.B.2 & 4	Conductive casing should be marked N/A as it should be identified as the long string casing.
4b	VII.C	Information in this Section should be provided. See additional comments in Attachment 2.
4b	VII.D	Information in this Section should be provided. See additional comments in Attachment 2.
4b	VIII	Information on the drilling company should be provided when known.
4e	II.A.1	Provide justification for not monitoring injection pressure. See additional comments in Attachment 2.
4e	III	Provide justification for not providing a Mechanical Integrity Testing program. See additional comments in Attachment 2.
4f	V	Provide justification for not evaluating the compatibility of the injection fluid and the components of injection system. See additional comments in Attachment 2.
4g	I.A	Provide justification for not including a plan for abandonment during construction. See additional comments in Attachment 2.
4g	I.E	Provide justification for not including a cost estimate for plugging and abandonment.

ATTACHMENT 2

Preliminary Technical Review Comments

City Of Aurora - Route 25 Repository Site
0894075971 – Kane County
Permit No. UIC-016-COA
UIC Log No. UIC-147

The following preliminary technical comments regarding design, operation and ultimate plugging of the proposed UIC wells were identified during the completeness review of your application. If you have any questions concerning these items, please contact Kevin Lesko at 217-524-3271.

1. FORM 1, Section II. D – This item marked yes indicating that the facility will discharge to waters of the Sate. Section 12.6.4, page12-21, of the application indicates that the supernatant extraction system will discharge to the Fox Metro Water Reclamation District (FMWRD) sanitary sewer system. This item should be marked yes if the facility will directly discharge wastewater to surface waters of the State under the NPDES program. This item should not be checked yes for stormwater runoff from the facility.

2. FORM 4b, Section VII - The proposed design of the injection well does not appear to include installation of centralizers on the injection string. This will allow the injection string to move freely within the cased borehole as the string is only connected at the floor of the injection well manhole and the ceiling of Level 1 of the mine. Unrestrained movement of the injection string due to the dynamic nature of the lime sludge injection would seem to be detrimental to the integrity of the injection well casing and injection string. The steel tabs installed to facilitate installation of the injection string will result in a relatively small contact point load on the well casing that, over long periods of operation, could result in substantial wear on the casing even with minimal movement of the injection string. Provide additional information to address this concern.

3. FORM 4b, Section VII.B. - The well casing is an 8 inch schedule 40 galvanized or carbon steel pipe with an exterior coal tar epoxy coating. This should be identified as the long string casing for the well rather than the surface casing.

4. FORM 4b, Section VII.C. - The injection string is to be constructed of six inch galvanized steel pipe with threaded connections utilizing o-rings seals. After sections of pipe are threaded together they will be bead welded. Several concerns are raised by the welding of the pipe joints:

    a. What effect does the heat generated during welding of the pipe joints have on the o-rings?

b. What are the procedures welding of the galvanized piping? What effect does this have on the corrosion resistance of the piping joints?

5. FORM 4b, Section VII.C. - The item 1, Maximum allowable suspended weight based on joint strength of Injection tubing, and item 2, weight of injection tubing string (axial load) in air, are marked N/A. This basic information should be provided in the application.

6. FORM 4b, Section VII.C. - Page 12-7 of the application describes the installation of steel tabs a few inches down from the shoulder of the injection string pipe to facilitate installation of the injection string. As the weight of the injection string increases these tabs may result in the deformation of the end of the injection string. Will this deformation hinder the connection of the piping? How does the welding of the steel tabs affect the corrosion resistance of the pipe?

7. FORM 4b, Section VII.D. - All items of this section are marked N/A. According to the description on page 12-7 of the application, the 8-inch diameter pipe (long string casing) will be grouted using bentonite or neat cement from depth to 5 feet below manhole floor followed by 3 feet of bentonite and 2 feet of cement. At a minimum the application should include the specification of the material that may be used to cement the long string casing and the method of placement.

8. FORM 4b, Section VIII - Information on the well drilling company is marked N/A. This information should be provided when it becomes available.

9. FORM 4c, Section I.A.6 - The name and location of injection wells is marked N/A, however, the name and location of the proposed wells is identified on page 4.9 of the application.

10. FORM 4c, Section II.C - The location of the PID is identified as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of a PID for the system should be identified. The PID should identify the control systems for the operation of the well system.

11. FORM 4c, Section II.D - The location of each item in this section is indicated as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of the information required for each item should be identified.

12. FORM 4e, Section II - Item 1, Injection pressure gauges is marked N/A. How will the injection pressure of the system be monitored? What is the maximum allowable pressure for the various system components? How will problems with the injection system be indentified if the injection pressure is not monitored?

13. FORM 4e, Section III - This Item is marked N/A. The applicant should propose a program for Mechanical Integrity Testing (MIT) of the wells. An MIT program should take into account:

    a. the physical characteristics of the lime sludge, including the probability that it is more abrasive than a filtered liquid typically seen in injection well systems;

    b. the compatibility of the high pH lime sludge with galvanized steel injection string;

    c. the injection wells do not have sealed annuluses that can be monitored to detect leaks in the injection string; and

    d. the length of operation of the injection well system of up to 59 years.

    Internal pressure testing of the injection string and caliper logs would appear to be reasonable test to run on a periodic basis. This program should also take into account the lack of a sealed annulus that could be monitored to detect leaks in the injection string. The frequency of integrity testing should be justified.

14. FORM 4f, Section V - The Injection Fluid Compatibility section is marked N/A. The compatibility of the lime sludge with components of the system, including the Kennedy stop bulkheads and the formation should be discussed. This discussion should take into account the operating life of the project. It appears as though some of the required information is included in Appendix A of the application.

15. FORM 4g, Section I, - The plugging and abandonment plan does not address plugging of the annular space between the injection string and the "surface" casing. In order to prevent the migration of fluids this annulus must be plugged during closure of the injection wells. It would be preferable to remove as much of the injection string as possible from the borehole, install a bridge plug within the casing and cement the well to the surface.

16. FORM 4g, Section I, Item A - The application should include a plan on how a well will be plugged should it not be completed due to unforeseen circumstances.

17. FORM 4g, Section I, Item D - The plan indicates that an inflatable bladder will be used as a temporary plug above which bentonite grout will be placed. Once the bentonite grout is in place air pressure to the bladder will be discontinued and the bladder will deflate. The applicant should demonstrate that the bentonite grout column will have adequate support/strength to stay in place without permanent support below it that a cement retainer/bridge plug would provide.

18. FORM 4g, Section I, Item E - This item is marked N/A. A cost estimate for plugging and abandonment of the injection well system should be provided in order to establish the necessary financial assurance for closure of the injection well system.

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KL Review Notes

UIC ADMININSTRATIVE RECORD

0894075971 – Kane County
City Of Aurora - Route 25 Repository Site
Permit No. UIC-016-COA
UIC Log # UIC-147
UIC Admin Record

Review Notes for Completeness Determination
Feasibility Study Work Plan for Class V UIC Area Permit

Kevin Lesko KL
March 25, 2013

A completeness review was conducted, as required by 35 IAC 702.122, on the City Of Aurora's UIC application dated February 19, 2013.

Background

Deuchler Environmental submitted a Class V non-hazardous UIC area permit on behalf of the City of Aurora. The wells will inject "lime sludge" generated from the city of Aurora's Water Treatment Plant ("WTP"). The sludge will be injected into a section of a dolomite mine which has been sealed off from the remainder of the mining operations.

Review

Attached is a copy of the UIC application forms 4, 4a, 4b, 4c, 4d, 4e, 4f & 4g. A checkmark on the form indicates that this portion of the application is complete.

See Memo dated March, 20 2013 for the completeness review of Scott Kaufman, RCRA GU, for his review of the sections of the application related to Form 4a, 4b, 4d and 4e. He determined that sections of the application were incomplete, due to the lack of an explanation of items marked not applicable.

A technical review was not performed by Scott Kaufman, RCRA GU at this time due to time constraints. Limited technical comments are provided below, however, these are based on a preliminary review and should not be considered to be comprehensive in nature.

FORM 1

Section II. D – This item marked yes indicating that the facility will discharge to waters of the Sate. Section 12.6.4, page12-21, of the application indicates that the supernatant extraction system will discharge to the Fox Metro Water Reclamation District (FMWRD) sanitary sewer system. This item should be marked yes if the facility will directly discharge wastewater to

surface waters of the State under the NPDES program. This item should not be checked yes for stormwater runoff from the facility.

FORM 4

Applicant request for an Area permit for four (4) Class V wells.

Section VII – This section should be marked as not applicable as this is not a hazardous waste disposal well.

FORM 4a

This form was reviewed by Scott Kaufman of the Groundwater Unit (GU).

FORM 4b

Section VI.

Injection String Design - The proposed design of the injection well does not appear to include the use of centralizers for the injection string. There would appear to be potential movement of the injection string within the cased borehole due to the dynamic nature of the lime sludge injection. Any unrestrained movement of the injection string would seem to be detrimental to the integrity of the injection well casing and injection string. The steel tabs installed to facilitate installation of the injection string would result in a relatively small contact point load on the well casing that could result in substantial wear on the casing even with minimal movement of the injection string over long periods of operation.

> Provide additional information to address this issue or revisions to the design of the injection string.

Section VII.

VII.B. – Well Casings

The well casing is an 8 inch schedule 40 galvanized or carbon steel pipe with an exterior coal tar epoxy coating. This would be considered to be the long string casing, although the applicant identifies it as the surface casing on Form 4b.

VII.C. - Injection Tubing String

The injection string will be 6 inch schedule 40 galvanized steel piping. The connections will be threaded and utilize o-rings seals. Once connected the pipe joints will be bead welded.

Several concerns are raised by the welding of the pipe joints:

1. What effect does the heat generated during welding of the pipe joints have on the o-rings?

2. What are the procedures welding of the galvanized piping? The welding of galvanized steel may require removal of the zinc coating prior to welding or other specific techniques to assure proper bond. What effect does this have on the corrosion resistance of the piping joints?

The Items 1 and 2 are marked N/A. This information should be provided.

> Provide the information identified in for 4b, Section VII. C. items 1 and 2

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

Page 12-7 of the application describes the installation of steel tabs a few inches down from the shoulder of the injection string. These tabs will be installed in order to facilitate installation of the injection string into the borehole. The tabs will be used to support the weight of the injection string during installation. As the weight of the injection string increases the location of the tabs may cause deformation of the end of the pipe that may hinder the connection of the next section of pipe.

VII.D. - Cement

All items of this section are marked N/A. According to the description on page 12-7 of the application, the 8-inch diameter pipe (long string casing) will be grouted using bentonite or neat cement from depth to 5 feet below manhole floor followed by 3 feet of bentonite and 2 feet of cement.

> Information for items D. 4 and 6 should be provided in the application.

VII.E. Annulus Protection System

The annular space between the 8" casing and the 6" injection string will not be sealed with a packer. The top of the string will be cemented in place on the floor of the manhole while the bottom of the string will be secured to the ceiling of level 1 of the mine by welding a one inch steel to the injection string and using roof bolts to attach the plate to the ceiling.

Since the annular space will not be sealed the annular space cannot be monitored to determine if the injection string/casing has mechanical integrity. The applicant should explain how the

integrity of the injection string and casing can be evaluated over the life of the operation. See comments on Form 4e, Section III below.

Section VIII.

Information on the well drilling company is marked N/A. At a minimum this information should be provided when it becomes available.

Section IX.

Extensive information appears to have been gathered about the geology of the area as identified in Sections 5.4 to 5.6 of the application.

FORM 4c

Note operational life of disposal operation anticipated to be up to 59 years. This is a long term project that will require continuing maintenance.

Section I.A.6. Name and location of Injection Wells

This item is marked N/A, however, the name and location of the proposed wells is identified on page 4.9 of the application.

Section II.C.

The location of the PID is indicated as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of a PID for the system should be identified. The PID should identify the control systems for the operation of the well system.

Section II.D.E. HPO KH KL 5/1/14

The location of each item in this section is indicated as Appendix D. This Appendix is over 49 pages long plus drawings. The specific location of the information required for each item should be identified.

FORM 4e

Section II. Monitoring Program

Item 1, Injection pressure gauges is marked N/A. How will the injection pressure of the system be monitored? What is the maximum allowable pressure for the various system components? If the pressure is not monitored how will problems within the system be indentified?

Section III. Mechanical Integrity Test During Service Life of Well

This Item is marked N/A. The applicant should propose a program for Mechanical Integrity Testing of the wells. An MIT program should be proposed because:

1. the injection of a sludge would seem to result in greater wear than a filtered liquid;

2. the compatibility of the high pH lime sludge with galvanized steel has not been discussed;

3. the injection wells do not have sealed annuluses that can be monitored to detect leaks in the injection string; and

4. injection may be conducted at the site for up to 59 years.

Internal pressure testing of the injection string and caliper logs would appear to be reasonable test to run on a periodic basis. This program should also take into account the lack of a sealed annulus that could be monitored to detect leaks in the injection string. . The time period between a integrity test should be justified.

>> Check guidance documents for time frame may be less than year between MIT

FORM 4f

Section V. Injection Fluid Compatibility

This section is marked N/A. The compatibility of the lime sludge with components of the system, including the Kennedy bulkheads and the formation should be discussed. This discussion should take into account the operating life of the project. It appears as though some of the required information is included in Appendix A of the application.

FORM 4g

Section I.

Item A is marked N/A. Should a well not be completed due to unforeseen circumstances a plan on how the well will be plugged should be provided.

Item D. The plan indicates that an inflatable bladder will be used as a temporary plug above which bentonite grout will be placed. Once the bentonite grout is in place air pressure to the bladder will be discontinued and the bladder will deflate. Will the bentonite grout column have adequate support without permanent support below it, such as a cement retainer/bridge plug?

Specification for proposed bentonite plugs should be included in the application.

A description of how the bentonite will be placed into the injection string should be provided.

The hose used to inflate the bladder would also appear to be a potential pathway for the movement of fluid along the length of the bentonite plug. This potential pathway should be eliminated in the plan through the use of an alternated bottom plug such as a cement retainer or bridge plug. This would also provide better support for the proposed bentonite grout.

The plugging plan does not address the annular space between the injection string and the "surface" casing. How will migration of fluids be prevented along this annular space?

Region 5's UIC - Class V Permit Application Instructions (see Attached) contain the following guidance for P&A

Q. PLUGGING AND ABANDONMENT PLAN:

> Describe how the Class V well will be closed in a manner that prevents the movement of fluid containing any contaminant into a USDW, if the presence of that contaminant may cause a violation of any primary drinking water regulation or otherwise adversely affect the health of persons. Include a schematic and/or other appropriate drawings of the construction details for each Class V well showing how the well will be closed. The plan should include (as appropriate):
>
> 1. The type, number, and placement of any plugs to be used;
> 2. The type, grade and quantity of any cement (or other material) to be used;
> 3. Describe the method to be used to place any plugs; and
> 4. Describe how any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well will be disposed or otherwise managed according to applicable requirements.

Item E. – Cost estimate for plugging and abandonment.

This item is marked N/A. It appears as though the cost estimate should be provided in order to establish the necessary financial assurance for closure of the injection well system.

Financial Assurance

Is financial assurance required for Class V wells?

702.160 Establishing Permit Conditions, contains the following requirement which points to 704 Subpart E.

> 702.160 (a)
> . . . Permits for other wells must contain the requirements set forth in Subpart

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Part 704 Subpart E which includes Section 704.189 Financial Responsibility, which requires:

> a) The permittee, including the transferor of a permit, is required to demonstrate and maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner prescribed by the Agency until one of the following occurs:
>
> . . .

Region 5's UIC - Class V Permit Application Instructions (Attached) contain the following:

R. NECESSARY RESOURCES:

1. Submit evidence, such as a surety bond, trust agreement, or financial statement to verify that the financial resources necessary for closure of each well are available.

It appears that financial assurance is required for a permitted Class V injection well facility.

Conclusion

Portions of the application have been determined to be incomplete. The technical comments above are based on a preliminary review of the application.

A letter identifying incomplete sections and preliminary technical deficiencies of the application should be prepared. Is should include those incomplete items identified in Scott Kaufman's March, 20 2013 Memo.

Attachments:

- "Check list" UIC Application Forms 4, 4a, 4b, 4c, 4d, 4e, 4f & 4g
- Region 5 UIC - Class V Permit Application Instructions
- March, 20 2013 Memo from Scott Kaufman

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City Of Aurora – Rt. 25 Repository Site
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Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION
GENERAL UIC PROGRAM REQUIREMENTS
FORM 4

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

I. Well Status
Operating _____ Modification/Conversion _____ Proposed ✓

II. Type of Permit
Individual:
New _____ Renewal _____ Emergency _____
Permit Number _____

Area: Number of Wells _____ Name of Field _____
New _____ Renewal _____ Emergency _____
Permit Number _____

III. Class V

IV. Location of Well (if area permit is requested, give approximate center of area)
A. Township-Range-Section system of the Bureau of Land Management of the US Government (specify distance, direction and number; circle pertinent direction where applicable)
_____feet north/south and _____feet east/west of the _____ corner of the _____ quarter of the _____ quarter of Section _____, Township _____ north/south, Range _____ east/west of the _____ Principal Meridian, _____ County, Illinois.

B. Latitude _____ (degs. mins. secs.) C. Longitude _____ (degs. mins. secs.) Closest Municipality _____ (Name & County)

V. OWNER CITY OF AURORA
Land Ownership
(Enter name of the site landowner if not the applicant or operator)
A. Name and Title _____ B. Phone Number _____
C. Street, PO Box or Route _____
D. City or Town E. State F. County G. Zip Code _____
H. Lease is to terminate on (month, day, year) _____

VI. Attachments (see instruction sheet)
A. Application Forms (enter form numbers) _____

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B. Are five (5) copies of the Feasibility Report attached? Yes____ No____(explain)
C. Are five (5) copies of the Well Completion Report attached?
Yes ____ No____(explain)
D. Has the applicant applied to proper local government unit(s) to secure siting approval? Yes_____ No____(explain)
Are two (2) copies of siting approval attached? Yes _____ No ____(explain)
E. Is a certification of financial responsibility to close, plug and abandon the well(s) attached? Yes _____ No ____(explain)
F. If the land is leased, is a copy of the lease agreement attached?
Yes _____ No ____(explain)

VII. Illinois State Legislative Requirements (see instruction sheet)
(Applicable to hazardous waste disposal sites except those publicly-owned sewage works or the disposal or utilization of sludge from publicly-owned sewage works.)

N/A

A. Is the proposed or existing hazardous waste disposal site located:
1. Above an active in inactive shaft or tunneled mine or within 2 miles of an active fault in the earth's crust or active quarry doing blasting?
Yes _____ No _____

2. In a county populated with less than 225,000:
a. Within 1 ½ miles of the corporate limits as defined on June 30, 1978 of any municipality?
Yes _____ No _____
If "yes", has approval been given by the governing body of the municipality in an official action?
Yes _____ No_____

b. Within 1000 feet of an existing private well or the existing source Of a public water supply measured from the boundary of the actual active permitted site and excluding existing private wells on the property of the permit applicant?
Yes _____ No _____

B. Is the proposed or existing well a pollution control facility? Yes _____ No _____
Have the requirements of SB172 been met? Yes _____ No_____
Attach a dated copy of the approval by the county board or city council

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

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DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4a - HYDROGEOLOGIC INFORMATION

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Reviewed By Scott Kaufman - Groundwater Unit

Location in Application

_____I. Elevation of Land Surface at Well Location
_____II. Faults, know or suspected within the area of review.
_____III. Maps and cross sections as required by Section 730.114(a) or 730.134(a).
_____IV. Injection Zone
_____ A. Geologic name(s) of injection zone.
_____ B. Depth interval of injection zone beneath land surface.
_____ C. Characteristics of injection zone.
_____ 1. Lithologic description
_____ 2. Injection zone thickness available to accept waste.
_____ 3. Fracture pressure at top of injection zone, include source
_____ 4. Effective porosity, include source
_____ 5. Intrinsic permeability, include source
_____ 6. Hydraulic conductivity or permeability, include source
_____ 7. Storage coefficient, include source
_____ 8. Seepage velocity (ft/yr) and flow direction of formation water, include source.
_____ D. Characteristics of injection zone formation water.
_____ 1. Temperature, include source
_____ 2. Pressure, include source
_____ 3. Density, include source
_____ 4. Viscosity, include source
_____ 5. Total Dissolved Solids, include source
_____ 6. Potentiometric surface, include source
_____ E. Additional or alternative zones considered for injection

_____ V. Upper Confining Zone
_____ A. Geologic name(s) of confining zone
_____ B. Depth interval of upper confining zone beneath land surface.
_____ C. Characteristics of confining zone
_____ 1. Lithologic description
_____ 2. Fracture pressure at depth, include source
_____ 3. Intrinsic permeability, include source
_____ 4. Hydraulic conductivity, include source
_____ 5. Alternative confining zones proposed, include explanation

and depth interval(s)

_____VI. Lower Confining Zone
_____ A. Geologic name(s) of confining zone
_____ B. Depth interval of lower confining zone beneath land surface
_____ C. Characteristics of confining zone
_____ 1. Lithologic description
_____ 2. Fracture pressure at depth, include source
_____ 3. Intrinsic permeability, include source
_____ 4. Hydraulic conductivity, include source
_____ 5. Alternative confining zones proposed, include explanation and depth interval(s)

_____VII. Overlying Sources of Groundwater at the Site
_____ A. Characteristics of the aquifer immediately overlying the confining zone
_____ 1. Elevation at top of aquifer, include source
_____ 2. Potentiometric surface, include source
_____ 3. Total Dissolved Solids, include source
_____ 4. Lithology, include source
_____ 5. Aquifer thickness
_____ 6. Specific gravity, include source
_____ B. Underground Sources of Drinking Water (USDW)
_____ 1. Maps and cross sections required by 730.114(a)(4) or 730.134(a)(4)
_____ 2. Lowest depth of USDW
_____ 3. Elevation of potentiometric surface of lowest USDW referenced tomean sea level
_____ 4. Distance to nearest water supply well
_____ 5. Distance to nearest down gradient water supply well

_____VIII. Minerals and Hydrocarbons
_____ A. Mineral or natural resources beneath or within 5 miles of the site, include types and depth intervals

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0894075971 – Kane County
Log # UIC-147

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

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DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4b - INJECTION WELL DESIGN, CONSTRUCTION TESTS and LOGS

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

- ✓ I. Well Depth
- N/A II. Anticipated fracturing pressure —
- ✓ III. Static Water level and type of fluid
- ✓ IV. Expected service life of well —— 48-59 yrs (14-8)
- ✓ V. Injection well completion, see instructions
- ✓ VI. Schematic or other appropriate drawing of the surface and subsurface construction details of well
- VII. Well Design and Construction
  - ✓ A. Well hole diameters and corresponding depth intervals
  - ✓ B. Casing, see instructions
    - N/A 1. Conductive casing
    - ✓ 2. Surface casing
    - N/A 3. Intermediate casing(s)
    - 4. Long string casing → WELL CONSIST OF LONG-STRING CASING 8" GALVANISED OR CARBON STEEL W/ COAL TAR EXPOXY COATING → IDENTIFIED IN APP AS SURFACE CASING
    - 5. Other casing
  - I C. Injection tubing, see instructions
    - I 1. Maximum allowable suspended weight based on joint strength of Injection tubing
    - N/A I 2. Weight of injection tubing string (axial load) in air
  - I D. Cement, see instructions → CASING WILL BE GROUTED WITH BENTONITE OR NEAT CEMENT GROUT pg 12-7.
    - 1. Conductive casing
    - 2. Surface casing
    - 3. Intermediate casing
    - 4. Long string casing
    - 5. Other casing
    - 6. Cementing techniques, equipment positions and staging depths
    - 7. Perforation depths
  - ✓ E. Annulus Protection System
    - ✓ 1. Annular space(s), specify ID and OD
    - ✓ 2. Type of annular fluid(s)
    - N/A 3. Specific gravity of annular fluid(s)
    - 4. Type of additive(s) and Inhibitor(s)
    - 5. Coefficient of annulus fluid(s)
    - 6. Packer or fluid seal, see instructions
      - ✓ a. Packer(s), see instructions

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N/A b. Fluid spotting procedure, frequency and quantity

N/A VIII. Information on well drilling company used during construction, see instructions

IX. Tests and Logs, see instructions

N/A A. During drilling — SEE EXTENSIVE INFORMATION GATHERED AS PART OF SITE INVESTIGATION.

B. During and after casing installation

C. Demonstration of mechanical integrity

D. Copies of the logs and tests listed above

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

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Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c - OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

✓ I. Operation Program

✓ A. Area Injection Project (if applicable)

✓ 1. Maximum fluid to be injected per day — APPROX 165,000 G/DAY

✓ 2. Years remaining in area injection project – 48 TO 59 YEARS (#4-8)

✓ 3. Anticipated total number of injection wells required

✓ 4. Injection wells operate with/without common manifold

5. Number of injection zone monitoring wells, include list and schematics

✓ 6. Number of, name and location of injection wells currently in project, see instructions

N/A B. Single Injection Well (if area permit is applied for, provide for typical well)

AREA PERMIT

1. Number or name of well
2. Location, see instructions
3. Expected service life
4. Operation during 24 hour period
5. Operation days per month
6. Injection pressure, average and maximum
7. Injection rate, average and maximum
8. Casing-tubing annulus pressure, average and maximum
   a. During operation, average and maximum
9. Other annulus pressure
10. Number of injection zone monitoring wells, include schematics

✓ II. Surface Facilities

✓ A. Injection fluid storage

✓ 1. Storage capacity in days and gallons

✓ 2. Type of storage facility(s)

✓ 3. Storage capacity in case of well failure, describe

✓ B. Holding tanks and flow lines, describe

✓ C. Process and Instrumentation Diagram attachment

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N/A

D. Filter(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute
6. Pore size, microns

E. Injection Pump(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

City Of Aurora – Rt. 25 Repository Site
0894075971 – Kane County
Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4d - AREA OF REVIEW

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

SEE MEMO FROM SCOTT KAUFMAN – GW FOR OTHER

Location in Application

_____ I. Radius of the Area of Review
_____ II. Method of Radius determination, see instructions
__✓__ III. Map with information required by Section 730.114(a)(2) or 730.134(a)(2)
__✓__ IV. Description of Anticipated Injection Fluid Movement During the Life of the Project, see instructions
_____ V. Wells Within the Area of Review
_____ A. Tabulation of well data required by 730.114(a)(3) or 730.134(a)(3)
_____ B. Number of wells within 2 ½ miles of injection well penetrating within 300 feet of the uppermost injection zone which are:
_____ 1. Properly plugged and abandoned
_____ 2. Temporarily abandoned
_____ 3. Operating
_____ 4. Improperly sealed, completed or abandoned
_____ C. Plugging affidavits for all plugged wells
_____ D. Proposed corrective action for unplugged wells penetrating the injection zone

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Name & Official Title

_____ Phone Number

_____ Signature

_____ Date Signed

City Of Aurora – Rt. 25 Repository Site
0894075971 – Kane County
Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e - MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

- ✓ I. Waste Sampling and Analysis
  - ✓ A. Sampling frequency
  - ✓ B. Analysis parameters
  - ✓ C. Sampling location
  - ✓ D. Detailed waste analysis plan
- ✓ II. Monitoring Program
  - ✓ A. Recording devices, see instructions
    - ✓ 1. Injection pressure gauges — SEE REVISED NOTES
    - ✓ 2. Casing-tubing annulus pressure gauges
    - ✓ 3. Flow meters
    - N/A 4. pH recording devices
    - ✓ 5. Temperature
  - B. USDW Monitoring in Area of Review
    - 1. Number of wells
    - 2. Type of wells
    - 3. Frequency of monitoring
    - 4. Type of sample
    - 5. Parameters
    - 6. Map of well location and logs

    } SEE 3/20/2013 MEMO FROM SCOTT KAUFMANN
  - C. Detailed Groundwater Monitoring Plan
- ✓ III. Mechanical Integrity Tests During Service Life of Well, see instructions
- ✓ IV. Contingency Plan for Well Failure or Shut In, see instructions
  - ✓ A. Detailed contingency plan

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Name & Official Title

_____ Phone Number

_____ Signature

_____ Date Signed

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0894075971 – Kane County
Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4f - CHARACTERISTICS, COMPATIBILITY and PRE-INJECTION TREATMENT of INJECTION FLUID

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

_____I. Component Streams Forming Injection Fluid
_____II. Source and Generation Rate of Component Streams
_____III. Volume of Injection Fluid Generated Daily and Annually
_____IV. Physical and Chemical Characteristics of Injection Fluid, see instructions
_____ A. Generic waste/Fluid name
_____ B. Fluid phase
_____ C. Complete waste analysis
_____ D. Flash point
_____ E. Organics
_____ F. TDS
_____ G. pH
N/A H. Temperature
_____ I. Density
_____ J. Specific gravity
N/A K. Compressibility
_____ L. Micro organisms
_____ M. Chemical persistence
_____ N. Key component name(s)
N/A V. Injection Fluid Compatibility
_____ A. Compatibility with injection zone
_____ B. Compatibility with minerals in the injection zone
_____ C. Compatibility with minerals in the 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 tanks(s) and flow lines
N/A E. Compatibility with filter and filter components
I _____ F. Full description of compatibility concerns
_____VI. Pre-Injection Fluid Treatment, see instructions

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Log # UIC-147

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

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Log # UIC-147

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4g - PLUGGING AND ABANDONMENT PROCEDURE

USEPA ID NUMBER _____
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

✓	I.	Description of Plugging Procedures, see instructions
~~N/A~~ I	A.	Abandonment during construction
✓	B.	Abandonment after injection
✓	C.	Type and quantity of plugging materials, depth intervals
✓	D.	Detailed plugging and abandonment procedures
~~N/A~~ I	E.	Cost estimate for plugging and abandonment

ANNULAR SPACE PLUGGING ??

? CHECK CLASS V FA ? NOT SURE IF REQUIRED ?

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

http://www.epa.gov/r5water/uic/forms/clvpermap.htm
Last updated on 6/14/2012

Class V Permit Application Instructions

REGION 5 UNDERGROUND INJECTION CONTROL
CLASS V PERMIT APPLICATION INSTRUCTIONS

(From: INSTRUCTIONS - Attachments / EPA Form 7520-6)

A. AREA OF REVIEW METHODS: Not Applicable
B. MAPS OF WELLS/AREA AND AREA OF REVIEW:
   1. Submit a topographic map (approximate scale 1:400) extending at least one mile beyond the property boundaries of the facility, clearly showing the following:
      a. The facility and all water intake (such as water supply wells) and discharge (drainage, sewer, discharges to ponds, lakes, ditches, streams or rivers, etc.) structures, including all surface and subsurface piping;
      b. All hazardous waste treatment, storage, or disposal area(s) within one-quarter mile of the facility's property boundaries; and
      c. All wells (including injection wells, water supply wells and drinking water wells), springs and other surface water bodies listed in public records or otherwise known to the applicant within one-quarter mile of the facility's property boundaries.
   2. Submit the following information on all public and private water wells (active and/or plugged) listed in public records or otherwise known to the applicant that lie within one- quarter mile of the property boundaries (A copy of the form filed with the public agency is acceptable.):
      a. Type of well;
      b. Record of well completion, including construction details;
      c. Location;
      d. Date drilled;
      e. Total depth of the well;
      f. Name of the aquifer at the total depth of the well;
      g. The amount of water (in gallons per minute) yielded by the aquifer; and
      h. Records of well closure for each plugged well.
   3. Submit a list of the names and addresses of all landowners within one-quarter mile of the facility boundaries (this requirement may be waived by the Director for densely populated areas).
C. CORRECTIVE ACTION PLAN AND WELL DATA: Not Applicable
D. MAPS AND CROSS SECTION OF USDWs:
   Submit appropriately scaled and labeled maps and cross sections detailing the geologic structure of the local area, including:
   1. All Underground Sources of Drinking Water (USDWs) within one-quarter mile of the facility's property boundaries. The vertical limits of the cross sections detailing the geologic structure should extend at least 50 feet below the lowermost USDW affected by injection operations;
   2. The direction of water movement in each USDW which may be affected by injection operations at this facility;

   Note: A USDW is defined as an aquifer or its portion which contains fewer than 10,000 mg/1 of total dissolved solids.
E. NAME AND DEPTH OF USDWs (Class II): Not Applicable
F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA:
   Submit appropriately scaled and labeled maps and cross sections detailing the geologic structure of the local area, including:
   1. Geologic structure of the local area (including the lithology of the injection interval); and
   2. Generalized maps illustrating the regional geologic setting.
G. GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (Class II): Not Applicable

H. OPERATING DATA:
   1. Submit the following information (in tabular form) for each Class V injection well:
      a. Average and maximum daily volumes of fluids entering the well (gallons);
      b. Average and maximum monthly volumes of fluids entering the well (gallons);
      c. The source(s) of fluid(s) entering the well and volume of fluid(s) from each source;
      d. Material Safety Data Sheets (if available) or the brand name(s) and description(s) of all fluid(s) that have the potential of entering the well; and
      e. The percentage of fluid from each source entering the well.
   2. Submit a fluid analysis of the waste stream for all injected fluids such that the nature of the fluid is characterized completely. The waste fluids must not result in the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of any primary drinking water regulation or may otherwise adversely affect human health.

      Note: This means that for motor vehicle waste disposal wells, before any motor vehicle service related wastewater is discharged into the ground, it must not exceed any primary drinking water regulation (Maximum Contaminant Levels or MCLs) or other health-based standards at the point of injection (40 CFR Sections 144.3 and 146.3). The equipment and procedures used to obtain, transport and analyze the samples should follow a Quality Assurance plan which has been submitted to and approved by our office.

I. FORMATION TESTING PROGRAM: Not Applicable
J. STIMULATION PROGRAM: Not Applicable
K. INJECTION PROCEDURES:
   1. Describe how the fluids move though the system from generation of the wastewater to the release of the fluids into the subsurface from the injection well, including any treatment the fluids receive at any point before injection.
   2. Include descriptions and specifications of any equipment that might be used to inject fluid (e.g., pumps) and injection pressures if applicable.
L. CONSTRUCTION PROCEDURES: Not Applicable
M. CONSTRUCTION DETAILS:
   1. Submit a properly scaled and labeled map of the facility locating all Class V injection wells and all potential sources (for example, floor drains and shop sinks) receiving fluids that might be injected into the wells.
   2. Submit a flow chart depicting the source(s) of all injected fluids. The chart should include:
      a. Entry of source material into the facility;
      b. All processes within the facility which generate fluids which are disposed of into the well(s);
      c. Treatment processes (if any) and ultimate disposal to the well(s);
      d. Points at which the injection fluid may be sampled; and
      e. Provide a narrative explaining the diagram.
   3. Submit schematic and/or other appropriate drawings of the surface and subsurface construction details for each Class V well and its associated surface and subsurface interconnections within the facility boundaries. The drawings should include:
      a. The location, composition and dimensions of structures such as tanks, conduits, screens, casing or other subsurface structures, etc.;
      b. Injection well depth and diameter;
      c. Name of the formation(s) into which each well injects fluids;
      d. Date the construction or installation of each well was completed; and
      e. Narrative information describing the diagram to ensure clarity.
   4. Submit the following information concerning each Class V well from the date of installation or construction to the present:
      a. Date of initial operation of the well;
      b. Date(s) of modifications/additions or conversion of the well (if applicable); and
      c. Projected date(s) for completion and operation (proposed wells only).
N. CHANGES IN INJECTED FLUID: Not Applicable
O. PLANS FOR WELL FAILURES: Not Applicable
P. MONITORING PROGRAM:
   A monitoring program must be developed to ensure that injection operations at the facility do not result in the movement of fluid containing any contaminant into USDWs, if the

presence of that contaminant may cause a violation of any primary drinking water regulation or may otherwise adversely affect human health. The monitoring program should include:

1. A monitoring plan, outlining the steps necessary to prevent the movement of fluid containing any contaminant into USDWs. The frequency of analysis of the facility's wastewater must be included;
2. Any proposed pretreatment of the waste stream, including levels to which each constituent will be reduced. Please note that compliance with federal standards may not be sufficient to satisfy local and state requirements. It is your responsibility to determine whether you are in compliance with all applicable regulations;
3. The location(s) of any wastewater monitoring point(s) before the fluid is injected into the subsurface from the well and the technical basis for choosing the location(s);
4. The location(s) of any ground water monitoring well(s) (taking into account the direction of water movement in each USDW) and the technical basis for choosing the location(s);
5. A description of the proposed construction of any monitoring well(s), including appropriate construction details similar to those requested for the injection well(s) in Part M of these instructions;
6. A description of the proposed sampling of any ground water monitoring well(s), including the sampling frequency of each well and the technical basis for that frequency. The velocity of water movement in each affected USDW and the volume of injected fluid must be taken into account in determining the minimum sampling frequency; and
7. If injection operations are likely to impact a USDW which is currently being used as a primary drinking water source within one-quarter mile of the facility's property boundaries, the monitoring plan MUST include a sampling plan for the drinking water wells.

Q. PLUGGING AND ABANDONMENT PLAN:
Describe how the Class V well will be closed in a manner that prevents the movement of fluid containing any contaminant into a USDW, if the presence of that contaminant may cause a violation of any primary drinking water regulation or otherwise adversely affect the health of persons. Include a schematic and/or other appropriate drawings of the construction details for each Class V well showing how the well will be closed. The plan should include (as appropriate):
   1. The type, number, and placement of any plugs to be used;
   2. The type, grade and quantity of any cement (or other material) to be used;
   3. Describe the method to be used to place any plugs; and
   4. Describe how any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well will be disposed or otherwise managed according to applicable requirements.

R. NECESSARY RESOURCES:
   1. Submit evidence, such as a surety bond, trust agreement, or financial statement to verify that the financial resources necessary for closure of each well are available.

S. AQUIFER EXEMPTIONS: Not Applicable

T. EXISTING EPA PERMITS: Submit a list of any federal (or delegated state or local) permits or approvals received or applied for that apply to this facility. For example, permits from the Hazardous Waste Management Program under the Resource Conservation and Recovery Act (RCRA) and National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act (CWA).

U. DESCRIPTION OF BUSINESS: Submit a brief description of the nature of the business.

April 20, 2005 version

GW Review

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
PAT QUINN, GOVERNOR LISA BONNETT, DIRECTOR

Memorandum

Date: October 30, 2014

To: Kelly Huser

From: Scott Kaufman – Groundwater Unit (GU) BM SK

Subject: Class V Underground Injection Control (UIC) Permit Application – Facility Responses to Technical Review

Re: 0894075971 – Kane
City of Aurora
UIC/Adm. Record
Log No. UIC-147

A technical review has been completed of the groundwater portions of a document entitled, "Revision Inserts and Modified Forms for PA", dated September 30, 2014 and received by the Illinois EPA on October 1, 2014. The subject document was submitted by Marc R. Fisher of Deuchler Environmental, Inc. (Deuchler) in response to two Illinois EPA letters dated June 2, 2014 and June 19, 2014 regarding Illinois EPA technical review of the facility's February 19, 2013 Underground Injection Control (UIC) Permit Application (Permit Application).

FACILITY BACKGROUND

The City of Aurora (COA) operates a community water supply that serves a population of approximately 198,000 residents. Drinking water is extracted from a network of 18 municipal water supply wells and blended with surface water. The water is treated by a lime softening process at the COA Water Treatment Plant (WTP). Average water production rates are approximately 15.4 million gallons per day (GPD) from October through April and 19.2 MGD from May through September.

The lime sludge that is generated during the treatment process from claricones at regular intervals called "blowdowns". The discharge rate is approximately 800 gpm and typically occurs every three hours of operation for a duration of three minutes.

Currently, the lime sludge is diverted from the claricones to five different dewatering lagoons. The sludge is dewatered until it passes a standard paint filter test and is then excavated, loaded onto trucks, and transported either to a licensed municipal waste landfill or for use as an agricultural soil amendment. The cost of lime sludge management over the past three years has averaged $1,675,000.

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

The intent of the subject project is to construct a fully closed system to deliver lime sludge directly from the WTP to an injection point, approximately 3,500 ft. to the north. The proposed injection area is within a subterranean limestone and dolomite mine located approximately 250ft bgs. The mine will serve as a permanent detention area for the sludge. Four injection wells are proposed to be installed down to the roof of the upper chamber of the mine. Ancillary piping will be constructed that will distribute the sludge throughout the mine and remove decanted water that results from the settling out of the lime in the slurry. The decanted water will be pumped out of the mine as dewatering occurs.

SUBMITAL BACKGROUND

February 26, 2013 - The subject UIC Permit Application was received by the Illinois EPA.

June 19, 2013 - The Illinois EPA letter (Log No. UIC-147) provided responses as a result of a completeness review and preliminary technical review of the UIC Permit Application.

October 29, 2013 - The facility submitted a document to respond to the June 19, 2013 Illinois EPA letter.

June 2, 2014 – Illinois EPA letter (Log No. UIC-147) providing a notice of deficiencies (NOD) following technical review of the UIC Permit Application and the October 29, 2013 document.

October 1, 2014 – The Illinois EPA receives the subject submittal which provides responses to the June 2, 2014 Illinois EPA letter.

SUBJECT SUBMITTAL

The groundwater portions of the subject submittal are as follows:

- Section 12.3.1 (Page 12-10) – IW Drilling Method: This revision was submitted in response to e-mail correspondence between this reviewer and Marc Fisher (see Attachment 1 to this review memorandum).

- Section 16 (all pages) – Monitoring Program: This revision was submitted in response to e-mail correspondence between this reviewer and Marc Fisher (see Attachment 1 to this review memorandum).

- Section 6.1 (Page 6-2) – Prairie Aquigroup (Quaternary Aquifer): This response provides revisions to Section 4a.VII.A of the Checklist and addresses Comment 1 of the June 2, 2014 Illinois EPA letter (Log No. UIC-147).

- Figure 2.2 (Page 2-6) – Well search location map: This response provides revisions to Section 4d.III of the Checklist and addresses Comment 2 of the June 2, 2014 Illinois EPA letter (Log No. UIC-147).

- Exhibit A – Ground Water Waiver Request: This response provides revisions to Section 4e.II.C of the Checklist and addresses Comments 3 and 4 of the June 2, 2014 Illinois EPA letter (Log No. UIC-147).

Section 12.3.1 (Page 12-10) – IW Drilling Method

In additional to non-groundwater-related revisions, the second paragraph of Page 12-10 was revised by the addition of the following sentence:

> "Drill cuttings will be logged for determination of the geology and this information will be recorded and submitted as part of the Well Completion Report."

ILLINOIS EPA COMMENT

The Illinois EPA has no comment regarding this revision.

Section 16 (all pages) – Monitoring Program

Section 16 is comprised of Sections 16.0 through 16.6. Most of Sections 16.0 through 16.3 have been deleted and refer to the proposed Groundwater Monitoring Waiver Request provided in Exhibit A of the subject submittal. Section 16.4 (Routine Monitoring) has been completely deleted. Sections 16.5 and 16.6 have not been revised.

ILLINOIS EPA COMMENT

The Illinois EPA has no comment regarding this revision.

Section 6.1 (Page 6-2) – Prairie Aquigroup (Quaternary Aquifer)

The second paragraph of Section 6.1 was revised to refer to groundwater within the AOR as a Class I Groundwater pursuant to 35 Ill. Adm. Code 620.

ILLINOIS EPA COMMENT

The Illinois EPA has determined that Comment 1 of the June 2, 2014 Illinois EPA letter (Log No. UIC-147) has been adequately addressed and that Section 4a.VII.A of the Checklist is technically adequate.

Figure 2.2 (Page 2-6) – Well Search Location Map

The Illinois EPA has determined that Comment 2 of the June 2, 2014 Illinois EPA letter (Log No. UIC-147) has been adequately addressed and that Section 4d.III of the Checklist is technically adequate.

Exhibit A – Ground Water Waiver Request

Exhibit A is organized into the following Sections:

Section 1.1 – Potential for Fluid Flow

Section 1.1.1 – Geology

Section 1.1.2 – Joint Sets

Section 1.1.3 – Bedding Planes

Section 1.1.4 – Hydromechanical Modeling

Section 1.2 – Characteristics of the Lime Sludge

Section 1.3 – Characteristics of the System

Section 2.0 – Proposal for Variance Request

Section 2.1 – Sampling Method

Section 2.2 – Parameter List and Analysis Methods

Section 2.3 – Tiered Sampling Frequency

Section 2.4 – Contingency Plan

Section 2.5 – Reporting

Section 3.0 – Conclusions

Each section is discussed in greater detail below.

Exhibit A, Section 1.1 – Potential for Fluid Flow

The facility states that the rock mass is impermeable and that fluid movement can occur only along bedding planes, fractures/joints, and dissolution features.

Exhibit A, Section 1.1.1 – Geology

The injection zone is within a limestone room and pillar mine, which has allowed direct inspection of the geology rather than inference by virtue of borings. The injection zone (mine Level 2) is comprised of the limestone of the Dunleith Formation of the Galena Group. Filed mapping within the mine indicated the following:

- The rock is composed of limestone, with bedding planes of variable thickness.
- No faulting, vertical offsets, or folding was observed.
- Four joint orientations were observed: J1 (northeast-southwest), J2 (northwest – southeast), J3 (east-west), and J4 (north-south). J1 and J2 are the primary joint sets.

The facility refers to Section 10.0 and Appendix A of the Permit Application, which provides a discussion of joint mapping conducted by Agapito Associates, Inc. (AAI).

Exhibit A, Section 1.1.2 – Joint Sets

J1 and J2 had average lengths of 80 ft on Level 2. Maximum observed length was approximately 200 ft. Joint spacing averaged approximately 110 ft, what a maximum spacing ranging from 350 to over 500 ft.

Four joint types were observed:

- Closed joints with small aperture and no infilling (23%).
- Simple clay infilling (75.4%); mean K = 2.7E-8 cm/sec.
- Clay pods (0.6%).
- Calcite/Breccia (1%); mean K = 2.5E-7 cm/sec; mean K = 1.74E-5 cm/sec.

Exhibit A, Section 1.1.3 – Bedding Planes

Packer tests were conducted at 20 ft intervals on the monitoring well installed at the margin of the mine property. The tests determined a mean K-value of 9.26E-6 cm/sec; similar to values deterred within the injection zone.

Exhibit A, Section 1.1.4 – Hydromechanical Modeling

The facility conducted hydromechanical modeling using UDEC 4.0, a two-dimensional numeric model based on the distinct element method for discontinuum modeling. The model was chosen to address potential fluid flow along secondary pore features such as bedding planes and fractures. Fate and transport modeling of contaminants was not conducted because waste analysis indicate not contaminants. Therefore, the model was conducted to evaluate fluid migration and the overall stability of the rock system in the presence of the stored lime sludge.

Assumptions used in the model regarding the mapped fractures are discussed in Section 1.1.2 above. Other model assumptions and boundary conditions were assumed to be as follows;

1. Sludge disposal concurrent with mining of the underlying Level 3;

2. Lime injection via four injection wells;
3. An assumed maximum supernatant head of 6ft above settled sludge;
4. A blanket of lime sludge created by alternating injections;
5. K of lime sludge solids equals 1.0E-5 cm/sec (based on measured values);
6. Lime sludge solids will eventually reach 50 ft thickness;
7. Lime sludge bulk density = 144 pcf;
8. No fluid flow within rock matrix;
9. Bedding planes repeated at 20ft intervals;
10. Joints assumed vertical;
11. Average lateral joint spacing = 120ft and average joint lengths = 200ft based on mapping;
12. Joints assumed to repeat in the same vertical plane separated by 100ft between joint ends;
13. Three different types of joints mapped with different apertures and different fill material types. Mathematical distributions for the various types were calculated.
14. Potentiometric surface of 180.4ft MSL;

Sensitivity analyses were conducted as part of the modeling, which included a worst-case scenario of a 50 ft. supernatant head with no infilling of joints.

The results of the modeling indicate the following:

1. The worst-case fluid flow is estimated to be 0.021 to 0.035 GPM/acre (1,300 to 2,160 GPD across the entire 43-acre lime sludge detention area;
2. The model predicts very low horizontal flow with negligible contribution to total flow;
3. Flow will decrease with time;
4. Mining will not have a significant influence on K of the natural system or stability of the rock mass;
5. It is unlikely that the worst-case scenario will exist because joints will be prepared prior to lime disposal;

6. The aperture size of the joints is larger than the particle size, which facilitates infilling of the joints by the sludge and a reduction of joint permeability.

7. Once the lime sludge solids have covered the floor of the mine and Level 3 has been completed, negligible flow, on the order of a few gallons per day, could potentially reach the water table. Once Level 3 is excavated, if any water flows from the sludge detention area, it will be captured within Level 3 and negligible flow is predicted to reach the St. Peter Aquifer.

Exhibit A, Section 1.2 – Characteristics of the Lime Sludge

The lime sludge, once deposited in the mine, will separate into a solid fraction and a supernatant.

Lime sludge solids have been tested fifteen times between June 1999 and July 2012. The following constituents have been detected above the detection limit as follows:

- Benzene – April 24, 2012;
- Cis-1,2-dichloroethene – April 24, 2012;
- Methyl tertiary butyl ether – April 24, 2012; and
- Phenol – October 20, 2008; April 24, 2012; July 3, 2012; and July 19, 2012.

The facility states that there are no sources in the waste stream generation process that can introduce those constituents into the sludge and that they may be the result of cross-contamination.

The supernatant has been tested seven times between August 2002 and July 2012. In that time the only detections above the reporting limit were as follows:

- Chloroform – April 24, 2012; and
- 2,4-D – July 3, 2012

All other analytical results (VOCs, SVOCs, PAHs, pesticides, herbicides and PCBs) for sludge and supernatant were nondetect. No exceedences of the 35 Ill. Adm. Code 620, Class I GQSs or 35 Ill. Adm. Code 611 standards were detected.

Exhibit A, Section 1.3 – Characteristics of the System

The City of Aurora uses a lime treatment process. They have a blended water system that is usually 60% Fox River water and 40% well water. Once treatment is completed the lime sludge is blown out of the claricones and is diverted to dewater lagoons.

Under the proposed system, the sludge will be discharge to a covered wet well, and will be pumped into a forcemain that will be fed to one of four injection wells at the site. From the Water Treatment Plant to the deposition into the mine, the injection system will be completely closed. Therefore, any sample take at the pump discharge point within the proposed pump house will represent the composition of the material entering the mine.

Exhibit A, Section 2.0 – Proposal for Variance Request

The facility states that the proposed system will be inherently safe and protective of groundwater based on the following:

- Area geology;
- Mine preparation activities;
- Very small amount of fluid flow as indicated by the modeling;
- The injection method by way of a closed system; and
- The uncontaminated nature of the sludge.

The facility asserts that it is more prudent to monitor the composition of the sludge rather than monitoring the groundwater which may not indicate impacts until many years afterward. The facility points out that there is approximately 175 ft of dolomite of the Platteville Group between the floor of the injection zone and the top of the aquifer. Also, give the configuration of the site to the property boundaries, creating (installing) a monitoring well network that could be considered approvable by Illinois EPA would be difficult. The facility proposes installing a sampling port to the discharge line of the pump in order to facilitate the collection of sludge for laboratory analysis.

Exhibit A, Section 2.1 – Sampling Method

Sludge samples will be collected and analyzed using USEPA SW-846 methods. The laboratory will supply two 8 oz. glass sample jars. The sampling port will be controlled by a manual valve. During the day of the sampling, after a sludge blowdown occurs it will fill the wet well at the pump house. Once the sludge reaches a certain height within the wet well the pumps will be activate and begin pumping the sludge into the force main. At the time of sampling, one end of a plastic hose will be attached to the sampling port and the other end will be inserted into one of the jars. The jars will be filled, properly labeled, wrapped and place in an ice-filled cooler for transport to a NELAC laboratory for analysis. Chain-of-custody procedures will be followed. The samples will be immediately transported to the laboratory.

Exhibit A, Section 2.2 – Parameter List and Analysis Methods

The facility proposes analysis of the lime sludge for the following parameters:

Parameter	Test Method
Volatile Organic Compounds (VOCs)	5030B/8260B/8011
Semi-volatile Organic Compounds (SVOCs)	3510C/8270C
Pesticides and Polychlorinated Biphenyls (PCBs)	3510C/8081A/8082
Herbicides	8321A
Metals	3010A/6010B
Mercury	7470A
Radium 226 and 228	903.1/Ra-05
Cyanide	335.4R1
Nitrate, as N	353.2R2.0
Total Dissolved Solids (TDS)	375.2R2.0
pH	4500H+, B
Chloride	4500Cl, E
Fluoride	4500F, C
Perchlorate	
Total Solids Analysis	

The facility states that total solids analysis is necessary because the sample will be analyzed as sludge. Additionally, a note will be added to the notes section of the COC form saying "As received basis." The percent total solids analysis is critical because the presence of solids will skew the analysis results higher.

Exhibit A, Section 2.3 – Tiered Sampling Frequency

The facility proposes to sample lime sludge according to the following schedule:

- Bimonthly for the first year;
- Quarterly for years 2 through 6;
- Semi-annually for years 7 and 8; and
- Annually thereafter.

Exhibit A, Section 2.4 – Contingency Plan

In the event that one or more parameters exceeds applicable standards the facility proposes the following:

- If the occurrence is during bi-monthly sampling, continue sampling until four consecutive sampling events meet standards; then proceed to one year of quarterly sampling followed by one year of semi-annual sampling followed by annual sampling thereafter.

- If the occurrence is during quarterly sampling, continue quarterly sampling until four consecutive sampling events meet standards; then proceed to one year of quarterly sampling followed by one year of semi-annual sampling followed by annual sampling thereafter.

- If the occurrence is either during the semi-annual or annual sampling, then sample quarterly until four consecutive sampling events meet standards; then proceed to one year of semi-annual sampling followed by annual sampling thereafter.

Exhibit A, Section 2.5 – Reporting

Following each sampling event a report will be generated and submitted to the Illinois that will include the following:

- A cover letter with notifications of significant results;

- All laboratory reports; and

- Analytical data in tabular form.

Exhibit A, Section 3.0 – Conclusions

This section reiterates the information discussed above and will not be addressed further herein.

ILLINOIS EPA COMMENT

The following comments are made in regard to the groundwater portions of the subject submittal:

1. The Illinois EPA concurs with the geologic and system assessment provided in Sections 1.1 through 1.3 of Exhibit A.

2. In support of the groundwater monitoring waiver request, the facility proposes the Contingency Plan (Plan) provided in Exhibit A, Section 2.4. The Plan proposes to regularly monitor the characteristics of the sludge material prior to injection in order to offer additional protections in lieu of groundwater monitoring. The proposed Plan does not appear to be adequately protective at this time. It proposes, in the event that contamination is detected in the sludge, only to modify the monitoring frequency. It makes no proposal for assessing and mitigating the contamination or for providing alternate sludge disposal activities, and would potentially allow continuation of contaminated waste to be injected into the mine.

3. The Plan appears to propose analytical results of the sludge to be compared to the 35 Ill. Adm. Code Part 620 GQSs as a criterion for determining if the sludge is contaminated. 35 Ill. Adm. Code Part 620 GQSs are not applicable to sludge. The appropriate standards for the sludge are found in 35 Ill. Adm. Code 721.124.

4. In my view, the absence of an adequate Contingency Plan significantly weakens any argument for forgoing groundwater monitoring requirements at the site. Since the Plan is primarily a non-groundwater-related issue, I discussed it with Kelly Huser on October 29, 2014 and she concurred with my assessment. Kelly said that she thought that the Plan could be made approvable if the facility modified it to require immediate resampling when a hit is detected and provided procedures for diverting the sludge to a surface impoundment until any problems are corrected.

5. Based on information provided in the subject document, the groundwater monitoring waiver request may be approved provided the Contingency Plan is modified to include appropriate criteria for determining when and if the sludge is contaminated, as well as steps that must be taken to determine the nature and source of the contamination, and steps for mitigating that contamination. This determination must be made by Kelly Huser. In the event that the Plan is adequately modified, the following condition should be provided in the Permit:

   "Groundwater Monitoring Plan (35 Ill. Adm. Code 730.113). The Illinois EPA approves herein a request for a waiver from the groundwater monitoring requirements based on information provided in Exhibit A of the approved UIC Permit Application. The waiver request approval may be terminated if: (1) the waste sludge is determined to be hazardous pursuant to Conditions ___ above, (2) the Illinois EPA acquires new information on the geology of the facility area, or (3) new regulations requiring groundwater monitoring are promulgated. If the Illinois EPA terminates the approval of the groundwater monitoring plan waiver based on determination that the sludge is hazardous, acquisition of new geologic information, or promulgation of new regulations, the modification procedures of 35 Ill. Adm. Code Part 702 will be followed."

ILLINOIS EPA RECOMMENDATION

The following recommendation is made in regard to the technical review of the groundwater portions of the subject permit application. Based on information provided in the subject document, the groundwater monitoring waiver request may be approved provided the Contingency Plan is modified to include appropriate criteria for determining when and if the sludge is contaminated, as well as steps that must be taken to determine the nature and source of the contamination, and steps for mitigating that contamination. This determination must be made by Kelly Huser. In the event that the Plan is adequately modified, the following condition should be provided in the Permit:

"Groundwater Monitoring Plan (35 Ill. Adm. Code 730.113). The Illinois EPA approves herein a request for a waiver from the groundwater monitoring requirements based on information provided in Exhibit A of the approved UIC Permit Application. The waiver request approval may be terminated if: (1) the waste sludge is determined to be hazardous pursuant to Conditions ___ above, (2) the Illinois EPA acquires new information on the geology of the facility area, or (3) new regulations requiring groundwater monitoring are

promulgated. If the Illinois EPA terminates the approval of the groundwater monitoring plan waiver based on determination that the sludge is hazardous, acquisition of new geologic information, or promulgation of new regulations, the modification procedures of 35 Ill. Adm. Code Part 702 will be followed."

cc: Jim Moore w/o attachments
Scott Kaufman w/ attachments

Attachment 1

E-mail Correspondence

Kaufman, Scott

From: Kaufman, Scott
Sent: Monday, July 28, 2014 2:05 PM
To: 'Marc Fisher'
Cc: Myers, Terri; Huser, Kelly
Subject: RE: Site Visit

Marc,

We don't concur with some of what you have stated in your e-mail. I will touch on only a portion of it here.

We don't concur with your interpretation of what constitutes an injection well. I suggest that you look at the definitions proved in 35 Ill. Adm. Code 730.130 for "well injection", "underground injection", and "injection zone", as well as some specific types of injection wells listed in 35 Ill. Adm. Code 730.105(e), some of which are gravity-fed systems. The bottom line is that if the project meets the regulatory definition of an injection well(s) then it is subject to the regulatory requirements for injection wells.

Regarding the requirements for boring logs, while not specifically stated in the injection well regulations, we have regulatory programs that specifically require all monitoring wells to be continuously logged, and others that require the reporting of boring logs, thus implying a requirement for them to be continuously logged. In addition to requirements that site geology/hydrogeology be adequately characterized, our policy of requiring monitoring wells to be continuously logged is based, in part, on those requirements. So we stand by our requirement for any additional monitoring wells to be continuously logged and for those logs to be reported.

Regarding the supernatant meeting the applicable groundwater quality standards, in order to demonstrate compliance with the non-degradation provisions of Part 620, you must compare not only to the numeric standards but also to the ambient groundwater quality.

We do not consider one monitoring well to be a network by any definition, and it is therefore not adequate to meet the regulatory requirements for a monitoring well network.

Given your assertions about the supernatant and lime sludge characteristics that you documented in the permit application, you may consider the following: the facility has the option to apply for a groundwater monitoring waiver, which (if approved) would make much of what we have discussed above mute. Of course an adequate demonstration must be made in the permit application, and there are no guarantees that the Agency would approve one. However, I do think that you may have some arguments in your favor, such as the supernatant and sludge analyses. Also, the proposal to bolster sampling and analysis from the pump station prior to entry into the force main could provide some additional protection and may strengthen the request. Any such waiver request would have to be a very strong one, especially given that the injection zone is situated between two Class I Aquifers that are within the Area of Review.

So, to summarize:

1. If there is going to be groundwater monitoring as required by the UIC Permit, the facility will be required to install a monitoring well network adequate to monitor the USDWs and meet all of the requirements that the regulations provide for protection of those resources as the Agency determines is necessary. This includes the installation of an adequate network of monitoring wells, continuous logging of those wells, and establishment of a thorough understanding of the site-specific geology/hydrogeology based, in part, on the information derived from those logs.

2. If groundwater monitoring is not to be required by the UIC Permit, the facility must request a waiver from groundwater monitoring requirements and make an adequate demonstration that the waiver is appropriate as part of the permit application.

1

3. If the facility wishes to monitor groundwater with only one monitoring well, it must have an approved waiver from groundwater monitoring requirements, and must conduct the monitoring on its own beyond the requirements of the UIC Permit.

From: Marc Fisher [mailto:mfisher@deuchler.com]
Sent: Monday, July 21, 2014 9:10 AM
To: Kaufman, Scott
Cc: Marc R Fisher; Myers, Terri; Huser, Kelly; Philippe Moreau
Subject: Re: Site Visit

Scott,

Thank you for your thoughtful and timely response. In light of the fact that you will be having a meeting next week, I would like you to consider the following thoughts…

I understand the rationale for desiring additional monitoring wells associated with this PA. But it is asked that you consider the following factors in your decision making process:

- The lime sludge (both solids and supernatant testing) have never exhibited any contamination that is characteristic of a waste material (i.e., sw-846 testing) for inorganic or organic compounds;

- The supernatant not only meets the ground water quality standards, but also the drinking water quality standards before it would be injected into the mine; and

- The system is completely closed and contaminants cannot be introduced into the injection system except at one potential location: the proposed new pump station building located adjacent to lagoon # 3 in the secured portion of the water treatment plant property.

You are correct in your assessment that this is a unique PA. It is not related to the injection of a contaminated or hazardous waste, but it will be occurring above a USDW (the Ancell Group). In consideration of the fact that the lime sludge has never exhibited any characteristics or levels of contamination, it make sense for us to monitor the sludge before it goes into the mine, instead of after it is deposited.

Also, it is clear in the PA, that it is impossible for this system to impact overlying USDW's because the "injection" will occur under atmospheric pressure conditions.

This isn't technically an "injection" system, although it meets the regulatory definition of such. The term injection implies that the waste material is emplaced under high pressure, which simply isn't the case with this proposal. It is a non-pressurized gravity fed system, that is fully closed and sealed from the elements. The water treatment byproduct has been factually documented as being not contaminated since the plant has been in operation. As you and Kelly have observed during the recent tour, the plant personnel follow rigorous sampling protocol of the raw water intake from the Fox River and wells to prevent any potential upsets to the treatment and distribution of the finished drinking water to its customers.

Therefore, we would like you to consider an increase in the level of the sampling and analysis of the sludge (solids and supernatant) from the new pump station at the plant or other points in the system, prior to its entry into the forcemain and into the mine, in lieu of constructing additional MW's. It only makes sense to insure that the drinking water treatment byproduct (lime sludge) is free of contamination prior to entering the mine, then to indirectly measure it via monitoring wells after it enters the mine. If any sign of a problem is identified during this sampling, it can be proactively addressed and corrected prior to the disposal of the lime sludge into the mine, instead of addressing it retroactively years after the sludge has been deposited. Under such circumstances, it is impossible for any contamination to enter the mine, thus there can be no possibility that the proposed system will potentially impact the USDW. We strongly feel that the existing monitoring well, along with testing of the lime sludge prior to its entry into the mine, is more than sufficient to demonstrate compliance with 620 and with the anti-degradation clause.

As such, we respectfully request that you consider these facts in your decision making process.

Thank you and please feel free to contact me should you have any questions.

Sincerely,

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

Marc R. Fisher

Environmental Manager

230 Woodlawn Avenue

Aurora, Illinois 60506

Direct Line: (630) 423-0482

Main Phone: (630) 897-8380

Fax: (630) 897-5696

Cell: (630) 926-4083

mfisher@deuchler.com

On Thu, Jul 17, 2014 at 5:18 PM, Kaufman, Scott <Scott.Kaufman@illinois.gov> wrote:

Hello Marc,

Thanks once again for a good day and for everyone's hospitality . I think that everyone from IEPA learned a lot about the project and enjoyed themselves.

Regarding the monitoring well construction, there is a diagram of appropriate monitoring well construction provided on the Agency web site at http://www.epa.state.il.us/land/regulatory-programs/permits-and-management/forms/monitor-well-diagram.pdf. The issues I see with existing monitoring well (MW-1) are the amount of sand above the sand pack and the 20 ft well screen length are out of spec with what you can see in the diagram. However, we will not require the facility to replace that well, unless some time down the road it has been determined to be causing a problem. The new wells should be constructed in accordance with the diagram. Any alternate construction must be approved by the Agency.

It's up to you to determine if you want to install piezometers to determine groundwater flow direction for additional monitoring well installation. If you are certain that you know groundwater flow direction and can get wells located at an appropriate downgradient compliance point location, that is great. However, if you get it wrong and end up with a couple of upgradient wells and one downgradient well, then we would not consider that an adequate monitoring well network.

Your assumption about not being required to log the new monitoring wells may not be correct. I'm going to have to get back to you on that issue. It is an issue that our group will have to meet on next week. Requiring continuous logging of all new monitoring wells is a standard condition in our RCRA permits, and is also consistent with what other UIC sites have themselves proposed to do in their approved UIC permit applications.

Regarding alternatives for the proposed monitoring well network, please keep in mind that the groundwater monitoring program must be credible and defensible:

1. This project is unique. I'm not aware of a precedent in Illinois.

2. The scale of this project is quite large.

3. The injection zone is situated between two 35 Ill. Adm. Code 620 Class I Groundwaters. We must ensure adequate monitoring of this project to protect those resource groundwaters.

4. To adequately protect those resource groundwaters the facility must gain a thorough understanding of the site hydrogeology.

5. The purpose of the monitoring program is to protect those resources and to demonstrate compliance with the regulations (this includes the Non-degradation provisions of 35 Ill. Adm. Code 620).

6. Considering the above, I think that it is clear that one monitoring well serving as a monitoring network would not be adequate. I also think that gaining as much geologic/hydrogeologic data from the installation of additional monitoring wells would very much be to the facility's benefit.

I will let you know more after our internal meeting, probably Tuesday.

Scott Kaufman

From: Marc R Fisher [mailto:mfisher@deuchler.com]
Sent: Thursday, July 17, 2014 1:28 PM
To: Kaufman, Scott; Huser, Kelly
Cc: 'Philippe Moreau'
Subject: Site Visit
Importance: High

Scott and Kelly,

It was a pleasure meeting you both yesterday!! I hope the trip up from Springfield was worthwhile.

With regard to our response to the monitoring well issue. Could you review the well completion report prepared by GZA and included in Appendix B of the Permit Application (specifically regarding the MW design and construction) and the description of the construction of the on-site monitoring well in Section 7.0. Would the potential new monitoring wells need to be constructed in the manner as indicated here, or would other design parameters be acceptable. Additionally, in order to identify locations for the monitoring wells, would piezometers be needed to identify the GW flow direction?

Additionally, I assume that the holes would not need to be cored or logged since we already have a detailed log from the continuous core previously obtained from the site. I will be making recommendations to the City regarding the response to this issue soon. I need to develop a cost structure for the response as well as for potential alternatives to MW's that we may wish for you to consider.

Your assistance in this matter is greatly appreciated.

Sincerely,

Deuchler Environmental, Inc.
CONSULTING ENGINEERS

Marc R. Fisher

Environmental Manager

230 Woodlawn Avenue

Aurora, Illinois 60506

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Main Phone: (630) 897-8380

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mfisher@deuchler.com

Attachment 2

Illinois EPA Underground Injection Control Permit Application Checklist

Completeness Review - 3/19/13
Second Completeness Review - 4/29/14

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4a - HYDROGEOLOGIC INFORMATION

USEPA ID NUMBER N/A
IEPA ID NUMBER 0E9407597
WELL NUMBER _____

Technically Complete?	Complete?	Location in Application		
Y	✓	12.3.1	I.	Elevation of Land Surface at Well Location
Y	✓	2.5.1	II.	Faults, know or suspected within the area of review.
Y	✓	5.3/App. I	III.	Maps and cross sections as required by Section 730.114(a) or 730.134(a).
Y	✓	5.0	IV.	Injection Zone
Y	PV	11.1/5.3.2	A.	Geologic name(s) of injection zone.
Y	✓	11.1/Fig 11.2	B.	Depth interval of injection zone beneath land surface.
	✓	5.0/11.0	C.	Characteristics of injection zone.
Y	✓	5.4/App. B		1. Lithologic description
Y	✓	12.3.1		2. Injection zone thickness available to accept waste.
Y	No ✓	N/A		3. Fracture pressure at top of injection zone, include source
Y	No ✓	N/A		4. Effective porosity, include source
Y	✓	12.5/5.5		5. Intrinsic permeability, include source
Y	✓	5.5		6. Hydraulic conductivity or permeability, include source
Y	No ✓	N/A		7. Storage coefficient, include source
Y	No ✓	N/A		8. Seepage velocity (ft/yr) and flow direction of formation water, include source.
Y	No ✓	N/A	D.	Characteristics of injection zone formation water.
Y	No ✓	N/A		1. Temperature, include source
Y	No ✓	N/A		2. Pressure, include source
Y	No ✓	N/A		3. Density, include source
Y	No ✓	N/A		4. Viscosity, include source
Y	No ✓	N/A		5. Total Dissolved Solids, include source
Y	No ✓	N/A		6. Potentiometric surface, include source
Y	No ✓	N/A	E.	Additional or alternative zones considered for injection
Y	✓	5.2.2 5.2.3	V.	Upper Confining Zone
Y	✓	5.2.2/App. B	A.	Geologic name(s) of confining zone
Y	✓	App. B	B.	Depth interval of upper confining zone beneath land surface.
Y	✓	5.2.2/App. B	C.	Characteristics of confining zone
Y	✓	5.2.2/App. B		1. Lithologic description
Y	No ✓	N/A		2. Fracture pressure at depth, include source
Y	No ✓	N/A		3. Intrinsic permeability, include source
Y	No ✓	N/A		4. Hydraulic conductivity, include source
Y	No ✓	N/A		5. Alternative confining zones proposed, include explanation

and depth interval(s)

VI. Lower Confining Zone
A. Geologic name(s) of confining zone
B. Depth interval of lower confining zone beneath land surface
C. Characteristics of confining zone
1. Lithologic description
2. Fracture pressure at depth, include source
3. Intrinsic permeability, include source
4. Hydraulic conductivity, include source
5. Alternative confining zones proposed, include explanation and depth interval(s)

VII. Overlying Sources of Groundwater at the Site
A. Characteristics of the aquifer immediately overlying the confining zone
1. Elevation at top of aquifer, include source
2. Potentiometric surface, include source
3. Total Dissolved Solids, include source
4. Lithology, include source
5. Aquifer thickness
6. Specific gravity, include source
B. Underground Sources of Drinking Water (USDW)
1. Maps and cross sections required by 730.114(a)(4) or 730.134(a)(4)
2. Lowest depth of USDW
3. Elevation of potentiometric surface of lowest USDW referenced to mean sea level
4. Distance to nearest water supply well
5. Distance to nearest down gradient water supply well

VIII. Minerals and Hydrocarbons
A. Mineral or natural resources beneath or within 5 miles of the site, include types and depth intervals

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4b - INJECTION WELL DESIGN, CONSTRUCTION TESTS and LOGS

USEPA ID NUMBER N/A
IEPA ID NUMBER 089-07597I
WELL NUMBER _____

Location in Application

_____ I. Well Depth
_____ II. Anticipated fracturing pressure
_____ III. Static Water level and type of fluid
_____ IV. Expected service life of well
_____ V. Injection well completion, see instructions
_____ VI. Schematic or other appropriate drawing of the surface and subsurface construction details of well
_____ VII. Well Design and Construction
_____ A. Well hole diameters and corresponding depth intervals
_____ B. Casing, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing(s)
_____ 4. Long string casing
_____ 5. Other casing
_____ C. Injection tubing, see instructions
_____ 1. Maximum allowable suspended weight based on joint strength of Injection tubing
_____ 2. Weight of injection tubing string (axial load) in air
_____ D. Cement, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing
_____ 4. Long string casing
_____ 5. Other casing
_____ 6. Cementing techniques, equipment positions and staging depths
_____ 7. Perforation depths
_____ E. Annulus Protection System
_____ 1. Annular space(s), specify ID and OD
_____ 2. Type of annular fluid(s)
_____ 3. Specific gravity of annular fluid(s)
_____ 4. Type of additive(s) and Inhibitor(s)
_____ 5. Coefficient of annulus fluid(s)
_____ 6. Packer or fluid seal, see instructions
_____ a. Packer(s), see instructions

b. Fluid spotting procedure, frequency and quantity

____ VIII. Information on well drilling company used during construction, see instructions

____ IX. Tests and Logs, see instructions

____ A. During drilling

____ B. During and after casing installation

____ C. Demonstration of mechanical integrity

____ D. Copies of the logs and tests listed above

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c - OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894025971
WELL NUMBER ______

complete? Location in Application

- ______ I. Operation Program
  - ______ A. Area Injection Project (if applicable)
    - ______ 1. Maximum fluid to be injected per day
    - ______ 2. Years remaining in area injection project
    - ______ 3. Anticipated total number of injection wells required
    - ______ 4. Injection wells operate with/without common manifold
    - Y ✓ 5.4/A B 5. Number of injection zone monitoring wells, include list and schematics
    - Y ✓ 124 F 6. Number of, name and location of injection wells currently in project, see instructions
  - ______ B. Single Injection Well (if area permit is applied for, provide for typical well)
    - ______ 1. Number or name of well
    - ______ 2. Location, see instructions
    - ______ 3. Expected service life
    - ______ 4. Operation during 24 hour period
    - ______ 5. Operation days per month
    - ______ 6. Injection pressure, average and maximum
    - ______ 7. Injection rate, average and maximum
    - ______ 8. Casing-tubing annulus pressure, average and maximum
      - ______ a. During operation, average and maximum
    - ______ 9. Other annulus pressure
    - Y. N/A 10. Number of injection zone monitoring wells, include schematics

- ______ II. Surface Facilities
  - ______ A. Injection fluid storage
    - ______ 1. Storage capacity in days and gallons
    - ______ 2. Type of storage facility(s)
    - ______ 3. Storage capacity in case of well failure, describe
  - ______ B. Holding tanks and flow lines, describe
  - ______ C. Process and Instrumentation Diagram attachment

D. Filter(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute
6. Pore size, microns

E. Injection Pump(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4d - AREA OF REVIEW

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407591
WELL NUMBER _____

				Location in Application
Y	✓	2.4 2.5	I.	Radius of the Area of Review
Y	✓	2.4	II.	Method of Radius determination, see instructions
Y NPDES	✓	2.2 1 2.2 5	III.	Map with information required by Section 730.114(a)(2) or 730.134(a)(2)
Y	✓	2.6 1 2.7	IV.	Description of Anticipated Injection Fluid Movement During the Life of the Project, see instructions
Y	✓	2.5.2	V.	Wells Within the Area of Review
Y	✓	Table 2.1	A.	Tabulation of well data required by 730.114(a)(3) or 730.134(a)(3)
Y	✓	2.5.2	B.	Number of wells within 2 ½ miles of injection well penetrating within 300 feet of the uppermost injection zone which are:
Y	✓	2.5.2		1. Properly plugged and abandoned
Y	✓	2.5.2		2. Temporarily abandoned
Y	✓	2.5.2		3. Operating
Y	✓	2.5.2		4. Improperly sealed, completed or abandoned
Y NO	✓	N/A	C.	Plugging affidavits for all plugged wells
Y NO	✓	N/A	D.	Proposed corrective action for unplugged wells penetrating the injection zone

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e - MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Complete? Technically adequate (Y/N)

Location in Application

_____ I. Waste Sampling and Analysis
_____ A. Sampling frequency
_____ B. Analysis parameters
_____ C. Sampling location
_____ D. Detailed waste analysis plan
_____ II. Monitoring Program
_____ A. Recording devices, see instructions
_____ 1. Injection pressure gauges
_____ 2. Casing-tubing annulus pressure gauges
_____ 3. Flow meters
_____ 4. pH recording devices
_____ 5. Temperature

Y ✓ 16.3/16.4 B. USDW Monitoring in Area of Review
Y ✓ ~~16.3/16.4~~ 16.0 1. Number of wells
Y ✓ ~~16.3/16.4~~ 16.0 2. Type of wells
Y ✓ ~~16.3/16.4~~ 16.3 3. Frequency of monitoring
Y ✓ 16.3/16.4 4. Type of sample
Y ✓ 16.3/16.4 5. Parameters
N ✓ Fig 4.C App B 6. Map of well location and logs
✓ 16.3/16.4 C. Detailed Groundwater Monitoring Plan
_____ III. Mechanical Integrity Tests During Service Life of Well, see instructions
_____ IV. Contingency Plan for Well Failure or Shut In, see instructions
_____ A. Detailed contingency plan

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

GW monitoring waiver requested in Exh. 5.4 A of September 30, 2014 revisions to the UIC Permit Application, DSE 10/3/14

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4f - CHARACTERISTICS, COMPATIBILITY and PRE-INJECTION TREATMENT of INJECTION FLUID

USEPA ID NUMBER N/A
IEPA ID NUMBER 029407507
WELL NUMBER _____

Location in Application

_____ I. Component Streams Forming Injection Fluid
_____ II. Source and Generation Rate of Component Streams
_____ III. Volume of Injection Fluid Generated Daily and Annually
_____ IV. Physical and Chemical Characteristics of Injection Fluid, see instructions
_____ A. Generic waste/Fluid name
_____ B. Fluid phase
_____ C. Complete waste analysis
_____ D. Flash point
_____ E. Organics
_____ F. TDS
_____ G. pH
_____ H. Temperature
_____ I. Density
_____ J. Specific gravity
_____ K. Compressibility
_____ L. Micro organisms
_____ M. Chemical persistence
_____ N. Key component name(s)
_____ V. Injection Fluid Compatibility
_____ A. Compatibility with injection zone
_____ B. Compatibility with minerals in the injection zone
_____ C. Compatibility with minerals in the 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 tanks(s) and flow lines
_____ E. Compatibility with filter and filter components
_____ F. Full description of compatibility concerns
_____ VI. Pre-Injection Fluid Treatment, see instructions

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4g - PLUGGING AND ABANDONMENT PROCEDURE

USEPA ID NUMBER _____
IEPA ID NUMBER _____
WELL NUMBER _____

Location in Application

_____ I. Description of Plugging Procedures, see instructions
_____ A. Abandonment during construction
_____ B. Abandonment after injection
_____ C. Type and quantity of plugging materials, depth intervals
_____ D. Detailed plugging and abandonment procedures
_____ E. Cost estimate for plugging and abandonment

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4h - WELL COMPLETION REPORT

USEPA ID NUMBER N/A
IEPA ID NUMBER 0895075971
WELL NUMBER _____

I. Type of Permit
Individual: _____
Emergency _____
New _____
Renewal _____
Permit Number _____
Area: _____
Number of well _____
Name of Field _____
Emergency _____
New _____
Renewal _____
Permit Number _____

Location in Application

_____ II. Location, see instructions
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ III. Surface Elevation
_____ IV. Well Depth
_____ V. Static Water Level
_____ VI. Demonstrated Fracturing Pressure, if applicable
_____ VII. Injection Well Completion
_____ 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. Coefficient of annular fluid
5. Packer(s)
   a. Setting depth
   b. Type
   c. Name and model
6. Description of fluid spotting frequency, type and quantity
7. Information on well driller used for construction of this well

X. Tests and Logs
- A. During Drilling
- B. During and after casing installation
- C. Demonstrate mechanical integrity prior to operation
- D. Copies of logs and tests listed above
- E. Description of well stimulation

XI. Well Design and Construction
- A. Casings, see instructions
  1. Conductive casing
  2. Surface casing
  3. Intermediate casing(s)
  4. Long string casing
  5. Other casing
- B. Injection Tubing, see instructions
  1. Maximum allowable suspended weight based on joint strength
  2. Weight of injection tubing string (axial load) in air
- C. Cement, see instructions
  1. Conductive casing
  2. Surface casing(s)
  3. Intermediate casing
  4. Long string casing
  5. Other casing

XII. Surface Facilities, see instructions
- A. Filters(s)
- B. Injection pump(s)

XIII. Hydrogeologic Information
- A. Revised UIC Form 4a
- B. Revised UIC Form 4d using actual data on injection formation
- C. Revised UIC Form 4g
- D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
- E. Copy of any plugging affidavits on injection well filed with Department of Natural Resources

XIV. Injection Fluid Compatibility, see instructions
- 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

_____ XV. Monitoring Program, see instructions
_____ A. Injection pressure gauge(s)
_____ B. Casing-tubing annular pressure gauge(s)
_____ C. Flow meter(s)
_____ D. pH recording device(s)
_____ E. Temperature

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
PAT QUINN, GOVERNOR LISA BONNETT, DIRECTOR

Memorandum

Date: May 20, 2014

To: Kelly Huser

From: Scott Kaufman – Groundwater Unit (GU)

Subject: Class V Underground Injection Control (UIC) Permit Application – Technical Review

Re: 0894075971 – Kane
City of Aurora
UIC/Adm. Record
Log No. UIC-147

A technical review has been completed of the groundwater portions of the above referenced UIC Permit Application (Permit Application) submitted by Marc R. Fisher of Deuchler Environmental, Inc. The Permit Application is dated February 19, 2013 and was received by the Illinois EPA on February 26, 2013. This review also address an October 29, 2013 document submitted by the facility in response to a June 19, 2013 Illinois EPA letter (Log No. UIC-147) that provides completeness review and preliminary technical review comments regarding the subject application.

BACKGROUND

The City of Aurora (COA) operates a community water supply that serves a population of approximately 198,000 residents. Drinking water is extracted from a network of 18 municipal water supply wells and blended with surface water. The water is treated by a lime softening process at the COA Water Treatment Plant (WTP). Average water production rates are approximately 15.4 million gallons per day (GPD) from October through April and 19.2 MGD from May through September.

The lime sludge that is generated during the treatment process from claricones at regular intervals called "blowdowns". The discharge rate is approximately 800 gpm and typically occurs every three hours of operation for a duration of three minutes.

Currently, the lime sludge is diverted from the claricones to five different dewatering lagoons. The sludge is dewatered until it passes a standard paint filter test and is then excavated, loaded onto trucks, and transported either to a licensed municipal waste landfill or for use as an agricultural soil amendment. The cost of lime sludge management over the past three years has averaged $1,675,000.

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800
2009 Mall St., Collinsville, IL 62234 (618) 346-5120
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 10-300, Chicago, IL 60601 (312) 814-6026

The intent of the subject project is to construct a fully closed system to deliver lime sludge directly from the WTP to an injection point, approximately 3,500 ft. to the north. The proposed injection area is within a subterranean limestone and dolomite mine located approximately 250ft bgs. The mine will serve as a permanent detention area for the sludge. Four injection wells are proposed to be installed down to the roof of the upper chamber of the mine. Ancillary piping will be constructed that will distribute the sludge throughout the mine and remove decanted water that results from the settling out of the lime in the slurry. The decanted water will be pumped out of the mine as dewatering occurs.

SUBJECT SUBMITAL

The subject submittal is organized with Sections 1.0 through 18.0, plus Appendices A through R. It does not specifically follow the outline of the "Illinois Environmental Protection Agency Underground Injection Control Permit Application" Checklist (Checklist), which consists of Forms 4a through 4h, but it does provide a copy of the Checklist and cites where the applicable information is located.

This review follows the outline of the checklist. The groundwater portions of the Permit Application consist of all of Form 4a, and portions of Forms 4c, 4d, and 4e. A copy of the Checklist used in this review is provided in Attachment 1 to this review memorandum. These portions of the Permit Application are discussed in greater detail below.

Form 4a – Hydrogeologic Information

Checklist Section 4a.I – Elevation of Land Surface at Well Location

Location of Information: Application Section 12.3.1 - The application states that the injection location will be between 670 and 700ft above mean sea level (MSL).

Checklist Section 4a.II – Faults, Known or Suspected Within the Area of Review

Location of Information: Application Section 2.5.1 – The facility states that there are no known faults for other seismic features within the AOR. The closest fault is the Sandwich Fault approximately 18 miles southwest of the proposed injection site.

Checklist Section 4a.III – Maps and Cross Section as Required by Section 730.114(a) and 730.134(a)

Location of Information: Application Section 5.3 and Appendix I – Information is provided regarding 35 Ill. Adm. Code 730.114(a). Section 5.3 provides regional geologic cross-sections from the Illinois State Geological Survey (ISGS) Circular 547 (1991). The facility obtained from the ISGS 37 boring logs from locations near the injection site. Three geologic cross-sections were produced from those logs centering on the injection site. The boring logs are presented in Appendix H of the subject document, and the geologic cross-sections are presented

in Appendix I of the subject document. USDWs are noted on the cross-sections. Three USDWs underlie the injection zone.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTIONS 4a.I, 4a.II AND 4a.III

At this time, the information addressing the groundwater portions of Sections 4a.I, 4a.II, and 4a.III of the Checklist is technically adequate.

Checklist Section 4a.IV – Injection Zone

Location of Information: Application Section 5.0 – The injection site is located at the southeast corner of the intersection of Illinois Route 25 and Mettel Road, Aurora, Illinois. The legal description of the property is the northwest quarter of Section 10, Township 38 North, Range 8 East of the Third Principal meridian, Kane County, Illinois. The plat of survey and topographic map of the property are located in Appendix F of the subject document.

Checklist Section 4a.IV.A – Geologic Name(s) of Injections Zone

Location of Information: Application Sections 11.1 and 5.3 – The WTP lime sludge will be transported and retained within the Lafargo Conco South Mine which is constructed within the Galena and Platteville Groups (limestone and dolomite deposits).

Checklist Section 4a.IV.B – Depth Interval of Injection Zone Beneath Land Surface

Location of Information: Application Section 11.1 and Figure 11.2 – The Lafargo Conco South Mine is a standard room and pillar design. The pillars are composed of solid rock approximately 50ft square and the rooms are excavated to an approximate dimension of 47ft by 47ft. The mine currently has two levels (Level 1 [upper level] and Level 2 [lower level]), and a third level [below Level 2] is planned for the future. The deepest portion of the floor of the upper level (Level 1) is at approximately 379ft MSL (391ft bgs) and the ceiling of Level 1 is approximately 50ft above the floor (429ft MSL). There is a rock sill 25ft thick between Levels 1 and 2. The elevation of the floor of Level 2 is approximately 307ft MSL. The floor elevation of the proposed Level 3 will be approximately 231ft MSL. The pillars on Level 1 line up with the pillars on Level 2. A conceptualized mine configuration is provided in Figure 11.1 of the subject document. Figures 12.7 and 12.8 of the subject document provide depictions of the mine layout.

Checklist Section 4a.IV.C – Characteristics of the Injection Zone

Location of Information: Application Sections 5.0 and 11.0 – A detailed discussion of geology of the Galena-Platteville Groups (the geologic zone in which the mine is located) is provided in Sections 5.2.3 of the subject document. A detailed discussion of the Lafarge Conco South Mine (the injection zone) is provided in Sections 11.1 through 11.7 of the subject document. The mine is a standard room and pillar design. Each pillar is approximately 50ft by 50ft and rooms are mined to approximately 47ft by 47ft. The deepest floor depth is approximately 50ft below the ceiling and there is a sill of rock 25ft thick between Levels 1 and 2. The pillars of Levels 1 and 2

line up directly to increase rock strength. A layout of the mine is provided in Figures 12.7 and 12.8 of the subject document. Figure 11.2 of the subject document provides a composite log on the installed monitoring well and the mine configuration with respect to geology. The mine has been thoroughly surveyed and will be prepped before injection. The facility will install Kennedy Stoppings to seal off the area that will be injected. A discussion of Kennedy Stoppings is provided in Section 11.5 of the subject document. Three sediment basins will be constructed in Level 2 to decrease energy and velocity of sludge as it is deposited, enhance the uniformity of the sludge, help insure that the solids are taken out of suspension, and increase the filling efficiency.

Checklist Section 4a.IV.C.1 – Lithologic Description

Location of Information: Application Section 5.4 and Appendix B – During October 2008, the facility installed a monitoring well into the St. Peter Formation at the northwestern corner of the site. The well location is depicted in Figures 2.2, 4.1, 4.6, 12.7 and 12.8 of the subject document. The well was logged, geophysical testing was conducted, packer tests were conducted at 20ft intervals, groundwater elevation was measured and groundwater samples were collected.

Appendix B of the subject document provides a report by GZA Environmental that includes detailed lithologic and hydrogeologic descriptions of each unit encountered in the well boring. A geologic profile of the mine, which summarizes the logging and other boring activities, is provided in Figure 11.2 of the subject document.

Checklist Section 4a.IV.C.2 – Injection Zone Thickness Available to Accept Waste

Location of Information: Application Section 12.3.1 – Four injection wells will be installed. Each well will be drilled through to the ceiling elevation of Level 1. The total thickness of strata currently exploited by the mine is approximately 122ft based on Figure 11.2 of the subject submittal.

Checklist Section 4a.IV.C.3 – Fracture Pressure at Top of Injection Zone

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that this information is not applicable because the injection will occur into a cavernous subterranean mine at atmospheric pressure.

Checklist Section 4a.IV.C.4 – Effective Porosity

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that this information is not applicable because the injection will occur into a cavernous subterranean mine at atmospheric pressure.

Checklist Section 4a.IV.C.5 - Intrinsic Permeability

Location of Information: Application Sections 5.5 and 10.8 – The facility evaluated permeability by conducting packer tests at 20ft intervals throughout the Galena/Platteville Group where

mining has been/will be conducted and where sludge storage will occur. The tests were used to evaluate secondary porosity (bedding plane, vertical fracture joint and vugs). There is no primary matrix porosity in the subject limestones and dolomites.

The packer tests indicate that hydraulic conductivity (K) values ranged from a high of 5.92E-5 cm/sec to a low of 9.89E-8 cm/sec. The weighted geometric mean (allowing for the different thickness of the deepest test) was 4.75E-6 cm/sec. The three test results from the Dunleith Formation (where sludge disposal is proposed) averaged 1.08E-6 cm/sec. The eight results from the geologic formation below the injection level averaged 5.95E-6 cm/sec. These K values were used in hydrogeologic modeling discussed in Section 10 of the subject document.

In Section 10.8 of the subject document, the facility summarizes results of a geologic/hydrogeological survey by Agapito Associates, Inc. (AAI). Among other activities, AAI mapped visible joints throughout both levels of the mine, except for areas that were inaccessible due to current mining activities. AAI classified and measured the joint widths and depths, calculated average width values, and analyzed geologic materials that filled the secondary porosity features. AAI identified three types of joints: open, clay filled and calcite filled. AAI determined K values for the types of fill material via laboratory studies. Joint K values were determined from laboratory measurements and compared with values determined from reference studies. Those values were ultimately used as input parameters in the UDEC 4.0 model (Itasca 2004), a two-dimensional distinct element model that simulates the response of discontinuous media, such as jointed rock mass, subjected to either static or dynamic loading.

Section 5 of Appendix A summarizes results from the UDEC modeling. Several scenarios were evaluated, including a worst-case scenario where there is no lime sludge in the mine and 50ft of supernatant head. Under the worst-case scenario, the model predicted a maximum potential vertical flow rate of 0.9 to 1.5 gpm (1,300 to 2,160 gpd) across the entire 43-acre lime sludge detention area over the life of the system operation. Once lime sludge solids have covered the flow of the mine and Level 3 has been completed, negligible flow, a few gallons per day, could potentially reach the water table.

The model predicted very minor flow horizontally through vertical joints and bedding planes that could potentially reach the water table due to the circuitous flow path and comparatively low hydraulic conductivity values.

Checklist Section 4a.IV.C.6 – Hydraulic Conductivity or Permeability

Location of Information: Application Sections 5.5 and 10.8 – See Checklist Section IV.C.5 above.

Checklist Section 4a.IV.C.7 - Storage Coefficient

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that this information is not applicable because the injection will occur into a cavernous subterranean mine at atmospheric pressure.

Checklist Section 4a.IV.C.8 – Seepage Velocity (ft/yr) and Flow Direction of Formation Water

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that this information is not applicable because the injection will occur into a cavernous subterranean mine at atmospheric pressure.

Checklist Section 4a.IV.D – Characteristics of Injection Zone Formation Water

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that this information is not applicable because the Galen-Platteville Groups are not considered to be water bearing units within the AOR. All injection activities will occur in the South Mine. The North and South Mines are connected beneath the adjacent toll way by four tunnels. All four tunnels will be sealed off using bulkheads call Kennedy Stoppings. At the North Mine, there is an inclined access tunnel (decline) that connects the ground surface to Level 1 of the North Mine. The South Mine has no direct connection to the surface. Water accumulates in the North Mine into a sedimentation basin located within Level 1 of the mine. This water is generated from the contact between the base of the Silurian Dolomite formations and the Brainard Formation at the top of the Maquoketa Group. Because the decline cuts through the geologic contact, water that is held there, stratigraphically above Level 1 of the North Mine, travels down the decline and into a sedimentation basin in level 1 of the North Mine. The water is fully contained in the sediment basin and is pumped to the surface for eventual discharge via NPDES permit. None of the water travels to the South Mine. The South Mine is dry and has been categorized as a dry mine.

The facility states that according to Visocky et al. 1985, the Galena-Platteville Groups are not considered to be water-bearing units in areas of northeastern Illinois where these Groups are overlain by the Maquoketa Group. Additionally, Bauer and Gross 1996 states that the Galena-Platteville Group at Fermilab (4 miles northeast of the site) were chosen as a potential site for the Superconducting Super Collider (SSC) because they are "non-aquifer units". The facility acknowledges that, on a regional basis, the Galena-Platteville Group can produce groundwater, but briefly discusses a 1988 study by Visocky and Schulmeister indicating very few water supply wells in the unit. A potentiometric map and groundwater quality analyses were conducted as part of that study. That information is presented in the subject response. The facility also cites a study by Benson 1990 that evaluated a portion of the Galena-Platteville Group in Kane County. Groundwater chemistry parameters were collected and the results are presented in the subject response. Pressure, density, and viscosity parameter values were not available for the Galena-Platteville in the literature, but have no bearing since the unit is not a water-bearing unit.

Checklist Section 4a.IV.D.1 - Temperature

Location of Information: October 29, 2013 Response to Illinois EPA Comments – 54°F. See Checklist Section IV.D above.

Checklist Section 4a.IV.D.2 – Pressure

Location of Information: October 29, 2013 Response to Illinois EPA Comments – Not available. See Checklist Section IV.D above.

Checklist Section 4a.IV.D.3 – Density

Location of Information: October 29, 2013 Response to Illinois EPA Comments – Not available. See Checklist Section IV.D above.

Checklist Section 4a.IV.D.4 – Viscosity

Location of Information: October 29, 2013 Response to Illinois EPA Comments – Not available. See Checklist Section IV.D above.

Checklist Section 4a.IV.D.5 – Total Dissolved Solids

Location of Information: October 29, 2013 Response to Illinois EPA Comments – 327 mg/L. See Checklist Section IV.D above.

Checklist Section 4a.IV.D.6 – Potentiometric Surface

Location of Information: October 29, 2013 Response to Illinois EPA Comments – Figure 2.

Checklist Section 4a.IV.E – Additional or Alternate Zones Considered for Injections

Location of Information: October 29, 2013 Response to Illinois EPA Comments – No alternative zones are considered for injection.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTIONS 4a.IV

At this time, the information addressing the groundwater portions of Sections 4a.IV of the Checklist is technically adequate.

Checklist Section 4a.V – Upper Confining Zone

Location of Information: Application Sections 5.2.3 – The upper confining zone is the Ordovician Maquoketa Group. Details of the upper confining units are provided below.

Checklist Section 4a.V.A – Geologic Name(s) of Confining Zone

Location of Information: Application Sections 5.2.3 and Appendix B – Brainard Formation, Ft. Atkinson Formation, and Scales Formation.

Checklist Section 4a.V.B – Depth Interval of Upper Confining Zone Beneath Land Surface

Location of Information: Application Sections 5.2.3 and Appendix B – The upper confining zone consists of these units:

Upper Fort Atkinson Formation – 53 to 58ft bgs.

Brainard Formation – 58 to 139ft bgs.

Lower Ft. Atkinson Formation – 139 to 140ft bgs.

Ft. Atkinson/Scales Shale Transition Zone – 140 to 155ft bgs.

Scales Shale – 155 to 207ft bgs.

Checklist Section 4a.V.C – Characteristics of Confining Zone

Location of Information: Application Sections 5.2.3 and Appendix B – Section 4.2 of Appendix B provides a detailed description of each of the units listed in Section 4a.V.b above.

Checklist Section 4a.V.C.1 – Lithologic Description

Location of Information: Application Sections 5.2.3 and Appendix B – Section 4.2 of Appendix B provides a detailed lithologic description of each of the units listed in Section 4a.V.B above.

Checklist Section 4a.V.C.2 – Fracture Pressure at Depth

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that the sludge will be injected into an approximate 105 ft vertical portion of the Galena-Platteville groups (from the ceiling of Level 1 to the floor of Level 2). There will be approximately 33 ft of Galena-Platteville overlying the injection zone and 170 ft of Galena-Platteville underlying the injection zone. The facility therefore contends that the Galena-Platteville group represents not only the injection zone, but also the upper and lower confining units.

The fracture pressure of the upper confining zone is therefore equivalent to the mechanical integrity tests conducted during the feasibility study. The summary of the tests is provided in Section 10.7, page 10-7 of the Permit Application (PA), and also provided in Appendix A of the AAI Report (Table 4-1, page 4-1 and in Appendix C of the AAI Report). The mean value for unconfined compressive strength for the core sample is 15,894 psi.

Checklist Section 4a.V.C.3 – Intrinsic Permeability

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that intrinsic permeability of the limestone and dolomite is low as discussed on Page 2-2 of the AAI Report. Permeability is mainly a result of secondary porosity features. Sections 10.8

and 10.9 summarize the characteristics of permeability and K used in the numerical models conducted by AAI.

Checklist Section 4a.V.C.4 – Hydraulic Conductivity

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that intrinsic permeability of the limestone and dolomite is low as discussed on Page 2-2 of the AAI Report. Permeability is mainly a result of secondary porosity features. Sections 10.8 and 10.9 summarize the characteristics of permeability and K used in the numerical models conducted by AAI.

Checklist Section 4a.V.C.5 – Alternative Confining Zones Proposed, Include Explanation and Depth Intervals.

Location of Information: October 29, 2013 Response to Illinois EPA Comments – No alternate confining zones are proposed.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTIONS 4a.V

At this time, the information addressing the groundwater portions of Sections 4a.V of the Checklist is technically adequate.

Checklist Section 4a.VI - Lower Confining Zone

Location of Information: Application Sections 5.2.3 and 5.2.4 – The facility considers the lower confining zone to be the dolomites of the lowermost portions of the Galena-Platteville.

Checklist Section 4a.VI.A – Geologic Name(s) of Confining Zone

Location of Information: Application Sections 5.2.3 and 5.2.4 – Grand Detour Formation, Mifflin Formation, and Pecatonica Formation.

Checklist Section 4a.VI.B – Depth Interval of Lower Confining Zone Beneath Land Surface

Location of Information: Application Sections 5.2.4 and Appendix I – Approximately 444ft bgs to 540ft bgs; total thickness approximately 96ft based on the monitoring well boring log (see Figure 11.2 of the subject document).

Checklist Section 4a.VI.C – Characteristics of Confining Zone

Location of Information: Application Sections 5.2.3 and 5.2.4 – See Sections 4a.VI.C.1 through 4a.VI.C.5 below.

Checklist Section 4a.VI.C.1 – Lithologic Description

Location of Information: Application Sections 5.2.3 and 5.2.4 – The Grand Detour Formation us a thick-bedded to massive, light brown to gray dolomite that often has a distinct blue-gray color on fresh surfaces. The Mifflin Formation is a fossiliferous, fine-grained to microcrystalline dolomite with distinct shale partings. The Pecatonica Formation is the basal unit of the Platteville Group. It is a light brown to light gray, microcrystalline, thinly bedded dolomite that becomes increasingly siliceous and vuggy at the bottom.

Checklist Section 4a.VI.C.2 – Fracture Pressure at Depth

Location of Information: Application Sections 5.2.3 and 5.2.4 – See Illinois EPA Comment below.

Checklist Section 4a.VI.C.3 – Intrinsic Permeability

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that intrinsic permeability of the limestone and dolomite is low as discussed on Page 2-2 of the AAI Report. Permeability is mainly a result of secondary porosity features. Sections 10.8 and 10.9 summarize the characteristics of permeability and K used in the numerical models conducted by AAI.

Checklist Section 4a.VI.C.4 – Hydraulic Conductivity

Location of Information: Application Section 5.5 – See discussion of Checklist Section IV.C.5 above.

Checklist Section 4a.VI.C.5 – Alternative Confining Zones Proposed

Location of Information: October 29, 2013 Response to Illinois EPA Comments – No alternate confining zones are proposed.

ILLINOIS EPA COMMENTS

The following comments are made in regard to Checklist Section 4a.VI:

1. Regarding Checklist Section 4a.VI.C.2, Sections 5.2.3 and 5.43 of the Application do not address fracture pressure. However, in the October 29, 2013 response to Illinois EPA Comment regarding Checklist Section 4a.V.C.2, the facility contends that the Galena-Platteville group represents not only the injection zone, but also the upper and lower confining units. The fracture pressure of the upper confining zone is therefore equivalent to the mechanical integrity tests conducted during the feasibility study. The summary of the tests is provided in Section 10.7, page 10-7 of the Permit Application, and also provided in Appendix A of the AAI Report (Table 4-1, page 4-1

and in Appendix C of the AAI Report). The mean value for unconfined compressive strength for the core sample is 15,894 psi.

2. At this time, the information addressing the groundwater portions of Sections 4a.VI of the Checklist is technically adequate.

Checklist Section 4a.VII – Overlying Sources of Groundwater at the Site

Location of Information: Application Section 6.1 and 6.2 – The USDW's in the AOR are summarized in the following table:

GW/Aquifer Unit	Anticipated Depth (ft)	Unit Thickness (ft)	Contact/Confining Unit	Position Relative to Lime sludge Placement	Comment
Quaternary Sediments	12	12	Silurian Joliet/Kankakee Formation Dolomite	Above	Class II Aquifer; generally not used for industrial or potable purposes in the AOR
Silurian Wilhelmi Formation dolomite	53	10	Ordovician Brainard Formation Shale	Above	Class I aquifer used for industrial and potable purposes
Ordovician St. Peter Formation Sandstone	540	231	Knox Dolomite Megagroup	Below	Class I aquifer used for industrial and potable purposes
Cambrian Ironton-Galesville Formation Sandstone	900	160	Eau Claire Formation Dolomite/Shale	Below	Class I aquifer used for industrial and potable purposes
Cambrian Mt. Simon Formation Sandstone	1280	2000+	Pre-Cambrian Granite Basement Rock	Below	Class I aquifer used for industrial and potable purposes

Checklist Section 4a.VII.A – Characteristics of the Aquifer Immediately Overlying the Confining Zone

Location of Information: Application Section 6.1 and 6.2 – Section 6.1 provides a general description of the Quaternary aquifer. The facility states that at the site groundwater in generally encountered in the sandy outwash unit at the contact between the unconsolidated sediments and the Silurian dolomite. The facility states that even though the bedrock formations are fractured, their hydraulic conductivities are significantly less than those of the sand unit with the sediment and form the confining unit to this shallow groundwater unit. The facility states that this shallow groundwater in the AOR is typically Class II, but acknowledges that in other areas served as a potable water supply, such as the Village of Sugar Grove. The yield as specific capacity of the unit in Sugar Grove is approximately 3,000 gpm with a specific capacity of up to 5,000 gpm/ft.

Section 6.2 provides a general description of the Silurian aquifer. The Silurian aquifer is primarily in the Wilhelmi Formation. The Brainard Formation shale acts as the basal confining unit for the Silurian aquifer. In the area of the site the unit can yield up 1,000 gpm. The quality of water is good, but TDS ranges from 350 mg/L to 1,000 mg/L and hardness tends to be high.

Checklist Section 4a.VII.A.1 – Elevation of Top of Aquifer

Location of Information: Application Section 6.1 and 6.2 – 47.2 to 48.1 ft bgs (from Section 4.3.1 of Appendix B of the subject document).

Checklist Section 4a.VII.A.2 – Potentiometric Surface

Location of Information: October 29, 2013 Response to Illinois EPA Comments – A potentiometric map of the Silurian dolomite aquifer (Locke et al. 2007) is provided in Figure 4 of the response.

Checklist Section 4a.VII.A.3 – Total Dissolved Solids

Location of Information: October 29, 2013 Response to Illinois EPA Comments – 250 to 1000 mg/L.

Checklist Section 4a.VII.A.4 – Lithology

Location of Information: Application Sections 5.2.1 and 5.2.2 – The unconsolidated Quaternary system (present where not removed by quarrying) consists of the Henry Formation and the Yorkville member of the Lemont Formation of the Wedron group. The Henry Formation consists of stratified sand and gravel and contains localized lenses of silt, clay and organic debris. The Yorkville member consists of calcareous, gray, silty clay to silty clay loam diamicton that contains lenses of gravel, sand silt and clay. The Silurian system consists mostly of dolomitic reef deposits. On-site, the Silurian system consists of the Joliet, Kankakee, Elwood and Wilhelmi formations. The Joliet and Kankakee Formations tend to be undifferentiated and composed of white, gray to greenish gray dolomite with some chert and shale. The Elwood Formation is slightly argillaceous, brownish gray fine-grained dolomite that can contain dense layers of chert. The Wilhelmi Formation is composed of medium gray argillaceous dolomite that at its base can contain reworked shaly sediments from the underlying Brainard. The basal portion of the Silurian system is fractured and contains the aquifer.

Checklist Section 4a.VII.A.5 - Aquifer Thickness

Location of Information: Application Sections 6.1 and 6.2 – Regionally the aquifer can be up to 200 ft thick and averages approximately 80 ft thick, but at the facility it appears to extend no greater than approximately 75 ft bgs (the base of the Wilhelmi/Brainard transition Zone).

Checklist Section 4a.VII.A.6 – Specific Gravity

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that specific gravity data was not available for the permit application, but points out that the lime storage will occur under atmospheric conditions, with no upward pressure exerted on overlying formations. Therefore this parameter will have no bearing on the project.

Checklist Section 4a.VII.B – Underground Sources of Drinking Water

Location of Information: Application Section 6.0 – See Checklist Section 4a.VII above.

Checklist Section 4a.VII.B.1 – Maps and Cross Sections Required by 730.114(a)(4) or 730.134(a)(4)

Location of Information: Application Section 5.3 and Appendix I – Information is provided to meet the requirements of 35 Ill. Adm. Code 730.114(a)(4). Regional geologic cross-sections are provided in Section 5.3 of the subject document. Geologic cross-sections of the immediate vicinity of the facility are provided in Appendix I of the subject document. Regional potentiometric surface maps (Figures 6.1 through 6.3) are provided in Section 6.6 of the subject document. A map depiction of the injection well location is provided in Figure ES-2, Page vi of Appendix A. Isopach maps are provided in Section 5.2 of the subject document.

Checklist Section 4a.VII.B.2 – Lowest Depth of Underground Source of Drinking Water (USDW)

Location of Information: Application Section 6.3, 6.4 and Appendix I – The facility states that the St. Peter and Ironton-Galesville Formation of the Midwest Bedrock Aquigroup or the Cambro-Ordovician Aquifer are the principal aquifers used for private and public drinking water supplies within the AOR. The basal bedrock aquigroup is the Cambrian Mt. Simon Formation (sandstone). Low to moderate yields and salinity issues limit the use of this aquifer for water supply purposes. The facility therefore considers the St. Peter the nearest underlying USDW because it's yields and groundwater quality are superior to the Mt. Simon and all but one of the active City of Aurora CWS wells are completed in the Glenwood-St. Peter. The Glenwood-St. Peter is approximately 540ft bgs at the facility (see Figure 11.2 on Page 11-6 of the subject document). The potentiometric surface is at approximately 475ft bgs, which is approximately 65 ft above the Glenwood and therefore under confined conditions. The potentiometric surface is approximately 35ft below the floor of proposed mine Level 3.

Checklist Section 4a.VII.B.3 – Elevation of Potentiometric Surface of Lowest USDW Referenced to Mean Sea Level

Location of Information: Application Section 6.6 – Section 6.6 provides potentiometric maps of the deep sandstone aquifer (St. Peter, Prairie Du Chien, Eminence-Potosi, Franconia, and Ironton-Galesville) in northeast Illinois.

Checklist Section 4a.VII.B.4 – Distance to Nearest Water Supply Well

Location of Information: Application Tables 2.1 and 3.1 – Table 2.1 and the accompanying Figure 2.2 (location map) provide a list of wells within the AOR. Table 3.1 provides a list of Aurora CWS wells. The nearest water supply well appears to be Figure 2.2 map Reference No. E11/E18, which is approximately 854 ft from the southeast property boundary.

Checklist Section 4a.VII.B.5 – Distance to Nearest Downgradient Water Supply Well

Location of Information: Application Tables 2.1 and 3.1 – No specific discussion of nearest downgradient water supply well is provided in the subject document.

ILLINOIS EPA COMMENTS

The following comments are made in regard to Checklist Section 4a.VII:

1. Regarding Checklist Section 4a.VII.A, the Illinois EPA does not concur with the facility's statement in Section 6.1 that shallow most groundwater (encountered in the Quaternary sediments) in the AOR is 35 Ill. Adm. Code 620, Class II Groundwater. If a continuous zone of groundwater begins within ten feet of the ground surface and extends greater than ten feet below the ground surface it will not be considered Class II Groundwater if an additional criteria is met under 35 Ill. Adm. Code 620.210, which in that case it will be considered Class I groundwater. The shallow most groundwater at the facility is hydraulically connected to the Silurian Dolomite, which is a fractured carbonate unit greater than 15 ft thick. It therefore meets the additional Class I criteria of 35 Ill. Adm. Code 620.210(a)(3) and must be considered Class I Groundwater. Section 6.1 of the Permit Application must be revised accordingly.

2. Regarding Checklist Section 4a.VII.B.5, on May 6, 2014, I talked to Marc Fischer of Deuchler Environmental by phone regarding Checklist Section 4a.VII.B.5. He informed me of the following:

   a. Local groundwater flow direction has not determined, only assumed based on regional flow. He said that the Silurian aquifer flow was assumed to be east, and the St. Peter-Glenwood flow assumed to be west.

   b. He said that it would be difficult to determine local flow for the St. Peter-Glenwood from existing water supply wells because most of them are screened in both the St. Peter and the Ironton-Galesville.

   c. He said that more information regarding local groundwater flow would be determined once the Permit is issued.

   d. The monitoring well location was based on westerly flow of St. Peter (screened in that unit) and the farthest possible distance from mining activities while still remaining on-site.

3. Based on Comments 2.a through 2.d above, the facility will be required to install additional monitoring wells to establish a network that can determine and monitor groundwater flow direction. See comments to Checklist Section 4e.II.B below.

Checklist Section 4a.VIII – Minerals and Hydrocarbons

Location of Information: October 29, 2013 Response to Illinois EPA Comments – The facility states that there is no hydrocarbon production within five miles of the site. In Kane County, significant quantities of mineral aggregates are produced. The principal aggregate types produced are sand and gravel from Quaternary glacial deposits and limestone and dolomite surface quarrying of the Silurian system and subsurface mines in the Galena-Platteville Groups.

Checklist Section 4a.VIII.A – Mineral or Natural Resources Beneath or Within 5 Miles of the Site

See Section 4a.VIII above.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTIONS 4a.VIII

At this time, the information addressing the groundwater portions of Sections 4a.VIII of the Checklist is technically adequate.

Form 4c – Operation Program and Surface Facilities

Checklist Section 4c.I.A.5 – Number of Injection Zone Monitoring Wells, Include List and Schematics

Location of Information: Application Section 5.4 and Appendix B – One monitoring well is proposed. Section 5.4 provides summary discussion of installation of the existing monitoring well. Appendix B provides a detailed report from GZA on the installation and testing of the monitoring well.

Checklist Section 4c.I.A.6 – Number of, Name and location of Injection Wells Currently in Project

Location of Information: Application Section 12.3 and Figure 4.6 – Four injection wells are currently planned for the project.

Checklist Section 4c.I.B.10 – Number of Injection Zone Monitoring Wells, Include Schematics

Location of Information: October 29, 2013 Response to Illinois EPA Comments – This information is not applicable because it will be an area injection as opposed to a single injection well.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTION 4c

At this time, the information addressing the groundwater portions of Sections 4c of the Checklist is technically adequate.

Form 4d – Area of Review

Checklist Section 4d.I – Radius of the Area of Review

Location of Information: Application Section 2.0 – This information is actually in Section 2.4. Based on modeling, the facility determined an AOR of 1,000 ft from the property boundary. However, to assure that adequate information was collected, data was collected within a ½ mile radius from the property boundary.

Checklist Section 4d.II – Method of Radius Determination

Location of Information: Application Section 2.4 – The AOR was determined using mathematical modeling. A summary discussion of the model is provided in Section 10 of the subject document, and a detailed report of the modeling results is provided in Appendix A of the subject document.

Checklist Section 4d.III – Map with Information Required by Section 730.114(a)(2) or 730.134(a)(2)

Location of Information: Application Figures 2.1, 2.2 and 2.4 – Figure 2.1 provides a geologic map of Northeastern Illinois (Graese 1991). Figure 2.2 provides a well search location map. Figure 2.4 provides a local land use map.

Checklist Section 4d.IV – Description of Anticipated Injection Fluid Movement During the Life of the Project

The facility used the UDEC 4.0 model to assess rock stability and potential fluid movement out of the lime sludge storage area into the surrounding geological formations. The UDEC model was chosen because it is appropriate to model flow of fluids through bedding planes and secondary porosity features rather than the rock matrix itself.

Model assumptions and boundary conditions were as follows;

1. Sludge disposal concurrent with mining of the underlying Level 3;
2. Sill thickness of 25ft;
3. Lime injection via four injection wells;
4. An assumed maximum supernatant head of 6ft above settled sludge;

5. A blanket of lime sludge created by alternating injections;
6. K of lime sludge solids equals 1.0E-5 cm/sec (based on measured values);
7. Lime sludge solids will eventually reach 50 ft thickness;
8. Lime sludge bulk density = 144 pcf;
9. No fluid flow within rock matrix;
10. Bedding plane average K = 9.26E-6 cm/sec for untested horizons within the geometry of the model.
11. Bedding planes repeated at 20ft intervals;
12. Joints assumed vertical;
13. Average lateral joint spacing = 120ft and average joint lengths = 200ft based on mapping;
14. Joints assumed to repeat in the same vertical plane separated by 100ft between joint ends;
15. Three different types of joints mapped with different apertures and different fill material types. Mathematical distributions for the various types were calculated.
16. Potentiometric surface of 180.4ft MSL;
17. An assumed in-situ vertical stress gradient of 1.09 psi/ft depth; and
18. Assumed maximum is-situ horizontal stress gradients of 3.51 psi/ft of depth and 2.11 psi/ft of depth, respectively.

Sensitivity analyses were conducted as part of the modeling, which included a worst-case scenario of a 50 ft. supernatant head with no infilling of joints.

The results of the modeling indicate the following:

1. Mining will not have a significant influence on K of the natural system or stability of the rock mass;
2. A safety factor of 2.0 will be exceeded in all cases for the pillars and 1.89 will be exceeded in all cases for the sills;
3. The worst-case fluid flow is estimated to be 0.021 to 0.035 GPM/acre (1,300 to 2,160 GPD across the entire 43-acre lime sludge detention area;

4. Once the lime sludge solids have covered the floor of the mine and Level 3 has been completed, negligible flow, on the order of a few gallons per day, could potentially reach the water table.

5. It is unlikely that the worst-case scenario will exist because joints will be prepared prior to lime disposal;

6. Once Level 3 is excavated, if any water flows from the sludge detention area, it will be captured within Level 3 and negligible flow is predicted to reach the St. Peter Aquifer.

7. Considering the chemistry of the Aurora CWS water, solid, and supernatant, there will be no adverse chemical impacts to in-situ rock.

Checklist Section 4d.V – Wells Within the Area of Review

Location of Information: Application Section 2.5.2 – A total of 35 wells, borings and test holes were identified with the AOR. No abandoned or inactive wells were identified. Figure 2.2 of the subject document depicts the locations of the wells.

Checklist Section 4d.V.A – Tabulation of Well Data Required by 730.114(a)(3) or 730.134(a)(3)

Location of Information: Application Table 2.1 – The tabulation of well data is intended to meet the requirement of 35 Ill. Adm. Code 730.114(a)(3).

Checklist Section 4d.V.B – Number of Wells Within 2 ½ Miles of Injection Well Penetrating Within 300 Feet of the Uppermost Injection Zone

Location of Information: Application Section 2.5.2 – A total of 35 wells, borings, and test holes were identified within the AOR. Five of those listed appear to be engineering or test borings. The rest appear to be water supply wells.

Checklist Section 4d.V.B.1 – (Wells) Properly Plugged and Abandoned

Location of Information: Application Section 2.5.2 – No abandoned or inactive wells were identified.

Checklist Section 4d.V.B.2 – (Wells) Temporarily Abandoned

Location of Information: Application Section 2.5.2 – No abandoned or inactive wells were identified.

Checklist Section 4d.V.B.3 – (Wells) Operating

Location of Information: Application Section 2.5.2 – No abandoned or inactive wells were identified.

Checklist Section 4d.V.B.4 – Improperly Sealed, Completed, or Abandoned

Location of Information: Application Section 2.5.2 – No improperly sealed, completed or abandoned wells were identified.

Checklist Section 4d.V.B.5 – Plugging Affidavits for All Plugged Wells

October 29, 2013 Response to Illinois EPA Comments – No abandoned or inactive wells were identified. Therefore, this information is not applicable.

Checklist Section 4d.V.B.6 – Proposed Corrective Action for Unplugged Wells Penetration the Injection Zone

October 29, 2013 Response to Illinois EPA Comments – No abandoned or inactive wells were identified. Therefore this information is not applicable.

ILLINOIS EPA COMMENTS REGARDING CHECKLIST SECTION 4d

The following comments are made in regard to Section 4d.

1. Regarding Checklist Section 4d.III, Figure 2.2 must be revised to depict the outline of the Area of Review, and appropriate scale, and a key to all symbols used on the map.

2. No information is provided regarding which of the existing water supply wells are in operation. So it is assumed herein that all of the wells listed in the AOR are operational.

Form 4e – Monitoring, Integrity Testing, and Contingency Plan

Checklist Section 4e.II.B – USDW Monitoring In the Area of Review

Location of Information: Application Sections 16.3 and 16.4 – The facility proposes that the following groundwater parameters be monitored quarterly:

pH	Fluoride	Cadmium	Manganese	Zinc
Cyanide, total	Antimony	Chromium	Nickel	Radium 226
Nitrate, as N	Arsenic	Cobalt	Selenium	Radium 228
Nitrite, as N	Barium	Copper	Silver	
Sulfate	Beryllium	Iron	Thallium	
Ammonia, as N	Boron	Lead	Vanadium	

The facility asserts that other parameters are not necessary because the supernatant does not exhibit any concentrations for any parameters that exceed either the 35 Ill. Adm. Code Part 620 GQSs or the 35 Ill. Adm. Code 611 Drinking Water MCLGs or MCLs in any of the sampling events conducted.

The facility states that the laboratory analysis method will be consistent with those methods identified in the Class V IUC permit issued by the Illinois EPA.

Checklist Section 4e.II.B.1 – Number of Wells

Location of Information: Application Sections 16.0 – One well is proposed; the existing monitoring well that has been installed on-site.

Checklist Section 4e.II.B.2 – Type of Wells

Location of Information: Application Sections 16.0 – Monitoring well screened in the St. Peter Formation.

Checklist Section 4e.II.B.3 – Frequency of Monitoring

Location of Information: Application Sections 16.3 – Quarterly monitoring is proposed.

Checklist Section 4e.II.B.4 – Types of Samples

Location of Information: Application Sections 16.3 – Groundwater samples will be collected for inorganic parameters as discussed in Checklist Section 4e.II.B above.

Checklist Section 4e.II.B.5 – Parameters

Location of Information: Application Sections 16.3 – Proposed groundwater parameters are discussed in Checklist Section 4e.II.B above.

Checklist Section 4e.II.B.6 – Map of Well Location and Logs

Location of Information: Application Figure 4.6 and Appendix B – The monitoring well is located on the far northwest corner of the facility as indicated in Figure 4.6. Appendix B consists of a GZA Environmental, Inc. report documenting the installation of the monitoring well.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTION 4e.II.B

The Illinois EPA has determined that the information submittal to meet the requirements of Section 4e.II.B of the Checklist is not technically adequate at this time due to the following:

1. In order to meet the requirements of 35 Ill. Adm. Code 704.122 and 704.282, and pursuant to 35 Ill. Adm. Code 704.149(a) and (b), and 704.282(d), the facility must propose the installation of additional wells to monitor groundwater in the USDW (Glenwood/St. Peter Formations) directly underlying the injection zone. The proposed monitoring well network must consist of a minimum of three monitoring

wells capable of determining groundwater flow direction and must be capable of determining if there is release from the injection zone into the underlying USDW in the vicinity of the facility. Section 16 of the application must be revised accordingly.

Checklist Section 4e.II.C – Detailed Groundwater Monitoring Plan

Location of Information: Application Sections 16.3 and 16.4 – See discussion of Section 4e.II.B above.

ILLINOIS EPA COMMENT REGARDING CHECKLIST SECTION 4e.II.C

The Illinois EPA has determined that the information submittal to meet the requirements of Section 4e.II.C of the Checklist is not technically adequate at this time. Detailed information must be submitted regarding the following:

1. Procedures that will be used for the following:
   a. Groundwater sample collection;
   b. Monitoring well purging;
   c. Groundwater sample chain of custody;
   d. Field quality control;
   e. Laboratory quality control;
   f. Data review and Validation;
2. The facility must propose a statistical analysis plan that will be utilized to determine if there has been release to groundwater. This must include, but not be limited to, the following:
   a. A list of groundwater parameters for which background values will be established;
   b. Statistical methods that will be used to calculate background values including the determination of data distribution and the handling of non-detects;
   c. The facility must propose what will constitute the baseline data set(s).
   d. Methods that will be used to compare appropriate compliance well data to the established background values;

e. Criteria that will determine when a statistically significant increase has been observed, the confidence level at which it will be determined, and the actions that will result from that determination;

f. The Illinois EPA strongly recommends that the facility develop a statistical analysis flow chart to be submitted as part of the Permit Application, and which may be included in the Permit;

g. The Illinois EPA recommends referring to the document entitled, "EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance". This document has now been finalized by USEPA and may be used as a reference.

ILLINOIS EPA RECOMMENDATIONS

The following recommendations are made in regard to the technical review of the groundwater portions of the subject permit application. Upon review, the Illinois EPA has determined that some groundwater portions of the subject submittal are not technically adequate at this time. Information must be submitted to address the technical deficiencies as discussed below:

1. Checklist Section 4a.VII.A – The Illinois EPA does not concur with the facility's statement in Section 6.1 that shallow most groundwater (encountered in the Quaternary sediments) in the AOR is 35 Ill. Adm. Code 620, Class II Groundwater. If a continuous zone of groundwater begins within ten feet of the ground surface and extends greater than ten feet below the ground surface it will not be considered Class II Groundwater if an additional criteria is met under 35 Ill. Adm. Code 620.210, which in that case it will be considered Class I groundwater. The shallow most groundwater at the facility is hydraulically connected to the Silurian Dolomite, which is a fractured carbonate unit greater than 15 ft thick. It therefore meets the additional Class I criteria of 35 Ill. Adm. Code 620.210(a)(3) and must be considered Class I Groundwater. Section 6.1 of the Permit Application must be revised accordingly.

2. Checklist Section 4d.III – Figure 2.2 of the application must be revised to depict the outline of the Area of Review, and appropriate scale, and a key to all symbols used on the map.

3. Checklist Section 4e.II.B – In order to meet the requirements of 35 Ill. Adm. Code 704.122 and 704.282, and pursuant to 35 Ill. Adm. Code 704.149(a) and (b), and 704.282(d), the facility must propose the installation of additional wells to monitor groundwater in the USDW (Glenwood/St. Peter Formations) directly underlying the injection zone. The proposed monitoring well network must consist of a minimum of three monitoring wells capable of determining groundwater flow direction and must be capable of determining if there is release from the injection zone into the underlying USDW in the vicinity of the facility. Section 16 of the application must be revised accordingly.

4. Checklist Section 4e.II.C – Section 16 of the application must be revised to include detailed information regarding the following:

   a. Procedures that will be used for the following:

      i. Groundwater sample collection:

      ii. Monitoring well purging;

      iii. Groundwater sample chain of custody;

      iv. Field quality control:

      v. Laboratory quality control;

      vi. Data review and validation;

   b. The facility must propose a statistical analysis plan that will be utilized to determine if there has been release to groundwater. This must include, but not be limited to, the following:

      i. A list of groundwater parameters for which background values will be established;

      ii. Statistical methods that will be used to calculate background values including the determination of data distribution and the handling of non-detects;

      iii. The facility must propose what will constitute the baseline data set(s).

      iv. Methods that will be used to compare appropriate compliance well data to the established background values;

      v. Criteria that will determine when a statistically significant increase has been observed, the confidence level at which it will be determined, and the actions that will result from that determination;

      vi. The Illinois EPA strongly recommends that the facility develop a statistical analysis flow chart to be submitted as part of the Permit Application, and which may be included in the Permit;

      vii. The Illinois EPA recommends referring to the document entitled, "EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance". This document has now been finalized by USEPA and may be used as a reference.

cc: Jim Moore w/o attachments
Scott Kaufman w/ attachments

Attachment 1

Illinois EPA Underground Injection Control Permit Application Checklist

Completeness Review - 3/19/13
Second Completeness Review - 4/29/14

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4a - HYDROGEOLOGIC INFORMATION

USEPA ID NUMBER N/A
IEPA ID NUMBER 0859407597I
WELL NUMBER

Complete?	Location in Application		
Y	✓ 12.3.1	I.	Elevation of Land Surface at Well Location
Y	✓ 2.5.1	II.	Faults, know or suspected within the area of review.
Y	✓ 53/App. I	III.	Maps and cross sections as required by Section 730.114(a) or 730.134(a).
Y	✓ 5.0	IV.	Injection Zone
Y	P ✓ 111/533	A.	Geologic name(s) of injection zone.
Y	✓ 111/F2 112	B.	Depth interval of injection zone beneath land surface.
	✓ 5.0/11.0	C.	Characteristics of injection zone.
Y	✓ 5.4/App. B	1.	Lithologic description
Y	✓ 12.3.1	2.	Injection zone thickness available to accept waste.
Y	No ✓ N/A	3.	Fracture pressure at top of injection zone, include source
Y	No ✓ N/A	4.	Effective porosity, include source
	✓ 10 E/5.5	5.	Intrinsic permeability, include source
	✓ 5.5	6.	Hydraulic conductivity or permeability, include source
Y	No ✓ N/A	7.	Storage coefficient, include source
Y	No ✓ N/A	8.	Seepage velocity (ft/yr) and flow direction of formation water, include source.
Y	No ✓ N/A	D.	Characteristics of injection zone formation water.
Y	No ✓ N/A	1.	Temperature, include source
Y	No ✓ N/A	2.	Pressure, include source
Y	No ✓ N/A	3.	Density, include source
Y	No ✓ N/A	4.	Viscosity, include source
Y	No ✓ N/A	5.	Total Dissolved Solids, include source
Y	No ✓ N/A	6.	Potentiometric surface, include source
Y	No ✓ N/A	E.	Additional or alternative zones considered for injection
Y	✓ 5.2.2 5.2.3	V.	Upper Confining Zone
Y	✓ 5.2.2/App. B	A.	Geologic name(s) of confining zone
Y	✓ App. B	B.	Depth interval of upper confining zone beneath land surface.
Y	✓ 5.2.2/App. B	C.	Characteristics of confining zone
Y	✓ 5.2.2/App. B	1.	Lithologic description
Y	No ✓ N/A	2.	Fracture pressure at depth, include source
Y	No ✓ N/A	3.	Intrinsic permeability, include source
Y	No ✓ N/A	4.	Hydraulic conductivity, include source
Y	No ✓ N/A	5.	Alternative confining zones proposed, include explanation

Technically Adequate (Y/N)		Complete?		
				and depth interval(s)
Y		✓	5.2.3/5.2.4	VI. Lower Confining Zone
Y		✓	5.2.3/5.2.4	A. Geologic name(s) of confining zone
Y		✓	5.2.3/5.2.4	B. Depth interval of lower confining zone beneath land surface
Y		✓	5.2.3/5.2.4	C. Characteristics of confining zone
Y		✓	5.2.3/5.2.4	1. Lithologic description
Y		✓	5.2.3/5.2.4	2. Fracture pressure at depth, include source
Y	No	✓	NA	3. Intrinsic permeability, include source
Y		✓	5.5	4. Hydraulic conductivity, include source
Y	No	✓	NA	5. Alternative confining zones proposed, include explanation and depth interval(s)
Y		✓	6.1/6.2	VII. Overlying Sources of Groundwater at the Site
N		✓	6.1/6.2	A. Characteristics of the aquifer immediately overlying the confining zone
Y		✓	6.1/6.2 / Appendix B, 9.3.1	1. Elevation at top of aquifer, include source
Y	No	✓	N/A	2. Potentiometric surface, include source
Y	No	✓	N/A	3. Total Dissolved Solids, include source
Y		✓	5.2.1/5.2.2	4. Lithology, include source
Y		✓	6.1/6.2	5. Aquifer thickness
Y	No	✓	N/A	6. Specific gravity, include source
Y		✓	5.3	B. Underground Sources of Drinking Water (USDW)
Y		✓	5.3/Appx B	1. Maps and cross sections required by 730.114(a)(4) or 730.134(a)(4)
Y		✓	6.3/6.4/Appx B	2. Lowest depth of USDW
Y		✓	6.6	3. Elevation of potentiometric surface of lowest USDW referenced to mean sea level
Y		✓	Tables 2.1/3.1	4. Distance to nearest water supply well
Y		✓	Tables 2.1/3.1	5. Distance to nearest down gradient water supply well
Y	No	✓	N/A	VIII. Minerals and Hydrocarbons
Y	No	✓	N/A	A. Mineral or natural resources beneath or within 5 miles of the site, include types and depth intervals

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title	Phone Number
Signature	Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4b - INJECTION WELL DESIGN, CONSTRUCTION TESTS and LOGS

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407597I
WELL NUMBER _____

Location in Application

_____ I. Well Depth
_____ II. Anticipated fracturing pressure
_____ III. Static Water level and type of fluid
_____ IV. Expected service life of well
_____ V. Injection well completion, see instructions
_____ VI. Schematic or other appropriate drawing of the surface and subsurface construction details of well
_____ VII. Well Design and Construction
_____ A. Well hole diameters and corresponding depth intervals
_____ B. Casing, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing(s)
_____ 4. Long string casing
_____ 5. Other casing
_____ C. Injection tubing, see instructions
_____ 1. Maximum allowable suspended weight based on joint strength of Injection tubing
_____ 2. Weight of injection tubing string (axial load) in air
_____ D. Cement, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing
_____ 4. Long string casing
_____ 5. Other casing
_____ 6. Cementing techniques, equipment positions and staging depths
_____ 7. Perforation depths
_____ E. Annulus Protection System
_____ 1. Annular space(s), specify ID and OD
_____ 2. Type of annular fluid(s)
_____ 3. Specific gravity of annular fluid(s)
_____ 4. Type of additive(s) and Inhibitor(s)
_____ 5. Coefficient of annulus fluid(s)
_____ 6. Packer or fluid seal, see instructions
_____ a. Packer(s), see instructions

b. Fluid spotting procedure, frequency and quantity

____ VIII. Information on well drilling company used during construction, see instructions

____ IX. Tests and Logs, see instructions

____ A. During drilling

____ B. During and after casing installation

____ C. Demonstration of mechanical integrity

____ D. Copies of the logs and tests listed above

Certification

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Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c - OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER N/A
IEPA ID NUMBER 0899407597
WELL NUMBER _____

technically complete? Location in Application

_____ I. Operation Program
_____ A. Area Injection Project (if applicable)
_____ 1. Maximum fluid to be injected per day
_____ 2. Years remaining in area injection project
_____ 3. Anticipated total number of injection wells required
_____ 4. Injection wells operate with/without common manifold
Y ✓ 5.4/A_SS B 5. Number of injection zone monitoring wells, include list and schematics
Y ✓ 12Y Figure 46 6. Number of, name and location of injection wells currently in project, see instructions
_____ B. Single Injection Well (if area permit is applied for, provide for typical well)
_____ 1. Number or name of well
_____ 2. Location, see instructions
_____ 3. Expected service life
_____ 4. Operation during 24 hour period
_____ 5. Operation days per month
_____ 6. Injection pressure, average and maximum
_____ 7. Injection rate, average and maximum
_____ 8. Casing-tubing annulus pressure, average and maximum
_____ a. During operation, average and maximum
_____ 9. Other annulus pressure
Y NS ✓ N/A 10. Number of injection zone monitoring wells, include schematics

_____ II. Surface Facilities
_____ A. Injection fluid storage
_____ 1. Storage capacity in days and gallons
_____ 2. Type of storage facility(s)
_____ 3. Storage capacity in case of well failure, describe
_____ B. Holding tanks and flow lines, describe
_____ C. Process and Instrumentation Diagram attachment

D. Filter(s)
   1. Location
   2. Type
   3. Name
   4. Model Number
   5. Capacity, gallons per minute
   6. Pore size, microns

E. Injection Pump(s)
   1. Location
   2. Type
   3. Name
   4. Model Number
   5. Capacity, gallons per minute

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4d - AREA OF REVIEW

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407 5971
WELL NUMBER _____

Location in Application

2.4 ~~2.0~~	I.	Radius of the Area of Review
2.4	II.	Method of Radius determination, see instructions
Fig 2.1/2.3/2.4	III.	Map with information required by Section 730.114(a)(2) or 730.134(a)(2)
10.5/10.7	IV.	Description of Anticipated Injection Fluid Movement During the Life of the Project, see instructions
2.5.2	V.	Wells Within the Area of Review
Table 2.1		A. Tabulation of well data required by 730.114(a)(3) or 730.134(a)(3)
2.5.2		B. Number of wells within 2 ½ miles of injection well penetrating within 300 feet of the uppermost injection zone which are:
2.5.2		1. Properly plugged and abandoned
2.5.2		2. Temporarily abandoned
2.5.2		3. Operating
2.5.2		4. Improperly sealed, completed or abandoned
N/A		C. Plugging affidavits for all plugged wells
N/A		D. Proposed corrective action for unplugged wells penetrating the injection zone

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e - MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075971
WELL NUMBER ______

Complete? Technically adequate (Y/N)

Location in Application

Technically adequate (Y/N)	Complete?	Location in Application			
		______	I.		Waste Sampling and Analysis
		______		A.	Sampling frequency
		______		B.	Analysis parameters
		______		C.	Sampling location
		______		D.	Detailed waste analysis plan
		______	II.		Monitoring Program
		______		A.	Recording devices, see instructions
		______			1. Injection pressure gauges
		______			2. Casing-tubing annulus pressure gauges
		______			3. Flow meters
		______			4. pH recording devices
		______			5. Temperature
	✓	16.3/16.4		B.	USDW Monitoring in Area of Review
N	✓	~~16.3/16.4~~ 16.3			1. Number of wells
Y	✓	~~16.3/16.4~~ 16.3			2. Type of wells
Y	✓	~~16.3/16.4~~ 16.3			3. Frequency of monitoring
Y	✓	16.3/16.4			4. Type of sample
Y	✓	16.3/16.4			5. Parameters
Y	✓	F.2 4.C, A,10 B			6. Map of well location and logs
N	✓	16.3/16.4		C.	Detailed Groundwater Monitoring Plan
		______	III.		Mechanical Integrity Tests During Service Life of Well, see instructions
		______	IV.		Contingency Plan for Well Failure or Shut In, see instructions
		______		A.	Detailed contingency plan

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

______________________	______________________
Name & Official Title	Phone Number
______________________	______________________
Signature	Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4f - CHARACTERISTICS, COMPATIBILITY and PRE-INJECTION TREATMENT of INJECTION FLUID

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075921
WELL NUMBER _____

Location in Application

_____ I. Component Streams Forming Injection Fluid
_____ II. Source and Generation Rate of Component Streams
_____ III. Volume of Injection Fluid Generated Daily and Annually
_____ IV. Physical and Chemical Characteristics of Injection Fluid, see instructions
_____ A. Generic waste/Fluid name
_____ B. Fluid phase
_____ C. Complete waste analysis
_____ D. Flash point
_____ E. Organics
_____ F. TDS
_____ G. pH
_____ H. Temperature
_____ I. Density
_____ J. Specific gravity
_____ K. Compressibility
_____ L. Micro organisms
_____ M. Chemical persistence
_____ N. Key component name(s)
_____ V. Injection Fluid Compatibility
_____ A. Compatibility with injection zone
_____ B. Compatibility with minerals in the injection zone
_____ C. Compatibility with minerals in the 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 tanks(s) and flow lines
_____ E. Compatibility with filter and filter components
_____ F. Full description of compatibility concerns
_____ VI. Pre-Injection Fluid Treatment, see instructions

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4g - PLUGGING AND ABANDONMENT PROCEDURE

USEPA ID NUMBER N/A
IEPA ID NUMBER [illegible]
WELL NUMBER _____

Location in Application

_____ I. Description of Plugging Procedures, see instructions
_____ A. Abandonment during construction
_____ B. Abandonment after injection
_____ C. Type and quantity of plugging materials, depth intervals
_____ D. Detailed plugging and abandonment procedures
_____ E. Cost estimate for plugging and abandonment

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4h - WELL COMPLETION REPORT

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075971
WELL NUMBER _____

I. Type of Permit
Individual: _____
Emergency _____
New _____
Renewal _____
Permit Number _____
Area: _____
Number of well _____
Name of Field _____
Emergency _____
New _____
Renewal _____
Permit Number _____

Location in Application

_____ II. Location, see instructions
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ III. Surface Elevation
_____ IV. Well Depth
_____ V. Static Water Level
_____ VI. Demonstrated Fracturing Pressure, if applicable
_____ VII. Injection Well Completion
_____ 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. Coefficient of annular fluid
5. Packer(s)
   a. Setting depth
   b. Type
   c. Name and model
6. Description of fluid spotting frequency, type and quantity
7. Information on well driller used for construction of this well

X. Tests and Logs
- A. During Drilling
- B. During and after casing installation
- C. Demonstrate mechanical integrity prior to operation
- D. Copies of logs and tests listed above
- E. Description of well stimulation

XI. Well Design and Construction
- A. Casings, see instructions
  1. Conductive casing
  2. Surface casing
  3. Intermediate casing(s)
  4. Long string casing
  5. Other casing
- B. Injection Tubing, see instructions
  1. Maximum allowable suspended weight based on joint strength
  2. Weight of injection tubing string (axial load) in air
- C. Cement, see instructions
  1. Conductive casing
  2. Surface casing(s)
  3. Intermediate casing
  4. Long string casing
  5. Other casing

XII. Surface Facilities, see instructions
- A. Filters(s)
- B. Injection pump(s)

XIII. Hydrogeologic Information
- A. Revised UIC Form 4a
- B. Revised UIC Form 4d using actual data on injection formation
- C. Revised UIC Form 4g
- D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
- E. Copy of any plugging affidavits on injection well filed with Department of Natural Resources

XIV. Injection Fluid Compatibility, see instructions
- 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

XV. Monitoring Program, see instructions
A. Injection pressure gauge(s)
B. Casing-tubing annular pressure gauge(s)
C. Flow meter(s)
D. pH recording device(s)
E. Temperature

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

Attachment 2

Geologic Cross-Sections

Figures 5.2 and 11.2 of the Subject Submittal

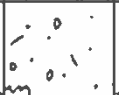
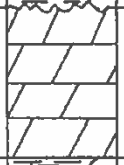
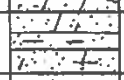
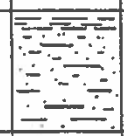
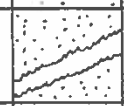
AQUIFER	SYSTEM	FORMATION OR GROUP	LOG	DESCRIPTION
Glacial or Unconsolidated	Quaternary			Unconsolidated glacial deposits. Commonly pebbly clay, but with silt, sand, and gravel. Some glacial deposits consist of very permeable bodies of sand and gravel.
Shallow Bedrock	Silurian			Dolomite, very pure to very silty. Upper part frequently creviced and broken. Lower part contains thin shale layers and tends to be silty.
	Ordovician	Maquoketa		Shale, gray or brown.
		Galena-Platteville		Dolomite, commonly creviced when not underlying the Maquoketa Shale. Some limestone layers and thin shale partings.
		Glenwood		Sandstone and dolomite, shale at the top.
Deep Sandstone		St. Peter		Sandstone, fine to medium texture, well sorted and poorly cemented. Exceptionally pure quartz sand.
		Prairie Du Chien		Interbedded dolomites and sandstones.
	Cambrian	Eminence-Potosi		Dolomite, white, fine-grained, but typically sandy at its base. (Lower unit known as St. Lawrence in Wisconsin.)
		Franconia		Sandstone, dolomitic with thin shale partings.
		Ironton-Galesville		Sandstone, coarse to fine-grained, well sorted. May be dolomitic in the upper part.
		Eau Claire		Shale and siltstone. Contains a sandy dolomite member in northeastern Illinois. Entire formation becomes essentially a fine-grained sandstone in Milwaukee.
		Mt. Simon		Sandstone, coarse-grained. Thickness estimated at 2,000 feet in Illinois.
	Precambrian			Crystalline rock, probably granite.

Figure 5.2 – Generalized Regional Geologic Section

5.2.1 Quaternary System

The unconsolidated deposits at the site that have not been removed through quarrying consist of the Henry Formation of the Mason Group on the west and the Yorkville

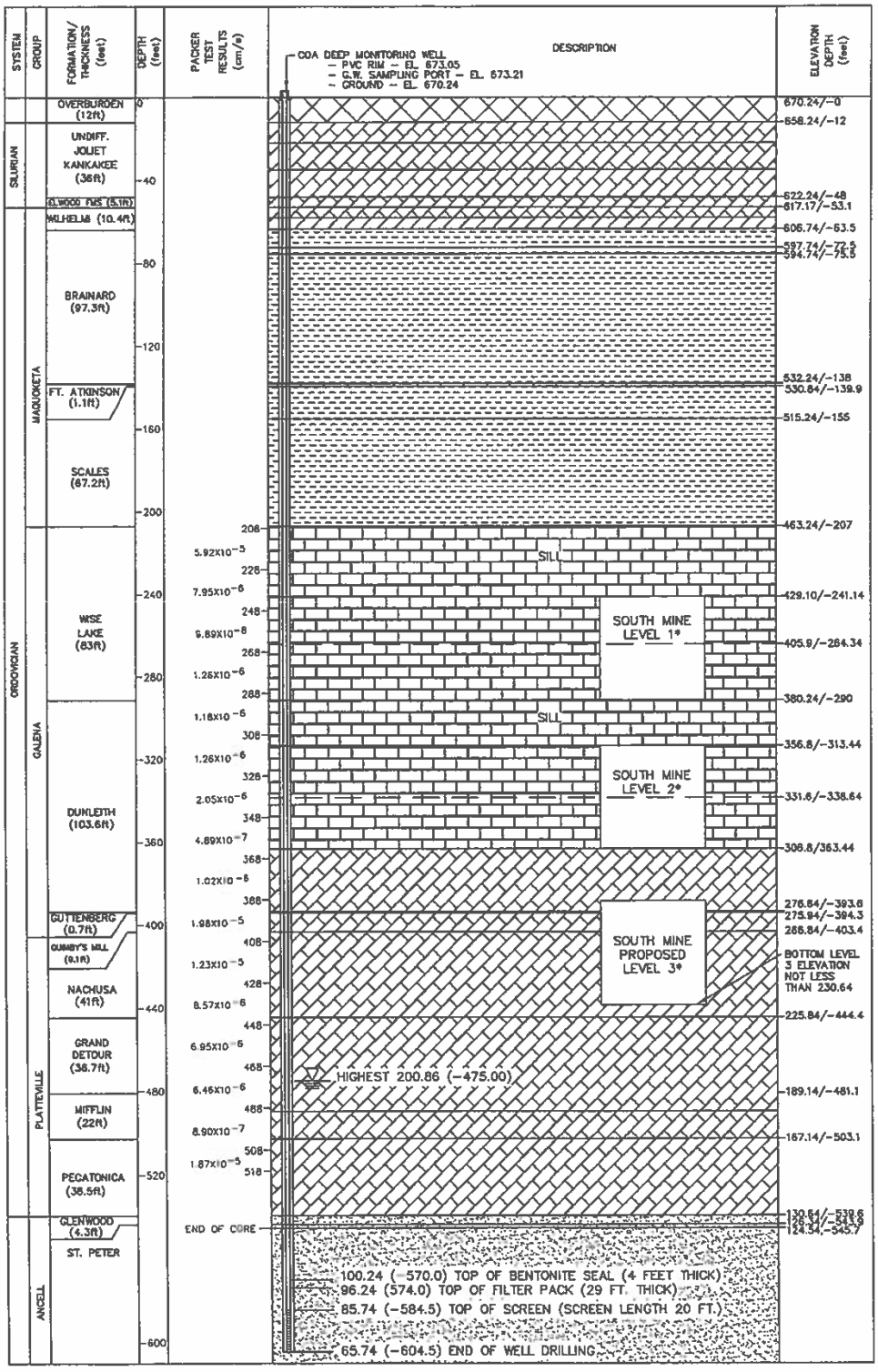
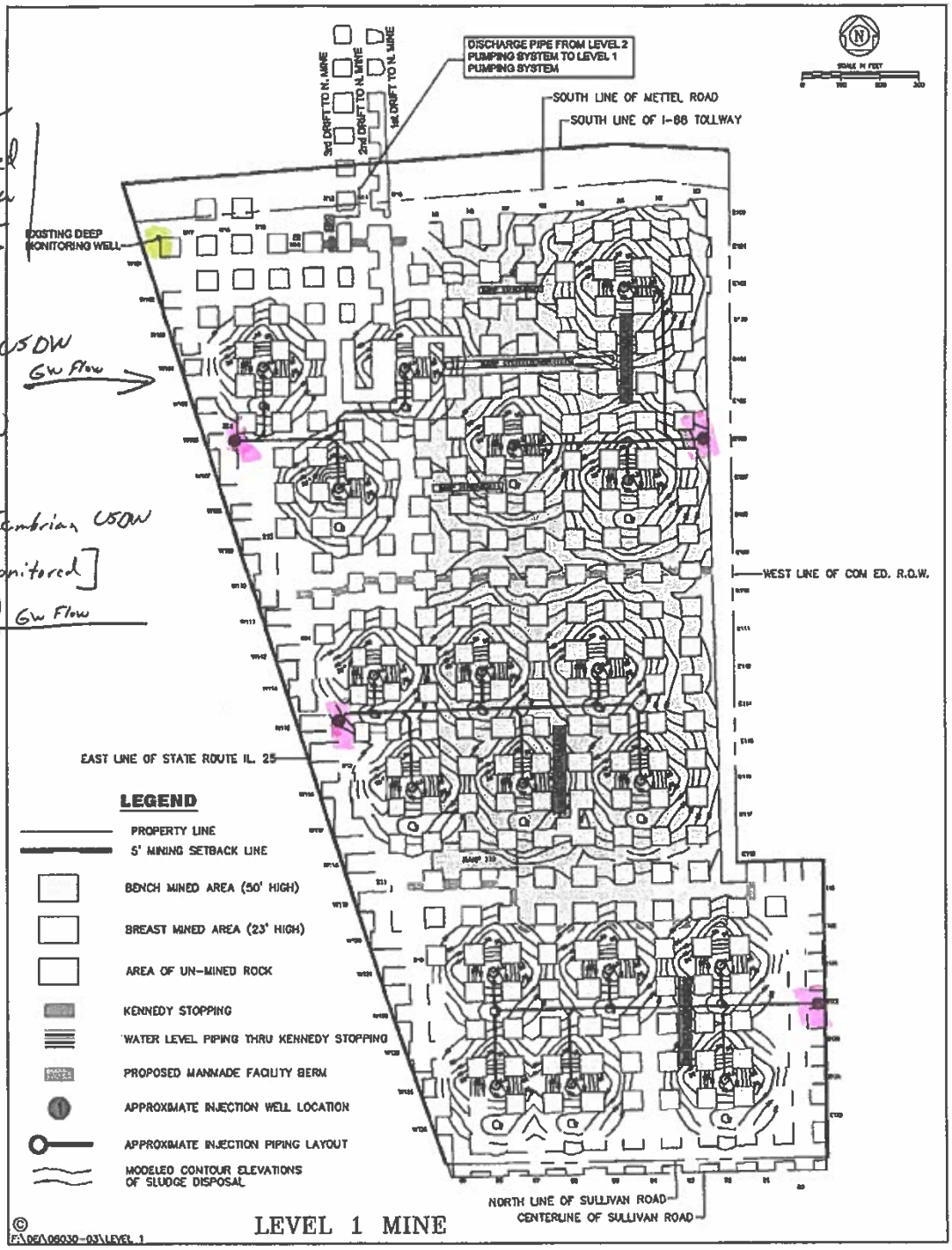


Figure 11.2 – Composite log and mine configuration with respect to geology

Attachment 3

Proposed Location of Injection Zone Monitoring Well

Figure ES-2 of Subject Submittal



Assumed based on regional data

Silurian USDW (Shallow) Gw Flow Cabore mine

Ordovician/Cambrian USDW (Deep) [monitored] (below mine) Gw Flow

Figure ES-2. Conco South Mine Level 1 Plan showing Injection Wells and Pipe Manifolds

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
PAT QUINN, GOVERNOR JOHN J. KIM, DIRECTOR

Memorandum

Date: March 20, 2013

To: Kevin Lesko

From: Scott Kaufman – Groundwater Unit

Subject: Underground Injection Control (UIC) Permit Application – Completeness Review

Re: 0894075971 -- Kane
City of Aurora
UIC/Adm. Record
Log No. UIC-147

A completeness review has been completed of the groundwater portions of the above referenced UIC Permit Application (Permit Application) submitted by Marc R. Fisher of Deuchler Environmental, Inc. The Permit Application is dated February 19, 2013 and was received by the Illinois EPA on February 26, 2013. Technical review of the groundwater portions of the Permit Application will be addressed in a forthcoming memorandum.

The Permit Application follows the outline of the Illinois Environmental Protection Agency Underground Injection Control Permit Application Checklist (Checklist), which consists of Forms 4a through 4h. A copy of checklist is provided as an attachment to this review memorandum.

The groundwater portions of the Permit Application consist of all of Form 4a, and portions of Forms 4c, 4d, and 4e. The Groundwater Unit has determined that, at this time, some groundwater portions of the Permit Application are incomplete as tabulated below.

Form	Location in Application	Deficiency
4a	IV.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.7	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.C.8	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.1	Explanation must be provided as to why this information is not applicable (N/A).

4a	IV.D.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.D.6	Explanation must be provided as to why this information is not applicable (N/A).
4a	IV.E	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.4	Explanation must be provided as to why this information is not applicable (N/A).
4a	V.C.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	VI.C.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	VI.C.5	Explanation must be provided as to why this information is not applicable (N/A).
4a	VII.A.2	Explanation must be provided as to why this information is not applicable (N/A).
4a	VII.A.3	Explanation must be provided as to why this information is not applicable (N/A).
4a	VII.A.6	Explanation must be provided as to why this information is not applicable (N/A).
4a	VIII	Explanation must be provided as to why this information is not applicable (N/A).
4a	VIII.A	Explanation must be provided as to why this information is not applicable (N/A).
4c	I.B.10	Explanation must be provided as to why this information is not applicable (N/A).
4d	V.C	Explanation must be provided as to why this information is not applicable (N/A).
4d	V.D	Explanation must be provided as to why this information is not applicable (N/A).

cc: Jim Moore w/attachment
Scott Kaufman w/ attachment

Completeness Review - 3/19/13

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4a - HYDROGEOLOGIC INFORMATION

USEPA ID NUMBER N/A
IEPA ID NUMBER 0859405971
WELL NUMBER

Complete?	Location in Application		
✓	12.3.1	I.	Elevation of Land Surface at Well Location
✓	2.5.1	II.	Faults, know or suspected within the area of review.
✓	5.3/App I	III.	Maps and cross sections as required by Section 730.114(a) or 730.134(a).
✓	5.0	IV.	Injection Zone
?	11.1/5.3.2	A.	Geologic name(s) of injection zone.
✓	11.1/Fig 11.2	B.	Depth interval of injection zone beneath land surface.
✓	5.0/11.0	C.	Characteristics of injection zone.
✓	5.4/App B	1.	Lithologic description
✓	12.3.1	2.	Injection zone thickness available to accept waste.
No	N/A	3.	Fracture pressure at top of injection zone, include source
No	N/A	4.	Effective porosity, include source
✓	12.5/5.5	5.	Intrinsic permeability, include source
✓	5.5	6.	Hydraulic conductivity or permeability, include source
No	N/A	7.	Storage coefficient, include source
No	N/A	8.	Seepage velocity (ft/yr) and flow direction of formation water, include source.
No	N/A	D.	Characteristics of injection zone formation water.
No	N/A	1.	Temperature, include source
No	N/A	2.	Pressure, include source
No	N/A	3.	Density, include source
No	N/A	4.	Viscosity, include source
No	N/A	5.	Total Dissolved Solids, include source
No	N/A	6.	Potentiometric surface, include source
No	N/A	E.	Additional or alternative zones considered for injection
✓	5.2.2	V.	Upper Confining Zone
✓	5.2.2/App B	A.	Geologic name(s) of confining zone
✓	App B	B.	Depth interval of upper confining zone beneath land surface.
✓	5.2.2/App B	C.	Characteristics of confining zone
✓	5.2.2/App B	1.	Lithologic description
No	N/A	2.	Fracture pressure at depth, include source
No	N/A	3.	Intrinsic permeability, include source
No	N/A	4.	Hydraulic conductivity, include source
No	N/A	5.	Alternative confining zones proposed, include explanation

and depth interval(s)

✓	5.2.3/5.2.4	VI.	Lower Confining Zone
✓	5.2.3/5.2.4	A.	Geologic name(s) of confining zone
✓	5.2.3/App I	B.	Depth interval of lower confining zone beneath land surface
✓	5.2.3/5.2.4	C.	Characteristics of confining zone
✓	5.2.3/5.2.4	1.	Lithologic description
✓	5.2.3/5.2.4	2.	Fracture pressure at depth, include source
No	NA	3.	Intrinsic permeability, include source
✓	5.5	4.	Hydraulic conductivity, include source
No	NA	5.	Alternative confining zones proposed, include explanation and depth interval(s)
✓	6.1/6.2	VII.	Overlying Sources of Groundwater at the Site
✓	6.1/6.2	A.	Characteristics of the aquifer immediately overlying the confining zone
✓	6.1/6.2	1.	Elevation at top of aquifer, include source
No	N/A	2.	Potentiometric surface, include source
No	N/A	3.	Total Dissolved Solids, include source
✓	5.2.1/5.2.2	4.	Lithology, include source
✓	6.1/6.2	5.	Aquifer thickness
No	N/A	6.	Specific gravity, include source
✓	6.0	B.	Underground Sources of Drinking Water (USDW)
✓	5.3/App I	1.	Maps and cross sections required by 730.114(a)(4) or 730.134(a)(4)
✓	6.3/6.4/App	2.	Lowest depth of USDW
✓	6.6	3.	Elevation of potentiometric surface of lowest USDW referenced to mean sea level
✓	Tables 2.1/3.1	4.	Distance to nearest water supply well
✓	Tables 2.1/3.1	5.	Distance to nearest down gradient water supply well
No	N/A	VIII.	Minerals and Hydrocarbons
No	N/A	A.	Mineral or natural resources beneath or within 5 miles of the site, include types and depth intervals

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4b - INJECTION WELL DESIGN, CONSTRUCTION TESTS and LOGS

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407597I
WELL NUMBER _____

Location in Application

_____ I. Well Depth
_____ II. Anticipated fracturing pressure
_____ III. Static Water level and type of fluid
_____ IV. Expected service life of well
_____ V. Injection well completion, see instructions
_____ VI. Schematic or other appropriate drawing of the surface and subsurface construction details of well
_____ VII. Well Design and Construction
_____ A. Well hole diameters and corresponding depth intervals
_____ B. Casing, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing(s)
_____ 4. Long string casing
_____ 5. Other casing
_____ C. Injection tubing, see instructions
_____ 1. Maximum allowable suspended weight based on joint strength of Injection tubing
_____ 2. Weight of injection tubing string (axial load) in air
_____ D. Cement, see instructions
_____ 1. Conductive casing
_____ 2. Surface casing
_____ 3. Intermediate casing
_____ 4. Long string casing
_____ 5. Other casing
_____ 6. Cementing techniques, equipment positions and staging depths
_____ 7. Perforation depths
_____ E. Annulus Protection System
_____ 1. Annular space(s), specify ID and OD
_____ 2. Type of annular fluid(s)
_____ 3. Specific gravity of annular fluid(s)
_____ 4. Type of additive(s) and Inhibitor(s)
_____ 5. Coefficient of annulus fluid(s)
_____ 6. Packer or fluid seal, see instructions
_____ a. Packer(s), see instructions

_____ b. Fluid spotting procedure, frequency and quantity

_____ VIII. Information on well drilling company used during construction, see instructions

_____ IX. Tests and Logs, see instructions

_____ A. During drilling

_____ B. During and after casing installation

_____ C. Demonstration of mechanical integrity

_____ D. Copies of the logs and tests listed above

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Name & Official Title Phone Number

_____ _____

Signature Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4c - OPERATION PROGRAM AND SURFACE FACILITIES

USEPA ID NUMBER N/A
IEPA ID NUMBER 0897407591
WELL NUMBER _____

complete? Location in Application

_____ I. Operation Program
_____ A. Area Injection Project (if applicable)
_____ 1. Maximum fluid to be injected per day
_____ 2. Years remaining in area injection project
_____ 3. Anticipated total number of injection wells required
_____ 4. Injection wells operate with/without common manifold
✓ 5.4/Attp B 5. Number of injection zone monitoring wells, include list and schematics
_____ 6. Number of, name and location of injection wells currently in project, see instructions
_____ B. Single Injection Well (if area permit is applied for, provide for typical well)
_____ 1. Number or name of well
_____ 2. Location, see instructions
_____ 3. Expected service life
_____ 4. Operation during 24 hour period
_____ 5. Operation days per month
_____ 6. Injection pressure, average and maximum
_____ 7. Injection rate, average and maximum
_____ 8. Casing-tubing annulus pressure, average and maximum
_____ a. During operation, average and maximum
_____ 9. Other annulus pressure
NS N/A 10. Number of injection zone monitoring wells, include schematics

_____ II. Surface Facilities
_____ A. Injection fluid storage
_____ 1. Storage capacity in days and gallons
_____ 2. Type of storage facility(s)
_____ 3. Storage capacity in case of well failure, describe
_____ B. Holding tanks and flow lines, describe
_____ C. Process and Instrumentation Diagram attachment

D. Filter(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute
6. Pore size, microns

E. Injection Pump(s)
1. Location
2. Type
3. Name
4. Model Number
5. Capacity, gallons per minute

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4d - AREA OF REVIEW

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407591
WELL NUMBER _____

Complete?	Location in Application		
✓	2.0	I.	Radius of the Area of Review
✓	2.4	II.	Method of Radius determination, see instructions
	_____	III.	Map with information required by Section 730.114(a)(2) or 730.134(a)(2)
	_____	IV.	Description of Anticipated Injection Fluid Movement During the Life of the Project, see instructions
✓	2.5.2	V.	Wells Within the Area of Review
✓	Table 2.1	A.	Tabulation of well data required by 730.114(a)(3) or 730.134(a)(3)
✓	2.5.2	B.	Number of wells within 2 ½ miles of injection well penetrating within 300 feet of the uppermost injection zone which are:
✓	2.5.2		1. Properly plugged and abandoned
✓	2.5.2		2. Temporarily abandoned
✓	2.5.2		3. Operating
✓	2.5.2		4. Improperly sealed, completed or abandoned
No	N/A	C.	Plugging affidavits for all plugged wells
No	N/A	D.	Proposed corrective action for unplugged wells penetrating the injection zone

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Name & Official Title

_____ Phone Number

_____ Signature

_____ Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4e - MONITORING, INTEGRITY TESTING and CONTINGENCY PLAN

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407597I
WELL NUMBER _____

Complete?

Location in Application

_____ I. Waste Sampling and Analysis
_____ A. Sampling frequency
_____ B. Analysis parameters
_____ C. Sampling location
_____ D. Detailed waste analysis plan
_____ II. Monitoring Program
_____ A. Recording devices, see instructions
_____ 1. Injection pressure gauges
_____ 2. Casing-tubing annulus pressure gauges
_____ 3. Flow meters
_____ 4. pH recording devices
_____ 5. Temperature
✓ 16.3/16.4 B. USDW Monitoring in Area of Review
✓ 16.3/16.4 1. Number of wells
✓ 16.3/16.4 2. Type of wells
✓ 16.3/16.4 3. Frequency of monitoring
✓ 16.3/16.4 4. Type of sample
✓ 16.3/16.4 5. Parameters
✓ Fig 4-C, App B 6. Map of well location and logs
✓ 16.3/16.4 C. Detailed Groundwater Monitoring Plan
_____ III. Mechanical Integrity Tests During Service Life of Well, see instructions
_____ IV. Contingency Plan for Well Failure or Shut In, see instructions
_____ A. Detailed contingency plan

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4f - CHARACTERISTICS, COMPATIBILITY and PRE-INJECTION TREATMENT of INJECTION FLUID

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075971
WELL NUMBER _____

Location in Application

_____ I. Component Streams Forming Injection Fluid
_____ II. Source and Generation Rate of Component Streams
_____ III. Volume of Injection Fluid Generated Daily and Annually
_____ IV. Physical and Chemical Characteristics of Injection Fluid, see instructions
_____ A. Generic waste/Fluid name
_____ B. Fluid phase
_____ C. Complete waste analysis
_____ D. Flash point
_____ E. Organics
_____ F. TDS
_____ G. pH
_____ H. Temperature
_____ I. Density
_____ J. Specific gravity
_____ K. Compressibility
_____ L. Micro organisms
_____ M. Chemical persistence
_____ N. Key component name(s)
_____ V. Injection Fluid Compatibility
_____ A. Compatibility with injection zone
_____ B. Compatibility with minerals in the injection zone
_____ C. Compatibility with minerals in the 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 tanks(s) and flow lines
_____ E. Compatibility with filter and filter components
_____ F. Full description of compatibility concerns
_____ VI. Pre-Injection Fluid Treatment, see instructions

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title

Phone Number

Signature

Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4g - PLUGGING AND ABANDONMENT PROCEDURE

USEPA ID NUMBER N/A
IEPA ID NUMBER 089407 5971
WELL NUMBER _____

Location in Application

_____ I. Description of Plugging Procedures, see instructions
_____ A. Abandonment during construction
_____ B. Abandonment after injection
_____ C. Type and quantity of plugging materials, depth intervals
_____ D. Detailed plugging and abandonment procedures
_____ E. Cost estimate for plugging and abandonment

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____
Name & Official Title Phone Number

_____ _____
Signature Date Signed

DRAFT UIC PERMIT FORMS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

FORM 4h - WELL COMPLETION REPORT

USEPA ID NUMBER N/A
IEPA ID NUMBER 0894075971
WELL NUMBER _____

I. Type of Permit
Individual: _____
Emergency _____
New _____
Renewal _____
Permit Number _____
Area: _____
Number of well _____
Name of Field _____
Emergency _____
New _____
Renewal _____
Permit Number _____

Location in Application

_____ II. Location, see instructions
_____ A. Township-Range-Section
_____ B. Latitude/Longitude
_____ C. Closest Municipality
_____ III. Surface Elevation
_____ IV. Well Depth
_____ V. Static Water Level
_____ VI. Demonstrated Fracturing Pressure, if applicable
_____ VII. Injection Well Completion
_____ 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. Coefficient of annular fluid
5. Packer(s)
   a. Setting depth
   b. Type
   c. Name and model
6. Description of fluid spotting frequency, type and quantity
7. Information on well driller used for construction of this well

X. Tests and Logs
- A. During Drilling
- B. During and after casing installation
- C. Demonstrate mechanical integrity prior to operation
- D. Copies of logs and tests listed above
- E. Description of well stimulation

XI. Well Design and Construction
- A. Casings, see instructions
  1. Conductive casing
  2. Surface casing
  3. Intermediate casing(s)
  4. Long string casing
  5. Other casing
- B. Injection Tubing, see instructions
  1. Maximum allowable suspended weight based on joint strength
  2. Weight of injection tubing string (axial load) in air
- C. Cement, see instructions
  1. Conductive casing
  2. Surface casing(s)
  3. Intermediate casing
  4. Long string casing
  5. Other casing

XII. Surface Facilities, see instructions
- A. Filters(s)
- B. Injection pump(s)

XIII. Hydrogeologic Information
- A. Revised UIC Form 4a
- B. Revised UIC Form 4d using actual data on injection formation
- C. Revised UIC Form 4g
- D. Copy of well completion report submitted to the Department of Natural Resources (Formerly Mines and Minerals)
- E. Copy of any plugging affidavits on injection well filed with Department of Natural Resources

XIV. Injection Fluid Compatibility, see instructions
- 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

XV. Monitoring Program, see instructions
A. Injection pressure gauge(s)
B. Casing-tubing annular pressure gauge(s)
C. Flow meter(s)
D. pH recording device(s)
E. Temperature

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title _____ Phone Number _____

Signature _____ Date Signed _____

CROPA

CROPA

Huser, Kelly

From: Cook, David
Sent: Thursday, May 15, 2014 11:12 AM
To: Huser, Kelly
Subject: RE: Scan from a Xerox WorkCentre

I spoke with Marc Fisher. He said that the City of Aurora is planning to apply for a DPWS construction permit for the work at the water treatment plant. A DPWS construction permit is required for the discharge from the claricones to the new wetwell. DPWS won't be reviewing for any forcemain work offsite.

The CROPA form will be sent back through inter-office mail after DPWS/Groundwater reviews it. Thanks.

David Cook, DPWS
2-0078

-----Original Message-----
From: Huser, Kelly
Sent: Thursday, May 15, 2014 8:22 AM
To: Cook, David
Subject: FW: Scan from a Xerox WorkCentre

David, attached is a copy of the CROPA we sent to you last year. The consultant for City of Aurora is Marc Fisher, Deuchler Environmental, Inc., 630-423-0482. My concern is with the proposed pump station that will be built on the side of Lagoon No. 2. Do they need to modify any permits they have at the water treatment plant to include this pump station. They state that in the event the pump station is not operational they will send the lime sludge to the dewatering lagoons. If you have any questions, please call the consultant or myself.

Thanks,

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax
• Please consider the environment before printing this e-mail

-----Original Message-----
From: WorkCentre 5335 [mailto:noreply@illinois.gov]
Sent: Thursday, May 15, 2014 8:12 AM
To: Huser, Kelly

Subject: Scan from a Xerox WorkCentre

Please open the attached document. It was scanned and sent to you using a Xerox WorkCentre.

Number of Images: 1
Attachment File Type: PDF

Device Name: WorkCentre 5335
Device Location:

For more information on Xerox products and solutions, please visit http://www.xerox.com/

Huser, Kelly

Subject:	DEI Conference Call
Location:	EPA.Land.Hickory.Conference
Start:	Thu 5/15/2014 1:00 PM
End:	Thu 5/15/2014 3:00 PM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Huser, Kelly
Resources:	EPA.Land.Hickory.Conference

888-494-4032
Access Code: 5646203698
Password: 974772

Huser, Kelly

From: LeCrone, Darin
Sent: Tuesday, December 02, 2014 9:12 AM
To: Cook, David; Huser, Kelly
Subject: RE: City of Aurora Class V UIC Permit

Yeah, I would probably refer to DWPC and DPWS. Other than that, it looks fine to me.

Darin E. LeCrone, P.E.
Manager, Industrial Unit
Division of Water Pollution Control
Illinois Environmental Protection Agency

217/782-0610

From: Cook, David
Sent: Tuesday, December 02, 2014 8:58 AM
To: Huser, Kelly; LeCrone, Darin
Subject: RE: City of Aurora Class V UIC Permit

Since there two permit requirements for BOW, you might want to add DPWS to the note below.

From: Huser, Kelly
Sent: Tuesday, December 02, 2014 8:50 AM
To: LeCrone, Darin; Cook, David
Subject: City of Aurora Class V UIC Permit

Darin and David, below is my proposed language for the City of Aurora Class V UIC permit. As you recall in your CROPRAs for this site you both state they would need to get a permit through the BOW and DPWS. They are injecting lime sludge from the Water Treatment Plant into an underground cavern. Is the proposed language in my permit ok with both of you?

"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 Division of Public Water Supplies, Illinois EPA Bureau of Air, Illinois Department of Natural Resources or other federal, state, or local agencies."

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
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Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax

Huser, Kelly

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Sent: Tuesday, December 02, 2014 8:58 AM
To: Huser, Kelly; LeCrone, Darin
Subject: RE: City of Aurora Class V UIC Permit

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Sent: Tuesday, December 02, 2014 8:50 AM
To: LeCrone, Darin; Cook, David
Subject: City of Aurora Class V UIC Permit

Darin and David, below is my proposed language for the City of Aurora Class V UIC permit. As you recall in your CROPRAs for this site you both state they would need to get a permit through the BOW and DPWS. They are injecting lime sludge from the Water Treatment Plant into an underground cavern. Is the proposed language in my permit ok with both of you?

"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 Division of Public Water Supplies, Illinois EPA Bureau of Air, Illinois Department of Natural Resources or other federal, state, or local agencies."

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
217/524-3291 Fax

Please consider the environment before printing this e-mail

13-005 Log-out 3-20-13 cbs

CROPA form (Coordinated Review of Permit Application)

REQUEST MEMORANDUM

Date: March 12, 2013 Please return to Kevin Lesko, DLPC/BOL/RCRA

To: BOW – Al Keller, Permit Section: BOW /DWPC #15
PWS – Jerry Kuhn, PWS - #13
BOA – Don Sutton, BOA/DAPC #11

From: Steve Nightingale, BOL/RCRA, Permit Section, DLPC

SUBJECT: Notice of Land Project for Coordinated Permit Review Consideration

City of Aurora (Intersection of Rt. 25 and Mettle Road.), Site Name — Aurora, Site City

Land Division received a permit application on February 26, 2013 for the project identified below. It is a significant land project as defined by CROPA Rules. Please review the project description and attached documents for significance with respect to your division and respond as soon as practicable. DLPC has until April 30, 2013 to make our permit decision.

Project: **The City of Aurora submitted a Class V Underground Injection Control permit application to construct four (4) injection wells. These injection wells will be used to disposal of non-hazardous lime sludge generated at the Aurora Community Water Supply (CWS) plant. Lime sludge slurry will be pumped via an eight inch forcemain to a city owned site located approximately 3500 feet north of the CWS treatment plant. The slurry will then be injected into a subterranean limestone and dolomite mine located at a depth of approximately 250 feet bgs. It is estimated that the mine has the capacity to accept lime sludge generated by the city for a period of 48 to 59 years..**

Comments: _____.

If you need further information about this application, please contact Kevin Lesko (assigned reviewer) at phone no. 217/524-3271.

5-14-13 Log-out cbs

RESPONSE MEMORANDUM

DATE: 5/30/14
TO: Kelly Huser LPC, Permit Section, DLPC
FROM: David Cook, DPWS, Permit Section _____
SUBJECT: Determination of CROPA Significance with Respect to APC/PWS/WPC
Division of PWS has reviewed the subject application and has determined that:

Circle below as appropriate.

(1) Project: Is significant / Is not significant
(2) Project involves: Emissions to atmosphere / Discharge to sewer, waterway / Public water supply
(3) A permit: Is needed / Has been issued / Is not required

Please coordinate future discussions about this project with:
David Cook Phone 2-0078

Comments: I SPOKE WITH MARC FISHER. AURORA WILL APPLY FOR A DPWS CONSTRUCTION PERMIT FOR THE IMPROVEMENTS TO THE WATER TREATMENT PLANT PROPERTY

cbs Recd 5-14-13 · 6-3-14

SFN:cbs\CropaMemo-Aurora.docx

Cook, David

From: Cook, David
Sent: Thursday, May 15, 2014 11:12 AM
To: Huser, Kelly
Subject: RE: Scan from a Xerox WorkCentre

I spoke with Marc Fisher. He said that the City of Aurora is planning to apply for a DPWS construction permit for the work at the water treatment plant. A DPWS construction permit is required for the discharge from the claricones to the new wetwell. DPWS won't be reviewing for any forcemain work offsite.

The CROPA form will be sent back through inter-office mail after DPWS/Groundwater reviews it. Thanks.

David Cook, DPWS
2-0078

-----Original Message-----
From: Huser, Kelly
Sent: Thursday, May 15, 2014 8:22 AM
To: Cook, David
Subject: FW: Scan from a Xerox WorkCentre

David, attached is a copy of the CROPA we sent to you last year. The consultant for City of Aurora is Marc Fisher, Deuchler Environmental, Inc., 630-423-0482. My concern is with the proposed pump station that will be built on the side of Lagoon No. 2. Do they need to modify any permits they have at the water treatment plant to include this pump station. They state that in the event the pump station is not operational they will send the lime sludge to the dewatering lagoons. If you have any questions, please call the consultant or myself.

Thanks,

Kelly D. Huser
Environmental Protection Engineer
Permit Section, Bureau of Land
Mail Code #33
1021 N. Grand Ave. East
P.O. Box 19276
Springfield, IL. 62794-9276
217/524-3867
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-----Original Message-----
From: WorkCentre 5335 [mailto:noreply@illinois.gov]
Sent: Thursday, May 15, 2014 8:12 AM

To: Huser, Kelly
Subject: Scan from a Xerox WorkCentre

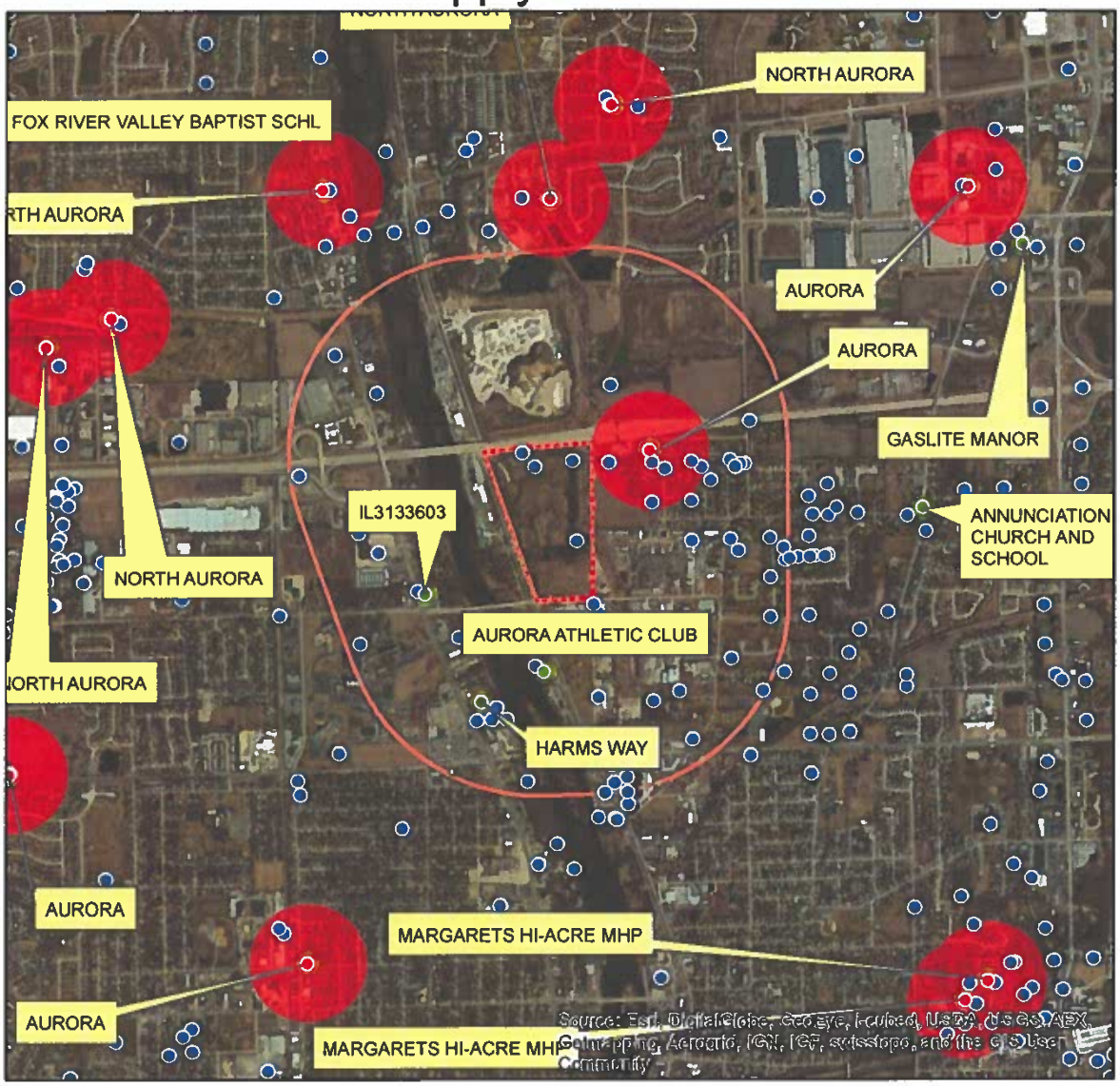
Please open the attached document. It was scanned and sent to you using a Xerox WorkCentre.

Number of Images: 1
Attachment File Type: PDF

Device Name: WorkCentre 5335
Device Location:

For more information on Xerox products and solutions, please visit http://www.xerox.com/

Potable Water Supply Wells near Aurora WTP



0 0.25 0.5 0.75 1 2 Miles

Legend

- CWS Wells
- NonCWS Wells
- ISGS Database Wells
- Non-CWS Well Minimum Setback Zone
- CWS Well Minimum Setback Zone
- CWS Well Maximum Setback Zone
- Aurora WTP Boundary
- 1000m Radius

N

Community and Non-Community wells from IEPA
ISGS wells obtained from ISGS database -
the status and location of these wells
have not been field verified

13-005 log-out 3-20-13 cbs

CROPA form (Coordinated Review of Permit Application)

REQUEST MEMORANDUM

KL

Date:	March 12, 2013	Please return to	**Kevin Lesko, DLPC/BOL/RCRA**	
To:	BOW – Al Keller,	Permit Section:	BOW /DWPC	# 15
	PWS – Jerry Kuhn,		PWS -	# 13
	BOA – Don Sutton,		BOA/DAPC	# 11
From:	Steve Nightingale, BOL/RCRA,	Permit Section, DLPC		

SUBJECT: Notice of Land Project for Coordinated Permit Review Consideration

City of Aurora (Intersection of Rt. 25 and Mettle Road.), Site Name — **Aurora** Site City

Land Division received a permit application on **February 26, 2013** for the project identified below. It is a significant land project as defined by CROPA Rules. Please review the project description and attached documents for significance with respect to your division and respond as soon as practicable. DLPC has until **April 30, 2013** to make our permit decision.

Project: **The City of Aurora submitted a Class V Underground Injection Control permit application to construct four (4) injection wells. These injection wells will be used to disposal of non-hazardous lime sludge generated at the Aurora Community Water Supply (CWS) plant. Lime sludge slurry will be pumped via an eight inch forcemain to a city owned site located approximately 3500 feet north of the CWS treatment plant. The slurry will then be injected into a subterranean limestone and dolomite mine located at a depth of approximately 250 feet bgs. It is estimated that the mine has the capacity to accept lime sludge generated by the city for a period of 48 to 59 years.** For information about the facility call Marc Fisher, Deuchler Env. Inc. 630-897-8380

Comments: Based on conversations, it appears they are discharging to the sanitary sewer.

If you need further information about this application, please contact ~~**Kevin Lesko**~~ Kelly Huser (assigned reviewer) at phone no. ~~**217/524-3271**~~ 524-3867

Recd 2-18-14 log-out cbs

RESPONSE MEMORANDUM

DATE: 2/11/14

TO: Kelly Huser, **Permit Section, DLPC**

FROM: Darin LeCrone, Permit Section DWPC

SUBJECT: Determination of CROPA Significance with Respect to APC/PWS/WPC

Division of DWPC has reviewed the subject application and has determined that:

Circle below as appropriate.

(1)	Project:	Is significant	Is not significant	
(2)	Project involves:	Emissions to atmosphere		
		Discharge to sewer, waterway		
		Public water supply		
(3)	A permit:	Is needed	Has been issued	Is not required

Please coordinate future discussions about this project with: Darin LeCrone Phone 2-3292

Comments: Spoke to Consultant. Will involve discharge to sewer. They are aware of the permit requirement and will apply for sewer connection permit at the appropriate time. May need permit or modification from IDNR - Mines & Minerals.

SFN:cbs\CropaMemo-Aurora.docx

-13-005 log-out 3-20-13 cbs

CROPA form (Coordinated Review of Permit Application)

REQUEST MEMORANDUM

Date: March 12, 2013 Please return to **Kevin Lesko, DLPC/BOL/RCRA**

To: BOW – Al Keller, Permit Section: BOW /DWPC #15 ✓
PWS – Jerry Kuhn, PWS - #13
BOA – Don Sutton, BOA/DAPC #11

From: Steve Nightingale, BOL/RCRA, Permit Section, DLPC

SUBJECT: Notice of Land Project for Coordinated Permit Review Consideration

City of Aurora (Intersection of Rt. 25 and Mettle Road.), **Aurora**
Site Name Site City

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Comments: _____.

If you need further information about this application, please contact **Kevin Lesko** (assigned reviewer) at phone no. **217/524-3271**.

RESPONSE MEMORANDUM

DATE: _____
TO: _____, **Permit Section, DLPC**
FROM: _____, Permit Section _____
SUBJECT: Determination of CROPA Significance with Respect to APC/PWS/WPC
Division of _____ has reviewed the subject application and has determined that:

Circle below as appropriate.

(1) Project: Is significant Is not significant
(2) Project involves: Emissions to atmosphere
Discharge to sewer, waterway
Public water supply
(3) A permit: Is needed Has been issued Is not required

Please coordinate future discussions about this project with:
_____ Phone _____

Comments: _____

SFN:cbs\CropaMemo-Aurora.docx

13-005 log-out 3-20-13 cbs

CROPA form (Coordinated Review of Permit Application)

REQUEST MEMORANDUM

Date: March 12, 2013 Please return to **Kevin Lesko, DLPC/BOL/RCRA**

To: BOW – Al Keller, Permit Section: BOW /DWPC #15
PWS – Jerry Kuhn, PWS - #13
BOA – Don Sutton, BOA/DAPC #11

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SUBJECT: Notice of Land Project for Coordinated Permit Review Consideration

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Comments: _____.

If you need further information about this application, please contact **Kevin Lesko** (assigned reviewer) at phone no. **217/524-3271**.

5-14-13 log-out cbs

RESPONSE MEMORANDUM

DATE: MAY 6, 2013
TO: KEVIN LESKO, DLPC, **Permit Section, DLPC**
FROM: DAVID COOK, DPWS, Permit Section _____
SUBJECT: Determination of CROPA Significance with Respect to APC/PWS/WPC
Division of PWS has reviewed the subject application and has determined that:

Circle below as appropriate.

(1) Project: Is significant (Is not significant)
(2) Project involves: Emissions to atmosphere
Discharge to sewer, waterway
Public water supply
(3) A permit: Is needed Has been issued (Is not required)

Please coordinate future discussions about this project with:
DAVID COOK Phone 2-0078

Comments: _____

CBS Rec'd 5-14-13

SFN:cbs\CropaMemo-Aurora.docx

13-005 log-out 3-20-13 cbs HPC In 3-21-13 Mt 3-22-13 km

CROPA form (Coordinated Review of Permit Application)

REQUEST MEMORANDUM

Date: March 12, 2013 Please return to Kevin Lesko, DLPC/BOL/RCRA

To: BOW – Al Keller, Permit Section: BOW /DWPC # 15
PWS – Jerry Kuhn, PWS - # 13
BOA ~~Don Sutton~~, Ed Bakowski BOA/DAPC # 11 ✓

From: Steve Nightingale, BOL/RCRA, Permit Section, DLPC

SUBJECT: Notice of Land Project for Coordinated Permit Review Consideration

City of Aurora (Intersection of Rt. 25 and Mettle Road.), **Aurora**
Site Name Site City

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Comments: _____.

If you need further information about this application, please contact **Kevin Lesko** (assigned reviewer) at phone no. **217/524-3271**.

3-29-13 log-in cbs

RESPONSE MEMORANDUM

DATE: 3/22/2013
TO: ~~Ed Bakowski~~ Kevin Lesko BOL **Permit Section, DLPC**
FROM: Ed Bakowski, BOA Permit Section DAPC
SUBJECT: Determination of CROPA Significance with Respect to APC/PWS/WPC
Division of Air Pollution Control has reviewed the subject application and has determined that:

Circle below as appropriate.

(1) Project: Is significant ~~Is not significant~~
(2) Project involves: (No) Emissions to atmosphere
Discharge to sewer, waterway
Public water supply
(3) A permit: Is needed Has been issued (Is not required)

Please coordinate future discussions about this project with:
Bob Bernoteit Phone 524-0865

Comments: _____

SFN:cbs\CropaMemo-Aurora.docx