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January 3, 2014

FG-02-LET-0022

Jeffrey R. McDonald, Geologist
Underground Injection Control Branch
U.S. EPA – Region 5
77 West Jackson Boulevard
Mail Code: WU-16J
Chicago, IL 60604-3507

Dear Jeff:

**DOE AWARD NO: DE-FE0001882, Project 60549, ARRA Technical Support to
FutureGen Industrial Alliance, Request for Additional Information #4**

Please find attached our response to your email request for additional information (RAI 4) dated December 23, 2013 on the FutureGen Alliance's UIC permit application.

Please call if you have any questions.

Sincerely,

Tyler Gilmore
Battelle Manager FutureGen Storage Site
Pacific Northwest National Laboratory

TG/dmt
Attachment

cc: Ken Humphreys, CEO, FutureGen Alliance, Inc.
Lucinda Swartz, COO, FutureGen Alliance, Inc.

File

12-20-2013: Email from Jeff McDonald (U.S. EPA Region 5) to Tyler Gilmore (Alliance): "FGA FR and other requests: 12-20-2013"

Requests based on the text application

RAI #	Subject	Page	Doc. Sec.	Par.	EPA Comment / Question / Request	FutureGen Response	Footnote / Reference Citation
12-20-2013_001	References				"The Final EIS referenced document "Battelle. 2011a. Environmental Information Volume Biological Resources Section. Prepared for FutureGen Alliance. October 2011." Please provide a copy of this document. Submission of the document in electronic format is acceptable and encouraged."	<p>The referenced document in the Final EIS is provided in the data package transmitted to EPA via MassTransit© with this response. The corresponding folder name in the transmitted data package is 12-20-2013_001-EIV_Biological_Res_Section.</p> <p>Please note that the Environmental Information Volume "Biological Resources Section" includes Appendices A, B, and C in the master file (<i>FutureGen--Biological Resources EIV_October_2011.pdf</i>). Appendices D and E are provided separately.</p>	
12-20-2013_002	References				"Please provide a copy of all references cited in the application. Please also provide a copy of all references cited in the responses to EPA requests for additional information. Submission of the documents in electronic format is acceptable and encouraged."	<p>1) References cited in the Supporting Documentation of the UIC Permit Application</p> <p>Appendix A is a compilation of the reference lists from each chapter of the FutureGen 2.0 UIC permit application. At EPA's request, copies of referenced material are being provided if the documents are not copyright protected. Copies of federal and state regulations are not included. Blue highlighted text indicates documents provided to EPA via MassTransit© with this response, in the folder 12-20-2013_002-UIC_Permit_References. If the documents are copyright protected, hyperlinks are provided whenever possible to websites where the document can be read or where it can be purchased. There are a few instances where documents are copyright protected and exist only in hard copy form, and those are noted as such.</p> <p>2) References in the Request for Additional Information #1 (10-31-2013)</p> <p>a. The references related to the Seismic Reflection Survey and Vertical Seismic Profiling Data (RAI# 10-31-2013_001) are not published and cannot be released. However, the FutureGen Industrial Alliance, Inc. (Alliance) is open to any discussion with EPA related to this topic.</p> <p>b. In the response to RAI 10-31-2013_004 (Horizontal Components of Stress), both references are copyrighted material (limited information regarding these references is available in Appendix B).</p> <p>3) References in the Request for Additional Information #2 (11-14-2013)</p> <p>a. References related to the Capillary Pressure and Saturation Functions (11-14-2013_005)</p> <p>Data from the Manlove field used to generate Brooks-Corey parameters cannot be provided by the Alliance to the EPA. The Alliance suggests that the EPA request the data from ISGS (Sallie Greenberg or Scott Frailey might be good contacts).</p> <p>b. References for other responses</p> <p>Appendix B is a compilation of the reference lists from the responses to the EPA's RAIs (10-31-2013 and 11-14-2013). The documents used for the responses to the EPA's RAIs are all copyright protected and cannot be provided to the EPA. Hyperlinks are included whenever possible to websites where the document can be read or where it can be purchased. There are a few instances where documents are copyright protected and exist only in hard copy form, and those are noted as such.</p>	

12-20-2013: Email from Jeff McDonald (U.S. EPA Region 5) to Tyler Gilmore (Alliance): "FGA FR and other requests: 12-20-2013"

Requests based on the text application

RAI #	Subject	Page	Doc. Sec.	Par.	EPA Comment / Question / Request	FutureGen Response	Footnote / Reference Citation
12-20-2013_003	Construction Procedures and Plugging and Abandonment Plans for the Monitoring Wells				"Please submit individual construction procedures and plugging and abandonment plans for each of the five monitoring wells that include the third-party cost estimates for each well. We saw cost estimates on pages C-11 and C-12 of the application. If these were developed from a third party, we'd like to see what they submitted for you to generate those tables."	Construction procedures and plugging abandonment plans are provided in Appendix C . A discussion and location map of the updated and revised monitoring well network is also provided in Appendix C , along with cost estimate information.	

Appendix A

RAI 12-20-2013_002

Additional Information Regarding

References used in the Supporting Documentation of the UIC Permit Applications

This is a compilation of the reference lists from each chapter of the Supporting Documentation of the UIC permit applications. At EPA's request, copies of referenced material are being provided if the documents are not copyright protected. Copies of federal and state regulations are not included. Blue highlighted text indicates documents provided via MassTransit© with this response. If the documents are copyright protected, hyperlinks are provided whenever possible to websites where the document can be read or where it can be purchased. There are a few instances where documents are copyright protected and exist only in hard copy form, and those are noted as such.

1. Chapter 1 References

40 CFR 144. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 144 "Underground Injection Control Program," Section 31, "Application for a Permit; Authorization by Permit." Available online at <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=774ab822b9c130b9e2f051b076114d7a&ty=HTML&h=L&r=PART&n=40y24.0.1.1.6>.

40 CFR 146. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 146, "Underground Injection Control Program: Criteria and Standards." Available online at <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=774ab822b9c130b9e2f051b076114d7a&ty=HTML&h=L&r=PART&n=40y24.0.1.1.8>.

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76 FR 29728. May 23, 2011. "Notice of Intent to Prepare an Environmental Impact Statement and Notice of Potential Floodplain and Wetlands Involvement for the FutureGen 2.0 Program." *Federal Register*. U.S. Department of Energy. Available online at <http://www.gpo.gov/fdsys/pkg/FR-2011-05-23/pdf/2011-12632.pdf>.

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National Environmental Policy Act of 1969, as amended (NEPA). 42 U.S.C. 4321 et seq. Available online at <http://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/pdf/USCODE-2011-title42-chap55.pdf>.

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2. Chapter 2 References

40 CFR 144. Code of Federal Regulations, Title 40, *Protection of the Environment*, Part 144 “Underground Injection Control Program,” Section 31, “Application for a Permit; Authorization by Permit.” Available online at <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=774ab822b9c130b9e2f051b076114d7a&ty=HTML&h=L&r=PART&n=40y24.0.1.1.6>.

40 CFR 146. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 146, “Underground Injection Control Program: Criteria and Standards.” Available online at <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=774ab822b9c130b9e2f051b076114d7a&ty=HTML&h=L&r=PART&n=40y24.0.1.1.8>.

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Appendix B

RAI 12-20-2013_002

Additional Information Regarding

References used in the Responses to EPA Requests for Additional Information

(RAI# 10-31-2013 & RAI# 11-14-2013)

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Appendix C

RAI 12-20-2013_003

Additional Information Regarding

Construction Procedures and Plugging and Abandonment Plans for the Monitoring Wells

Plugging and Abandonment of Monitoring Wells

The monitoring well network (Figure 1) has been updated in accordance with discussion in the UIC application supporting documentation.

Chapter 5 UIC Supporting Documentation section 5.1, p. 5.2: The monitoring network design was developed based on the current conceptual understanding of the Morgan County CO₂ storage site and was used to guide development of the testing and monitoring approaches described in Section 5.2. The technical approaches described in Section 5.2 should be considered working versions that over time will be updated and modified as required in response to changes in the site conceptual model and/or operational parameters.

The objective of the monitoring program is to select and implement a suite of monitoring technologies that are both technically robust and cost-effective and provide an effective means of 1) evaluating CO₂ mass balance and 2) detecting any unforeseen containment loss.

The application proposed two single-level in-reservoir (SLR) wells, one above confining zone (ACZ) well, one underground source of drinking water (USDW) well, and a one multi-level in-reservoir (MLR) well within the injection reservoir for a total of five monitoring wells.

As part of the project's design optimization the monitoring well network design has been revised (Figure 2) to increase its effectiveness, simplify its engineering design, and hopefully eliminate any permitting challenges that might have been associated with the MLR. The revisions include eliminating the MLR well in favor of adding two fully cased reservoir access tube (RAT) wells. The revised design includes a total of seven monitoring wells as follows:

- Two ACZ wells. These wells will be used to monitor immediately above the Eau Claire caprock in the Ironton Sandstone. Pressure and hydrochemistry will be monitored.
- Two SLR wells, one of which is a reconfiguration of the previously drilled stratigraphic well. These wells will be used to monitor pressure and hydrochemistry within the injection zone beyond the east and west ends of the horizontal CO₂-injection laterals.
- Two RAT wells. These are fully cased wells, which allow access for monitoring instrumentation via pulsed-neutron logging equipment to quantify CO₂ saturation in the reservoir. The wells will not be perforated to avoid two-phase flow near the borehole, which can distort the CO₂ saturation measurements.
- One USDW well. This well will be used to monitor the lowermost USDW (St. Peter Sandstone).

Note that the specific geographic coordinates of each well remain “proposed” as the project is in the process of finalizing legal agreements with surface landowners. Also, we believe this proposed network should substantially exceed the intent of the regulations. Thus, we respectfully ask that only those wells required to meet the minimum permit requirements be included in the permit as prerequisite permit conditions.

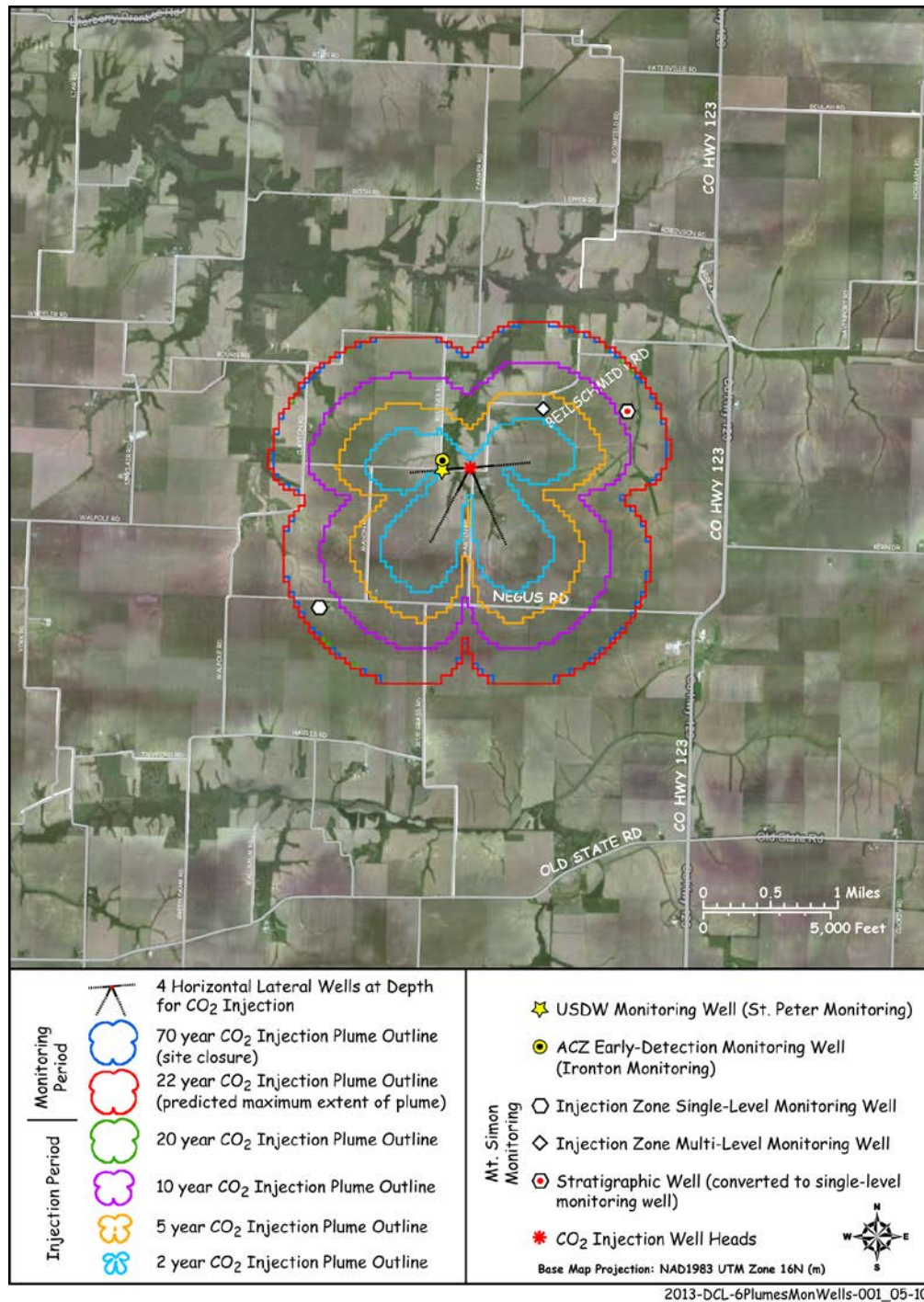


Figure 1. Monitoring Well Network as Presented in Testing and Monitoring Plan (Chapter 5) of the UIC Permit Supporting Documentation as Submitted in May 2013

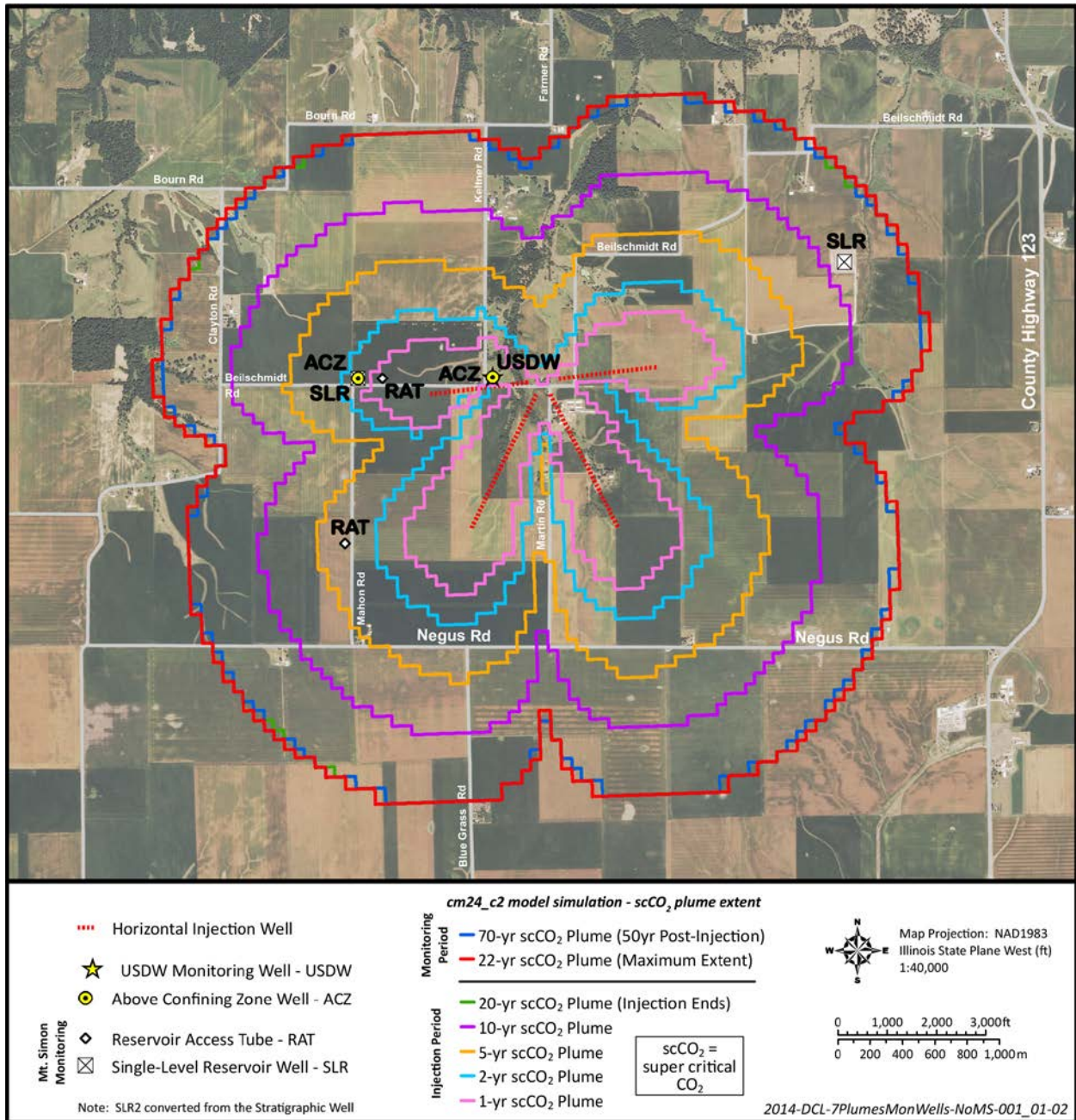


Figure 2. Updated and Revised Plan for Monitoring Wells.

Monitoring Wells Plugging

Upon site closure, all monitoring wells will be plugged and capped below grade. The most recent monitoring well design includes five deep monitoring wells and two RAT wells as listed in Table 1.

Table 1. Planned Monitoring Wells within the FutureGen Site Network

	Single-Level In-Reservoir (SLR)	Above Confining Zone (ACZ)	USDW	Reservoir Access Tube (RAT)
# of Wells	2	2	1	2
Total Depth (ft)	4,150	3,470	2,000	4,465
Monitored Zone	Mount Simon SS	Ironton SS	St. Peter SS	Mount Simon SS
Monitoring Instrumentation	Fiber-optic P/T (tubing conveyed) ^b ; P/T/SpC probe in monitored interval ^(a)	Fiber optic (microseismic) cable cemented in annulus; P/T/SpC probe in monitored interval ^(a)	P/T/SpC probe in monitored interval ^(a)	Pulsed-neutron logging equipment

(a) The P/T/SpC (pressure, temperature, specific conductance) probe is an electronic downhole multiparameter probe incorporating sensors for measuring fluid P/T/SpC within the monitored interval. This probe may also be configured with sensors to measure pH and Eh. The probe is installed inside tubing string, which is perforated (slotted) over the monitoring interval. Sensor signals are multiplexed to a surface data logger through a single conductor wireline cable.

(b) Fiber-optic cable attached to the outside of the tubing string, in the annular space between the tubing and casing.

SS = sandstone.

All deep monitoring wells at the site will be plugged to prevent any upward migration of the CO₂ or formation fluids to USDWs. Each of the five deep monitoring wells and the RAT wells will be plugged and abandoned using best practices to prevent the communication of fluids between the injection zone and the USDWs. The planned well construction design for the two SLR, two ACZ and the single USDW monitoring wells are illustrated in Appendix A, as well as the planned construction design for the RAT wells.

Before the wells are plugged, the internal and external integrity of the wells will be confirmed by conducting cement-bond, temperature, and noise logs on each of the wells. In addition, a pressure fall-off test will be performed above the perforated or screened intervals (where present) to confirm well integrity. The results of the logging and testing will be reviewed and approved by appropriate regulatory agencies prior to plugging the wells.

The five monitoring wells with either casing perforations or screens will be plugged using a CO₂-resistant cement retainer method to cement the open intervals and a balanced plug method to cement the well above open intervals and cement retainer. The RAT wells, which are completely cased without an open interval, will be abandoned using the balanced-plug method. Once the interior of the casing has been properly plugged with cement, the casing will be cut off below ground and capped. Regulations at the time of the plugging and abandonment will dictate the specifications regarding the depth at which the casing is cut and the method used to cap the well.

SLR Wells Plugging and Abandonment

At the conclusion of the post-operations monitoring period (~50-year), the SLR wells will be plugged and abandoned in accordance with the well plugging plan that is incorporated into the supporting documentation of the Class VI UIC permit applications. Well-plugging activities will begin with the complete removal of in-well data transmission cables, along with fiber-optic cables attached to the 2-7/8-in stainless-steel tubing as well as the tubing packer and bridge plug (Figure A-1). With all extraneous equipment removed, the well will be flushed with a buffer fluid (if possible) and a final external mechanical-integrity test (MIT) of the well casing will be performed via pulsed-neutron capture (PNC) logging prior to backfilling the well with cement. The cement plugging material at the bottom of the well will be compatible with the CO₂ injectate to prevent cement degradation over time. For the cost estimate, it is assumed that each of the wells will be filled completely with cement from total depth (TD) to ground surface. The well casings will be cut off at ground surface and covered with a steel plate and a permanent marker that contains identifying information about the well (permit number, owner, etc.).

ACZ Well Plugging and Abandonment

At the conclusion of the post-operations monitoring period (~50-year), the ACZ wells will be plugged and abandoned in accordance with the well plugging plan that is incorporated into the supporting documentation of the Class VI UIC permit applications. First, all extraneous equipment within the well will be removed, including the in-well data-transmission cable and bridge plug. Next, the well will be flushed with a buffer fluid (if possible) and a final external MIT of the well casing will be performed via PNC logging prior to backfilling the well with cement. The cement plugging material at the bottom of the well will be compatible with any escaping CO₂ injectate. For the cost estimate, it is assumed that each of the wells will be filled completely with cement from TD to ground surface. The well casings will be cut off at ground surface and covered with a steel plate and a permanent marker that contains identifying information about the well (permit number, owner, etc.).

USDW Well Plugging and Abandonment

At the conclusion of the post-operations monitoring period (~50-year), the USDW well will be plugged and abandoned in accordance with the well plugging plan that is incorporated into the Class VI UIC permit. First, all extraneous equipment within the well will be removed, including the in-well data-transmission cable and bridge plug. Next, the well will be flushed with a buffer fluid (if possible) and a final external MIT of the well casing will be performed via PNC logging prior to backfilling the well with cement. The cement plugging material at the bottom of the well will be compatible with any escaping CO₂ injectate. For the cost estimate, it is assumed that the USDW well will be filled completely with cement from TD to ground surface. The well casings will be cut off at ground surface and covered with a steel plate and a permanent marker that contains identifying information about the well (permit number, owner, etc.).

RAT Well Plugging and Abandonment

At the conclusion of the post-operations monitoring period (~50-year), the RAT wells will be plugged and abandoned by flushing the holes with a buffer fluid (if possible) and a final external MIT of the well casing will be performed via PNC logging prior to backfilling the holes with cement. The cement plugging material at the bottom of the hole will be compatible with CO₂ injectate to prevent cement degradation over time. For the cost estimate, it is assumed that the RAT wells will be filled completely with cement from TD to ground surface. The well casings will be cut off at ground surface and covered

with a steel plate and a permanent marker that contains identifying information about the well (permit number, owner, etc.).

Site Restoration/Remedial Activities

After the conclusion of the post-operations monitoring period (~50-year), any remaining surface facilities associated with monitoring wells and reservoir access tube will be reclaimed and the area returned to pre-development condition. All gravel pads, access roads, and surface facilities will be removed, and the land will be reclaimed for agricultural or other beneficial pre-construction uses.

Revised Cost Estimates

When revising cost estimates for site closure plugging and abandonment provided by Patrick Engineering in Appendix C of the Class VI UIC Permit, cost estimates (Table 2) were updated to reflect the most recent monitoring well design.

Table 2. Site Closure Summary for All Monitoring Wells and RAT Wells

Activity	Total Cost (\$)
a. Non-endangerment demonstration	26,000
b. Lowermost USDW (LUSDW) monitoring well plugging	319,000
c. Single-Level, In-Reservoir (SLR) monitoring well plugging (5.5" dia.)	487,600
d. Single-Level, In-Reservoir (SLR) monitoring well plugging (7" dia.)	571,600
e. Above-Confining Zone monitoring well plugging	858,960
f. Reservoir Access Tube monitoring well plugging	617,660
g. Remove surface features and reclaim land	140,000
h. Document plugging and closure process	17,000
Total site closure	3,037,820

These estimates are based on plugging and abandonment costs for the following other UIC Permit Applications: 1) Illinois EPA for the FutureGen1 CO₂ injection well (2009), 2) Tenaska CO₂ injection well (2009), 3) Archer Daniel Midland first CO₂ injection well (2011), and 4) the EPA Geologic CO₂ Sequestration Technology and Cost Analysis (Nov. 2011). The following values are an average cost for these line items for well plugging from the four documents above with the values inflated to 2012 dollars. The estimates assume cementing the entire depth of the well.

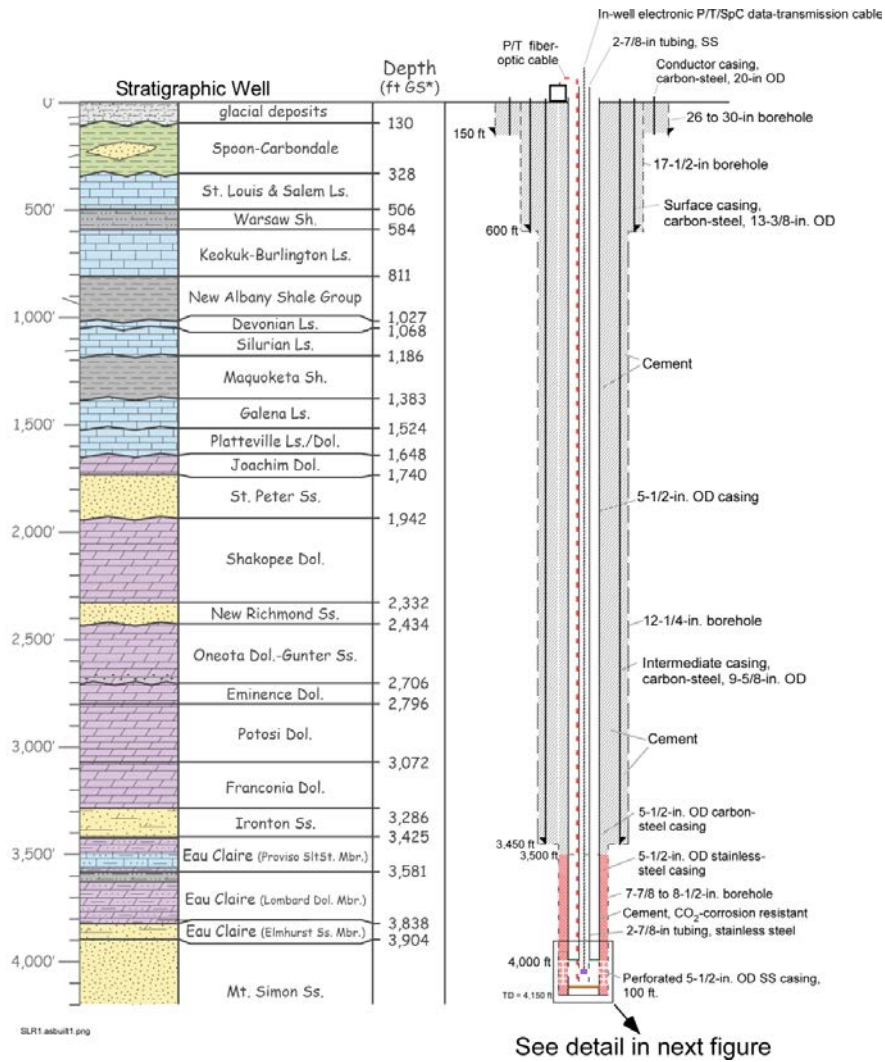
Casing evaluation	\$1.77 /in-ft.
Evaluation of any problems discovered by the casing evaluation	\$0.57 /in-ft.
Cost for repairing problems & cleanup of any groundwater or soil contamination	\$1.19 /in-ft.
Cost for cementing or other materials used to plug the well	\$5.30 /in-ft.
Cost for labor, engineering, rig time, equipment and consultants	\$4.47 /in-ft.

Updated, third-party, cost-estimate details prepared for each of the different types of wells by Patrick Engineering are presented in Attachment B.

Attachment A.

Planned Construction Designs for Monitoring Wells and Reservoir Access Tube Wells

**U.S. Environmental Protection Agency Request for Additional Information #4, Regarding:
 FG-RPT-017, Revision 1, SUPPORTING DOCUMENTATION: Underground Injection Control Class VI Injection Well Permit Applications
 for FutureGen 2.0 Morgan County UIC Wells 1, 2, 3, and 4**



See detail in next figure

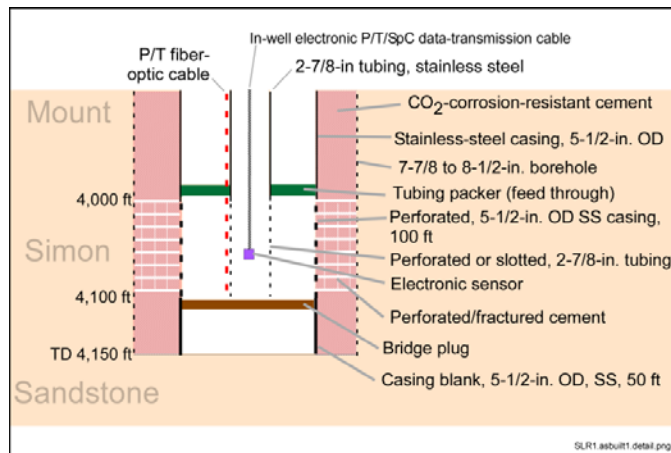
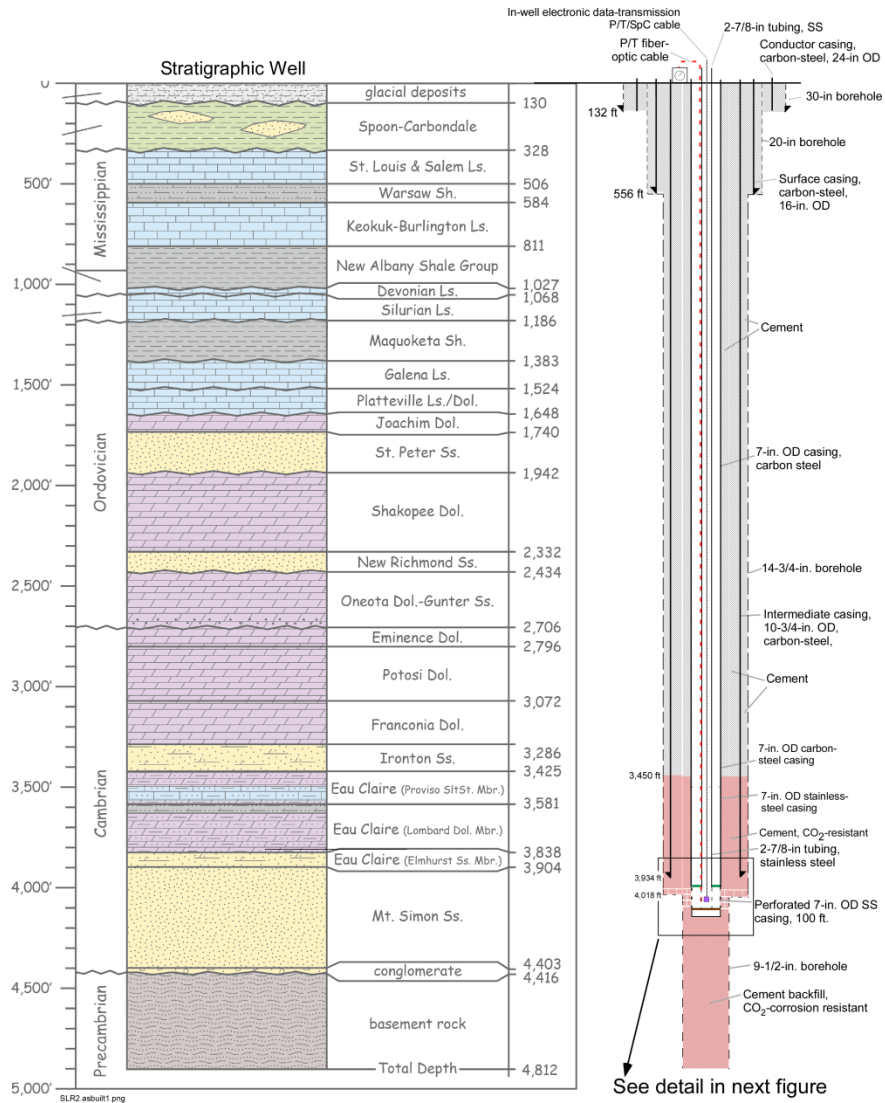


Figure A-1. Planned Well Construction for New 5.5-in.-Diameter Single-Level In-Reservoir Monitoring Well

**U.S. Environmental Protection Agency Request for Additional Information #4, Regarding:
 FG-RPT-017, Revision 1, SUPPORTING DOCUMENTATION: Underground Injection Control Class VI Injection Well Permit Applications
 for FutureGen 2.0 Morgan County UIC Wells 1, 2, 3, and 4**



See detail in next figure

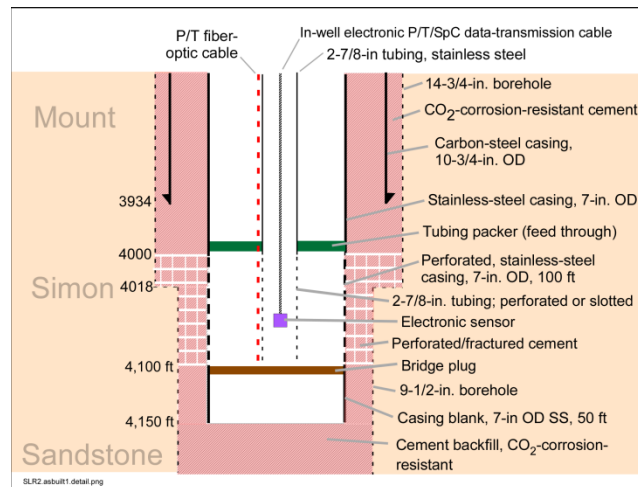


Figure A-2. Planned Well Construction for 7-in.-Diameter Single-Level In-Reservoir Monitoring Well to Be Reconfigured from the Stratigraphic Well

**U.S. Environmental Protection Agency Request for Additional Information #4, Regarding:
 FG-RPT-017, Revision 1, SUPPORTING DOCUMENTATION: Underground Injection Control Class VI Injection Well Permit Applications
 for FutureGen 2.0 Morgan County UIC Wells 1, 2, 3, and 4**

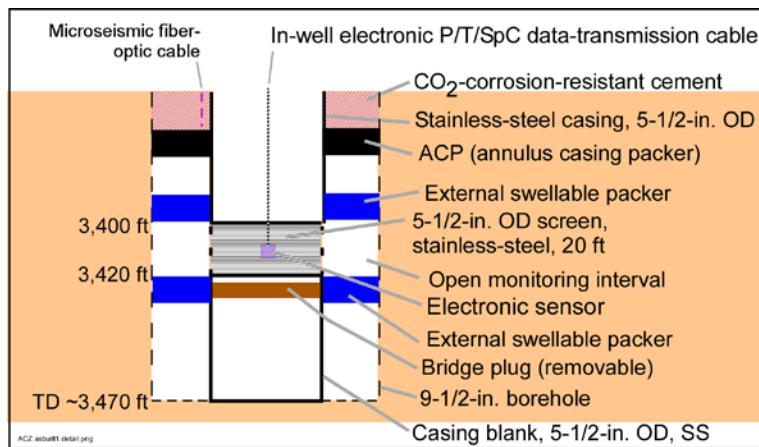
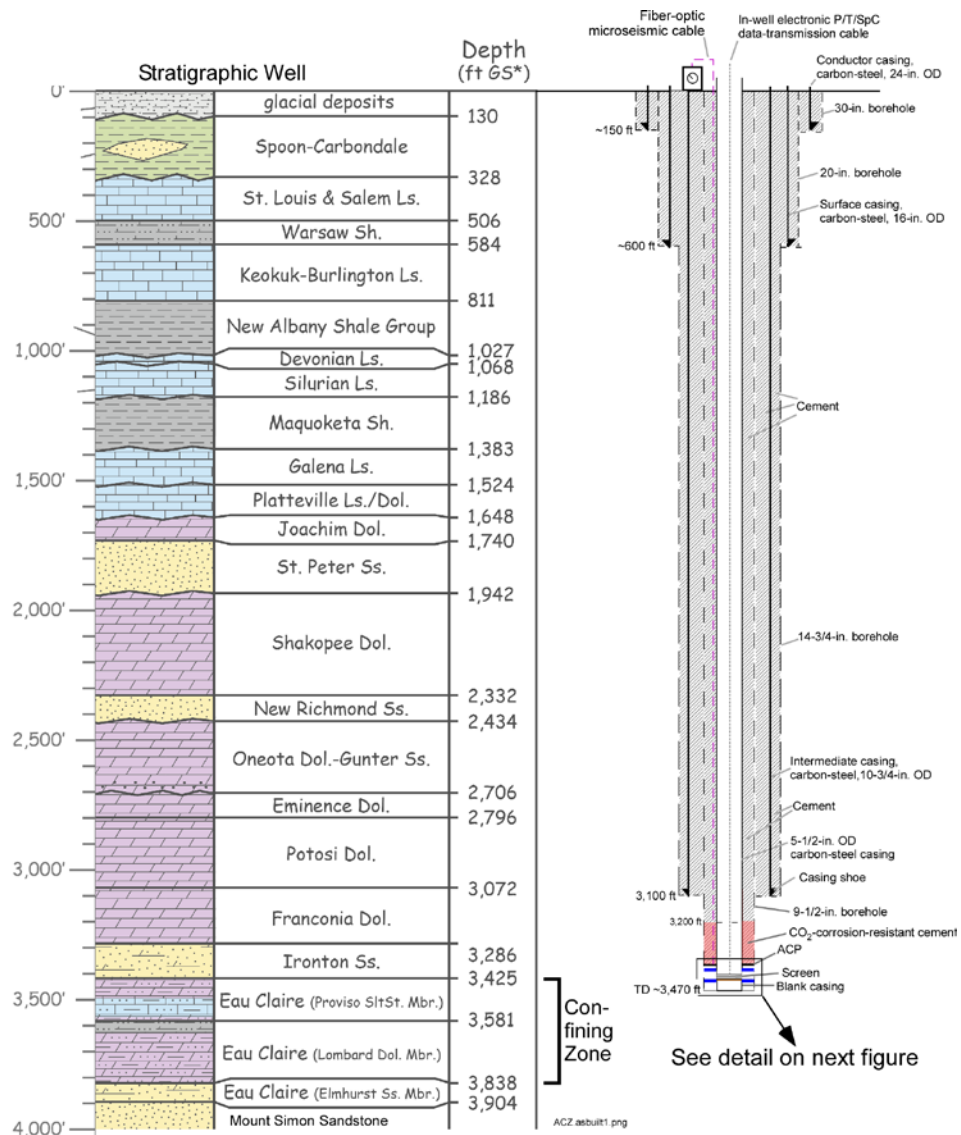


Figure A-3. Planned Well Construction for the Above Confining Zone (ACZ) Monitoring Wells

**U.S. Environmental Protection Agency Request for Additional Information #4, Regarding:
 FG-RPT-017, Revision 1, SUPPORTING DOCUMENTATION: Underground Injection Control Class VI Injection Well Permit Applications
 for FutureGen 2.0 Morgan County UIC Wells 1, 2, 3, and 4**

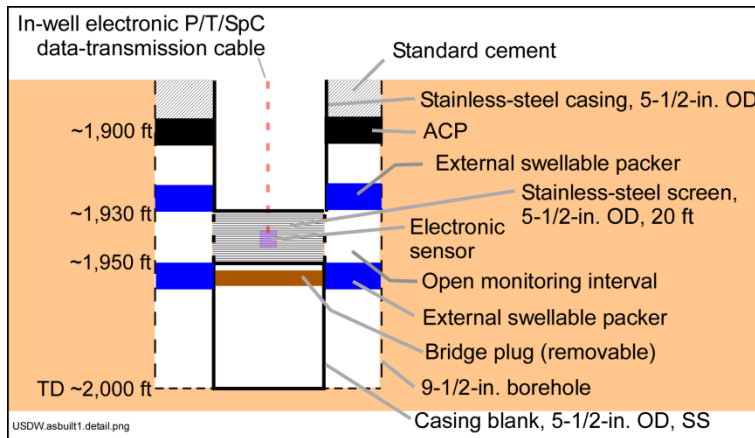
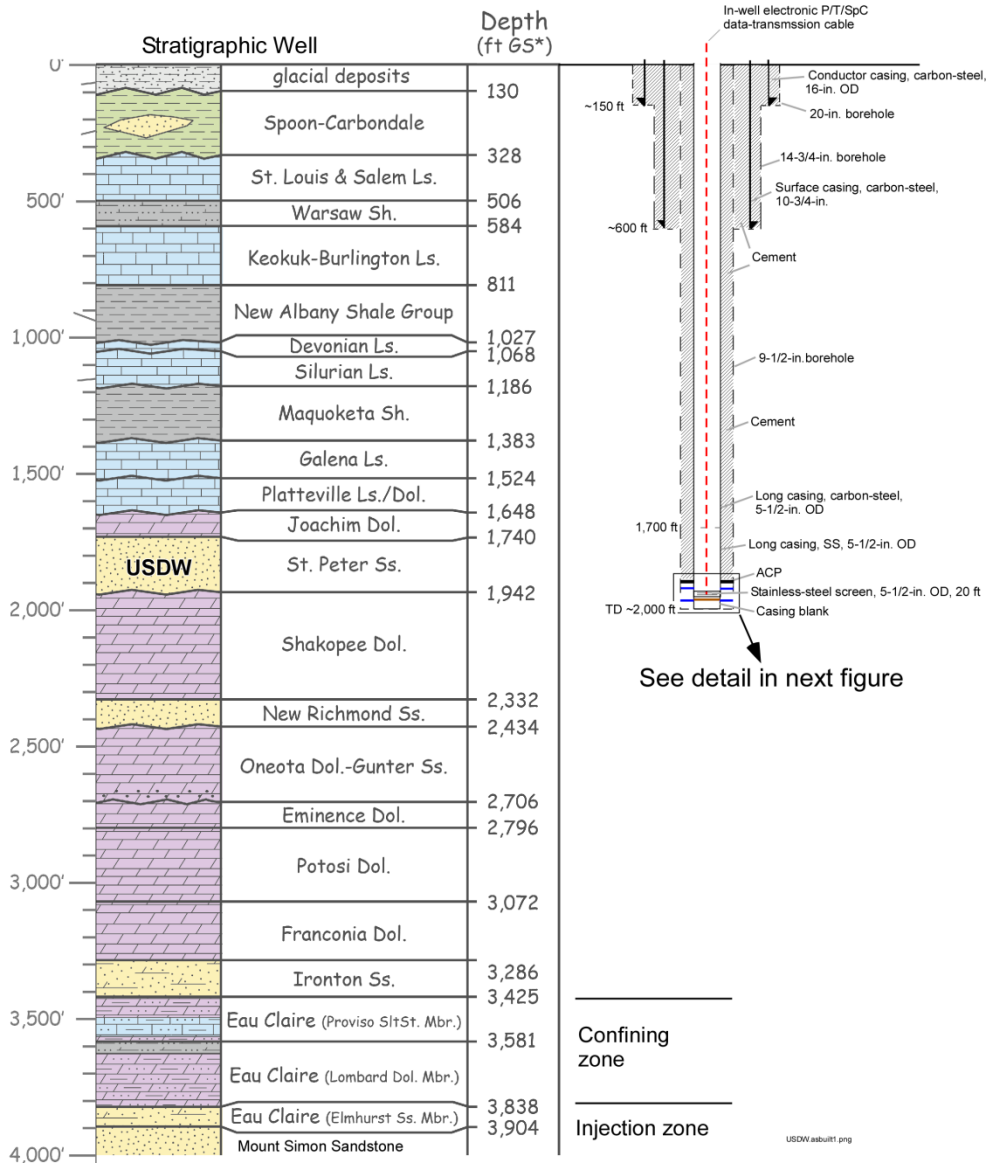


Figure A-4. Planned Well Construction for the USDW Monitoring Well

**U.S. Environmental Protection Agency Request for Additional Information #4, Regarding:
 FG-RPT-017, Revision 1, SUPPORTING DOCUMENTATION: Underground Injection Control Class VI Injection Well Permit Applications
 for FutureGen 2.0 Morgan County UIC Wells 1, 2, 3, and 4**

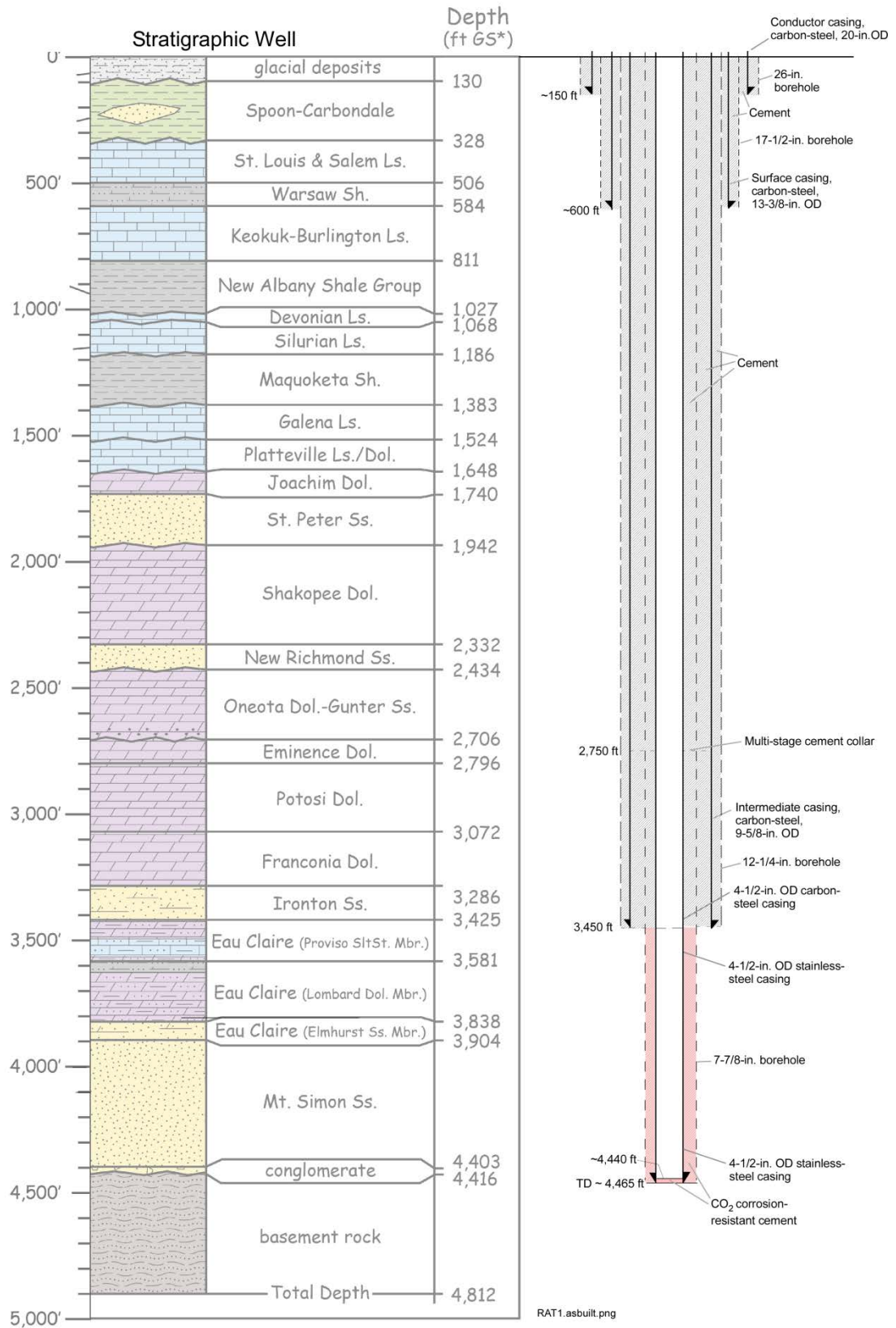


Figure A-5. Planned Construction for the Reservoir Access Tube (RAT) Wells

Attachment B

This is Section IX in Appendix C of the original UIC Permit revised to reflect the updated proposed monitoring network. Footnote 1 explains the cost estimating method.

Cost Estimate to Demonstrate Financial Responsibility for Class VI UIC Permit (Appendix C, Section IX, Site Closure Cost Estimate)

December 30, 2013

Prepared by:



IX. Site Closure Cost Estimate

The estimated costs in this section cover the final closure of the site. After the default 50-year, post-injection, and site-care period, and when it could be demonstrated that the project would no longer pose a risk of endangerment to any USDWs, the site would be permanently closed.

The costs are broken into four functional areas: 1) preparing the non-endangerment report; 2) plugging and abandoning all monitoring wells; 3) reclaiming land, including removal of remaining surface site buildings and appurtenances; and 4) documenting the site-closure process. The costs would be one-time costs that would be paid at the final project termination.

The plugging of the monitoring wells would include mechanical integrity testing, plugging the hole with cement the entire depth of the well, and cutting off the well casings below the ground. All structures and appurtenances at the sites of the monitoring wells would be completely removed and the sites would be restored to pre-project conditions.

Well-plugging and site-remediation costs were estimated based on Patrick’s experience and costs incurred or estimated for other projects. Three previous UIC applications for CO₂ sequestration wells and DOE documents were reviewed and average costs for mobilization and plugging costs per inch-foot of bore were developed^{i, 1}

Table 4. Site Closure Summary

Activity	Total Cost (\$)
a. Non-endangerment demonstration	26,000
b. LUSDW monitoring well plugging	319,000
c. Single Level, In Reservoir (SLR) monitoring well plugging (5.5” dia.)	487,600
d. Single Level, In Reservoir (SLR) monitoring well plugging (7” dia.)	571,600
e. Above-Confining Zone monitoring well plugging	858,960
f. Reservoir Access Tube monitoring well plugging	617,660
g. Remove surface features and reclaim land	140,000
h. Document plugging and closure process	17,000
Total site closure	3,037,820

¹ UIC Permit Applications to Illinois EPA for the FutureGen1 CO₂ injection well (2009), Tenaska CO₂ injection well (2009), ADM first CO₂ injection well (2011), and EPA Geologic CO₂ Sequestration Technology and Cost Analysis (Nov. 2011). The values below are an average cost for these line items for well plugging from the four documents above with the values inflated to 2012 dollars. The estimates assume cementing the entire depth of the well.

Casing evaluation	\$1.77 /in-ft.
Evaluation of any problems discovered by the casing evaluation	\$0.57 /in-ft.
Cost for repairing problems & cleanup of any groundwater or soil contamination	\$1.19 /in-ft.
Cost for cementing or other materials used to plug the well	\$5.30 /in-ft.
Cost for labor, engineering, rig time, equipment and consultants	\$4.47 /in-ft.

Table 4a. Site Closure Detail

a. Non-endangerment demonstration			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Prepare non-endangerment demonstration report			26,000
Total cost non-endangerment demonstration			26,000

b. LUSDW monitoring well plugging (1900 feet deep)			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Casing evaluation	21,000	1	21,000
Evaluation of any problems discovered by the casing evaluation	7,000	1	7,000
Cost for repairing problems & cleanup of any groundwater or soil contamination	14,000	1	14,000
Cost for cementing or other materials used to plug the well	62,000	1	62,000
Cost for labor, engineering, rig time, equipment and consultants	52,000	1	52,000
Cost for decontamination of equipment	4,000	1	4,000
Cost for disposal of any equipment	2,000	1	2,000
Gravel pad removal (175' x 175')	143,000	1	143,000
Project management and oversight (90 hours @ \$153/hour)			14,000
Total cost for LUSDW monitoring well plugging			319,000

c. Single Level, In Reservoir (SLR) monitoring well plugging (Assumes 1 well 4200 feet deep, 5.5" casing)			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Casing evaluation	41,000	1	41000
Evaluation of any problems discovered by the casing evaluation	13,000	1	13000
Cost for repairing problems & cleanup of any groundwater or soil contamination	28,000	1	28000
Cost for cementing or other materials used to plug the well	122,000	1	122000
Cost for labor, engineering, rig time, equipment and consultants	103,000	1	103000
Cost for decontamination of equipment	4,000	1	4000
Cost for disposal of any equipment	3,000	1	3000
Gravel pad removal (175' x 175')	143,000	1	143000
Project management and oversight (200 hours @ \$153/hour)			30600
Total cost for SLR (5.5") monitoring well plugging			487,600

d. Single Level, In Reservoir (SLR) monitoring well plugging (Assumes 1 well, 4200 feet deep, 7" casing)			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Casing evaluation	52,000	1	52,000
Evaluation of any problems discovered by the casing evaluation	17,000	1	17,000
Cost for repairing problems & cleanup of any groundwater or soil contamination	35,000	1	35,000
Cost for cementing or other materials used to plug the well	156,000	1	156,000
Cost for labor, engineering, rig time, equipment and consultants	131,000	1	131,000
Cost for decontamination of equipment	4,000	1	4,000
Cost for disposal of any equipment	3,000	1	3,000
Gravel pad removal (175' x 175')	143,000	1	143,000
Project management and oversight (200 hours @ \$153/hour)			30,600
Total cost for SLR (7") monitoring well plugging			571,600

e. Above Confining Zone (ACZ) monitoring well plugging (3,500 feet deep, 5.5" casing)			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Casing evaluation	34,000	2	68,000
Evaluation of any problems discovered by the casing evaluation	11,000	2	22,000
Cost for repairing problems & cleanup of any groundwater or soil contamination	23,000	2	46,000
Cost for cementing or other materials used to plug the well	102,000	2	204,000
Cost for labor, engineering, rig time, equipment and consultants	86,000	2	172,000
Cost for decontamination of equipment	4,000	2	8,000
Cost for disposal of any equipment	2,000	2	4,000
Gravel pad removal (175' x 175')	143,000	2	286,000
Project management and oversight (320 hours @ \$153/hour)			61,200
Total cost for ACZ monitoring wells plugging			858,960

f. Reservoir Access Tube (RAT) monitoring well plugging (4500 feet deep, 4.5" casing)			
Activity	Cost per Well (\$)	Number of Wells	Total Cost (\$)
Casing evaluation	36,000	2	72,000
Evaluation of any problems discovered by the casing evaluation	12,000	2	24,000
Cost for repairing problems & cleanup of any groundwater or soil contamination	24,000	2	48,000
Cost for cementing or other materials used to plug the well	107,000	2	214,000
Cost for labor, engineering, rig time, equipment and consultants	90,000	2	180,000
Cost for decontamination of equipment	4,000	2	8,000
Cost for disposal of any equipment	3,000	2	6,000
Gravel pad removal (25' x 25')	16,000	2	32,000
Project management and oversight (220 hours @ \$153/hour)			33,660
Total cost for RAT monitoring wells plugging			617,660
g. Surface features removal and land reclamation			
Activity	Unit Cost (\$)	Number	Total Cost (\$)
Phase II demolition (@ 50 years following cessation of injection) - injection well site 1 well maintenance and monitoring building, and appurtenances	112,000	1	112,000
Remove access roads (miles)	11,000	2.5	28,000
Total cost to remove surface features and reclaim land			140,000
h. Documentation			
Activity	Hours	Rate (\$/hr)	Total Cost (\$)
Document plugging and closure process (well plugging, post-injection plans, notification of intent to close, and post-closure report).	110	153	17,000
Total cost for documentation of well plugging and closure process			17,000


Attachment C

Plugging and Abandonment Plans for Monitoring Wells

Plugging and abandonment plans for the following monitoring wells are provided in this attachment:

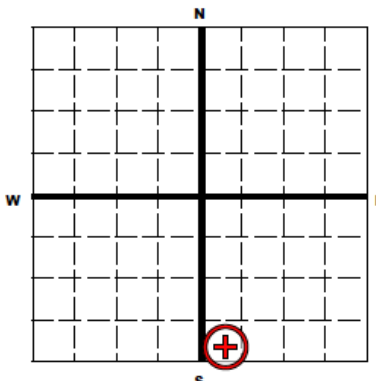
- ACZ (W)
 - ACZ (far W)
 - RAT (W)
 - RAT (SW)
 - SLR (W)-5.5"
 - SLR (NE)-7"
 - USDW (W)
-

OMB No. 2040-0042 Approval Expires 11/30/2014



United States Environmental Protection Agency
Washington, DC 20460


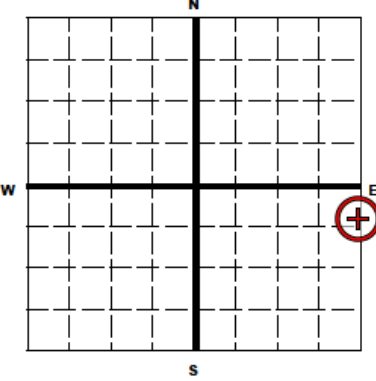
PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility Well ACZ(W), FutureGen 2.0, Morgan County, IL		Name and Address of Owner/Operator FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650																										
Locate Well and Outline Unit on Section Plat - 640 Acres 	State Illinois	County Morgan	Permit Number																									
	Surface Location Description SW 1/4 of SW 1/4 of SW 1/4 of SE 1/4 of Section 26 Township 16N Range 9W																											
	Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location <input type="text"/> ft. frm (N/S) <input type="text"/> Line of quarter section and <input type="text"/> ft. from (E/W) <input type="text"/> Line of quarter section.																											
	TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <input type="text" value="1"/>	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III		Lease Name <input type="text"/>																								
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SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE																								
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CEMENTING TO PLUG AND ABANDON DATA:		PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7																				
Size of Hole or Pipe in which Plug Will Be Placed (inches):		9.5"	5.5"	5.5"																								
Depth to Bottom of Tubing or Drill Pipe (ft.):		3,470'	3,350'	3,200'																								
Sacks of Cement To Be Used (each plug)		61	22	447																								
Slurry Volume To Be Pumped (cu. ft.)		68	25	528																								
Calculated Top of Plug (ft.)		3,350	3,200	0																								
Measured Top of Plug (if tagged ft.)		-	-	-																								
Slurry Wt. (Lb./Gal.)		15.82	15.82	15.6																								
Type Cement or Other Material (Class III)		EverCret	EverCret	Class A																								
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)																												
From		To		From		To																						
3,470'		3,350' (perforated)																										
3,400'		3,420' (screened)																										
Estimated Cost to Plug Wells																												
\$429,480																												
Certification I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)																												
Name and Official Title (Please type or print) Hard copy with signature to follow			Signature			Date Signed																						

United States Environmental Protection Agency Washington, DC 20460																										
PLUGGING AND ABANDONMENT PLAN																										
Name and Address of Facility: Well ACZ(far W), FutureGen 2.0, Morgan County, IL																										
Name and Address of Owner/Operator: FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650																										
State: Illinois	County: Morgan																									
Surface Location Description: SW 1/4 of SW 1/4 of SW 1/4 of SW 1/4 of Section 26 Township 16N Range 9W																										
Locate well in two directions from nearest lines of quarter section and drilling unit																										
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TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells: 1	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III																									
Lease Name: _____	Well Number: _____																									
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METHOD OF EMPLACEMENT OF CEMENT PLUGS																										
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Estimated Cost to Plug Wells: \$429,480																										
Certification																										
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Name and Official Title (Please type or print): Hard copy with signature to follow	Signature: _____ Date Signed: _____																									

United States Environmental Protection Agency Washington, DC 20460				
PLUGGING AND ABANDONMENT PLAN				
Name and Address of Facility: <u>RAT(W) Well, FutureGen 2.0, Morgan County, IL</u>				
Name and Address of Owner/Operator: <u>FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650</u>				
Locate Well and Outline Unit on Section Plat - 640 Acres 	State: <u>Illinois</u> County: <u>Morgan</u> Permit Number: _____			
	Surface Location Description <u>SE 1/4 of SW 1/4 of SW 1/4 of SW 1/4 of</u> Section <u>26</u> Township <u>16N</u> Range <u>9W</u>			
	Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location _____ ft. frm (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section.			
	<table border="0" style="width:100%;"> <tr> <td style="width: 50%;"> TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u> </td> <td style="width: 50%;"> WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III </td> </tr> </table>	TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u>	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III	
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Lease Name: _____ Well Number: _____				
CASING AND TUBING RECORD AFTER PLUGGING				
SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
20"	94	0-150	150	26"
13-3/8"	61	0-600	600	17.5"
9-5/8"	36	0-3,450	3,450	12.25"
4-1/2"	10.5	0-4,465	4,465	7.875"
METHOD OF EMPLACEMENT OF CEMENT PLUGS				
<input checked="" type="checkbox"/> The Balance Method <input type="checkbox"/> The Dump Bailer Method <input type="checkbox"/> The Two-Plug Method <input type="checkbox"/> Other				
CEMENTING TO PLUG AND ABANDON DATA:				
Size of Hole or Pipe in which Plug Will Be Placed (inches):	4.5"	4.5"		
Depth to Bottom of Tubing or Drill Pipe (ft.)	4,440'	3,450'		
Sacks of Cement To Be Used (each plug)	98	323		
Slurry Volume To Be Pumped (cu. ft.)	109	381		
Calculated Top of Plug (ft.)	3,450'	0'		
Measured Top of Plug (if tagged ft.)	-	-		
Slurry Wt. (Lb./Gal.)	15.82	15.6		
Type Cement or Other Material (Class III)	EverCret	Class A		
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)				
From	To	From	To	
Estimated Cost to Plug Wells \$308,830				
Certification				
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Name and Official Title (Please type or print) <u>Hard copy with signature to follow</u>		Signature _____		Date Signed _____

OMB No. 2040-0042 Approval Expires 11/30/2014

 United States Environmental Protection Agency Washington, DC 20460																										
PLUGGING AND ABANDONMENT PLAN																										
Name and Address of Facility: <u>RAT(SW) Well, FutureGen 2.0, Morgan County, IL</u>																										
Name and Address of Owner/Operator: <u>FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650</u>																										
Locate Well and Outline Unit on Section Plat - 640 Acres 	State: <u>Illinois</u> County: <u>Morgan</u> Permit Number: _____																									
	Surface Location Description <u>SE 1/4 of NE 1/4 of NE 1/4 of SE 1/4 of</u> Section <u>34</u> Township <u>16N</u> Range <u>9W</u>																									
	Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location _____ ft. frm (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section.																									
	TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u> Lease Name: _____																									
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CEMENTING TO PLUG AND ABANDON DATA:																										
Size of Hole or Pipe in which Plug Will Be Placed (inches):	<u>4.5"</u>	<u>4.5"</u>																								
Depth to Bottom of Tubing or Drill Pipe (ft.)	<u>4,440</u>	<u>3,450</u>																								
Sacks of Cement To Be Used (each plug)	<u>98</u>	<u>323</u>																								
Slurry Volume To Be Pumped (cu. ft.)	<u>109</u>	<u>381</u>																								
Calculated Top of Plug (ft.)	<u>3,450</u>	<u>0</u>																								
Measured Top of Plug (if tagged ft.)	-	-																								
Slurry Wt. (Lb./Gal.)	<u>15.82</u>	<u>15.6</u>																								
Type Cement or Other Material (Class III)	<u>EverCret</u>	<u>Class A</u>																								
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)																										
From	To	From	To																							
Estimated Cost to Plug Wells																										
\$308,830																										
Certification																										
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Name and Official Title (Please type or print)				Signature		Date Signed																				
Hard copy with signature to follow																										

United States Environmental Protection Agency Washington, DC 20460								
PLUGGING AND ABANDONMENT PLAN								
Name and Address of Facility: Well SLR(W), FutureGen 2.0, Morgan County, IL								
Name and Address of Owner/Operator: FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650								
Locate Well and Outline Unit on Section Plat - 640 Acres 	State: Illinois County: Morgan Permit Number:							
	Surface Location Description SW 1/4 of SW 1/4 of SW 1/4 of SW 1/4 of Section 26 Township 16N Range 9W							
	Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location: _____ ft. frm (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section.							
	<table border="0" style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells: 1 </td> <td style="width:50%; vertical-align: top;"> WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III </td> </tr> </table>	TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells: 1	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III					
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Lease Name: _____ Well Number: _____								
CASING AND TUBING RECORD AFTER PLUGGING								
SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE				
20"	94	0-150	150	26"				
13-3/8"	61	0-600	600	17.5"				
9-5/8"	36	0-3,450	3,450	12.25"				
5-1/2"	17	0-4,150	4,150	8"				
METHOD OF EMPLACEMENT OF CEMENT PLUGS								
<input checked="" type="checkbox"/> The Balance Method <input type="checkbox"/> The Dump Bailer Method <input type="checkbox"/> The Two-Plug Method <input type="checkbox"/> Other								
CEMENTING TO PLUG AND ABANDON DATA:								
Size of Hole or Pipe in which Plug Will Be Placed (inches):	5-1/2"	5-1/2"						
Depth to Bottom of Tubing or Drill Pipe (ft.)	4,150'	3,500'						
Sacks of Cement To Be Used (each plug)	98	489						
Slurry Volume To Be Pumped (cu. ft.)	110	577						
Calculated Top of Plug (ft.)	3,500'	0'						
Measured Top of Plug (if tagged ft.)	-	-						
Slurry Wt. (Lb./Gal.)	15.82	15.6						
Type Cement or Other Material (Class III)	EverCret	Class A						
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)								
From	To	From	To					
4000'	4100' (perforated and fractured)							
Estimated Cost to Plug Wells \$536,600								
Certification								
I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)								
Name and Official Title (Please type or print) Hard copy with signature to follow			Signature			Date Signed		

United States Environmental Protection Agency Washington, DC 20460								
<h3>PLUGGING AND ABANDONMENT PLAN</h3>								
Name and Address of Facility Well SLR(NE), FutureGen 2.0, Morgan County, IL	Name and Address of Owner/Operator FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650							
Locate Well and Outline Unit on Section Plat - 640 Acres 	State: Illinois County: Morgan Permit Number: _____ Surface Location Description NW 1/4 of NE 1/4 of NE 1/4 of SE 1/4 of Section 25 Township 16N Range 9W Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location _____ ft. frm (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section.							
TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells: 1	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III							
Lease Name: _____	Well Number: _____							
CASING AND TUBING RECORD AFTER PLUGGING		METHOD OF EMPLACEMENT OF CEMENT PLUGS						
SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE	<input checked="" type="checkbox"/> The Balance Method <input type="checkbox"/> The Dump Bailer Method <input type="checkbox"/> The Two-Plug Method <input type="checkbox"/> Other			
24"	140	0-132	132	30"				
16"	84	0-556	556	20"				
10-3/4"	51	0-3,934	3,934	14.75"				
7"	29	4,150	4,150	9.5"				
CEMENTING TO PLUG AND ABANDON DATA:		PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches):		7"	7"					
Depth to Bottom of Tubing or Drill Pipe (ft.)		4,150'	3,500'					
Sacks of Cement To Be Used (each plug)		159	793					
Slurry Volume To Be Pumped (cu. ft.)		178	935					
Calculated Top of Plug (ft.)		3,500'	0'					
Measured Top of Plug (if tagged ft.)		-	-					
Slurry Wt. (Lb./Gal.)		15.82	15.6					
Type Cement or Other Material (Class III)		EverCret	Class A					
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)								
From		To		From		To		
4000'		4100' (perforated and fractured)						
Estimated Cost to Plug Wells								
\$571,600								
Certification I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)								
Name and Official Title (Please type or print)				Signature			Date Signed	
Hard copy with signature to follow								

United States Environmental Protection Agency Washington, DC 20460								
PLUGGING AND ABANDONMENT PLAN								
Name and Address of Facility Well USDW(W), FutureGen 2.0, Morgan County, IL	Name and Address of Owner/Operator FutureGen Alliance 73 Central Park Plaza East, Jacksonville, IL 62650							
Locate Well and Outline Unit on Section Plat - 640 Acres 	State Illinois							
	County Morgan							
	Permit Number _____							
	Surface Location Description SW 1/4 of SW 1/4 of SW 1/4 of SE 1/4 of Section 26 Township 16N Range 9W							
Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location _____ ft. frm (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section.								
<table border="0" style="width:100%;"> <tr> <td style="width: 50%;"> TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u> </td> <td style="width: 50%;"> WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III </td> </tr> </table>		TYPE OF AUTHORIZATION <input checked="" type="checkbox"/> Individual Permit <input type="checkbox"/> Area Permit <input type="checkbox"/> Rule Number of Wells <u>1</u>	WELL ACTIVITY <input type="checkbox"/> CLASS I <input type="checkbox"/> CLASS II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input type="checkbox"/> CLASS III					
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Lease Name _____ Well Number _____								
CASING AND TUBING RECORD AFTER PLUGGING								
SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE				
16"	55	0-150	150	20"				
10-3/4"	40.5	0-600	600	14.75"				
5-1/2"	17	0-2,000	2,000	9.5"				
METHOD OF EMPLACEMENT OF CEMENT PLUGS								
<input checked="" type="checkbox"/> The Balance Method <input type="checkbox"/> The Dump Bailer Method <input type="checkbox"/> The Two-Plug Method <input type="checkbox"/> Other								
CEMENTING TO PLUG AND ABANDON DATA:		PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches):		9.5"	5.5"					
Depth to Bottom of Tubing or Drill Pipe (ft.)		2,000'	1,880'					
Sacks of Cement To Be Used (each plug)		61	263					
Slurry Volume To Be Pumped (cu. ft.)		68	310					
Calculated Top of Plug (ft.)		1,880'	0					
Measured Top of Plug (if tagged ft.)		-	-					
Slurry Wt. (Lb./Gal.)		15.6	15.6					
Type Cement or Other Material (Class III)		Class A	Class A					
LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)								
From		To		From		To		
2,000'		1,880' (perforated)						
1,930'		1,950' (screened)						
Estimated Cost to Plug Wells \$319,000								
Certification								
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