ATTACHMENT 1

RESPONSE TO FACILITY COMMENTS
AND
ADDITIONAL CHANGES TO PERMIT

1150155136 -- Macon County
ADM Company
ILD984791459
Permit No. UIC-012-ADM
Log No. UIC-143
Well No. CCS #1
UIC Administrative Record File
Final Permit

The responses below addressed comments received from Archer Daniels Midland (ADM) in response to the Agency's draft permit which was public noticed on July 30, 2008.

COMMENT 1

Condition B.I .d - Injection Fluid Parameters

> d. Injection Fluid Parameters. The injected CO_2 shall be within the limits indicated below during injections
>
> | Parameters | Limits |
> |---|---|
> | Temperature | 88-120° F |
> | Specific Gravity | 44.4 lbs/ft^3 (maximum) |
> | Pressure | 1,070psi (minimum) |
>
> The limits above only apply to the injection of CO_2. These limits do not apply to the period when the CO_2 injection is commencing and when the injection is being shutdown. Other fluids may be injected for short periods for purposes of well testing, well stimulation and for the purposes of formation testing. The Permittee shall provide notice to the Illinois EPA of these tests in accordance with Condition H.26(e).

Comment:

ADM understands that the temperature and pressure parameter limits are intended to be representative of the CO_2 as it is injected into the formation. Therefore, ADM requests clarifying language be added to the permit that these parameters apply to conditions as measured near the bottom of the well. The suggested revision to the first sentence of this condition is:

"The injected CO_2, as measured near the bottom of the well, shall be within the limits indicated below during injections."

ILLINOIS EPA RESPONSE

This clarification of the location of the measurement of temperature and pressure is acceptable.

COMMENT 2 (see Condition B.I.d - Injection Fluid Parameters referenced above)

Density (referred to as specific gravity in the permit) is likely stated as a maximum in this permit to keep bottom hole injection pressure (BMP) below the fracture pressure which is important in an injection well where various materials may be injected. Typically density is calculated from pressure and temperature and with surface injection pressure the bottom hole injection pressure is calculated and compared to the maximum BHP, This project will have pressure and temperature measured downhole; therefore, the BHP will be measured directly and a calculation of pressure based on density is unnecessary. Consequently, the density limitation is unnecessary and ADM requests this density/specific gravity limit be deleted.

ILLINOIS EPA RESPONSE

ADM is correct in its reasoning of the need for limits on density, i.e., to assure that the fracture pressure of the formation is not exceeded during injection. Since the pressure will be measured near the injection point the limit on density is not required. The proposed removal of a limit on density is acceptable.

COMMENT 3 (see Condition B.I.d - Injection Fluid Parameters referenced above)

The upper temperature limit is no longer necessary as a result of this monitoring (near the injection point) *location. Given the fact that the lower temperature and pressure limits are the critical point for CO_2, any increase in temperature above this point cannot cause a phase change.*

The 120° F upper limit in the draft permit references a surface measurement and is not valid near the injection zone given the fact that a bottom hole formation has a temperature of ~140° F and is heating the fluid as it moves downward. As well, compression of the fluid due to the gravitational head also has a heating effect.

Should it be decided that an upper limit on temperature is required, please be aware that our preliminary wellbore calculations show CO_2 temperatures at the perforations of ~190° F. We would request some leeway above this for current unknowns and feel that we would not be restrained at 210°F

ILLINOIS EPA RESPONSE

The proposed change to eliminate the upper limit on temperature is not acceptable at this time. The proposal to raise the limit to 210° F is acceptable.

COMMENT 4 (see Condition B.I.d - Injection Fluid Parameters referenced above)

Testing and monitoring activities, some of which are requirements of the permit (e.g., B.2, B.5), may result in variance from the above parameters during periods of testing. As a result, ADM is requesting the second sentence in the last paragraph of this condition be changed to exclude periods of testing to assure compliance. The suggested revision is:

> "The limits above apply to the injection of CO_2 except during startup, testing, and shutdown periods."

ILLINOIS EPA RESPONSE

The proposed change in language is acceptable. The first two sentences of the referenced paragraph were removed and replaced with the proposed wording.

COMMENT 5

With regard to upgrades to the injection well plan to further protect against corrosion; ADM has decided to upgrade from carbon to chrome steel the 9 5/8" casing from at least as deep as the injection point up through the base of the primary seal. As well the entire length of 4 ½" tubing will be chrome material. Following is a summary of the updated specifications referenced in the application for this material. Additionally, attached are technical data sheets for both the 9 5/8" casing and 4 ½" tubing.

Application Table 5 in 4-B Section 7 can be updated as follows:

Table 5: Casing Specifications

Name	*Depth Interval (feet)*	*Outside Diameter (inches)*	*Inside Diameter (inches)*	*Weight (lbm/ft)*	*Grade (API)*	*Design Coupling (Short or Long Threaded)*	*Thermal Cond. @ 77° F (BTU ft.hr.°F)*
Long (carbon)	*0-~5,500*	*95/8*	*8.835*	*40.0*	*N80*	*Long*	*31*
Long (chrome)	*~5500-7500*	*95/8*	*8.681*	*47.0*	*13CR80*	*JFEBEAR*	*16*

Application Table 6 in 4-B Section 7 can be updated as follows.

Table 6: Tubing Specifications

Name	*Depth Interval (feet)*[1]	*Outside Diameter (inches)*	*Inside Diameter (inches)*	*Weight (lbm/ft)*	*Grade (API)*	*Design Coupling (Short or Long Threaded)*	*Thermal Cond. @ 77° F (BTU ft.hr.°F)*
Injection tubing	*0-~7000*	*4 ½*	*3.963*	*12.6*	*13CR85*	*JFEBEAR*	*16*

ILLINOIS EPA RESPONSE

The proposed upgrade to the casing and injection string tubing is acceptable. The applicant has revised the information contained in the permit application as described above.

COMMENT 6

EverCRETE Cement

In Section 4F of the original application the cement system planned to be used is referred to as CO_2 Resistant cement CemCRETE. A description and example of typical performance data was included in Appendix G. Schlumberger applied the name EverCRETE to the CemCRETE systems used in a CO_2 resistant application to differentiate from conventional CemCRETE applications. The assignment of the name EverCRETE occurred after the application had been submitted. The typical lab data in Section G is still appropriate however we can now insert actual pilot data that was developed with commercial samples of the materials involved which are attached to this letter. To summarize, the cement system has not changed only the name and we have additional lab performance data which is attached.

ILLINOIS EPA RESPONSE

The application has been updated by the applicant to address the change in the name of the CO_2 resistant cement as well as the additional data.

COMMENT 7

Injection Well Construction

In review of final drilling plans, an alternative to the conductor casing as detailed in the application in Section 5 - VIC Form 4B, VII Well Design and Construction is proposed. ADM is seeking IEPA approval for this alternative through this comment. In lieu of the Conductor casing (30" diameter) intended for the injection well from 0 to 30 feet, it is proposed that a dedicated direct pump for the removal of drilling fluids be used. We

believe that this alternative along with information based on a groundwater well that was drilled nearby which showed no shallow problems associated with groundwater, drift gas or unconsolidated formations provides equivalent or better protection.

The conductor casing was intended to prevent the drilling fluids (water and bentonite) from entering the cellar during well drilling. There is no structural purpose to the conductor casing. No other casing strings will be tied to the conductor casing. The conductor casing by design does not have a role in protecting a USDW from CO2. The two casing strings are designed to protect the USDW from CO_2. The drilling contractor will be using a drill rig that has a dedicated pump to directly pump drilling fluids from the cellar into the mud pit, limiting the potential for fluids on the surface.

ILLINOIS EPA RESPONSE

The conductor casing is, as the applicant states, not designed to protect USDWs. The proposed change in construction technique is acceptable. The permit application has been updated by the applicant to address the proposed change.

COMMENT 8

Attachment C Procedure for Calculating Average Values

ADM intends to use monitoring devices that will collect and store the data electronically as opposed to older devices that use paper strip charts and pencils for recording a graph. Therefore, ADM requests language be added to the beginning of the current language that states, "The following procedures shall not apply if data is collected and stored electronically." ADM request the following language be added as additional section.

> *"The following procedures apply where data is collected and stored electronically:"*
>
> 1) *Flow rate (mass/time) will be monitored continuously and clock hour averages will be generated as the default stored value.*
> 2) *Flow rate averages will be generated on a weekly basis (hourly averages from Monday 12:00 am to Sunday 11:59 pm) by summing the hourly averages during injection and dividing by the number of injection hours.*
> 3) *Flow rate averages will be generated on a monthly basis (hourly averages from first of month to end of month) by summing the hourly averages during injection and dividing by the appropriate number of injection hours in that month.*
> 4) *Annulus and Injection Pressure averages will be handled in the same manner (i.e., continuous monitoring with hourly averages generated), but averages will not discount non-injection periods, i.e., reported weekly and monthly average values will include all hourly averages collected.*
> 5) *Daily maximum and minimum values for all parameters will be the highest and lowest hourly averages for that 24-hr period.*

ILLINOIS EPA RESPONSE

The proposed method for calculating averages for data collected and stored electronically is acceptable except for Item 5 (Daily maximum and minimum values). The daily maximum and minimum values cannot be an average value they must be actual the actual minimum and maximum values.

Attachment C has been updated with the proposed language except for Item 5 and the sentence, *"The following procedures shall not apply if data is collected and stored electronically."* Instead of the additional sentence, clarification has been added to be clear that the methods originally identified apply to mechanical data collection devices.

ADDITIONAL CHANGES TO THE PERMIT

Section A

Condition A.4.

- Injection tubing specification changed from N80 to 13CR85 due to upgrade of injection tubing specifications.

- Erroneous reference to Attachment C changed to correct reference, Attachment B.

Section B

Condition B.4.

Wording revised removing requirement to "submit the final design of the injection zone monitoring wells to the Agency at least 90 days prior to the proposed installation of the wells." Inserted the following sentence: "This submittal shall be processed in accordance with Condition H.30."

The final design of the injection zone monitoring wells will be processed as a significant permit modification in accordance with 35 Ill. Adm. Code 705. Since the proposed design will be subject to public involvement requirements the time frame of 90 days prior is not appropriate.

Condition B.7(b)(vi)(a)

Incorrect reference to "Attachment E" revised to "Attachment C."

Section H

Condition (H.30) was added to address a commenter's concerns about the lack of public participation provided in the draft permit as related to the information identified below.

30. The following information to be submitted under this permit will be processed as a permit modification in accordance with 35 Ill. Adm. Code 705. The Agency will prepare a draft permit, public notice its availability for public review and accept comments in accordance with the requirements of 35 Ill. Adm. Code 705.

    - Corrosion Monitoring Plan (Condition B.2 (d))
    - Injection Zone Monitoring Well (Condition B.4)
    - Ambient Pressure Monitoring Procedure (Condition B.5)
    - Contingency Plan including associated monitoring and automatic shutoff systems (Condition H.27)
    - Annulus Protection System (Permit Application, Section 5, Form 4b Section V(E))

    Future changes to the permit will be processed in accordance with 35 Ill. Adm. Code 704 Subpart H. When required by 35 Ill. Adm. Code 704 Subpart H, the Agency will prepare a draft permit, public notice its availability for public review and accept comments in accordance with the requirements of 35 Ill. Adm. Code 705.

Section I

Incorrect references to "Appendix I" in this section have been changed to the correct references which is "Appendix H."

Attachment D

Condition B.4 Submittal Requirement: Removed requirement to submit Injection Zone Monitoring Well design 90 days prior to planning installation, as condition B.4 has been modified.

Condition H.28 Submittal Requirement: Added a requirement to submit a 39i Certification within 30 days as required by Condition H.28.