United States Environmental Protection Agency

EPA Seeks Comments on Plan to Modify an Existing Carbon Storage Permit

Archer Daniels Midland Co.
Decatur, Illinois

November 2016

You are invited

EPA will hold a formal public hearing on the ADM draft modified permit at: Decatur Public Library, 130 N. Franklin Street

December 13, 2016

Public Hearing, 6 – 7 p.m.
Oral and written comments will be recorded or accepted. EPA will provide a summary of its proposed decision but will not answer questions during the hearing.

How to comment

In addition to accepting comments at the public hearing, EPA will accept written comments from November 10 until December 14, 2016. Please refer to Archer Daniels Midland, IL-115-6A-0001, when providing comments.

Mail or email your comments to:
Andrew Greenhagen
U.S. EPA, Water Division
UIC Branch (WU-16J)
77 W. Jackson Blvd.
Chicago, IL 60604-3590
Email: greenhagen.andrew@epa.gov
Phone: 312-353-7648

Web resources

https://go.usa.gov/3JwFP

Information Repository

The draft modified permit and fact sheet are available at:
Decatur Public Library
130 N. Franklin St.

You may call EPA toll-free at 800-621-8437, 8:30 a.m. – 4:30 p.m., weekdays.

This map shows where the injection well is located.

The U.S. Environmental Protection Agency plans to modify a permit for an injection well owned by the Archer Daniels Midland Company, 4666 Faries Parkway, Decatur, Illinois. The existing permit is for one injection well, CCS#2, that ADM wants to use to inject and store carbon dioxide, or CO_2, underground. The CO_2 is created when ADM makes ethanol. ADM plans to inject 1.1 million metric tons of CO_2 per year into this well over five years.

EPA first issued this permit in 2014. The proposed modifications will update the permit and attachments because of new information obtained during well construction and pre-injection testing. Only the conditions proposed for modification are re-opened for comment. A detailed list of the proposed modifications is available for viewing on EPA's website, at the Decatur Public Library, or by contacting EPA.

EPA is accepting comments from the public (*see box at left*) on this proposed permit modification approval. Comments may be submitted in writing or at the public hearing *(see box at left)*. The public comment period, which ends **Wednesday, December 14, 2016**, includes 30 days for comments as required by law, plus an additional three days for any delay caused by mailing. EPA will consider all comments it receives, and then issue a final decision along with a response to the significant comments.

The Safe Drinking Water Act requires EPA to regulate injection of fluids through wells to protect the quality of underground sources of drinking water. Issuing permits is one way EPA does this. You can find the regulations governing underground injection wells at Title 40 of the Code of Federal Regulations, Parts 144 and 146.

To learn more about EPA's Underground Injection Control program, or to join our mailing list visit https://go.usa.gov/3JwFP.

How did EPA make its decision?

EPA made its draft decision to modify the permit by evaluating technical information and project-specific data that was obtained during well construction and pre-injection testing. EPA is proposing modifications related to:

- Size of the Area of Review (the region surrounding the well that ADM and EPA examined to ensure the protection of underground sources of drinking water)
- Final injection and monitoring well construction
- Injection start-up procedures
- Other administrative edits for clarity

ADM constructed the well and performed required pre-operational testing in 2015. They then submitted updated information to EPA. EPA considered the additional data to propose these permit modifications.

What happens next in the permit process?

EPA will review all public comments before making a final decision on whether or not to approve the permit modifications. The Agency will respond to all significant comments on the draft modified permit.

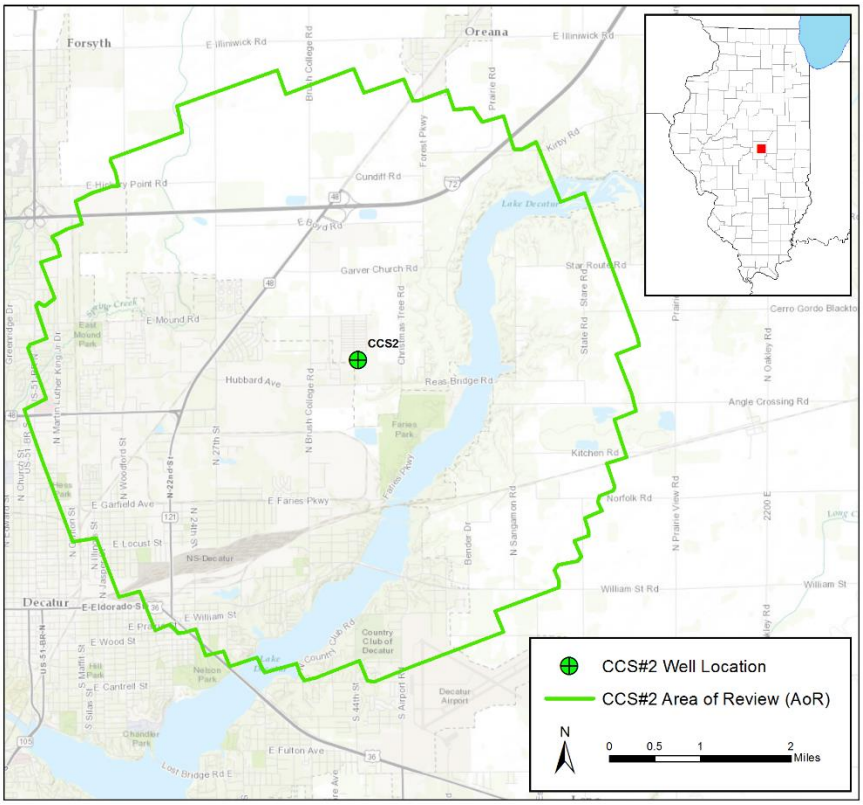
Administrative Record

The full administrative record, including all data submitted by Archer Daniels Midland Co., is available for public review at EPA's Chicago regional office. The office is open 9:00 a.m. – 4:00 p.m., weekdays. To review the administrative record or for additional information please contact Andrew Greenhagen at 312-353-7648 or greenhagen.andrew@epa.gov.

Legal Notice

To preserve your right to appeal any final permit decision, you must either participate in the public hearing or send in written comments on the draft modified permit decision by the end of the comment period.

The first appeal must be made to the Environmental Appeals Board; only after all agency review procedures have been exhausted may you file an action in the appropriate Circuit Court of Appeals.



This map shows the CCS#2 well location and Area of Review.

Archer Daniels Midland (ADM) of Decatur, Illinois has a U.S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) Program permit to inject carbon dioxide (CO_2) for geologic sequestration in a Class VI well (CCS#2).

ADM is capturing CO_2 generated from a fuel ethanol production unit at its agricultural and biofuels facility which, when injected underground, will support the goal of reducing carbon emissions to the atmosphere to help mitigate climate change.

Under the authority of Title 40 of the Code of Federal Regulations (40 CFR) Parts 144 and 146, EPA Class VI permits must specify conditions for the construction, operation, monitoring, reporting, plugging, post-injection site care and site closure of Class VI injection wells so as to prevent the movement of fluids into any USDW or unauthorized zones. General provisions for EPA UIC permit requirements are found at 40 CFR Parts 124, 144, 146 and 147.

EPA is proposing modifications to the Class VI permit for CCS#2 that address updated information about the site that ADM submitted pursuant to Title 40 of the Code of Federal Regulations (40 CFR) 146.82(c). These changes relate to the size of the area of review, final injection and monitoring well construction, and injection start-up procedures. All other changes to the permit and attachments are editorial or clarifying in nature. EPA is retaining conditions related to completed activities (e.g., related to well construction and pre-operational formation testing activities) in the permit.

A number of changes are proposed in this draft major permit modification. The changes are categorized as formatting, administrative, and technical changes, and presented below:

- ***Formatting*** **-** A number of changes are proposed to ensure consistency of formatting throughout this document (e.g., capitalization, placement of table and figure headings, placement of footnotes and notes) and to support ease of review (e.g., reordering of tables or figures based on first reference, grammar and typo correction). For ease of review, these changes are not included in the table below.

- ***Administrative*** **-** Changes to operational dates and timeframes are proposed to conform to the updated permitting, operational and post-injection schedules. Additionally, limited wording edits were made for clarity. These changes are identified below.

- ***Technical*** **-** These changes are proposed to address new information collected and submitted to EPA in compliance with 40 CFR 146.82(c) (e.g., final well location coordinates, as-built well schematics, updated maps of the Area of Review, updated estimates of certain costs) following well construction and logging, and sampling and testing. These changes are identified and discussed below.

Throughout the tables below, page numbers refer to pages in the current version of the files.

In accordance with the conditions set forth in Title 40 of the Code of Federal Regulations (40 CFR) Parts 124.5, 144.39, and 146.82 the following permit conditions are proposed for modification:

Proposed Changes to the Permit

Page No.	Section/Topic	Description of Change	Justification
1	Authority	The coordinates of the CCS#2 injection well location, given in the first paragraph of this page, changed from 39º 53’ 08”, -89° 53’19” to 39º 53’ 09.32835”, -88° 53’16. 68306”.	This change reflects the final, as-drilled location of CCS#2.
1	Authority	The injection depths into the Mount Simon formation have changed from 5,545-7,051 feet to 5,553-7,043 feet.	This change reflects the final, as-constructed injection intervals at CC#2.
1	Authority	The Director of the Water Division has changed from Tinka G. Hyde to Christopher Korleski.	Administrative change.

Proposed Changes to Attachment A: Summary of Requirements

Page No.	Section/Topic	Description of Change	Justification
A1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
A1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change reflects the final, as-drilled location of CCS#2.
A1	Injection Well Operating Conditions	The word "minimum" was moved from the "Limitation or Permitted Value" column to the "Parameter/Condition" column to modify the second and third parameters/conditions, "Minimum Annulus Pressure" and "Minimum Annulus Pressure/Tubing Differential (directly above and across packer)."	Administrative change.
A1	Injection Well Operating Conditions – Parameter/Condition	The parenthetical "(directly above and across packer) was added at the end of the third parameter/condition that formerly read, "Minimum Annulus Pressure/Tubing Differential." The parameter/condition now reads, "Minimum Annulus Pressure/Tubing Differential (directly above and across packer)."	Administrative change.
A1	Injection Well Operating Conditions – Unit	The unit for the third parameter/condition, "Minimum Annulus Pressure/Tubing Differential (directly above and across packer)," was changed from "psig above surface injection pressure" to "psig."	This change was made for consistency with the Testing and Monitoring Plan.
A2 – A3	Start-up Monitoring and Reporting Procedures	This section was added to the Summary of Requirements.	This section was added to reflect the increased monitoring and reporting planned for the CCS#2 well during the start-up period and the first six months of the injection phase.

Proposed Changes to Attachment B: Area of Review (AoR) and Corrective Action Plan

Page No.	Section/Topic	Description of Change	Justification
B1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
B1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change reflects the final, as-drilled location of CCS#2.
B2	Description of Model – Model Description	The second-to-last sentence of the last paragraph in this section was modified. The sentence formerly read, "Convergence is achieved once the model reaches the maximum tolerance 'sufficiently small change' for temperature and pressure calculation results on successive iterations," and now reads, "Convergence is achieved once the model reaches the maximum tolerance where small changes of temperature and pressure calculation results occur on successive iterations."	Administrative change (to provide clarity).
B2	Description of Model – Description of AoR Delineation Modeling Effort	The first sentence of the first paragraph in this section formerly read, "The 3D geologic model developed for the injection simulations is based on the interpretation of a diverse collection of geological, geophysical, and petrophysical data acquired throughout the construction of the IBDP wells (CCS#1 and VW#1)," and now reads, "The 3D geologic model developed for the initial injection simulations was based on the interpretation of a diverse collection of geological, geophysical, and petrophysical data acquired throughout the construction of the IBDP wells (CCS#1 and VW#1)."	Administrative change.
B2	Description of Model – Description of AoR Delineation Modeling Effort	The following sentence was inserted at the end of the first paragraph in this section: "Following the collection of testing and logging data during construction and pre-operational testing of CCS#2 and VW#2, the geologic model was updated pursuant to 40 CFR 146.82(c)(1)."	This change reflects the reservoir model update that occurred during construction and pre-operational logging and testing.
B2	Description of Model – Description of AoR Delineation Modeling Effort	The first sentence of the second paragraph in this section formerly read, "The model implements porosity and permeability well logs from CCS#1, VW#1, and VW#2," and now reads, "The original, pre-construction phase model implemented porosity and permeability well logs from CCS#1, VW#1, and VW#2."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
B2 – B3	Description of Model – Description of AoR Delineation Modeling Effort	The following two sentences and list of seven steps were added to the end of the second paragraph of the section: "To update the reservoir model following pre-injection testing, logs from CCS#2 were used to update the 3D geologic model to reflect new information while remaining true to the original seismic property-driven distributions that did not require updates. The following steps were followed to incorporate CCS#2 well log data into the model domain permeability and porosity distributions: 1. Log (ELAN) permeability curves were upscaled into the static geologic model. 2. Permeability was log transformed. 3. General distribution was developed from log-permeability data. 4. The log permeability distribution was updated through co-simulation of VW#2 and CCS#2 log-permeability data with the existing 3D model log-permeability distribution and using the general log-permeability pdf developed from the data. The result honors the new log data at and near the wells and honors the seismic driven distribution as a trend away from VW#2 and CCS#2. 5. Permeability was inverse log transformed. 6. Steps 3 through 5 were done on a zone-by-zone basis. 7. The new permeability distribution was upscaled into a reservoir model grid and the existing permeability distribution for the CCS#2 injection zone was replaced with the newly computed permeability distribution within the CCS#2 injection zone across the entire lateral extent of the reservoir model grid."	This change reflects the most up-to-date reservoir model information submitted by ADM.
B3	Description of Model – Description of AoR Delineation Modeling Effort	The first sentence of the third full paragraph of this section was modified. The sentence formerly read, "In November 2011, injection of CO_2 into CCS#1 began and, as of January 2014, approximately 730,000 metric tons of CO_2 have been injected," and now reads, "In November 2011, injection of CO_2 into CCS#1 began and, as of project completion in November 2014, 999,215 metric tons of CO_2 had been injected."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
B4	Model Inputs and Assumptions	The following sentence was added to the end of the first paragraph of this section: "The model update to meet requirements of 40 CFR 146.82(c)(1) simulates three years of injection in CCS#1, followed by five years of injection in CCS#2, followed by a 50-year post-injection period."	This change reflects the inputs used during the reservoir model update.
B4	Model Inputs and Assumptions – Site Geology and Hydrology	The following two sentences were added to the end of the first paragraph of this section: "Wireline log results from CCS#2 and VW#2 and core analyses from VW#2 were compared to data collected from CCS#1 and the ISGS database. The results show good agreement, validating the local site geology and hydrogeology as defined by data from CCS#1 and other nearby wells."	This change reflects the results of the additional VW#2 and CCS#2 well log data acquired during the pre-operational phase of the CCS#2 project.
B4	Model Inputs and Assumptions – Site Geology and Hydrology	The modifying phrase, "and verified from pre-injection testing on CCS#2 and VW#2" was added to a sentence in the second paragraph of this section. The sentence now reads, "However, based on core sample and log analysis from the CCS#1 well, and verified from pre-injection testing on CCS#2 and VW#2, the upper Mt. Simon is interpreted to have been deposited "in a tidally influenced system similar to the reservoirs used for natural gas storage in northern Illinois," while the basal 600 ft (the target injection zone) represents an "arkosic sandstone that was originally deposited in a braided river-alluvial fan system."	This change reflects the results of the additional VW#2 and CCS#2 well log data acquired during the pre-operational phase of the CCS#2 project.
B4	Model Inputs and Assumptions – Site Geology and Hydrology	The following sentence was added to the end of the third paragraph of this section: "Pre-injection testing in CCS#2 and VW#2 confirmed the absence of faults and folds based on the results of fracture finder logs."	This change reflects the results of the additional VW#2 and CCS#2 fracture finder logs completed during pre-operational testing for the CCS#2 project.
B5	Model Inputs and Assumptions – Site Geology and Hydrology	The following two sentences were moved from the end of the second full paragraph of the "Tabulation of Wells within the AoR – Wells within the AoR" section to the end of the fourth paragraph of this section: "Like other areas with humid climates (Freeze and Cherry, 1979), the water table in central Illinois is expected to reflect the elevation of the land surface. Steady-state ground water flow modeling for the IBDP site indicates that shallow ground water flows toward the east and southeast toward the Sangamon River and Lake Decatur."	Administrative change.
B6	Table 1 – Zone	The "Zone" information for the model domain changed from "Eastern" to "SPCS27-1201."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B6	Table 1 – Coordinate of z_{min}	The coordinate of z_{min} changed from -6431.19 to -7113.19.	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Table 1 – Coordinate of z_{max}	The coordinate of z_{max} changed from -4290.78 to -4272.78.	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Porosity – Injection Zone Porosity	A former sentence in the first paragraph of the section that read, "For the injection interval of CCS#1 (-6,982 to -7,050 ft KB), the average effective porosity was found to be 21.0%," was replaced with two new sentences that read, "Pre-injection testing in CCS#2 identified an optimal injection interval of 6,630 to 6,825 ft KB, with multiple perforations of 6,630 – 6,670; 6,680 – 6,725; 6,735 – 6,775; and 6,781 – 6,825 (all in ft KB). The AoR was modeled using these perforation intervals, with an average effective porosity throughout the injection zone of 22%."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Porosity – Injection Zone Porosity	In the second paragraph of the section, the average porosity of the lower zone of the Mt. Simon was changed from 16.8% to 22%.	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Porosity – Injection Zone Porosity	The first sentence of the third paragraph of this section formerly read, "Based on the analysis of log results from CCS#1, ADM identified three porosity/permeability zones within the Mt. Simon," and now reads, "Based on the analysis of log results from CCS#2, ADM identified five porosity/permeability zones within the Mt. Simon."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Porosity – Injection Zone Porosity	At the end of the third paragraph of this section, the following two sentences were replaced. The text had read, "The lower zone of the Mt. Simon, extending from the base of the formation at -6,367 MSL (-7,049 ft KB) to -5,738 ft MSL (-6,420 ft KB), is described as containing 'the highest average porosity and quite good permeability.' The middle zone, extending from -5,738 ft MSL (-6,420 ft KB) to -5,268 ft MSL (-5,950 ft KB), and the upper zone, extending from -5,268 ft MSL (-5,950 ft KB) to the top of the Mt. Simon at -4.862 ft MSL (-5,544 ft KB), have lower porosities and permeabilities." This text has been deleted and replaced with the following three sentences: "Pre-injection testing identified a	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B6	Porosity – Injection Zone Porosity *(continued)*	high porosity/permeability region extending from the base of the Mt. Simon at 7,043 ft KB up to 6,427 ft KB; this overall interval included two sub-units with similar but varying porosity and permeability. The middle section of the Mt. Simon had lower porosity and permeability, extending from 6,427 to 5,907 ft KB. The upper unit from 5,907 to 5,553 ft KB also has high porosity and permeability, but was determined to be too close to the confining zone for injection."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B6	Porosity – Confining Zone Porosity	The following sentence was added to the end of the first paragraph in this section: "Pre-injection testing in CCS#2 and VW#2 indicated very small pore sizes based on CMR data, resulting in generally very low permeability (see "Confining Zone Permeability" below)."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B7	Figure 2	This figure has been modified to include the updated stratigraphic column. The previous figure is now on the left side of the composite figure under the heading "Original model," and the additional figure is on the right side under the heading "Updated model." The following changes were made to the original model to create the updated model: 1. Rock Type number labels were added adjacent to the right side of the stratigraphic column. The Mt. Simon Lower Zone is labeled "Rock Type 1 (intermittent layers of Rock Type 2)"; the Mt. Simon Middle Zone and the Mt. Simon Upper Zone are labeled "Rock Type 2"; and the Eau Claire is labeled "Rock Type 3." 2. The depth range of the Eau Claire formation was changed from 4545'-4862' to 4548'-4878'. 3. The following average porosity and permeability information was added for the Eau Claire, respectively: 4.7% and <<0.1 mD. 4. The depth range of the Mt. Simon Upper Zone was changed from 4862'-5268' to 4878-5232'. 5. The average porosity of the Mt. Simon Upper Zone changed from 10.6% to 11%, and its permeability changed from 66 mD to 95 mD.	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B7	Figure 2 *(continued)*	6. The Mt. Simon Upper Zone was delineated as part of a five-part (Units A-E) delineation of all Mt. Simon zones. An identical stratigraphic column spanning the depths of all Mt. Simon zones is adjacent to the "Updated model" column. The Mt. Simon Upper Zone is Unit E in this column. 7. The depth range of the Mt. Simon Middle Zone was changed from 5268'-5738- to 5232'-5752'. 8. The Mt. Simon Middle Zone is delineated into two units in the second stratigraphic column of the updated model: Unit D, which spans a depth range of 5232'-5450', has an average porosity of 9%, and an average permeability of 0.7 mD; and Unit C, which spans a depth range of 5450'-5752', has an average porosity of 8%, and an average permeability of 0.22 mD. 9. The depth range of the Mt. Simon Lower Zone was changed from 5738'-6367' to 5752'-6368'. 10. The Mt. Simon Lower Zone is delineated into two units in the second stratigraphic column of the updated model: Unit B, which spans a depth range of 5752'-5995', has an average porosity of 16%, and an average permeability of 21 mD; and Unit A, which spans a depth range of 5995'-6368', has an average porosity of 19%, and an average permeability of 25 mD (80 mD in perforated interval).	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B7	Figure 2	The following caption was added to Figure 2: "Reproduced layers of the geologic model and average porosity/permeability values, as identified by ADM based on log analysis, along with the approximate screened intervals of CCS #1 and CCS #2. The column on the left was produced during evaluation of the final AoR model prior to pre-injection testing; the right column incorporates the results of geophysical testing in CCS#2 and VW#2 during pre-injection testing. The updated column shows both the three primary rock types and the five rock types indicated by the wireline logs. Horizontal distances are not to scale, and the representation of layer thickness is approximate."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B7	Permeability – Injection Zone Permeability	The modifying phrase, "For the pre-construction modeling effort," was added to the beginning of the first sentence of this section. The sentence now reads, "For the pre-construction modeling effort, ADM determined intrinsic permeability for areas of the injection zone based on available core analyses and CCS#1 well testing results, and developed a core porosity-permeability transform based on grain size to estimate permeability over intervals without core samples."	Administrative change.
B8	Permeability – Injection Zone Permeability	The following two sentences were added to the end of the first paragraph of this section: "In the updated modeling effort following pre-operational testing and logging, ADM incorporated the logging and core analyses in CCS#2 and VW#2 using the methods described earlier in this plan. The well log data collected during pre-operational testing were simulated with the existing 3D permeability distribution to develop a new geological model."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B8	Permeability – Injection Zone Permeability	The last two sentences of the second paragraph of this section were deleted and replaced. The sentences had read, "ADM also directly calculated permeability for this interval from core samples and well log analyses, with a result of 182 mD. The CCS#1 well log reports an average permeability in the injection zone of 33 mD, though permeability in the perforated interval ranges from 60 mD to 'several hundred' mD (Figure 2)." The sentences now read, "ADM also directly calculated permeability for this interval from core samples and well log analyses, with a result of 80 mD in the perforated interval. Multiple regions in the perforated interval had much higher permeability (above 100mD), as shown in Figure 2."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B8	Permeability – Confining Zone Permeability	The following two sentences were added to the beginning of the first paragraph of this section: "During pre-operational testing, ADM collected 33 horizontal and 3 vertical whole core samples, and 2 rotary sidewall core samples, all from VW#2. These core samples were primarily used to validate and calibrate the ELAN petrophysical model based on well logs."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B8	Permeability – Confining Zone Permeability	A modifying phrase, "and confirmed by well logs in CCS#2," was added to the last sentence of the first paragraph in the section. The sentence now reads, "Based on the analysis of log results from CCS#1 and confirmed by well logs in CCS#2, the Eau Claire, extending from the top of the Mt. Simon to -4,545 ft MSL (-5,227 ft KB), is described as having "only a few small intervals of less than a few feet that have any permeability greater than 0.1 mD," which do not appear to be continuous."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B9	Table 2	Table 2 and its caption were replaced. The table previously had the caption, "Operating details for CCS#1 and CCS#2," and now has the caption, "Operating details for CCS#1 and CCS#2, as used in the model."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B10	Fracture Pressure and Fracture Gradient – Injection Zone	Maximum injection pressure values, corresponding elevations, and fracture gradients have been changed in the second paragraph of this section. The maximum injection pressure has changed from 4,500 psi at elevation -6,430 ft MSL to 4,266 psi at -6,630 ft MSL; the corresponding elevation for the maximum injection pressure for the top of the injection interval has changed from -6,020 ft MSL to -5,948 ft MSL; and the fracture gradient on which the maximum injection pressure is based has changed from 0.7 to 0.715.	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B10	Fracture Pressure and Fracture Gradient – Injection Zone	The last sentence of the second paragraph of this section formerly read, "These values are given in Table 3," and now reads, "These values are given in Table 2 above."	(The maximum injection pressure information for CCS#1 and CCS#2 in former Table 3 was incorporated into the current Table 2. Table 3, captioned "Maximum injection pressure for CCS#1 and CCS#2," was deleted.)
B10	Fracture Pressure and Fracture Gradient – Injection Zone	A second paragraph was added to the end of this section. It reads: "It was determined that these values (calculated based on CCS#1 results) accurately represent the system and will continue to be used for the fracture gradient and fracture pressure for CCS#2, until and unless more accurate project-specific data are available. A step-rate test run after the construction of CCS#2 yielded results that do not contradict initial fracture pressure gradient estimates. Injection pressure limits based upon this fracture pressure gradient should not create new fractures or extend any existing fractures. However, additional precautions for initial injection operations and monitoring have been added to Attachment A of this permit."	This change reflects the start-up procedures and associated monitoring/reporting protocols documented in Attachment A.

Page No.	Section/Topic	Description of Change	Justification
B10	Table 3	Table 3 was removed	Administrative change. (The maximum injection pressure information for CCS#1 and CCS#2 in former Table 3 was incorporated into the current Table 2. Table 3, captioned "Maximum injection pressure for CCS#1 and CCS#2," was deleted.)
B10	Initial Conditions	The first sentence of this section has been modified. The sentence previously read, "Fluid sampling and testing were conducted in April 2009 at CCS#1, including in-situ measurements of formation pressure and temperature and the collection of eight fluid samples at five depths," and now reads, "Fluid sampling and testing were conducted in August 2015 in VW#2, including in-situ measurements of formation pressure and temperature and the collection of eight fluid samples at five depths."	This change reflects the most up-to-date fluid sampling and analysis conducted at the site.
B10	Initial Conditions	The following sentence was added to the first paragraph of this section: "A temperature log was run in CCS#2 in 2015."	This change reflects the most up-to-date well testing conducted at the site.
B10	Initial Conditions	The initial conditions of the model have been updated. The former initial conditions of the model were as follows: • "Temperature ranged from 119.8°F at -5,772 ft KB to 125.8°F at -6,912 ft KB. • Formation pressure ranged from 2,583 psi at -5,772 ft KB to 3,206 psi at -7,045 ft KB. • Fluid density ranged from 1,090 g/L to 1,137 g/L, with an average of 1,119 g/L (of the five samples taken). TDS ranged from 164,500 ppm at -5,772 ft KB to 228,100 ppm at -7,045 ft KB, with an average of 196,700 ppm. For the initial conditions in the model, aqueous pressure was determined to be 3,205 psi at a reference elevation of -6,345 ft MSL. The initial temperature is 112°F at a reference elevation of -5,365 ft MSL, with a gradient of 1°F/100 ft. Salinity is spatially constant, at 200,000 ppm."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
B10	Initial Conditions *(continued)*	The revised initial conditions of the model are as follows: • "Temperature increased consistently with depth from 60 °F at 50' to 100 °F at 6,950 KB with an average temperature gradient of 0.0058 °F/ft. • Formation pressure was 3,200 psi at 6,980 KB with a pressure gradient of 0.46 psi/ft. The pressure ranged from 2,626 psi at 5,848 KB to 3,211 psi at 7,041 KB. • Fluid density ranged from 1,101 g/L to 1,136 g/L, with an average of 1,124 g/L (of the four samples collected). • TDS ranged from 149,830 ppm at 5,848 KB to 199,950 ppm at 7,041 KB with an average of 184,053 ppm (of the four samples collected). The values presented above from pre-operational testing activities are consistent with the values presented in the initial permit application and pre-construction modeling effort."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B11	Boundary Conditions	The following sentence was added to the end of this section: "No changes were made to the boundary conditions following pre-operational testing."	This change reflects the most up-to-date reservoir model information, updated to incorporate the project's pre-operational logging and testing results.
B15	Computational Modeling Results	The first sentence of this section formerly read, "The map below presents the AoR based on the modeling results," and now reads, "The map below presents the AoR based on the modeling results (the maximum extent of the plume and pressure front), along with wells identified within the AoR."	This edit was made to improve clarity of the attachment.
B15	Figure 7	Figure 7 was replaced with an updated figure showing the updated AoR delineation and the updated inventory of wells in the AoR.	This change reflects the most up-to-date AoR delineation and well inventory information submitted by ADM.
B16	Computational Modeling Results	The following paragraph was added to the end of this section: "The surface area of the AoR is 34.17 square miles. The predicted evolution of the plume and pressure front relative to monitoring locations is shown in the Testing and Monitoring Plan (Attachment C to this permit) and the Post-Injection Site Care (PISC) and Site Closure Plan (Attachment E to this permit)."	This addition was made to improve the clarity of the attachment and reflects the most up-to-date AoR delineation information.

Page No.	Section/Topic	Description of Change	Justification
B16	Corrective Action Plan and Schedule	The first paragraph of this section was replaced. The paragraph formerly read, "An estimated 215 wells are located within the vicinity of the AoR and evaluated and submitted to EPA by ADM in February 2014." The paragraph now reads, "Based on information from the Illinois State Geological Survey (ISGS) and the Illinois State Water Survey (ISWS) gathered in April 2016, ADM identified a total of 1,065 wells within the AoR. According to Illinois Department of Natural Resources (IDNR) drilling records (and confirmed by ISGS), no additional oil and gas wells were drilled in Macon County between April and September 2016. Except for the wells associated with the IBDP and IL-ICCS projects (as described below), no wells were identified that penetrate the confining zone within the AoR."	This change reflects the most up-to-date well inventory information submitted by ADM.
B16	Corrective Action Plan and Schedule – Wells within the AoR	An addition was made to the first sentence of this section. The sentence formerly read, "The only existing wells within the AoR which currently penetrate the caprock (Eau Claire Formation) are:" and now reads, "The only existing wells within the AoR which currently penetrate the caprock (Eau Claire Formation) are wells associated with the IBDP and IL-ICCS projects:"	Administrative change.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The first bullet of this section, which names existing rocks penetrating the Eau Claire Formation, has been modified. The bullet formerly read, "The IBDP injection well," and now reads, "The IBDP injection well, CCS#1 (which is currently permitted as a Class VI well in its post-injection phase and will be used as a monitoring well during the IL-ICCS project)."	Administrative change.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The second bullet of this section, which names existing rocks penetrating the Eau Claire Formation, has been modified. The bullet formerly read, "IBDP verification well," and now reads, "The IBDP verification well, VW#1 (which will continue to be used as a monitoring well during the IL-ICCS project)."	Administrative change.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The following third bullet of this section, which names existing wells penetrating the Eau Claire Formation, has been added: "The IL-ICCS injection well, CCS#2.	Administrative change.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The fourth bullet has been added: "The IL-ICCS verification well, VW#2."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
B16	Corrective Action Plan and Schedule – Wells within the AoR	The first sentence of the second paragraph in this section was modified. The sentence formerly read, "The latest estimate shows that a total of 215 wells are located within the vicinity of the proposed well," and now reads, "The latest estimate shows that a total of 1,065 wells are located within the AoR."	This change reflects the most up-to-date well inventory information submitted by ADM.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The second sentence of the second paragraph in this section formerly read, "Water wells (157 of 215 wells) are the most common well type," and now reads, "Water wells (725 of 1,065 wells) are the most common well type."	This change reflects the most up-to-date well inventory information submitted by ADM.
B16	Corrective Action Plan and Schedule – Wells within the AoR	The word "generally" was added to the third sentence of the second paragraph in this section. The sentence now reads, "The domestic water wells generally have depths of less than 60 m (200 ft)."	Administrative change. (This addition was made to improve the clarity of the attachment.)
B16	Corrective Action Plan and Schedule – Wells within the AoR	The fourth sentence of the second paragraph in this section formerly read, "All wells within the 4 townships-area of the injection well site were also identified (total of 3,761 wells)," now reads, "As part of the original permit application, all wells within the 4 townships-area of the injection well site were also identified (total of 3,761 wells at that time)."	Administrative change.
B17	Corrective Action Plan and Schedule – Wells Penetrating the Confining Zone	The heading of this section was changed. The heading formerly read, "Wells Penetrating the Confining Zone [from Section 5.5.2]" and now reads, "Wells Penetrating the Confining Zone."	Administrative change.
B17	Corrective Action Plan and Schedule – Wells Penetrating the Confining Zone	The last sentence of the first paragraph in this section was modified. The sentence formerly read, "Therefore, there are only three known wells that penetrate the uppermost injection zone." The sentence now reads, "Therefore, there are only four known wells that penetrate into the uppermost injection zone: the IBDP wells CCS#1 and VW#1, and the IL-ICCS wells CCS#2 and VW#2."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
B17	Corrective Action Plan and Schedule – Wells Penetrating the Confining Zone	The following three bullets and sentence were deleted: • Operating Wells: Three wells penetrating the uppermost injection zone are known to be in use within the AoR. The IBDP wells (CCS#1 and VW#1) began injection operation in November 2011. The IL-ICCS verification well (VW#2) has been drilled and cased but not completed. • Properly Plugged and Abandoned wells: No wells deeper than -762 m KB (-2,500 ft KB) are known to have been plugged and abandoned within the AoR. • Temporarily Abandoned Wells: No wells deeper than -762 m KB (-2,500 ft KB) are known to have been temporarily abandoned within the AoR. No plugging affidavits are provided, as the IBDP wells are currently in use.	This change was made to improve clarity in the attachment by removing duplicative information.
B17	Corrective Action Plan and Schedule – Wells Penetrating the Confining Zone	The first sentence of the second paragraph in this section was modified. The sentence formerly read, "If any of these wells are taken out of service prior to initiating injection, ADM will provide information to EPA to confirm that they have been properly plugged to ensure USDW protection pursuant to requirements at 40 CFR Part 146," The sentence now reads, "If any of these wells are taken out of service during the life of the project, ADM will provide information to EPA to confirm that they have been properly plugged to ensure USDW protection pursuant to requirements at 40 CFR Part 146."	Administrative change.
B17	Corrective Action Plan and Schedule – Wells Penetrating the Confining Zone	The following sentence was added to the end of this section: "If any additional wells that penetrate the confining zone are identified (e.g., if the AoR is re-delineated to cover a larger area as the result of an AoR reevaluation), ADM will complete corrective action as needed pursuant to 40 CFR 146.849(d)."	This addition was made to improve the clarity of the attachment in reflecting the Class VI Rule requirements.
B17	Corrective Action Plan and Schedule – Plan for Site Access	This section formerly read, "Not applicable," and now reads, "This is not applicable because no corrective action is required."	This addition was made to improve the clarity of the attachment.
B17	Corrective Action Plan and Schedule – Justification of Phased Corrective Action	This section formerly read, "Not applicable," and now reads, "This is not applicable because no corrective action is required."	This addition was made to improve the clarity of the attachment.

Page No.	Section/Topic	Description of Change	Justification
B17	Area of Review Reevaluation Plan and Schedule	The following sentence was inserted following the second sentence of the first step in this section: "Monitoring activities to be conducted are described in the Testing and Monitoring Plan (Attachment C to this permit) and the PISC and Closure Plan (Attachment E to this permit)."	This addition was made to improve the clarity of the attachment.
B18	Area of Review Reevaluation Plan and Schedule	The second activity listed under the first step of the monitoring data review was modified. The sentence formerly read, "Also, limited 2D and 3D seismic surveys may be employed to determine the plume location at specific times." The sentence now reads, "Also, 2D and 3D seismic surveys will be employed to determine the plume location as described in the Testing and Monitoring Plan and/or the PISC and Site Closure Plan (as applicable)."	This addition was made to improve the clarity of the attachment and reflects the most up-to-date content of Attachments C and E.
B19	Area of Review Reevaluation Plan and Schedule – AoR Reevaluation Cycle	The following two sentences were inserted following the first sentence of the second paragraph in this section: "Given anomalous results in the CCS#2 step-rate test, ADM will modify their monitoring and reporting schedule to collect and review data more regularly during the first six months of the injection phase. Specifically, pressure and seismic results will be reviewed on a monthly basis to identify any deviations from expected conditions (see Attachment A of this permit for more detail)."	This language was added to reflect the increased monitoring and reporting planned for the start-up period and the first six months of the injection phase, as documented in Attachment A.
B20	Area of Review Reevaluation Plan and Schedule – Triggers for AoR Reevaluations Prior to the Next Scheduled Reevaluation	The last sentence of the "Exceeding Fracture Pressure Conditions" monitoring parameter bullet was modified. The sentence formerly read, "The Testing and Monitoring Plan provides discussion of pressure monitoring," and now reads, "The Testing and Monitoring Plan (Attachment C to this permit) and the operating procedures in Attachment A to this permit provides discussion of pressure monitoring and specific procedures that will be completed during the injection start-up period."	This language was added to reflect the increased monitoring and reporting planned for the start-up period and the first six months of the injection phase, as documented in Attachment A.
B20	Area of Review Reevaluation Plan and Schedule – Triggers for AoR Reevaluations Prior to the Next Scheduled Reevaluation	The last sentence of the "Exceeding Established Baseline Hydrochemical/Physical Parameter Patterns" monitoring parameter bullet was modified. The sentence formerly read, "The Testing and Monitoring Plan provides extended information regarding how pressure, temperature, and fluid conductivity will be monitored." The sentence now reads, "The Testing and Monitoring Plan (Attachment C to this permit) provides extended information regarding how pressure, temperature, and fluid conductivity will be monitored."	This edit was made to improve the clarity of the attachment.

Proposed Changes to Attachment C: Testing and Monitoring Plan

Page No.	Section/Topic	Description of Change	Justification
C1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
C1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change was made to reflect the final, as-drilled location of CCS#2.
C1	Facility Information – Quality Assurance Procedures	This section formerly read, "A quality assurance and surveillance plan (QASP) for all testing and monitoring activities pursuant to 146.90(k) is provided in Appendix A to this Testing and Monitoring Plan," now reads, "A quality assurance and surveillance plan (QASP) for all testing and monitoring activities pursuant to 40 CFR 146.90(k) is provided in the Appendix to this Testing and Monitoring Plan."	Administrative change.
C3	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure	The last sentence of the second paragraph of this section was modified to include the acronym for distributed temperature sensing (DTS). The sentence now reads, "In addition there will be distributed temperature sensing (DTS) fibers in the injection well."	Administrative change.
C3	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure	The second sentence of the third paragraph in this section was modified. The sentence formerly read, "Downhole gauges, in lieu of removing the injection tubing, will demonstrate accuracy by using a second pressure gauge, with current certified calibration, that will be lowered into the well to the same depth as the permanent downhole gauge," and now reads, "In lieu of removing the injection tubing, downhole gauges will demonstrate accuracy by using a second pressure gauge, with current certified calibration, that will be lowered into the well to the same depth as the permanent downhole gauge."	Administrative change.
C3	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure	The following sentence was added to the end of the third paragraph of this section: "DTS sampling rate will be once per 10 seconds."	This addition was made to improve the clarity of the attachment by including additional detail.
C3	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure	The first sentence of the fourth paragraph of this section was modified. The sentence formerly read, "Flow will be monitored with a coriolis mass flowmeter at the wellhead," and now reads, "Flow will be monitored with a Coriolis mass flowmeter at the compression facility."	This change reflects changes that have occurred at the ADM surface facility.

Page No.	Section/Topic	Description of Change	Justification
C4	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Injection Rate and Pressure Monitoring	The last sentence of this section was modified. The sentence formerly read, "ADM supervisors and operators will have the capability to monitor the status of the entire system site in two locations: the compression control room (near the main compressors), and the main Alcohol Department control room." The sentence now reads, "ADM supervisors and operators will have the capability to monitor the status of the entire system from distributive control centers but mainly from two locations: the phase 1 compression control room (near the CO_2 collection and blower facility), and the phase 2 main compression control room."	This change reflects changes that have occurred at the ADM surface facility.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The third procedure in this section was modified to change the set level of the injection tubing packer from 6,320 to 6,312 ft KB. The sentence now reads, "During periods of well shut down, the surface annulus pressure will be kept at a minimum pressure to maintain a pressure differential of at least 100 psi between the annular fluid directly above (higher pressure) and below (lower pressure) the injection tubing packer set at 6,312 ft KB."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The third full paragraph of this section formerly read, "Figure 1 shows an example of the injection well annulus protection system. The final design configuration of the annular monitoring system may differ from the example. The final design of the annular pressure system will be submitted to UIC Program Director with the construction completion report." The paragraph now reads, "Figure 1 shows the process instrument diagram for the injection well annulus protection system."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The first sentence of the fourth full paragraph in this section formerly read, "The annular monitoring system will consist of a continuous annular pressure gauge, a brine water storage reservoir, a low-volume/high-pressure pump, a control box, fluid volume measurement device, fluid, and electrical connections." The sentence now reads, "The annular monitoring system consists of a continuous annular pressure gauge, a pressurized annulus fluid reservoir (annulus head tank), pressure regulators, and tank fluid level indication."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.

Page No.	Section/Topic	Description of Change	Justification
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The second part of the fourth full paragraph in this section formerly read, "The control box will receive pressure data from an annular pressure gauge and will be programmed to operate the pump as needed to maintain approximately 400 psi (or greater) on the annulus. A means to monitor the volume of fluid pumped into the annulus will be incorporated into the system by use of a tank fluid level gauge, flow meter, pump stroke counter or other appropriate devices." This section has been replaced with one sentence, which reads, "The annulus system will maintain annulus pressure by controlling the pressure on the annulus head tank using either compressed nitrogen or CO_2."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The first sentence of the fifth full paragraph in this section formerly read, "Pressure will be monitored by the ADM control system gauges," and now reads "The annulus pressure will be maintained between approximately 425-525 psi and monitored by the ADM control system gauges."	This addition was made to improve the clarity of the attachment by including additional detail.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The second sentence of the fifth full paragraph in this section formerly read, "The pump will be controlled by two pressure switches—one for low pressure to engage the pump and the other for high pressure to shut the pump down." The sentence now reads, "The annulus head tank pressure will be controlled by pressure regulators–one set of regulators to maintain pressure above 400 psi by adding compressed nitrogen or CO_2 and the other to relieve pressure above 525 psi by venting gas off the annulus head tank."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The following sentence was deleted from the end of the fifth full paragraph in this section: "Anticipated range on the switches would be 400 psi or higher for the low pressure set point and 500 psi or higher for the high pressure set point."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.

Page No.	Section/Topic	Description of Change	Justification
C5	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The following four sentences were deleted from the beginning of the sixth full paragraph in this section: "Annulus pressure will be monitored at the ADM data control system. A brine storage tank will be connected to the suction inlet of the pump. A hydrostatic tank level gauge will be installed in the brine storage tank with data fed into the ADM monitoring system. The brine in the storage tank will be similar to the brine in the annulus."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.
C6	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The first sentence of the seventh full paragraph in this section formerly read, "Average annular pressure and fluid volume changes will be recorded daily," and now reads, "Average annular pressure and annulus tank fluid level will be recorded daily."	This edit was made to improve the clarity of the attachment.
C6	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Continuous Monitoring of Annular Pressure	The following sentence was added to the end of the seventh full paragraph in this section: "The volume of fluid added or removed from the system will be recorded."	This addition was made to improve the clarity of the attachment by including additional detail.
C6	Continuous Recording of Injection Pressure, Rate, and Volume; Annulus Pressure – Casing-Tubing Pressure Monitoring	The second sentence of the second paragraph in this section was modified to change the range of surface pressure of the casing-tubing annulus from 400-700 psi to 425-525 psi. The sentence now reads, "Surface pressure of the casing-tubing annulus is anticipated to be from 425 to 525 psi."	This change reflects the most up-to-date information about the CCS#2 monitoring equipment.
C7	Table 5	Note 4, a footnote attached to the "Minimum sampling frequency: once every" column header, was added to the table. The note reads, "DTS sampling frequency is once every 10 seconds and recorded on an hourly basis."	This addition was made to improve the clarity of the attachment by including additional detail.
C7	Corrosion Monitoring – Sample Description	The last sentence of the first paragraph in this section was modified. The sentence formerly read, "Each coupon will be weighed, measured, and photographed prior to initial exposure (see "Sample Monitoring" section for measurement data)." The sentence now reads, "Each coupon will be weighed, measured, and photographed prior to initial exposure (see "Sample Handling and Monitoring" below)."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
C9	Groundwater Quality Monitoring	The third bulleted zone of focus in the groundwater monitoring plan was modified. The bullet formerly read, "The Ironton-Galesville Sandstone—the zone above the confining Eau Claire cap rock," and now reads, "The Ironton-Galesville Sandstone – the zone above the Eau Claire confining zone."	This edit was made to improve the clarity of the attachment.
C9	Figure 3	The caption of Figure 3 has been modified. The caption formerly read, "Location of existing shallow groundwater monitoring wells and planned deep wells," and now reads, "Location of shallow groundwater monitoring wells and deep monitoring wells."	This change reflects the most up-to-date information since construction of the CCS#2 well was completed.
C10	Table 7	The spatial coverage for the CCS#2 DTS monitoring in the Quaternary and/or Pennsylvanian strata has changed from "1 point location, distributed measurement to 6325 KB/5631 MSL" to "1 point location, distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.
C10	Table 7	The spatial coverage for the GM#2 fluid sampling in the St. Peter formation has changed from "1 point location, 1 interval: 3300 KB/2606 MSL" to "1 point location, 1 interval: 3450 KB/2759 MSL."	This change reflects the most up-to-date well information since construction of the GM#2 well was completed.
C10	Table 7	The spatial coverage for the GM#2 pressure/temperature monitoring in the St. Peter formation has changed from "1 point location, 1 interval: 3450 KB/2756 MSL" to "1 point location, 1 interval: 3450 KB/2759 MSL."	This change reflects the most up-to-date well information since construction of the GM#2 well was completed.
C10	Table 7	The spatial coverage for the CCS#2 DTS monitoring in the St. Peter formation has changed from "1 point location, distributed measurement to 6325 KB/5631 MSL" to "1 point location, distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.
C10	Table 7	The spatial coverage for the VW#2 fluid sampling in the Ironton-Galesville formation has changed from "1 point location, 1 interval: 5000 KB/4918 MSL" to "1 point location, 1 interval: 5010 KB/4307 MSL."	This change reflects the most up-to-date well information since construction of the VW#2 well was completed.
C10	Table 7	The spatial coverage for the CCS#2 DTS monitoring in the Ironton-Galesville formation has changed from "1 point location, distributed measurement to 6325 KB/5631 MSL" to "1 point location, distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.

Page No.	Section/Topic	Description of Change	Justification
C11	Table 8	The monitoring activity "RST" was defined as "Reservoir Saturation Tool (RST) logs" in the first row in which it appears in Table 8. That data cell now reads, "Pulse Neutron Logging/ Reservoir Saturation Tool (RST) logs."	Administrative change.
C13	Table 9	Former Note 1, which reads, "An equivalent method may be employed with the prior approval of the Director," was incorporated into the end of the current Note 1, which includes the former Table 9 footnote.	Administrative change.
C13	External Mechanical Integrity Tests (MITs)	The title of this section was changed from "External Mechanical Integrity Testing" to "External Mechanical Integrity Tests."	Administrative change.
C17	Pressure Fall-Off Testing – Pressure Fall-off Test Procedure	The third sentence of this section was modified to change the normal injection rate from 3,000 MT/day to 2,750 MT/day. The sentence now reads, "The normal injection rate is estimated to be 2,750 MT/day (the last 3 years of the planned 5-year injection period)."	This change reflects an update to ADM's planned injection parameters.
C18	Table 11	The spatial coverage for the VW#2 fluid sampling for the Mt. Simon formation has changed from "1 point location, 3 intervals: 6800, 6300, 5800 KB; 6106, 5606, 5106 MSL" to "1 point location, 3 intervals: 6710, 6500, 5810 KB; 6007, 5797, 5107 MSL"	This change reflects the most up-to-date well information since construction of the VW#2 well was completed.
C19	Table 11	The frequency of the full coverage 3D surface seismic survey monitoring for the Mt. Simon formation changed from "Baseline, Year 2 (2018)" to "Baseline, Year 2 (2019)."	This edit was made to capture the anticipated numerical year of Year 2 of the CCS#2 operational phase.
C19	Table 12	The spatial coverage for the VW#2 pressure/temperature monitoring in the Mt. Simon formation has changed from "1 point location, 4 intervals: 7000, 6800, 6300, 5800 KB; 6306, 6106, 5606, 5106 MSL" to "1 point location, 4 intervals: 7041, 6681, 6524, 5848 KB; 6338, 5978, 5821, 5145 MSL."	This change reflects the most up-to-date well information since construction of the VW#2 well was completed.
C19	Table 12	The spatial coverage for the CCS#2 pressure/temperature monitoring in the Mt. Simon formation has changed from "1 point location, 1 interval: PT @ 6325 KB/5631 MSL; Perfs @ 6718 - 6881 KB, 6024 - 6187 MSL" to "1 point location, 1 interval: PT @ 6270 KB/5579 MSL; Perfs @ 6630 - 6825 KB, 5939 - 6134 MSL."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.
C19	Table 12	The spatial coverage for the CCS#2 DTS monitoring in the Mt. Simon formation has changed from "1 point location, distributed measurement to 6325 KB/5631 MSL" to "1 point location, distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well information since construction of the CCS#2 well was completed.

Page No.	Section/Topic	Description of Change	Justification
C20	Table 13	Former Note 1, which reads, "An equivalent method may be employed with the prior approval of the Director," was incorporated into the end of the current Note 1, which includes the former Table 13 footnote.	Administrative change.
C20	Carbon Dioxide Plume and Pressure Front Tracking	The following paragraph was added following Table 13 on page C20: "Monitoring locations relative to the predicted location of the CO2 plume and pressure front at 1-year intervals throughout the injection phase are shown in Figure 4 through Figure 9. Predicted pressure profiles at the top of the injection interval and bottom-hole pressure at CCS#2 are shown in Figure 10 and Figure 11. The predicted amount of CO2 in the mobile gas, trapped gas, and dissolved (aqueous) phases for 50 years after the commencement of injection is shown in Figure 12."	Model predictions were included in the attachment to facilitate comparison with testing and monitoring results.
C21	Figure 4	Figure 4 was added.	These changes reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C21	Figure 4	The following caption was added to Figure 4: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, at the commencement of injection for CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
C22	Figure 5	Figure 5 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C22	Figure 5	The following caption was added to Figure 5: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, after 1 year of injection at CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
C23	Figure 6	Figure 6 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C23	Figure 6	The following caption was added to Figure 6: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, after 2 years of injection at CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
C24	Figure 7	Figure 7 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C24	Figure 7	The following caption was added to Figure 7: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, after 3 years of injection at CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
C25	Figure 8	Figure 8 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C25	Figure 8	The following caption was added to Figure 8: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, after 4 years of injection at CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
C26	Figure 9	Figure 9 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C26	Figure 9	The following caption was added to Figure 9: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, after 5 years of injection at CCS #2."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
C27	Figure 10	Figure 10 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C27	Figure 10	The following caption was added to Figure 10: "Predicted pressure profile at the top of the CCS#2 injection interval, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
C27	Figure 11	Figure 11 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C27	Figure 11	The following caption was added to Figure 11: "Predicted CCS#2 bottom-hole pressure profile, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
C28	Figure 12	Figure 12 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
C28	Figure 12	The following caption was added to Figure 12: "Predicted CO_2 phase distribution, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.

Proposed Changes to Attachment D: Injection Well Plugging Plan

Page No.	Section/Topic	Description of Change	Justification
D1	Introduction	A two-sentence introduction, which read, "The Permittee will submit a final injection well plugging plan using the as-built well construction schematics. This will be submitted with the injection well completion report," was deleted.	Administrative change.
D1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
D1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change was made to reflect the final, as-drilled location of CCS#2.
D1	Facility Information	The sentence that formerly read, "Injection well plugging and abandonment will be conducted according to the procedures below, which are based on information submitted by ADM in November 2013," now reads "Injection well plugging and abandonment will be conducted according to the procedures below, which are based on information submitted by ADM in May of 2016."	Administrative change.
D1	Facility Information	The sentence that formerly read, "If a loss of mechanical integrity is discovered, it will be repaired prior to proceeding with the plugging operations," now reads, "If a loss of mechanical integrity is discovered, the well will be repaired prior to proceeding with the plugging operations."	Administrative change.
D2	Information on Plugs	The first sentence of this section that read, "The volume and depth of the plug or plugs will depend on the final geology and downhole conditions of the well as assessed during construction," was deleted.	This sentence served as a placeholder for the plugs' volume and depth data that were subject to change prior to construction. Because construction has been completed, the data were updated and the placeholder was deleted.
D2	Information on Plugs – Plug #1	The "Depth to Bottom of Tubing or Drill Pipe (ft)" data for Plug #1 was changed from 7000 to 7100.	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.
D2	Information on Plugs – Plug #1	The "Sacks of Cement to be Used (each plug)" data for Plug #1 was changed from 1333 to 1378.	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.

Page No.	Section/Topic	Description of Change	Justification
D2	Information on Plugs – Plug #1	The "Slurry Volume to be Pumped (cu. ft)" data for Plug #1 was changed from 1480 to 1530.	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.
D2	Information on Plugs – Plug #1	The "Bottom of Plug (ft)" data was changed from 7000 to 7100.	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.
D4	Narrative Description of Plugging Procedures – Notifications, Permits, and Inspections	The Plug #1 data was changed in item #11, which describes the depth parameters of the plugging plan. The first two sentences that formerly read, "The lower section of the well will be plugged using CO_2 resistant cement from TD around 7000ft to around 1000ft above the top of the Eau Claire formation (to approximately 4000 ft). This will be accomplished by placing plugs in 500 ft incremental lifts. Using a density of 15.9 ppg slurry with a yield of 1.11 cf/sk, approximately 1333 sacks of cement will be required," have been modified and now reads, "The lower section of the well will be plugged using CO_2 resistant cement from TD around 7100ft to around 1000ft above the top of the Eau Claire formation (to approximately 4000 ft). This will be accomplished by placing plugs in 500 ft incremental lifts. Using a density of 15.9 ppg slurry with a yield of 1.11 cf/sk, approximately 1378 sacks of cement will be required." The last sentence of item #11 that formerly read, "(Calculations: Assume 47 lb/ft casing for this interval 3000ft x .4110 cu ft/ft x 1.20/ 1.11 cu ft/sk = 1333 sacks,)" now reads, "(Calculations: Assume 47 lb/ft casing for this interval 3100ft x .4110 cu ft/ft x 1.20/ 1.11 cu ft/sk = 1378 sacks.)"	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.
D5	Narrative Description of Plugging Procedures – Figure 1	Figure 1 was revised in the following ways: 1. The column labeled, "FORMATION TOPS MD" formerly listed formations as follows, in order of increasing depth: RKB, Limestone, Logan Shale, Renault Ls, St. Louis Ls/Anhyd, Borden Ss, Burlington Ls, New Albany Sh, Silurian Ls, Maquoketa Sh, Galena Ls, Platteville Ls, St. Peter Ss, Shakopee Dol, Oneota Dol, Gunter Ss, Eminence Dol, Potosi Dol, Ironton Ss, Eau Claire, Eau Claire Ls, Eau Claire Sh, Upper Mt. Simon Ss, Lower Mt. Simon Ss, Precambrian. The formations were updated, and are now listed as follows: RKB, Limestone, Renault Ls, St. Louis Ls/Anhyd,	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.

Page No.	Section/Topic	Description of Change	Justification
D5	Narrative Description of Plugging Procedures – Figure 1 *(continued)*	Burlington Ls, New Albany Sh, Silurian Ls, Maquoketa Sh, Galena Ls, Platteville Ls, St. Peter Ss, Shakopee Dol, Oneota Dol, Gunter Ss, Eminence Dol, Potosi Dol, Ironton Ss, Eau Claire,M. Simon E, M. Simon D, M. Simon C, M. Simon B, M. Simon A, Argenta, Precambrian. 2. The hole size from the surface to the depth of the surface casing has changed from 24 inches to 26 inches; 3. The surface casing label that read, "Surface casing 20 94# J55" was removed; 4. A duplicate lift, Lift 13 (Class A/H), was removed; 5. A note adjacent to Lift 9 that read, "Well filled with cement in 500 foot lifts using balanced plug method," was removed; 6. A labeled arrow that read, "Bottom of plug #2 = 4,000 ft" adjacent to the interface of Lifts 6 and 7 was removed; 7. A label that read, "13-3/8 csg Stage tool at ~3850'" adjacent to Lift 7 was removed; 8. A label that reads, "Top of EverCRETE Plug ~4000 ft" was added adjacent to the interface of Lifts 6 and 7; 9. A label that read, "Intermediate Csg 13-3/8" 54.5# J55 from __ to 13-3/8" 61# J55 from __ to 5350' Two stage cement job planned" adjacent to the interface between Lifts 3 and 4 was removed; 10. A labeled arrow that read, "Bottom of plug #1 = 7,000 ft" adjacent to the bottom of Lift 1 was removed; 11. A label that read, "Injection Zone (approx) adjacent to Lift 1 was removed. 12. A label that read, "Long String Casing 9-5/8" 40# N80 Surf to 5250' 9-5/8" 47# 13CRL80 5250 to 7200'" adjacent to the bottom of Lift 1 was removed; 13. A label that reads, "Btm of EverCRETE Plug ~7100 ft" adjacent to the bottom of Lift 1 was added; 14. A label that read, "Perforations ~6700' to 6800'" adjacent to the top of Lift 1 was replaced with a label that reads, "Injection Zone Perforations: 6630'-6670' 6680'-6725' 6735'-6775' 6787'-6825' adjacent to the interface between Lifts 1 and 2. 15. A label that reads, "80 ft cement at bottom of casing" adjacent to the bottom of Lift 1 was added;	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.

Page No.	Section/Topic	Description of Change	Justification
D5	Narrative Description of Plugging Procedures – Figure 1 *(continued)*	16. Two sentences were removed from the note at the bottom of the figure. The note formerly read, "Plugs to be set usin [sic] balanced plug method in 500 feet lifts. All casings to be cemented to surface. CO2 resistant Evercrete to be used for tall cement on long string job," was revised and now reads, "All casings to be cemented to surface." 17. From Figure 1 Title, "Perforation zone(s) are estimated." was deleted.	This change reflects the most up-to-date plugging information, based on the as-built construction of CCS#2.

Proposed Changes to Attachment E: PISC and Site Closure Plan

Page No.	Section/Topic	Description of Change	Justification
E1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
E1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change was made to reflect the final, as-drilled location of CCS#2.
E1	Facility Information	A sentence in this paragraph was modified to change the phrase "UIC Program Director" to "Director."	Administrative change.
E1	Predicted Position of the CO2 Plume and Associated Pressure Front at Site Closure	The second sentence in this section that read, "This map is based on the final AoR delineation modeling results submitted in January 2014, per 40 CFR 146.84," now reads, "This map is based on the final AoR delineation modeling results submitted in May 2016, per 40 CFR 146.84."	Administrative change.
E2	Figure 1	Figure 1 was replaced and its caption was modified. The previous caption read, "Predicted Extent of the CO_2 plume and pressure front at site closure," and the current caption reads, "Predicted extent of the CO_2 plume 10 years after the cessation of injection (Est Yr 2031). Pressure front (DPif = 62.2 psi) not shown because pressure is expected to decrease below that level at site closure."	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
E3	Table 1	Note 2 was revised to change the phrase "UIC Program Director" to "Director."	Administrative change.
E4	Table 2	Note 1 was revised to change the phrase "UIC Program Director" to "Director."	Administrative change.
E4	Table 3	The Table 3 caption was modified. The caption previously read, "Indirect Summary of analytical and field parameters for groundwater samples," and now reads, "Summary of Analytical and Field Parameters for Groundwater Samples."	Administrative change. (This change was made to correct an error in the previous version of the plan.)
E5	Table 3	Note 1 was modified. The second sentence of the note formerly read, "An equivalent method may be employed with prior approval of the UIC Program Director," and now reads, "An equivalent method may be employed with prior approval of the Director."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
E6	Figure 2	The caption of Figure 2 was modified. The caption formerly read, "Location of existing shallow groundwater monitoring wells and planned deep wells," and now reads, "Location of shallow groundwater monitoring wells and deep monitoring wells."	This change reflects the most up-to-date information since construction of the CCS#2 well and associated monitoring wells was completed.
E7	Groundwater Quality Monitoring	The following paragraph was added prior to Table 4: Collection and recording of continuous monitoring data will occur at the frequencies described in Table 4.	Administrative change.
E7	Table 4	The content of the previous Table 4 "Note" was changed to the current Table 4 "Note 1" footnote attached to the second column header, "Minimum sampling frequency: once every."	Administrative change.
E7	Table 4	The Table 4 "Note 2" was added. The footnote is attached to the third column header, "Minimum recording frequency: once every." Note 2 reads, "Recording frequency refers to how often the sampled information gets recorded to digital format (such as a computer hard drive). Following the same example above, the data from the injection pressure transducer might be recorded to a hard drive once every minute."	Administrative change.
E7	Table 4	The former Table 4 "1" footnote is now "Note 3." This footnote is still attached to the "5 minutes" data cell, the minimum recording frequency for continuous monitoring of the injection well.	Administrative change.
E7	Table 4	The Table 4 "Note 4" was added. The footnote is attached to the second and third column header, "Minimum recording frequency: once every." Note 4 reads, "DTS sampling frequency is once every 10 seconds and recorded on an hourly basis."	This addition was made to improve the clarity of the attachment by including additional detail.
E7 – E8	Table 5	Notes 1 and 2 were revised to change the phrase "UIC Program Director" to "Director."	Administrative change.
E8	Table 6	Former Note 1, which reads, "An equivalent method may be employed with the prior approval of the Director," was revised to change the phrase "UIC Program Director" to "Director." The note was also incorporated into the end of the current Note 1, which includes the former Table 6 footnote.	Administrative change.
E9	Table 7	Note 2 was revised to change the phrase "UIC Program Director" to "Director."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
E9	Carbon Dioxide Plume and Pressure Front Tracking	The following paragraph was added following Table 7: "Monitoring locations relative to the predicted location of the CO_2 plume and pressure front at 5-year intervals throughout the post-injection phase are shown in Figure 3 through Figure 5. Predicted pressure profiles at the top of the injection interval and bottom-hole pressure at CCS#2 for 50 years after the commencement of injection are shown in Figure 6 and Figure 7. The predicted amount of CO_2 in the mobile gas, trapped gas, and dissolved (aqueous) phases for 50 years after the commencement of injection is shown in Figure 8."	Model predictions were added to this attachment to facilitate comparison with testing and monitoring results.
E10	Figure 3	Figure 3 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E10	Figure 3	The following caption was added to Figure 3: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, at the beginning of the post-injection phase."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
E11	Figure 4	Figure 4 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E11	Figure 4	The following caption was added to Figure 4: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, at the end of 5 years after the cessation of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.

Page No.	Section/Topic	Description of Change	Justification
E12	Figure 5	Figure 5 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E12	Figure 5	The following caption was added to Figure 5: "Predicted extent of the CO_2 plume and pressure front (DPif = 62.2 psi) relative to monitoring locations, at the end of 10 years after the cessation of injection (predicted time of site closure)."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
E13	Figure 6	Figure 6 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E13	Figure 6	The following caption was added to Figure 6: "Predicted pressure profile at the top of the CCS#2 injection interval, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
E13	Figure 7	Figure 7 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E13	Figure 7	The following caption was added to Figure 7: "Figure 7. Predicted CCS#2 bottom-hole pressure profile, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.

Page No.	Section/Topic	Description of Change	Justification
E14	Figure 8	Figure 8 was added.	These changes reflect the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results. The model predictions were included to facilitate comparison with testing and monitoring results.
E14	Figure 8	The following caption was added to Figure 8: "Predicted CO_2 phase distribution, simulated for 50 years after the commencement of injection."	This caption reflects the most up-to-date AoR model information, updated to incorporate the project's pre-operational logging and testing results.
E14	Schedule for Submitting Post-Injection Monitoring Results	The first paragraph of this section was revised to change the phrase "UIC Program Director" to "Director."	Administrative change.
E15	Non-Endangerment Demonstration Criteria	The first sentence of this section was revised. The previous sentence read, "Prior to approval of the end of the PISC period, the operator will submit a demonstration of non-endangerment of USDWs to the UIC Program Director, per 40 CFR 146.93(b)(2) or (3)," and the current sentence reads, "Prior to authorization of site closure, ADM will submit a demonstration of non-endangerment of USDWs to the Director, per 40 CFR 146.93(b)(2) or (3). "	This edit was made to improve clarity of the attachment.
E15	Non-Endangerment Demonstration Criteria	The first sentence of the second paragraph of this section was revised. The previous sentence read, "The operator will issue a report to the UIC Program Director," and the current sentence reads, "To make the non-endangerment demonstration, ADM will issue a report to the Director."	This edit was made to improve clarity of the attachment.
E15	Non-Endangerment Demonstration Criteria	The word "evaluation" was removed from the third sentence of the second paragraph in this section. The previous sentence read, "The report will detail how the non-endangerment demonstration evaluation uses site-specific conditions to confirm and demonstrate non-endangerment." The revised sentence now reads, "The report will detail how the non-endangerment demonstration uses site-specific conditions to confirm and demonstrate non-endangerment."	This edit was made to improve clarity of the attachment.

Page No.	Section/Topic	Description of Change	Justification
E15	Non-Endangerment Demonstration Criteria	The parenthetical "(or appropriately reference)" was added to the fourth sentence of the second paragraph in this section. Additionally, this sentence was revised to change the phrase "UIC Program Director" to "Director." The previous sentence read, "The report will include: all relevant monitoring data and interpretations upon which the non-endangerment demonstration is based, model documentation and all supporting data, and any other information necessary for the UIC Program Director to review the analysis." The current sentence now reads, "The report will include (or appropriately reference): all relevant monitoring data and interpretations upon which the non-endangerment demonstration is based, model documentation and all supporting data, and any other information necessary for the Director to review the analysis."	This edit was made to improve clarity of the attachment and to reflect the most up-to-date EPA guidance on Class VI reporting.
E15	Non-Endangerment Demonstration Criteria	The final fragmented sentence of the second paragraph in this section, which introduces subsequent sections and ends with a colon, was revised to change the word "sections" to "components." The previous fragment read, "The report will include the following sections:" and the current fragment reads, "The report will include the following components:"	Administrative change.
E15	Non-Endangerment Demonstration Criteria – Summary of Existing Monitoring Data	The second sentence of this section was revised to change the phrase "UIC Program Director" to "Director."	Administrative change.
E15	Non-Endangerment Demonstration Criteria – Comparison of Monitoring Data and Model Predictions and Model Documentation	The second sentence of this section was revised. The previous sentence read, "The data will include time-lapse temperature, pressure, ground water analysis, passive seismic, and geophysical surveys (i.e. logging, operating-phase VSP, and 3D surface seismic surveys) used to update the computational model and to monitor the site." The revised sentence reads, "The data will include the results of time-lapse temperature and pressure monitoring, groundwater quality analysis, passive seismic monitoring, and geophysical surveys (i.e. logging, operating-phase VSP, and 3D surface seismic surveys) used to update the computational model and to monitor the site."	This edit was made to improve clarity of the attachment.

Page No.	Section/Topic	Description of Change	Justification
E16	Non-Endangerment Demonstration Criteria – Evaluation of Carbon Dioxide Plume	The word "potentially" was removed from the first sentence of the paragraph. The sentence previously read, "The operator will use a combination of time-lapse RST logs, time-lapse VSP surveys, and potentially other seismic methods (2D or 3D surveys) to locate and track the extent of the CO2 plume." and now reads "The operator will use a combination of time-lapse RST logs, time-lapse VSP surveys, and other seismic methods (2D or 3D surveys) to locate and track the extent of the CO2 plume."	This change reflects the most up-to-date monitoring program for CCS#2.
E16	Non-Endangerment Demonstration Criteria – Evaluation of Carbon Dioxide Plume	The sixth sentence of this section that previously read, "Also, limited 2D and 3D seismic surveys may be employed to determine the plume location at specific times," now reads, "Also, limited 2D and 3D seismic surveys will be employed to determine the plume location at specific times."	This change clarifies the planned use of 2D and 3D seismic surveys during the CCS#2 PISC period.
E18	Non-Endangerment Demonstration Criteria – Evaluation of Carbon Dioxide Plume	The second sentence of the second paragraph in this section was modified to change the word "site" to "interval." The previous sentence read, "The storage site (Mt. Simon) is considered to be an open reservoir system with a regional dip oriented NW (up-dip) to SE (down-dip) and having excellent porosity (20%) and permeability (120 mD)," and the sentence now reads, "The storage interval (Mt. Simon) is considered to be an open reservoir system with a regional dip oriented NW (up-dip) to SE (down-dip) and having excellent porosity (20%) and permeability (120 mD)."	This edit was made to improve clarity of the attachment.
E20	Figure 13	Figure 13, formerly Figure 7, was replaced with an updated figure that parenthetically captures the numerical years associated with years into the PISC phase. "Year 0" was changed to "Year 0 (2016)," "Year 5" was changed to "Year 5 (2021)," "Year 10" was changed to "Year 10 (2026)," and "Year 15" was changed to "Year 15 (2031)."	Administrative change.
E20	Figure 13	The caption of Figure 13 was modified to change the end of Year 10 in the PISC period from 2030 to 2031. The caption now reads, "Illustration of Verification Well #2 comparison of actual dP versus the predicted monitoring interval dP during PISC period through year 2031."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
E21	Evaluation of Reservoir Pressure	The second sentence of the third paragraph in this section was revised. The previous sentence read, "Figure 8 shows the differential reservoir pressure predicted for three years after injection ceases, relative to original static reservoir pressure." The new sentence now reads, "Figure 14 shows an illustrative example of differential reservoir pressure predicted for three years after injection ceases, relative to original static reservoir pressure."	This edit was made to improve clarity of the attachment.
E21	Figure 14	The caption of Figure 14 was modified. The caption previously read, "Direct pressure measurements at CCS#1, CCS#2, & VW#2 will support the 10 psi differential pressure contour as predicted by the flow model (inside red circle), shown at January 1, 2023," and now reads, "Example of how direct pressure measurements at CCS#1, CCS#2, & VW#2 will support the 10 psi differential pressure contour as predicted by the flow model (inside red circle), shown at April 1, 2024."	This edit was made to improve clarity of the attachment.
E22	Non-Endangerment Demonstration Criteria – Evaluation of Potential Conduits for Fluid Movement	The first sentence of this section was modified. The sentence previously read, "As shown in the alternative PISC timeframe demonstration, other than the project wells, there are no potential conduits for fluid movement or leakage pathways within the AoR," and now reads, "Other than the project wells, there are no identified potential conduits for fluid movement or leakage pathways within the AoR."	This edit was made to improve clarity of the attachment.
E22	Non-Endangerment Demonstration Criteria – Evaluation of Potential Conduits for Fluid Movement	The second sentence of this section was modified. The sentence previously read, "As shown in Figure 9, the closest penetration of the seal formation is approximately 17 miles from the injection well," and now reads, "As shown in Figure 15, the closest penetration of the confining zone is approximately 17 miles from the injection well."	This edit was made to improve clarity of the attachment.
E23	Site Closure Plan	The third sentence of this section was modified to change "EPA" to "the Director." The sentence previously read, "Once the permitting agency has approved closure of the site, ADM will plug the verification well(s) and geophysical well(s); restore the site and move out all equipment; and submit a site closure report to EPA," and now reads, "Once the permitting agency has approved closure of the site, ADM will plug the verification well(s) and geophysical well(s); restore the site and move out all equipment; and submit a site closure report to the Director."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
E24	Site Closure Plan – Type and Quantity of Plugging Materials, Depth Intervals	The following sentence was deleted from the beginning of this section: "The volume and depth of the plug or plugs will depend on the final geology and downhole conditions of the well as assessed during construction."	This change reflects the most up-to-date plugging information since construction of the VW#2 well was completed.
E25	Site Closure Plan – Plugging and Abandonment Procedure	The first sentence of the 10th item in the procedure was modified. The sentence formerly read, "The lower section of the well will be plugged using CO_2 resistant cement from TD around 7000ft to around 1000ft above the top of the Eau Claire formation (to approximately 4000 ft)." The sentence now reads, "The lower section of the well will be plugged using CO_2 resistant cement from TD around 7150ft to around 800ft above the top of the Eau Claire formation (to approximately 4200 ft)."	These changes reflect the most up-to-date plugging information according to the as-built VW#2 construction dimensions.
E25	Site Closure Plan – Plugging and Abandonment Procedure	The first sentence of the 15th item in the procedure was modified. The sentence formerly read, "Finish filling well with cement from the surface if needed. Total of approximately 442 sacks total cement used in all remaining plugs above 4000 feet (4000 ft X .1305 cu ft/ft / 1.18 cu ft/sk = 442 sks)." The sentence now reads, "Finish filling well with cement from the surface if needed. Total of approximately 464 sacks total cement used in all remaining plugs above 4200 feet (4200 ft X .1305 cu ft/ft / 1.18 cu ft/sk = 464 sks)."	These changes reflect the most up-to-date plugging information according to the as-built VW#2 construction dimensions.
E26	Site Closure Plan – Plugging and Abandonment Procedure	The final two parenthetical sentences of the final paragraph on page E26 were deleted. The previous paragraph read, "See the figure below for a plugging schematic. (Perforation zone(s) are estimated. Well plugging plan will be updated and submitted with the well completion report.)" The current paragraph reads, "See Figure 17 below for a plugging schematic."	This change reflects the most up-to-date plugging information since construction of the VW#2 well was completed.

Proposed Changes to Attachment F: Emergency and Remedial Response Plan

Page No.	Section/Topic	Description of Change	Justification
F1	Introduction	The second sentence of the introductory section previously read "As steps to prevent unexpected carbon dioxide (CO2) movement have already been undertaken in accordance with risk analysis, this plan is about actions to be taken, and to be prepared to take, if unexpected movement or any other emergency events occur" and now reads "As steps to prevent unexpected carbon dioxide (CO2) movement have already been undertaken in accordance with risk analysis, this plan is about actions to be taken, and to be prepared to take, if unexpected fluid movement or any other emergency events occur."	Administrative change.
F1	Injection Well Location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change was made to reflect the final, as-drilled location of CCS#2.
F1	ERRP Overview	The second full paragraph of the first page previously read, "This emergency and remedial response plan (ERRP) describes actions that the owner / operator (ADM) shall take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during construction, operation, or post-injection site care periods," now reads, "This emergency and remedial response plan (ERRP) describes actions that the owner / operator (ADM) shall take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during the operation or post-injection site care periods."	Administrative change.
F2	Part 3: Emergency Identification and Response Actions	The second paragraph under Part 3 previously read, "In the event of an emergency requiring outside assistance, the project contact lead shall call the ADM Security Dispatch at (217) 424-4444 and ADM Corporate Communications at (217) 424-5413" and now reads, "In the event of an emergency requiring outside assistance, the lead project contact shall call the ADM Security Dispatch at (217) 424-4444 and ADM Corporate Communications at (217) 424-5413."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
F5	Potential Brine or CO_2 Leakage to USDW	The bullet point under the "Response Actions" heading of this section formerly read, "If the presence of indicator parameters are confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:" now reads, "If the presence of indicator parameters is confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:".	Administrative change.
F12	Part 4: Response Personnel and Equipment	The phone number of the UIC Program Director (US EPA Region V) has changed from 312-886-6234 to 312-353-7648.	Administrative change.
F15	Figure F-2	The caption for Figure F-2 has been modified. The caption formerly read, "Local area map for the IL-ICCS project. Emergency & remedial response activities will most likely be within the "area of review" highlighted on the map. Source: ISGS and ISWS well databases, current as of May 10, 2011," and now reads, "Local area map for the IL-ICCS project. Emergency & remedial response activities will most likely be within the "area of review" highlighted on the map. Source: ISGS and ISWS well databases, current as of September 1, 2016."	This change reflects the updated AoR delineation and the most up-to-date information on activities/structures in the AoR as submitted by ADM.

Proposed Changes to Attachment G: Construction Details

Page No.	Section/Topic	Description of Change	Justification
G1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
G1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53’ 08”, -89° 53’19” to 39º 53’ 09.32835”, -88° 53’16. 68306”.	This change was made to reflect the final, as-drilled location of CCS#2.
G1	Open hole diameters and intervals – Surface	The depth interval data for the surface casing changed from 0 – 450 ft to 0 – 347 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Open hole diameters and intervals – Intermediate	The depth interval data for the intermediate casing changed from 450 – 5,300 ft to 347 – 5,234 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Open hole diameters and intervals – Long	The depth interval data for the long string casing changed from 5,300 – 7,250 ft to 5,234 – 7,190 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Surface	The depth interval data for the surface casing changed from 0 – 450 ft to 0 – 347 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Surface	The grade (API) for the surface casing changed from H40 to J55.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Surface	The first two sentences of the note for surface casing (Note 1) were modified. The note previously read, “Surface casing will be 450 ft of 20 inch casing. After drilling a 26” hole to 450’ true vertical depth (TVD), 20”, 94 ppf, H40, short thread and coupling (STC) casing will be set and cemented to surface.” The note now reads, “Surface casing is 347 ft of 20 inch casing. After drilling a 26" hole to 347' true vertical depth (TVD), 20", 94 ppf, J55, short thread and coupling (STC) casing was set and cemented to surface.”	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Intermediate	The depth interval for the intermediate casing changed from 0 – 5,300 ft to 0 – 5,234 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Intermediate	The grade (API) for the intermediate casing changed from K55 or J55 to J55.	This change was made to reflect the final, as-drilled construction details for CCS#2.

Page No.	Section/Topic	Description of Change	Justification
G1	Casing specifications – Intermediate	The first three sentences of the note for intermediate casing (Note 2) were modified. The note previously read, "Intermediate casing: 5,300 ft of 13 3/8 inch casing. After a shoe test or formation integrity test (FIT) is performed, a 17 ½" hole will be drilled to approximately 5,300' TVD. 13-3/8", 61 ppf, J55, long thread and coupling (LTC) or buttress thread and coupling (BTC) will be cemented to surface." The note now reads, "Intermediate casing: 5,234 ft of 13 3/8 inch casing. After a shoe test or formation integrity test (FIT) was performed, a 17 1/2" hole was drilled to 5,234' TVD. 13-3/8", 61 ppf, J55, long thread and coupling (LTC) or buttress thread and coupling (BTC) was cemented to surface."	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Long (carbon)	The depth interval data for the carbon long strong casing changed from 0 – ~5,000 ft to 0 – 4,818 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Long (carbon)	The grade (API) for the carbon long string casing changed from N80 to L80-HC.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Long (chrome)	The depth interval data for the chrome long string casing changed from ~5,000 – ~7250 ft to 4,818 – 7,190 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Long (chrome)	The grade (API) for the chrome long string casing changed from "Chrome alloy" to 13CR80.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G1	Casing specifications – Long (chrome) and (carbon)	The note for both carbon and chrome long string casing (Note 3) was modified. The note previously read, "Long string casing: 0-5,000 ft of 9 5/8 inch, N80 casing; 5,000' – ~7250' of 9 5/8 inch, chrome alloy (e.g., 13CrL80). After a shoe test is performed and the integrity of the casing is tested, a 12 ¼" hole will be drilled to approximately 7500' TVD or through the Mt Simon, where the long string casing will be run and specially cemented. Coupling outside diameter is 10 5/8 inches for N-80 and 10.485 inches for the chrome alloy (e.g., 13Cr80)." The note now reads, "Long string casing: 0-4,818 ft of 9 ⅝ inch, L80-HC casing; 4,818' – 7,190' of 9 ⅝ inch, 13CR80. After a shoe test was performed and the integrity of the casing was tested, a 12 ¼" hole was drilled to 7190' TVD or through the Mt. Simon, where the long string casing was run and specially cemented. Coupling outside diameter is 10 ⅝ inches for L80-HC and 10.485 inches for the 13CR80."	This change was made to reflect the final, as-drilled construction details for CCS#2.

Page No.	Section/Topic	Description of Change	Justification
G2	Tubing specifications – Injection tubing	Former Note 1 was deleted. The note had read, "The tubing length will be finalized after the location of the perforations are selected and the packer location determined. The final tubing design may change subject to availability and/or pending results of reservoir analysis."	Administrative change.
G2	Tubing specifications – Injection tubing	The depth interval data for the injection tubing changed from 0 – 7,000 ft to 0 – 6,350 ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G2	Tubing specifications – Injection tubing	The outside diameter of the injection tubing changed from 4 ½ in to 5 ½ in.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G2	Tubing specifications – Injection tubing	The weight of the injection tubing changed from 12.6 lb/ft to 17 lb/ft.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G2	Tubing specifications – Injection tubing	The grade (API) of the injection tubing changed from "Chrome alloy" to 13CR80.	This change was made to reflect the final, as-drilled construction details for CCS#2.
G2	Tubing specifications – Injection tubing	A note for injection tubing (previously Note 1) was deleted. The note previously read, "The tubing length will be finalized after the location of the perforations are selected and the packer location determined. The final tubing design may change subject to availability and/or pending results of reservoir analysis." This was previously one note of four, and now there are three notes.	Administrative change.
G2	Tubing specifications – Injection tubing	A note for injection tubing (previously Note 3, now Note 2) was modified. The note previously read, "Weight of injection tubing string (axial load) in air (dead weight) will be 88,200 lbs," now reads, "Weight of injection tubing string (axial load) in air (dead weight) is 88,200 lbs."	Administrative change.
G2	Tubing specifications – Injection tubing	A note for injection tubing (previously Note 4, now Note 3) was modified. The note previously read, "Thermal conductivity of tubing @ 77°F will be 16 BTU / ft.hr.°F." The note now reads, "Thermal conductivity of tubing @ 77°F is 16 BTU / ft.hr.°F."	Administrative change.

Page No.	Section/Topic	Description of Change	Justification
G2	Tubing specifications	Two sentences describing the specifications of the injection tubing have been modified. The original paragraph read, "The injection well will be plugged back from the bottom with at least 80 feet of cement or a greater amount sufficient to prevent the injection fluid from coming in contact with the Precambrian granite basement. The figure on the following page is a well construction schematic for CCS#2." The paragraph now reads, "The injection well has approximately 80 feet of cement above the casing shoe to prevent the injection fluid from coming in contact with the Precambrian granite basement. The figure on the following page is the "as built" well construction schematic for CCS#2."	Administrative change.
G3	IL-ICCS CCS #2 Well Schematic	The depth and site elevation parameters for CCS#2 above the well schematic figure were modified. The parameters formerly read, "(depths are reference to the Kelley bushing = 694 ft above MSL) KB = 17 ft above ground, site elevation = 677 ft above MSL." The parameters now read, "Depths are reference to Kelly Bushing = 691.2 ft. above MSL**.** KB = 15.5 ft. above ground, site elevation = 675.7 ft. above MSL."	This change was made to reflect the final, as-drilled construction details for CCS#2.
G3	IL-ICCS CCS #2 Well Schematic	The IL-ICCS CCS #2 Well Schematic was revised in the following ways: 1. The column labeled, "FORMATION TOPS MD" formerly listed formations as follows, in order of increasing depth: RKB, Limestone, Logan Shale, Renault Ls, St. Louis Ls/Anhyd, Borden Ss, Burlington Ls, New Albany Sh, Silurian Ls, Maquoketa Sh, Galena Ls, Platteville Ls, St. Peter Ss, Shakopee Dol, Oneota Dol, Gunter Ss, Eminence Dol, Potosi Dol, Ironton Ss, Eau Claire, Eau Claire Ls, Eau Claire Sh, Upper Mt. Simon Ss, Lower Mt. Simon Ss, Precambrian. The formations were updated, and are now listed as follows: RKB, Limestone, Renault Ls, St. Louis Ls/Anhyd, Burlington Ls, New Albany Sh, Silurian Ls, Maquoketa Sh, Galena Ls, Platteville Ls, St. Peter Ss, Shakopee Dol, Oneota Dol, Gunter Ss, Eminence Dol, Potosi Dol, Ironton Ss, Eau Claire, M. Simon E, M. Simon D, M. Simon C, M. Simon B, M. Simon A, Argenta, Precambrian. 2. Depth interval data was added to the surface casing label; the label now reads, "Surface Casing 20" 94# J55 = 0' to 347'"; 3. The hole size corresponding to the surface casing was changed from 24" to 26"; 4. A label that read, "13-3/8 csg Stage tool at ~ 3850'" adjacent to the top of the intermediate casing was deleted;	This change was made to reflect the final, as-drilled construction details for CCS#2.

Page No.	Section/Topic	Description of Change	Justification
G3	IL-ICCS CCS #2 Well Schematic *(continued)*	5. A label that read, "Intermediate Csg 13-3/8" 54.5# J55 from __ to __ 13-3/8" 61# J55 from __ to __ 5350'. Two stage cement job planned," adjacent to the bottom of the intermediate casing now reads, "Intermediate Casing 13-3/8" 61# J55 = 0' to 5234'. Two stage cement job"; 6. A label that read, "Injection Packer, set at ~6320'" adjacent to the packer was deleted; 7. A label that read, "Injection Tubing 5-1/2" 17# 13CR80 SMLS BEAR R3 Surface to 6350'" adjacent to the completion assembly was deleted; 8. A label that read, "Injection Zone (*approx*) was replaced with a label adjacent to the base of the production casing that reads, "Production Casing 9-5/8" 40# L80-HC = 0' to 4818' 9-5/8" 47# 13CR80 = 4818' to 7190'. Two stage cement job, CO2 resistant EverCRETE used for tail cement,"; 9. A label that read, "Tubing Pressure Temperature ~6,325 ft" with an arrow pointing to the 'PT' indication near the completion assembly was deleted; 10. A label that read, "Pressure Temp Gage installed at packer" adjacent to the completion assembly was deleted; 11. A label that read, "Perf Zone ~6700-6,900" was deleted; 12. A label that reads, "Injection Zone Perforations: 6630'-6670' 6680'-6725' 6735'-6775' 6787-6825'" was inserted adjacent to the completion assembly; 13. A note was added to the bottom of the figure, which reads, "All casings to be cemented to surface."	This change was made to reflect the final, as-drilled construction details for CCS#2.

Proposed Changes to Attachment H: Financial Assurance Demonstration

Page No.	Section/Topic	Description of Change	Justification
H1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
H1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change reflects the final, as-drilled location of CCS#2.
H1	Facility Information	The second full paragraph of this section has been modified. The paragraph formerly read, "The estimated costs of each of these activities, as provided in "Cost Estimate to Demonstrate Financial Responsibility for Class VI UIC Permit" (Patrick Engineering, March 13, 2014), are presented in Table 1:." The paragraph now reads, "The updated costs of each of these activities, submitted pursuant to 40 CFR 146.82(c) on October 25, 2016, are presented in Table :"	This change reflects the updated cost estimates submitted by ADM.
H1	Table 1	The column header formerly called "Total Cost ($)" has been changed. The column header is now called "Total Cost (in Millions of $)."	This edit was made to improve the clarity of the attachment.
H1	Table 1	The total cost for the activity "Performing Corrective Action on Wells in AoR" has changed from $231,800 to $0.25 million.	This change reflects the updated cost estimates submitted by ADM.
H1	Table 1	The total cost for the activity "Plugging Injection Wells" has changed from $594,120 to $0.65 million.	This change reflects the updated cost estimates submitted by ADM.
H1	Table 1	The total cost for the activity "Post-Injection Site Care" has changed from $6,434,500 to $7.80 million.	This change reflects the updated cost estimates submitted by ADM.
H1	Table 1	The total cost for the activity "Site Closure" has changed from $535,300 to $0.59 million.	This change reflects the updated cost estimates submitted by ADM.
H1	Table 1	The total cost for the activity "Emergency and Remedial Response" changed from $30,792,000 to $33.81 million.	This change reflects the updated cost estimates submitted by ADM.
H2	Chief Financial Officer (CFO) letter	The previous letter from the ADM CFO, dated April 9, 2014, has been replaced.	This letter was replaced with an updated CFO letter, dated March 11, 2016.

Proposed Changes to Attachment I: Stimulation Program

Page No.	Section/Topic	Description of Change	Justification
I1	Facility Information – Facility contact	The facility contact/Plant Manager of the ADM CCS#2 well changed from Mr. Mark Burau to Mr. Steve Merritt and the facility contact email changed from mark.burau@adm.com to steve.merritt@adm.com.	Administrative change.
I1	Facility Information – Well location	The coordinates of the CCS#2 injection well location changed from 39º 53' 08", -89° 53'19" to 39º 53' 09.32835", -88° 53'16. 68306".	This change reflects the final, as-drilled location of CCS#2.
I1	Attachment I	The second sentence of the only paragraph in this attachment was deleted. The sentence had read, "The need for stimulation will be determined once the characterization data from the CO_2 injection wells are available and have been evaluated (i.e., results of geophysical logs, core analyses, hydrogeologic testing)." The paragraph now reads, "The need for stimulation to enhance the injectivity potential of the Mount Simon Sandstone is not anticipated at this time. If it is determined that stimulation techniques are needed, a stimulation plan will be developed and submitted to EPA Region 5 for review and approval prior to conducting any stimulation."	Administrative change.

Proposed Changes to Quality Assurance and Surveillance Plan (QASP)

Page No.	Section/Topic	Description of Change	Justification
Cover page	Date	The date changed from April 2014 to October 2016.	Administrative change.
vii	Distribution List	Two ADM points of contact were replaced. The primary point of contact has changed from Mark Burau to Steve Merritt and one point of contact changed from Sean Stidham to Ed Taylor.	Administrative change.
vii	Distribution List – Facilities Contact	The ADM Facilities Contact changed from Mr. Mark Burau to Mr. Steve Merritt.	Administrative change.
7	Table 1	The 5-year frequency of Time lapse 3D indirect CO2 plume tracking during the operation period changed from "Year 2 (2018)" to "Year 2 (2019)."	Administrative change.
8	Table 2	The data collection location for the CCS#2 DTS in the operational period changed from "Distributed measurement to 6325 KB/5631 MSL" to "Distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well specification data since construction of the CCS#2 well was completed.
8	Table 2	The data collection location for the CCS#2 DTS in the PISC period changed from "Distributed measurement to 6325 KB/5631 MSL" to "Distributed measurement to 6211 KB/5520 MSL."	This change reflects the most up-to-date well specification data since construction of the CCS#2 well was completed.
8	Table 2	The data collection location for the CCS#2 temperature and pressure in the Mt. Simon formation in the operational period changed from "T, P @ 6325 KB/5631 MSL Perfs @ 6718–6881 KB 6024–6187 MSL" to "1 point location, 1 interval: PT @ 6270 KB/5579 MSL; Perfs @ 6630 - 6825 KB, 5939 - 6134 MSL."	This change reflects the most up-to-date well specification data since construction of the CCS#2 well was completed.
8	Table 2	The data collection location for the CCS#2 temperature and pressure in the Mt. Simon formation in the PISC period changed from "1 interval T, P @ 6325 KB/5631 MSL Perfs @ 6718–6881 KB 6024–6187 MSL" to "1 point location, 1 interval: PT @ 6270 KB/5579 MSL; Perfs @ 6630 - 6825 KB, 5939 -6134 MSL."	This change reflects the most up-to-date well specification data since construction of the CCS#2 well was completed.
9	Table 2	The data collection location for the VW#2 temperature and pressure in the Ironton-Galesville formation in the operational period changed from "1 interval 5000 KB 4918 MSL" to "1 point location, 1 interval: 4902 KB/4199 MSL."	This change reflects the most up-to-date well specification data since construction of the VW#2 well was completed.

Page No.	Section/Topic	Description of Change	Justification
9	Table 2	The data collection location for the VW#2 temperature and pressure in the Ironton-Galesville formation in the PISC period changed from "1 interval 5000 KB 4918 MSL" to "1 point location, 1 interval: 4902 KB/4199 MSL."	This change reflects the most up-to-date well specification data since construction of the VW#2 well was completed.
9	Table 2	The data collection location for the VW#2 temperature and pressure in the Mt. Simon formation in the operational period changed from "4 intervals 7000, 6800, 6300, 5800 KB 6306, 6106, 5606, 5106 MSL" to "1 point location, 4 intervals: 7041, 6681, 6524, 5848 KB; 6338, 5978, 5821, 5145 MSL."	This change reflects the most up-to-date well specification data since construction of the VW#2 well was completed.
9	Table 2	The data collection location for the VW#2 temperature and pressure in the Mt. Simon formation in the PISC period changed from "4 intervals 7000, 6800, 6300, 5800 KB 6306, 6106, 5606, 5106 MSL" to "1 point location, 4 intervals: 7041, 6681, 6524, 5848 KB; 6338, 5978, 5821, 5145 MSL."	This change reflects the most up-to-date well specification data since construction of the VW#2 well was completed.
9	Table 2	The data collection location for the GM#2 temperature and pressure in the operational period changed from "1 interval 3300 KB 2606 MSL" to "1 point location, 1 interval: 3450 KB/2759 MSL."	This change reflects the most up-to-date well specification data since construction of the GM#2 well was completed.
9	Table 2	The data collection location for the GM#2 DTS in the PISC period changed from "1 interval 3300 KB 2606 MSL" to "1 point location, 1 interval: 3450 KB/2759 MSL."	This change reflects the most up-to-date well specification data since construction of the GM#2 well was completed.
10	Table 3	The 5-year frequency of 3D surface seismic surveying during the operation period changed from "Year 2 (2018)" to "Year 2 (2019)."	This edit was made to capture the anticipated numerical year of Year 2 of the CCS#2 operational phase.
11	Figure 2	Figure 2 was replaced with an updated figure.	This change reflects the most up-to-date information since well construction was completed.
11	Figure 2	The Figure 2 caption was revised. The former caption read, "IL-ICCS Project area showing location of existing shallow groundwater monitoring wells and planned deep wells." The current caption reads, "IL-ICCS Project area showing location of shallow groundwater monitoring wells and deep monitoring wells."	This change reflects the most up-to-date information since well construction was completed.

Page No.	Section/Topic	Description of Change	Justification
25	Design Strategy – VW#2 Sampling	The third sentence of this section has been modified. The sentence formerly read, "VW#2 will be equipped with a multilevel pressure and temperature monitoring system with fluid sampling capability at four (4) intervals (perforation intervals 2-5; 6800, 6300, 5800, 5000 KB)," and now reads, "VW#2 will be equipped with a multilevel pressure and temperature monitoring system with fluid sampling capability at four (4) intervals."	This change reflects the most up-to-date information since well construction was completed.
25	Design Strategy – VW#2 Sampling	The fifth sentence of this section has been modified. The sentence formerly read, "Pressure and temperature will be continuously monitored and recorded in each of the five (5) perforation intervals (perforation intervals 1-5; 7000, 6800, 6300, 5800, 5000 KB)," and now reads, "Pressure and temperature will be continuously monitored and recorded in each of the five (5) perforation intervals."	This change reflects the most up-to-date information since well construction was completed.