

# **Response Summary**

## **Addressing Comments Provided on the Draft UIC Permit for Archer Daniels Midland Company**

This document has been prepared to describe the Underground Injection Control (UIC) permitting process for Archer Daniels Midland Company (ADM) in Decatur, Illinois. It also summarizes pertinent issues, questions and comments received on the draft UIC permit during the public comment period and public hearing, and provides the Illinois EPA's responses to those questions and comments. This document is intended to fulfill the requirements for responding to significant comments found in Title 35, Illinois Administrative Code (35 Ill. Adm. Code), Section 705.210.

### ***Introduction to Underground Injection Control***

The Underground Injection Control (UIC) rules were developed over 25 years ago under the Safe Drinking Water Act with the goal of protecting underground sources of drinking water. The Illinois EPA (Agency) and Illinois Department of Natural Resources (IDNR) jointly administer the UIC permitting program in Illinois. Illinois EPA is responsible for administering the UIC Class I, III, and IV injection well regulations. The IDNR has authority for Class II wells. The UIC permit process and permit decision regarding the ADM facility have been solely the responsibility of the Illinois EPA.

The United States EPA is currently developing regulations specifically for UIC wells that inject carbon dioxide (CO<sub>2</sub>) for the purpose of geological sequestration. Although the regulations are not expected to be finalized for several years, the currently proposed federal rules are very similar to the Illinois Class I UIC well regulations that govern ADM's draft permit. Once the federal rules are finalized, ADM will be required to submit an application for a permit modification to address any additional requirements of the new regulations.

### ***Applicant***

Archer Daniels Midland Company applied to the Illinois EPA for a Class I UIC well permit on January 31, 2008. A Class I UIC well is used to inject liquid wastes deep below the lowermost underground source of drinking water (USDW). In this project, supercritical CO<sub>2</sub> will be injected several thousand feet below the lowermost USDW. The maximum total amount of supercritical CO<sub>2</sub> that may be injected under this permit is 1 million metric tonnes, approximately 1.1 million tons (U.S.).

The UIC permit will allow ADM to inject supercritical CO<sub>2</sub> deep underground into the geologic formation known as the Mt. Simon Sandstone. This is an effort to sequester, or store long-term, the CO<sub>2</sub> gas generated by ADM's ethanol production rather than release the CO<sub>2</sub> into the atmosphere where it acts as a greenhouse gas.

### ***Permit Decision***

The final UIC permit was issued to ADM on December 23, 2008. The final permit includes provisions for submission of certain additional data as modifications to the permit. This additional information will be made available to the public for comment.

This process of data submission, review, public comment and Agency approval, will be required prior to the Agency granting final authorization for injection of CO<sub>2</sub> to commence. The additional information to be submitted as modification requests to the final UIC permit is:

- 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))

Other data collected during the injection well's installation to be reviewed and approved by Illinois EPA prior to the Agency providing authorization for injection to commence includes:

- Groundwater monitoring well completion reports and boring logs;
- An updated map of the groundwater monitoring wells;
- Information concerning the determination of the lowermost USDW and other new geologic and hydrogeologic information obtained upon drilling;
- Site specific data including geologic/hydrogeologic data will be obtained upon drilling the injection well;
- Formation geochemistry, fracture pressures, and formation lithology data; fracture pressure and static level pressure after the injection well is cased and perforated;
- Injection well stimulation and injectivity test information; results of the geophysical modeling based on site specific data;
- Results of the formation computer modeling simulations;
- The detection methods proposed in the application (shallow groundwater monitoring, soil resistivity, seismic imaging or in situ logging);
- Any other detection monitoring devices that are to be used outside of those listed in the application;
- Appropriate additions such as groundwater monitoring well depths and designations.

***Major Changes from Draft Permit to Final Permit***

- Corrected typographical error of "Appendix I" in the permit's groundwater monitoring section to "Appendix H."
- Provide submission of specific documents (listed at the top of this page) as one or more significant modifications to the permit.
- Corrected minor typographical errors throughout the permit.

A complete listing of the additional changes from draft to final permit is contained in Attachment 1 to this Response Summary.

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***Response to Comments***

A summary of public comments provided during the public comment period and public hearing on the draft UIC permit for Archer Daniels Midland Company of Decatur, Illinois and the Illinois EPA's responses follow. ADM's comments and the Illinois EPA's responses are placed at the end of this document as Attachment 1.

**Comment 1:** I know this is not an area where we're troubled with many earthquakes but we do have little tremors from time to time. Has anyone thought about that? As deep as you're drilling and injecting this stuff, it may not have any bearing at all.

**Response:** The Illinois EPA geologist who reviewed the application examined reports prepared by the applicant and the Illinois State Geological Survey. The regulations require the applicant to identify any known or suspected geologic faults beneath the facility and within the Area of Review, a 2.5 mile radius outside the facility. ADM and the ISGS expanded their examination of the subsurface to a 25 mile radius and performed seismic surveys of the geologic units underlying the facility. The area is not predisposed to earthquakes; no geological faults have been identified in the area. Consequently, inducing an earthquake by injection into the geologic unit deep beneath the facility is very unlikely.

There are some documented cases of underground injection causing earthquakes in the past. In the 1960s, a facility in Denver, Colorado disposed of hazardous chemicals in a deep underground injection well. In this situation, the facility injected very large volumes of hazardous waste into a geological formation that contained nearby faults. This injection process lubricated the geologic blocks along the fault and caused them to slip in relation to each other. ADM will not be allowed to inject in a manner that would cause a fracture within the formation or an excessive buildup of pressure in the formation. Please keep in mind, there are no known geologic faults in the vicinity.

**Comment 2:** ADM did identify that there is a fault line somewhere on the southwest side of their property and they said that they were going to complete seismic surveys, but it's not required by the permit that they report those surveys to the public or to the Illinois EPA. Is there any intention of having those reports go to the Illinois EPA? Are the results going to be made public?

**Response:** The original ADM seismic survey report, reviewed as part of the permit application, provided some anomalous data that could not be verified with the studies performed to date. However, there are no known geologic faults in the vicinity of ADM. Another seismic survey will be performed and the results from this survey will be submitted to the Agency as part of ADM's Well Completion Report. The results of all seismic surveys provided to the Agency will be available to the public through a Freedom of Information Act request. Please submit a FOIA request at <http://www.epa.state.il.us/foia/> or contact Jan Ogden at [Jan.Ogden@illinois.gov](mailto:Jan.Ogden@illinois.gov) for information about making a FOIA request for any of these documents.

**The Illinois EPA recognizes that the geology of the area is stable so it is very unlikely an earthquake or other seismic activity would occur. However, because we need to better understand the anomalous data obtained during the original two-dimensional seismic survey, we will carefully review the supplemental data to be collected in the subsequent three-dimensional seismic survey. Once the well is drilled and the completion report reviewed, ADM and ISGS must address any remaining concerns the Agency has over the geology and demonstrate that there will not be any impacts to the underground sources of drinking water before ADM will be allowed to inject CO<sub>2</sub> into the formation.**

**Comment 3:** In light of federal rulemaking for a new class of carbon sequestration injection wells, is the Illinois EPA's current permit process adequate for such a large scale CO<sub>2</sub> injection project? The United States EPA hasn't even created their permit process for this type of project yet.

**Response:** The proposed rules for Carbon Dioxide (CO<sub>2</sub>) Geologic Sequestration (GS) Class VI Wells are not likely to be final for several years. It is likely that significant changes will be made to the proposed rule before it is finalized. In the interim, U.S. EPA has suggested that states regulate CO<sub>2</sub> injection activities under the Class V experimental injection well regulations. In Illinois, we chose to permit the injection well under the more stringent requirements of the Class I injection well regulations.

Comparing the proposed federal regulations for a new carbon sequestration Class VI injection well with the Illinois EPA's Class I regulations for injection wells reveals that the regulations are very similar. If the proposed federal Class VI rules were in effect today and ADM was required to meet those standards, the most significant physical modification of the injection well required would be the addition of a down-hole shut-off system. The other major change would be the addition of post-injection site care. This post-injection care would be required for a period of 50 years following cessation of injection and require monitoring and any other actions needed to assure that underground sources of drinking water (USDWs) remain protected.

A special condition in the permit allows the Illinois EPA to reopen the permit and incorporate any additional conditions that may result from any finalized new federal regulations. The Illinois EPA believes that ADM's proposed design for the injection well system could be modified to meet potential changes required under the proposed Class VI regulations when they are finalized.

The Illinois EPA is confident that this permit meets the requirements of the Class I injection well regulations under which it was developed and is protective of drinking water, both groundwater and surface water. The geological modeling projects that the injected CO<sub>2</sub> will remain where it is placed, consequently it will not impact underground sources of drinking water or surface water.

**Although this project is large for a pilot CO<sub>2</sub> injection project, it is not a large scale injection well when compared to other injection wells in the state. In other areas of Illinois, the Mt. Simon Sandstone formation has been used for decades to inject industrial wastes with higher acidity and in much greater volumes than those to be injected by ADM under this permit. The injection of higher acidity wastes and larger volumes of waste into the Mt. Simon formation under other parts of Illinois has not resulted in the migration of those wastes beyond the anticipated zone and has been protective of the lowermost underground source of drinking water (USDW) of the respective area. These liquid waste injection facilities have also made demonstrations to U.S. EPA that the hazardous waste will not migrate outside of the injection zone for a period of 10,000 years.**

**Comment 4:** How long is this permit in effect?

**Response:** The permit is a 10 year permit; a 10-year period is the maximum lifetime of a UIC permit. UIC permits may also be renewed for additional 10-year periods. ADM anticipates injection during a five-year period, but due to the nature of the project, there may be unanticipated delays.

**Comment 5:** This permit is experimental no matter what the IEPA's Fact Sheet says. This permit is experimental by its very nature. ADM has no experience with High Pressure Underground Injection. ADM has no experience with High Pressure Injection of CO<sub>2</sub> or CO<sub>3</sub>. In fact, very few people have experience with this type of Injection. It usually occurs in very safe, very secure depleted, or partially depleted, older oil fields. None of which exist in Illinois. I have many doubts about whether the carbon slurry will stay where it is pumped and because of the potential for salination of the Sangamon River watershed and the Mahomet Aquifer. The biggest problem with any Underground Injection scheme is the displacement of salt and saline which then migrates into fresh water sources. The proposed permit site is within the Sangamon River watershed and considering the volume of injection proposed very near the Mahomet Aquifer. Salt intrusion into either would spoil the drinking water for many people in the Central Illinois region. This permit request should be rejected on the grounds that it is a danger to the public health and safety.

**Response:** Deep geological injection of liquid wastes is an established technology utilized in the U.S. since the 1930s. Several Class I UIC wells have been operating in Illinois for many decades. Deep injection of pressurized CO<sub>2</sub> has also become an established technology having been used for decades in the oil industry to recover hard-to-reach oil from depleted oil fields. The underground storage of large volumes of pressurized natural gas has been ongoing in the U.S. since the early 1900s. Illinois has the largest number of saline aquifer natural gas storage fields in the U.S. These include storage fields in the Mt. Simon formation into which ADM will inject CO<sub>2</sub>.

**One aspect of the ADM CO<sub>2</sub> sequestration project that is new is the monitoring and data collection program being proposed by ADM to verify the placement of the CO<sub>2</sub> within the formation into which it has been injected. ADM has provided modeling**

**of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well even after 100 years. The confining layer, the Eau Claire formation, is approximately 300 to 500 feet thick and is the first of several geological barriers above the Mt. Simon formation which will prevent the CO<sub>2</sub> and saline water from the injection zone aquifer from migrating upward into the lowermost underground source of drinking water (USDW) of the area.**

**Comment 6:** I own some adjacent property to where this well is going to be, and I came here this evening with questions about possible pollution to the drinking water wells on that commercial real estate.

One of the reasons that the Sierra Club is interested in these types of projects is not only because of how it's going to affect the groundwater or local supplies of drinking water, but also if the CO<sub>2</sub> is actually going to stay in the ground. If there is a problem, if the pressure doesn't stay there, if the CO<sub>2</sub> does go back to a gaseous state and it is able to come out of the ground, who is liable for anything that might go wrong in the future after their permit is over? If there's no post-closure monitoring, who's going to be responsible for something that goes wrong?

**Response:** The underground injection permit program was developed under the Safe Drinking Water Act to protect underground sources of drinking water from injection well operations. Illinois EPA is confident that, based on the application we received and the modeling provided, this permit will be protective of drinking water, both groundwater and surface water. The modeling projects that the CO<sub>2</sub> will not impact underground sources of drinking water or surface water, because it indicates that the CO<sub>2</sub> will remain where it is placed and in a pressurized state. That modeling also serves as the reassurance that the CO<sub>2</sub> will not escape as a gas into the atmosphere. The ambient pressure within the Mt. Simon formation is anticipated to be approximately 2600 psi. The ambient temperature of the Mt. Simon is expected to be approximately 140°F. CO<sub>2</sub> at this pressure and temperature will remain in a supercritical state due to the natural conditions of the formation.

The Illinois EPA's UIC permit does not directly address the carbon sequestration issues of this project; our authority under the UIC permitting program extends to the viability of the injection process, the structural and engineering integrity of the well, and the stability and integrity of the geological formations to contain the fluid and prevent migration of the injected fluid into usable groundwater. Consequently the question about CO<sub>2</sub> being emitted as a gas unintentionally is also beyond the scope of the Underground Injection Control permit program

However, if a contaminant release were to occur, the Environmental Protection Act allows us to pursue those who cause an environmental problem. Because CO<sub>2</sub> is not regulated as a pollutant at this time, the release of CO<sub>2</sub> to the atmosphere would not necessarily be a violation of the Act. However, if significant amounts of CO<sub>2</sub> were escaping to the surface, groundwater will potentially also be negatively impacted.

**This groundwater impact could be a violation of the Safe Water Drinking Act which could be pursued through enforcement. If in future CO<sub>2</sub> is regulated as a pollutant under the Clean Air Act or other regulation, the release of CO<sub>2</sub> to the atmosphere may then be a violation of the Act.**

**Comment 7:** Does the scope of the permit include any unintentional emissions of CO<sub>2</sub>? One of the Sierra Club's, concerns is global warming, and I believe that one of the reasons that this project is even happening is to make sure that carbon capture and sequestration will actually keep CO<sub>2</sub> in the ground, and therefore, I think even though it's not within this permit, it still needs to be addressed as part of the project; that's part of the whole reason that ADM is doing this. Also, what if there's a safety hazard because of CO<sub>2</sub> escaping and who is liable if that CO<sub>2</sub> goes back in the air?

**Response:** U.S. EPA has considered these issues related to CO<sub>2</sub> escape to the atmosphere in their proposed regulations. Their assessment is that liability and assured sequestration are issues beyond the scope of the UIC permitting program. Therefore the Illinois EPA's UIC permit does not address the carbon sequestration issues of this project; our authority under the UIC permitting program extends to the viability of the injection process, the structural and engineering integrity of the well, and the stability and integrity of the geological formations to contain the fluid and prevent migration of the injected fluid into usable groundwater.

Because the UIC program is designed to be protective of groundwater quality, we require geological modeling to assure us of that protection. Since the modeling indicates that the CO<sub>2</sub> will not leave the injection area, that modeling also serves as the reassurance that the CO<sub>2</sub> will not escape as a gas into the atmosphere. However, the question about CO<sub>2</sub> being emitted as a gas unintentionally is really beyond the scope of the UIC permitting program.

In Illinois, if an applicant meets the requirements for a Class I injection well (i.e. the design meets the design requirements and the applicant has provided adequate geological modeling demonstrating that the CO<sub>2</sub> will stay put) and the Agency is confident the permitted well will be protective, the Illinois EPA must issue the permit. ADM has provided modeling of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well 100 years after injection has ceased.

**Comment 8:** I have some other technical questions here specifically about how this permitting process or the requirements of this permit may differ from what the U.S. EPA is going to require of such a project with their new rulemaking, and one of the specific questions we have is about the materials that are being used for piping the CO<sub>2</sub> and is it sufficiently corrosion resistant. Do you know what the materials are initially for the piping?

**Response:** The specifications for the materials used in the construction of the injection well are identified in Section 5 of the permit application, "Form 4b –

**Injection Well Design, Construction Test and Logs,**” specifically in Subsection VII **“Well Design and Construction”** that begins on page 89 of the permit application. The permit also reiterates some of the specifications for the injection well casing, cement, and injection string (the CO<sub>2</sub>-carrying inner pipe) in Section A **“Well Specification,”** items 3 and item 4.

Section 9 UIC Form 4f, **“Characteristics, Compatibility and Pre-Injection Treatment of Injection Fluid,”** subsection D. **“Compatibility with injection well components”** beginning on page 136 of the application addresses the compatibility of CO<sub>2</sub> to be injected and the material used in the construction of the well.

Part of the evaluation of the CO<sub>2</sub> piping materials is an assessment of how compatible the material is with CO<sub>2</sub> and the saline water of the aquifer; if the material reacts rapidly to the CO<sub>2</sub> and groundwater causing excessive corrosion, this would be an incompatible material and should not be considered for use in the well’s construction. Choice of construction materials is also dependant on the cost of those materials both for initial installation, and during their expected life as maintenance adds to cost. These choices are a critical part of the design of the well, both to assure that corrosion will not cause insurmountable problems during the well’s operation and also once the injection has ceased, consequently the materials to be used are identified in the permit.

The injection string will be composed of API (American Petroleum Institute) Grade 13CR85 chrome steel tubing. The long string casing will be API Grade 13CR80 chrome steel from the injection point (approximately 7,500 ft. below ground surface) up through the primary seal (approximately 5,500 ft. bgs). The permit application and final permit have been updated to reflect the use of these materials.

**Comment 9:** Another question we have is about the automatic shutoff mechanism and whether or not those plans are going to become available for public review. Will it be developed after the permit has been issued?

**Response:** The automatic shutoff mechanism is one of the designs that had yet to be developed by the applicant and submitted for Illinois EPA review at the time the comment period on the draft permit was open. The Agency has determined that the automatic shutoff mechanism design must be submitted as a significant modification to the permit and it will be made available for public review and comment prior to the Agency’s final modification decision.

Because of the nature of a UIC well, there are several unknowns until the well is actually drilled. Specific characteristics of the aquifer into which injection will take place are some of the unknowns that impact various systems. Because of this some of those designs have to be developed following installation of the well and assessment of the aquifer. Those system designs are not typically submitted as permit modifications requests subject to public comment.

**Comment 10:** *A letter from John Thompson, the Director of the Coal Transition Project of the Clean Air Task Force, was read into the hearing record:*

The Clean Air Task Force (CATF) is a national nonprofit environmental organization... We are dedicated to restoring clean air through scientific research, public education, and legal advocacy... Our work on climate focuses on several areas, including: ...developing federal and state policy on carbon storage...

The Clean Air Task Force urges Illinois EPA to issue the draft permit. This project has been designed by some of the nation's foremost experts in geologic sequestration. It will make significant contributions to resolving the technical issues associated with storing large volumes of carbon dioxide in deep saline aquifers. The Midwest Geological Sequestration Consortium's work is one of only seven groups in the U.S. to receive significant levels of federal support. While this project is aimed at the Illinois Basin, the knowledge and understanding developed from this work will advance geologic sequestration across the world. Climate change is one of the most critical challenges in the 21st century, and it won't be solved without new technologies that can reduce carbon dioxide. To prevent the worst of impacts of climate change, new technologies must be deployed in the coming decades that can reduce carbon dioxide release by amounts measured in gigatons. Geologic sequestration is one of the few options that can be deployed on this large scale. Thank you in advance for your consideration.

**Response:** **Thank you for your comments. The Agency issues UIC permits to applicants when applicants demonstrate that their proposals meet the requirements of the regulations.**

**Comment 11:** *Jay Dunn, business manager of IBEW 146, president of Decatur Building Construction Trades Council:* I assume that with the federal money funding this, that this project would be done under Davis-Bacon wages, and I just wanted to make sure that, if that is true, all the contractors that are bidding this work or performing this work must know that up front and that all the wages are posted for the men and women that'll be working on that job, so that everyone understands what wages should be paid.

**Response:** **Thank you for your comment. However, the issue of wages to be paid during the well's construction is beyond the scope of the Agency's review and consideration during this permitting action.**

**Comment 12:** If you have to "throw stuff away" there is a safer way to do it. Community Energy Systems is completely opposed to the old industrial model of "throwing things away". Everything in the world has a use and it is fiscally and environmentally irresponsible to simply discard them in public spaces. But if the decision here is to discard substances that have value at least they could be put to a use. There are well-contained rock surrounded large oil fields in Oklahoma, Ohio, and in Texas that are currently accepting spent CO<sub>2</sub> or CO<sub>3</sub>. It would be easy enough for ADM to build a pipeline to one of these sites. In fact ADM could make money from the project by building their pipeline close to other large carbon emitters on the way to such an oilfield and thus take on the disposal of their carbon as well.

There are other methods for sequestration besides "throwing the stuff away." This permit should be rejected because the emissions can be put to good use. This permit should be rejected because there is a safer and more productive method of disposing of these particular by-products (CO<sub>2</sub> can be used to raise algae, which can then be harvested for animal feed, skin treatments, biodegradable plastics and biofuel; Calera Cement will take CO<sub>2</sub> from the air to make cement). ADM could go into the Algae or the Concrete Business. This would create jobs and new businesses for Illinois. It would also generate profits for ADM. This permit should be rejected because it is unnecessary.

**Response: Thank you for your comments. However, these proposals are beyond the scope of the UIC permit program for which the Illinois EPA has authority. The Agency issues permits when applicants demonstrate that their proposals meet the requirements of the regulations.**

**Comment 13:** Carbon dioxide dissolved in water forms carbonic acid, a weak acid but it is corrosive. Will this pose a problem with the injection horizon [geological formation into which the CO<sub>2</sub> will be injected]? For example, will it tend to attack or dissolve it? Are the ramifications good or bad?

Are there sulfates in the injection horizon? If so, the injected fluid must be free of barium. Barium sulfate is an insoluble precipitate (only soluble in concentrated sulfuric acid) that will plug the face of the injection well and that is trouble. The Carter Oil Company had to watch out for that in water flood operations in the Loudon Oil Field near St. Elmo, Illinois. If this type of plugging occurs, Hydrfrac is about the only solution and a lot of space is required around the injection wellhead for access and the equipment and tanks required.

ADM is to be congratulated for undertaking this test to help the environment.

**Response: The CO<sub>2</sub> will be injected deep into the Mt. Simon Sandstone formation. Sandstone is a porous and permeable rock that has microscopic voids or pores between its mineral particles. In many geological formations, these pores hold water, creating aquifers. In this project, the pore spaces will hold the supercritical CO<sub>2</sub> as well. The pressures and temperatures deep in the sandstone formation should keep the CO<sub>2</sub> in its supercritical state. However, some CO<sub>2</sub> is likely to dissolve into the water of the saline aquifer. When CO<sub>2</sub> is dissolved in water, a weak carbonic acid, similar to the acidity of carbonated beverages, is formed. Current modeling data indicate that once CO<sub>2</sub> comes into contact with the saline water of the injection zone, some of the water will become weakly acidic, but that over time, some of the minerals in the sandstone formation will react with the CO<sub>2</sub>, neutralizing the weak acid and binding the carbon into the mineral structure of the formation.**

**In other areas of Illinois, the Mt. Simon Sandstone formation has been used for decades to inject industrial wastes with much higher acidity than that generated by the reaction between the existing saline aquifer in this sandstone formation and the CO<sub>2</sub> proposed for injection by ADM. The injection of higher acidity wastes into the**

**Mt. Simon formation under other parts of Illinois has not resulted in the migration of those wastes beyond the anticipated zone and has been protective of the lowermost underground source of drinking water of the respective area.**

**The CO<sub>2</sub> injection stream is free of barium consequently we do not anticipate the generation of barium sulfate in the aquifer.**

*Sierra Club provided the balance of the public comments on the draft UIC permit. The contents of the Sierra Club letter follow:*

**Comment 14:** As of the deadline date these comments are being filed, IL EPA has failed to provide information requested in a September 19, 2008 Freedom of Information Act (FOIA) [request] regarding this permitting activity... In its FOIA [request], submitted 30 days prior to the conclusion of the comment deadline, Sierra Club requested copies of documents relating to the carbon sequestration project at the Archer Daniels Midland Company's ethanol plant in Decatur, Illinois, not including the UIC permit application or UIC draft permit...

On September 26, 2008, at the request of IL EPA, [Sierra Club's attorney] reduced the scope of the request to the existing administrative record. This agreement – made three weeks before the comment deadline – was to ensure that Sierra Club and others with whom Sierra Club would freely share the requested information would be able to incorporate this information into its public comments... It states... “Sierra Club is willing to reduce the scope of the above-referenced Freedom of Information Act request to documents in the administrative record maintained by the IL EPA. I am reducing the scope of the request based on your characterization of the materials in the administrative record and to expedite IL EPA's response in light of the comment deadline.”

The failure of IL EPA to provide this requested information within the deadlines mandated by FOIA and in a manner consistent with comment deadline in this case defeats the goal of providing a full and complete opportunity for public participation in creating a record on which a legally adequate final permit can issue.

**Response:** The Illinois EPA apologizes for the delays in getting the Administrative Record materials to the Sierra Club. Once we had the request from this organization, we chose to scan the paper copies of the information into electronic images so the documents could be provided electronically since another request for that Administrative Record file had come in immediately afterward. Other requests were expected, based on the number of requests we had received and filled earlier for electronic copies of the draft permit and permit application, including a request from the Sierra Club. The process required assembly of the Administrative Record, review for confidentiality and trade secret considerations, sending the documents to our contractor for scanning and imaging, reviewing the returned images for quality and readability, and finally transferring the document images into our electronic filing system so they could be retrieved, transferred to CD, and finally, mailed to

**requesters. All of these steps, and unexpected delays along the line, added to the time it took for our FOIA staff to process these requests.**

**On October 15, two days prior to the end of the comment period an Agency staffer sent an e-mail to the Sierra Club's attorney, reminding him of the approaching end of the comment period. He responded that he might need to request an extension of the comment period due to the fact that the Administrative Record materials had not yet arrived. Later on October 15, the attorney was sent notification that the CD of the Administrative Record documents was placed in the mail by FOIA staff earlier that day. However, no extension of the comment period was subsequently requested by the attorney on behalf of the Sierra Club in order to review the additional permitting information ultimately provided by the Agency. Agency staff understood that silence to mean Sierra Club had no desire to supplement their comments on the draft permit based on a review of the Administrative Record.**

**Comment 15:** The siting analysis for this project allows ADM to proceed without clear evidence that the facility is properly sited on an area without faults.

The record available for public review is insufficient to support the use of the Mt. Simon Sandstone formation as a sequestration site. *See* IL EPA Draft UIC Well Permit, Archer Daniels Midland Company, No. 1150155136, July 30, 2008 [hereinafter *Draft UIC Permit*]; Archer Daniels Midland Company Application for Underground Injection Control Permit, Illinois Environmental Protection Agency, Bureau of Land, Class I-Non Hazardous, April 24, 2008 [hereinafter *ADM UIC Permit Application*]. While DOE has declared that saline formations represent an “enormous potential” for carbon storage, “much less is known about saline formations...Therefore, there is a greater amount of uncertainty regarding the suitability of saline formations for CO<sub>2</sub> storage.” Carbon Sequestration Atlas of the United States and Canada, U.S. Department of Energy, Office of Fossil Energy, National Energy Technology Laboratory, March 2007, p. 15. This uncertainty suggests significant, additional analysis should be completed before proceeding with permitting activity.

For example, in its permit application, ADM identified a “discontinuity in the seismic reflection” that suggests a “fractured zone or fault” in the critical Eau Claire confining zone “both west and south of the property.” *ADM UIC Permit Application*, p. 25. ADM states that this seismic reflection data is of poor quality and that its interpretation is therefore “ambiguous.” *Id.* The possible existence of a fault in the critical confining layer should not be left to an ambiguous interpretation before the permit application is submitted and definitely not before the Draft Permit is approved. However, ADM only proposes to complete a 3D seismic survey to clarify the existence of any fault “after the well is drilled, but prior to CO<sub>2</sub> injection.” *Id.* This means that ADM proposes to complete a 3D seismic survey of the area only *after* the permit has been approved and the sequestration well has been drilled. This is unacceptable.

Under the proposed federal regulations for Class VI underground sequestration wells, the U.S. Environmental Protection Agency (“EPA”) *requires* the carbon sequestration injection wells to be sited for injection into a zone capable of storing the fluid and below

a confining system that is “free of known open faults or fractures that could allow upward fluid movement that endangers USDWs.” 73 Fed. Reg. 43492, 43498-43499 (proposed July 25, 2008). A “thorough site-specific characterization” of the saline formation proposed for geological sequestration is “necessary” and the presence of “fractures” and “faults” must be ruled out. 73 Fed. Reg. 43492, 43502 (proposed July 25, 2008). In addition, under the proposed federal regulations owners or operators would be required to submit seismic surveys and “information on the seismic history of the area and the presence and depth of seismic sources to assess the potential for injection-induced earthquakes.” *Id.* at 43505. Logically, this analysis should be completed before any additional economic resources are spent and construction on the sequestration project begins.

The IL EPA should require that a clear understanding and interpretation of all data is submitted *before* the permit is approved. However, the Draft Permit does not require any seismic surveys to be completed before the permit is approved or before sequestration may take place. *See Draft UIC Permit*. The Illinois EPA appears to be relying upon ADM to submit a 3D seismic survey and ensure that the site has no faults before authorization for injection is granted. *See Draft UIC Permit*, cover page. It is unacceptable for the Illinois EPA to grant this Draft Permit to construct the sequestration well without prior assurance with thorough analysis of seismic surveys that the project is properly sited to permanently contain the carbon dioxide.

**Response: ADM must submit additional information as part of the Well Completion Report which will include the results of an additional seismic survey to provide detailed geologic information from beneath the facility. These data will be carefully evaluated in the permitting process prior to the Agency authorizing any CO<sub>2</sub> injection.**

**The “discontinuity” referenced in this comment is mentioned on page 24 of the UIC Permit Application. During a conference call held between the Illinois EPA and ADM/ISGS on February 15, 2008 this discontinuity was discussed (Illinois EPA Administrative Record, RCRA-Groundwater Assistance Unit Reviewer’s Notes). ADM/ISGS stated that the apparent discontinuity was not believed to be a geologic discontinuity, but a reflection caused by being at the edge of the image. The discontinuity is anomalous due to poor reflection quality using the 2D technology. In order to confirm the absence or existence of any discontinuity, the applicant will employ 3D seismic technology in the subsequent seismic survey. These two surveys will be used together to complete the seismic interpretation beneath the facility.**

**ADM has provided modeling of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well even after 100 years. The subsequent seismic survey to verify the integrity of the confining layer must be performed, then reviewed and approved by the Agency prior to the facility being granted authorization to begin injection of CO<sub>2</sub>. Final authorization of use of the well is contingent on all of the information provided, as a**

**function of the Well Completion Report, being acceptable and indicating suitable conditions for CO<sub>2</sub> injection.**

**Comment 16:** The Draft Permit does not contain the fundamental information of what specific materials will be used in the construction of the injection well. The IL EPA thereby does not ensure that corrosion resistant materials will be used; this is unacceptable.

The use of corrosion resistant materials is “crucial” to the success of long-term geological sequestration projects. *See* 73 Fed. Reg. 43492, 43510 (proposed July 25, 2008). This is because it is critical to ensure that: (1) the sequestered carbon remains underground and (2) while the carbon is underground it does not leach into aquifers used for drinking water. *See id.* at 43509. Because carbon dioxide is corrosive, the U.S. EPA’s proposal requires that Class VI carbon sequestration wells use corrosion resistant steel casings and cement for all injection well components. *Id.* at 43510-14. While the U.S. EPA proposal does not specify the precise materials to be used in the well construction, the proposed regulations do recommend using “Grade 316 stainless steel” to minimize the corrosion to metal components of the injection well. *Id.* at 43510. The U.S. EPA also suggests that “steel, an alloy, fiberglass, or a composite material most suitable for the injectate’s composition” should be utilized during construction. *Id.* at 43509. Lastly, the US EPA proposal discusses the use of “acid resistant cement” as beneficial for injection wells. *Id.* at 43509-43510.

In the permit application ADM refers to using “CO<sub>2</sub> resistant cement and metallurgy of the casing” during the construction of the construction well. *See ADM UIC Permit Application*, p. 89. However, the permit application also states that:

“[t]he subsurface and surface design (casing, cement, and wellhead designs) reflects *minimum* requirements to sustain the integrity of the caprock to ensure CO<sub>2</sub> remains in the Mt. Simon. For reason [sic] such as equipment or supply availability or changes to the supplemental monitoring program, the final well design will *meet or exceed* these requirements in terms of strength and CO<sub>2</sub> compatibility.” *ADM UIC Permit Application*, p. 89 (emphasis added).

The final well construction design standards are unacceptably left “to be determined”. IL EPA should require ADM to identify the specific design standards for well construction prior to authorizing construction.

The Draft Permit issued by the Illinois EPA does not require ADM to use any specific materials in the construction of the injection well and instead allows ADM to disclose what specific materials were used when it submits its Well Completion Report after the permit is approved and the injection well has been constructed. *See Draft UIC Permit*, section B, ¶ 6. The Draft Permit lacks requisite specificity and states that “ADM’s well has 3 nested *steel* casing(s?) that are installed in order to provide this protection...*Cement specifically designed* for this injection well is pumped into the areas between the nested

casings and the area between the casing and formation.” Fact Sheet for Draft UIC Permit, Archer Daniels Midland Company, July 30, 2008, section III. Do the casing and cement design specifications listed in the Draft Permit comport with the US EPA’s recommended acid resistant cement? *See Draft UIC Permit*, section A, ¶ 3. If so, how? And if not, why? What kind of steel is ADM using in the casings? Does this comport with the recommendations of the U.S. EPA? If so, how? If not, why?

Additionally, as referenced by ADM in the permit application, the Draft Permit states that the “casing and cementing” well specifications “represent the minimum requirement that must be met. The materials used may be varied due to equipment or supply availability, but in all cases [sic] [the standards] shall meet or exceed the above minimum requirement for strength and carbon dioxide compatibility.” *Draft UIC Permit*, section A, ¶ 3. There are two problems with the Illinois EPA requiring that ADM only “meet or exceed” the minimum requirements for “strength and carbon dioxide compatibility.” First, the US EPA stressed that use of corrosion resistant materials is crucial to the ultimate success of any carbon sequestration project. 73 Fed. Reg. 43492, 43510 (proposed July 25, 2008). When the IL EPA sets minimum standards for “carbon dioxide compatibility,” the regulatory effect of requiring the materials to be “corrosion-resistant” is frustrated.

Second, the Draft Permit does not require the highest standards be used to ensure that corrosion resistant materials are utilized in this research project and the Draft Permit gives the regulated entity, ADM, the ultimate choice on what materials to use and whether to meet the minimum standards or exceed the minimum. This lack of control and authority in regard to a cutting edge technology and in an area where much is unknown is unacceptable. For example, the Draft Permit does not require the specifics regarding the materials used in the well construction to be disclosed to IL EPA until the Well Completion Report is submitted. *See Draft UIC Permit*, section H, ¶ 6 (stating “the report shall include a description of construction, including driller’s log, materials used (i.e. tubing and casing tallies)...”).

**Response:** The specifications for the materials used in the construction of the injection well are identified in Section 5 of the permit application, “Form 4b – Injection Well Design, Construction Test and Logs” specifically in Subsection VII “Well Design and Construction,” which begins on page 89 of the permit application. The permit also reiterates some of the specifications for the injection well casing, cement and injection string in Section A “Well Specification,” items 3 and 4.

Section 9 UIC Form 4f, “Characteristics, Compatibility and Pre-Injection Treatment of Injection Fluid,” subsection D. “Compatibility with injection well components” beginning on page 136 of the application address the compatibility of CO<sub>2</sub> to be injected and the material used in the construction of the well.

After the close of the comment period, ADM notified the Illinois EPA that they have upgraded portions of the steel casing and injection tubing with the use of a more corrosion-resistant material than originally proposed. The injection string will be composed of API Grade 13CR85 chrome steel tubing. The long string casing will be

API Grade 13CR80 chrome steel from the injection point (approximately 7,500 ft. below ground surface) up through the base of the primary seal (approximately 5,500 ft. bgs). The permit application and final permit have been updated with this new information.

The Agency considers “carbon dioxide compatible” and “corrosion-resistant” to be synonymous for this permitting action. The permit specifies “minimum standards” for the materials to be used in the construction of the well. If the minimum standard is met, the requirements of the Class I regulations are met for the protection of USDWs. The minimum standard sets a highly protective threshold for the use of CO<sub>2</sub> compatible materials. Establishing a minimum standard ensures that the materials used will meet the rigorous requirements of the regulations, but also provides flexibility to the permittee to use construction materials that exceed the minimum standard.

Often there is no single standard that can be set for material compatibility. A range of materials may be compatible with the CO<sub>2</sub> that is to be injected. The choice of what material is used is based on several variables including corrosion resistance, strength of the material, other physical characteristics of the material, the characteristics of the fluid to be injected (including temperature and pressure) and other variables as well as the cost of the material. For example, 316 stainless steel is subject to corrosion; the U.S. EPA recommendation for 316 stainless steel in the proposed Class VI injection well regulation states that its use “only minimizes the corrosion to metal components.” Id. at 43510.

The Agency agrees that it is always desirable to have all of the information available for its staff to review as part of the application, and to be referenced in the draft permit when that draft permit is made available for public review. This was not possible in this permitting process, as is often the case. All of the pertinent information was not available from the applicant, ADM, and the Illinois State Geological Survey, ADM’s technical consultant and partner in this demonstration project. However, key information concerning the general proposal, injection approach and technology, and geology was determined to be compliant with the regulations; consequently a draft permit was prepared and provided to the public for review. Often in permitting cases when additional information is needed from an applicant, the Agency relies on a Compliance Schedule, a listing of what information will be provided by the applicant in a certain timeframe after the permit becomes effective.

Compliance Schedules are supplemented with conditions in the draft permit that provide a baseline of acceptable parameters so applicants and the public know what will be acceptable; this is reflected in the discussion of “minimum requirements” cited in the comment (page 89 quote from the application and section A, paragraph 3 of the draft permit). That baseline of what is acceptable sets a high standard for appropriate technologies and materials to comply with the requirements of the regulations. Applicants risk a lack of approval unless they meet the minimum

**standards provided for them in their permit. (Please note that Illinois EPA, while administering any U.S.EPA-delegated program, must impose requirements at least as stringent as the federal program imposes.)**

**The Illinois EPA will not authorize the use of the well for injection of CO<sub>2</sub> until all of the information required by the permit is submitted and the Agency determines that all applicable requirements for the safe injection of CO<sub>2</sub> have been met.**

**Comment 17:** The Well Completion Report is due “within 120 days of completion of the injection well” which is *after* the permit is approved by the Illinois EPA. This provision removes decision making authority from the IL EPA. While the Well Completion Report may be available to the public for review through a Freedom of Information Request, the opportunity for community input and comment will have passed and the goal of transparency in the permit process will have been frustrated. *See* Transcript for Illinois Environmental Protection Agency, Bureau of Land, Public Hearing, September 16, 2008.

**Response:** ADM must submit to the Agency for review and approval, a Well Completion Report that provides specific required additional information and the applicant may not use the well to inject CO<sub>2</sub> until the Agency approves it. ADM risks a lack of approval unless they meet the minimum standards provided for them in their permit. The Well Completion Report review and approval process ensures that Illinois EPA retains decision making authority over the progression of this project to injection of CO<sub>2</sub>.

While the Agency agrees that the public has no further opportunity to have their comments considered on those data submitted as part of the Well Completion Report, the Agency has chosen to require ADM to submit several other crucial documents as permit modifications subject to public comment. The list of documents to be submitted as permit modification requests is provided on page 2 of this Response Summary.

However, the Agency disagrees that employing a Compliance Schedule and the submission of a Well Completion Report to acquire further necessary information frustrates the transparency of the permitting process. As discussed in the response to comment 9, certain geological information can be collected only after the well is installed. The information requested in the Well Completion Report and the applicable parameters for acceptable technologies, materials and operations were identified in the draft permit as well as addressed in the application materials.

The comment period for the draft permit is the opportunity for the public to submit all comments concerning the draft permit. As several of the comments provided in this Sierra Club comment letter demonstrate, comments were made on several detailed aspects of the information yet to be submitted to the Agency (e.g., concerning the corrosion resistance of materials used in the well construction, corrosion monitoring programs, down-well automatic shut-off designs, use of

**surface air and soil flux leakage detection monitoring, as well as seismic and geological report documentation prior to permitting). In addition to that comment opportunity, anyone interested is welcome to review the documents submitted in response to the permit's Compliance Schedule as part of the Well Completion Report.**

**Comment 18:** The Draft Permit fails to comprehensively address the carbon sequestration process. As highlighted in the *Carbon Sequestration Technology Roadmap and Program Plan 2007*, there are three main components to geological sequestration: (1) capture; (2) transport; and (3) storage. U.S. Department of Energy, Office of Fossil Energy, & National Energy Technology Laboratory, *Carbon Sequestration Technology Roadmap and Program Plan 2007*, p.13. However, this Draft Permit only discusses the last component to sequestration which is underground storage of the CO<sub>2</sub>. The Illinois EPA has ignored the other two components of geologic sequestration, capture and transport, when considering the scope of the ADM research project. This narrow view of a complex and frontier technology is unacceptable when the IL EPA's purpose is ensuring the protection of human health and the environment within its jurisdiction. Illinois Environmental Protection Agency (available at: <http://www.epa.state.il.us/about/purpose.html>).

In the permit application, ADM only briefly refers to the capture component of carbon sequestration in the executive summary stating that the “dehydration/compression facility is proposed to be developed near the north boundary of the ADM facility; the CO<sub>2</sub> will be transported about 3,200 ft. through a 4-inch to 6-inch pipe to the injection well location.” *ADM UIC Permit Application*, p. 12. The Draft Permit itself makes no requirements relevant to the dehydration/compression facility. *See Draft UIC Permit*. How is the capture of the carbon regulated and what are the standards for the operating procedures of the dehydration/compression facility? What is the process for turning the sequestered carbon into a “supercritical” state? What regulations or rules apply to the dehydration/compression facility and what, if any, is the governmental body with regulatory control over this main component of geological sequestration?

Additionally, regulatory standards for CO<sub>2</sub> “transportation systems” are equally important as regulatory standards for injection well and storage reservoirs in order to “safeguard the environment and public health.” *See* U.S. Department of Energy, Office of Fossil Energy, & National Energy Technology Laboratory, *Carbon Sequestration Technology Roadmap and Program Plan 2007*. Did the Illinois EPA consider how the “supercritical” carbon is transported from the compressor facility to the well sequestration site? What regulations and/or standards will govern the transportation of the CO<sub>2</sub> to the injection well site? What are the protections in place to ensure that corrosion resistant materials are used in the pipe to transport the supercritical CO<sub>2</sub>?

If the compressor facility and/or the transportation of the supercritical carbon are outside the scope of the underground injection control permit, does the Illinois EPA maintain authority for oversight regarding environmental protections before the CO<sub>2</sub> is injected? If not, what, if any governmental body is responsible for control of these components of the

carbon sequestration process and how were the proposed plans for the carbon capture and transportation at the ADM facility analyzed?

**Response: The scope of the Illinois EPA’s review of this project encompassed only the UIC well. Regulation of the capture and transportation of the supercritical CO<sub>2</sub> is outside the scope of the UIC permit. (Please note that U.S. EPA’s proposed Class VI regulations do not address the capture and transport components of carbon sequestration process.) Since CO<sub>2</sub> is not a regulated pollutant, the capture and management of the CO<sub>2</sub> prior to injection are not subject to regulation by the Illinois EPA. The handling of CO<sub>2</sub> above ground is subject to the various programs that protect the safety of the employees at the plant, with government oversight provided by the Federal Occupational Safety and Health Administration (OSHA). Compressed CO<sub>2</sub> is routinely handled without incident. As the CO<sub>2</sub> would not be transported offsite, the Department of Transportation would not be involved.**

**Comment 19:** The critical element of an automatic shut down feature is not required by the Draft Permit. Instead, the Draft Permit allows for the “automatic shut down” feature to be disclosed in the Contingency Plan in the Well Completion Report at a future date.

Automatic down-hole injection shut-off features are necessary to guard against release in the case of a pressure drop or leakage of the injection well. 73 Fed. Reg. 43492, 43513 (proposed July 25, 2008). Automatic shut-off provides the “maximum protection to USDWs and the earliest warning” to owners or operations that repairs are necessary. *See id.* at 43513-14. The U.S. EPA’s proposal stresses that an automatic shut-off provision of the injection well is a “critical component” of the mechanical integrity of the system. *See id.* at 43513. The proposed federal regulations therefore *require* “automatic down-hole shut-off mechanisms.” *Id.*

However, the Draft Permit regulates this “critical component” by requiring that ADM submit in the Contingency Plan of the Well Completion Report a “description of the automatic shut down of the injection pumps, including the annulus pressure, injection pressure and flow rate which will trigger pumps shut down.” *UIC Draft Permit*, section H, ¶ 27. Because the Well Completion Report is not due until 120 days after the well is constructed, this provision removes the specific plans of the automatic shut down from public review. *See id.* at section H, ¶ 6.

**Response: The Agency agrees that it is always desirable to have all of the information available for its staff to review as part of the application and be referenced in the draft permit when that draft permit is made available for public review. Because the automatic shut down feature design was unavailable during the public comment period, the Agency has decided to require that design, and specific other information, be submitted as modifications to the final UIC permit thereby making them available to the public for comment. Please see the list of documents (at the top of this Response Summary’s page 2) required to be submitted as permit modifications.**

The commenter points out that automatic down-hole injection shut-off features are a requirement in the proposed federal regulation. This requirement may or may not be in the regulations that will be finalized in several years. Note also that the paragraph following the commenter's quoted wording of the Federal Register (73 Fed. Reg. 43514 (proposed July 25, 2008)) states: "This proposed requirement (down-hole shut-off systems) would eliminate the necessity of conducting other periodic internal MITs." As such this requirement would, at least in part, be in lieu of other mechanical integrity testing that is currently used.

The requirements for automatic shutdown of a Class I non-hazardous injection well are contained in 35 IAC Section 730.167 (f) & (g). These regulations do not require the use of a down-hole injection shut-off mechanism. The permittee may not use the well to inject CO<sub>2</sub> until the Agency determined that the automatic shutdown system meets the requirements specified in 35 IAC Section 730.167 (f) & (g). (Please note that Illinois EPA, while administering any U.S.EPA-delegated program, must impose requirements at least as stringent as the federal program imposes.)

However, due to the nature of injection wells certain information is not available for the final design of the injection well until the well is actually drilled. This is due to the fact that specific information about the geologic formation is not available until tests can be run on the actual formation. The Agency routinely requires the submittal of additional information from an applicant after a permit becomes effective. In these situations the Agency relies on a Compliance Schedule, a listing of what information will be provided by the applicant in a certain timeframe after the permit becomes effective. ADM may not use the well to inject CO<sub>2</sub> until all of the information required by the permit is submitted and the Agency determines that all applicable requirements for the safe injection of CO<sub>2</sub> have been met.

Compliance Schedules are also often supplemented with conditions in the draft and final permit that provide a baseline of acceptable parameters so applicants know what will be acceptable. That baseline of what is acceptable sets a very high standard for appropriate technologies, materials and operating parameters to comply with the requirements of the regulations. Everyone interested is welcome to review the documents submitted in response to the permit's Compliance Schedule as part of the Well Completion Report.

**Comment 20:** In order to protect human health and safety, as well as assess the longevity of storage, the permit should require surface air and soil flux leakage detection monitoring.

A survey of literature produced by industry experts suggests that leakage of sequestered CO<sub>2</sub> must be considered a real possibility<sup>1</sup>. Given this risk, demonstrated methods for detecting CO<sub>2</sub> leakage, such as surface air and soil flux monitoring, should be required by the permit. U.S. EPA has acknowledged that such monitoring can be used "to ensure that there has been no vertical CO<sub>2</sub> leakage, which could endanger USDWs." 73 Fed. Reg. 43492, 43514 (proposed July 25, 2008). In its permit application, ADM admits that "safe

and secure storage of CO<sub>2</sub> . . . requires significant and extensive techniques that include monitoring the injection zone, shallow groundwater, *soil*, and *air*. *ADM UIC Permit Application*, p. 124 (emphasis added). Yet, the Draft Permit does not require, nor has ADM agreed to perform, any monitoring of surface air or soil gas CO<sub>2</sub> fluxes. Further, the use of tracers, a related method for detecting the leakage of CO<sub>2</sub>, remains absent from the permit's monitoring requirements.

With respect to surface leakage detection, IL EPA's Draft Permit is more lenient than ADM's own permit application. On page 173 of its application, ADM states that it will install a shallow 3-D soil resistivity grid near the injection well. This grid does not measure CO<sub>2</sub>, but merely "detects variations in soil moisture that could be caused by migrating CO<sub>2</sub>." *ADM UIC Permit Application*, p. 173. However limited this measure of leakage detection may be, it is still more protective than that required by IL EPA's permit. On issues related to direct leakage detection, like surface soil gas and air flux monitoring, the permit remains silent.

There are a number of carbon sequestration projects which have implemented more comprehensive leakage detection methods than those being required by the draft permit. Notably, the Otway Project in Australia employs a four-tiered monitoring system which not only includes groundwater and seismic monitoring, but also soil gas and atmospheric CO<sub>2</sub> flux monitoring<sup>ii</sup>. The Otway Project uses soil and air flux CO<sub>2</sub> monitoring, in combination with the use of tracers, to directly detect the existence of leakages<sup>iii</sup>. Similarly, The Weyborn carbon sequestration project in Canada and the In Salah Project in Algeria have also implemented direct leakage detection monitoring<sup>iv</sup>. The Weyborn Project's surface monitoring plan includes soil gas sampling and analysis, while In Salah's monitoring program involves a range of technologies, including noble gas tracers<sup>v</sup>. None of the direct leakage detection technologies mentioned above is being utilized by ADM.

Surface soil gas and atmospheric monitoring should be required by IL EPA to address the primary concerns associated with the sequestration of CO<sub>2</sub>. Such monitoring is needed to detect leaks which could potentially affect human health and the local environment. Furthermore, direct leakage monitoring must be used to accomplish the task of assessing the longevity of storage. The need to quantify the amount of leaked CO<sub>2</sub> for carbon accounting purposes demands the use of available atmospheric leakage detection technologies<sup>vi</sup>. Technology for measuring surface levels of CO<sub>2</sub> has existed for some time (in heating and ventilation units, for example)<sup>vii</sup>. Although unique challenges exist for measuring large areas, experts have recognized that technologies such as infrared gas analyzers are capable of monitoring changes in levels of CO<sub>2</sub>, or tracer gases, over expansive areas. 73 Fed. Reg. 43492, 43516 (proposed July 25, 2008). In fact, the National Energy Technology Laboratory is currently developing technology which will further meet the need for atmospheric monitoring of geo-sequestration sites, using comparatively inexpensive instruments<sup>viii</sup>. However, as demonstrated by the Otway Project, established atmospheric detection technologies are not unaffordable. In cases such as ADM's, where public health and safety are concerned, the risks associated with unanticipated CO<sub>2</sub> release justify the cost of direct leakage detection technology.

A comprehensive leakage detection scheme is essential to the success of any carbon sequestration project. Early detection protects human health by triggering the remediation measures needed to mitigate the harmful effects of unanticipated releases of sequestered CO<sub>2</sub><sup>ix</sup>. Furthermore, public acceptance of geological sequestration cannot be attained unless it is demonstrated that sequestered CO<sub>2</sub> will remain stored underground and not leak to the surface<sup>x</sup>.

**Response:** The Illinois EPA has chosen to employ the most stringent regulations applicable; those are the Class I UIC well regulations. These regulations have several safeguards against leakage of the injected fluids, all of which act as very early leakage detection systems. The applicant must demonstrate that the confining geological formation is intact; the well is designed with three casings (large diameter steel pipes) nested inside of each other that will be cemented in place from various depths to the surface; provide continuous monitoring of the injection pressure, injection rate, and annular space pressure during well operation; as well as perform periodic mechanical integrity testing of the well.

In addition to requiring verification of the integrity of the confining layer, appropriate well design and well leakage monitoring, the regulations contemplate the potential for migration of injected fluids and therefore require monitoring of the lowermost underground source of drinking water, still very deep below ground surface therefore, also an early leakage detection system. If monitoring of this stratum indicates migration is occurring, corrective actions would be required. ADM has provided modeling of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well even after 100 years.

The use of tracers or surface air and soil flux leakage detection monitoring is not required under the current Class I regulations or the proposed U.S. EPA Class VI regulations. U.S. EPA states in the proposed Class VI regulations, “Under today’s proposal, owners or operators could, at the Director’s discretion, be required to conduct surface air monitoring and/or soil gas monitoring in the [Area of Review].” On the following page of the notice it states, “EPA seeks comment on the appropriate amount and types of monitoring that should be conducted at a [geological sequestration] site. Specifically, EPA seeks comment regarding the usefulness of indirect geophysical monitoring and surface air and soil gas monitoring.” U.S. EPA is trying to determine what role this type of monitoring should play in the permitting of these projects.

ADM and the Illinois State Geological Survey are performing some of the research to continue that monitoring discussion with U.S. EPA. Supplemental monitoring as described in the ADM permit application is part of their ongoing research designed to help determine what role monitoring systems should play in future permitting of these CO<sub>2</sub> sequestration projects, just as U.S. EPA has requested.

**Assured sequestration is an issue beyond the scope of the UIC permitting program. That is not to say that further surface soil gas and atmospheric monitoring, such as described in this comment, may be required of ADM beyond that required by this permit before any “carbon trading” system would allot “carbon credits” for the sequestration project. This would be a strong economic incentive for further monitoring.**

**Comment 21:** IL EPA should have required ADM to submit an adequate corrosion monitoring plan with its permit application, well in advance of any further action related to this project.

The Draft Permit provides no specifications as to what type of corrosion monitoring will be required of ADM. Instead, the permit only requires that ADM develop some type of corrosion monitoring system within 120 days, to be provided in the Well Completion Report. *UIC Draft Permit*, section B, ¶ 2(d). In its permit application, ADM merely states that corrosion coupon installation is “being considered.” *ADM UIC Permit Application*, p.125. However, under U.S. EPA’s proposed rules for geologic sequestration, corrosion monitoring would be required. Such monitoring can be accomplished through the use of coupons. 73 Fed. Reg. 43492, 43510-43511 (proposed July 25, 2008). IL EPA’s draft permit is silent as to whether corrosion coupon installation will be required. It remains unclear why IL EPA has not required ADM to produce a functional corrosion monitoring plan as a precondition to drilling and constructing the injection well. An unacceptable consequence of IL EPA’s inaction in this regard is that it ensures that any corrosion monitoring plan which is eventually adopted by ADM will escape public comment.

An effective corrosion monitoring plan is essential to maintaining mechanical integrity. According to the U.S. EPA, corrosion monitoring “can help avoid or provide early warning of corrosion of well materials that could compromise the well’s integrity.” 73 Fed. Reg. 43492, 43511 (proposed July 25, 2008). It has been demonstrated that CO<sub>2</sub> “reacts with water to become acidic, potentially accelerating corrosion of well materials.” *Id.* In order to adequately assess the risks posed by such acidity, ADM should be required to include the use of corrosion coupons, a demonstrated method for detecting corrosion of well materials, in its corrosion monitoring plan.

**Response:** Although current regulations for Class I non-hazardous waste injection wells do not require corrosion monitoring systems, the Illinois EPA has included a requirement in the permit requiring the facility to develop and submit a corrosion monitoring plan as a modification to the final permit with the opportunity for public comment.

**The proposed U.S. EPA Class VI regulations do not require the use of corrosion coupons. The regulations for corrosion monitoring contained in section 146.90(c) of the proposed regulations identify the use of corrosion coupons as only one method that may be used in a corrosion monitoring plan (73 Fed. Reg. 43539).**

**Comment 22:** Adequate post-injection site care and monitoring requirements should be imposed by the permit. The U.S. EPA's proposed regulations for geologic sequestration give great consideration to the need for lengthy post injection site care. In fact, U.S. EPA proposes a 50 year post-injection site care period. 73 Fed. Reg. 43492, 43520 (proposed July 25, 2008). In contrast, the IL EPA's Draft Permit is silent as to post-injection site care, even though experts have recognized that injected CO<sub>2</sub> may not stabilize for 100 years. *See* 73 Fed. Reg. 43492, 43518 (proposed July 25, 2008).

Post-injection site care issues remain at the core of public safety concerns regarding carbon sequestration projects, especially large-scale projects like ADM's. In its permit application, ADM states that the life of the injection well is at least 30 years (p.89), and that this period may be extended "much longer if sequestration demands are present." *See ADM UIC Permit Application*, p.11. Further, the application notes that the amount of CO<sub>2</sub> injected may experience a 20% increase, from 1,000 metric tons to 1,200 metric tons per day. *Id.* Although the permit application currently contemplates a total mass injected amount of approximately 1 million tons (*Id.*), it is clear that this amount may increase substantially due to future use of the well. As the length of the project and the volume of sequestered CO<sub>2</sub> increase, so too does the likelihood that a lengthy post-injection site care and monitoring period should be required to protect human health and safety.

In its application, ADM contemplates a two year post-injection groundwater monitoring program, but no post-injection air or soil monitoring is proposed. IL EPA's Draft Permit contains no requirements for post-injection site monitoring at all, and does not even make ADM's own proposal for two years of post-injection groundwater monitoring an enforceable provision of the permit. Indeed, the only provision in the Draft Permit relevant to the post-injection period is that ADM is required to plug and abandon the well in accordance with its plugging plan if the well is left inactive for two years. *UIC Draft Permit*, section H, ¶ 25. Adding a post-injection site care and monitoring plan is essential. And to the extent that IL EPA may wish to rely on future changes to the permit after U.S. EPA acts on its proposed regulations, there is no assurance when, if ever, a final federal rule will be in place. Thus, IL EPA's responsibility to make provisions in the permit for post-injection site care is not abated by the existence of U.S. EPA's proposed rules.

Even if the permit included ADM's two-year post-injection groundwater monitoring proposal, this would be inadequate. Not only does the two-year monitoring period fall short of achieving ADM's stated research goal of "understanding the fate of CO<sub>2</sub>," it is startlingly shorter than the shortest acceptable post-injection monitoring period advanced by any recognized studies. Though impractical in terms of implementation, White *et al.* (2003) have suggested that monitoring may be required for a thousand years<sup>xi</sup>. In an alternative view, Chow *et al.* (2003)<sup>xii</sup>, and Benson *et al.* (2004)<sup>xiii</sup> suggest that once it has been demonstrated that the CO<sub>2</sub> is no longer moving, post-injection monitoring may be ceased. U.S. EPA's proposed 50 year post-injection site monitoring default rule is based on the technical findings of similar studies, which have concluded that post-injection monitoring should continue until the CO<sub>2</sub> plume has stabilized. 73 Fed. Reg. 43492, 43518 (proposed July 25, 2008). Depending on the size of the project, experts predict that stabilization may take between 10 and 100 years. *Id.* In considering this information,

U.S. EPA rejected both a 10-year time frame, and the 30 year time frame used in most UIC projects, as being insufficiently protective. 73 Fed. Reg. 43492, 43519 (proposed July 25, 2008). Comparatively, the two year post-injection groundwater monitoring proposed by ADM, and the complete lack of any post-injection monitoring requirements in the draft permit itself, is far less protective than the least protective standard contemplated, and ultimately rejected, by U.S. EPA.

IL EPA should require that a sufficient post-injection site care and monitoring plan be implemented by ADM. Consistent with U.S. EPA's proposed regulations, IL EPA should require ADM to submit a post-injection site care plan which: (1) records the pressure differential between pre-injection and anticipated post-injection pressures in the injection zone; (2) predicts the position of the plume and associated pressure front when the site will be closed (3); describes the post-injection monitoring locations, methods, and proposed frequency of monitoring, and (4) provides a schedule for submitting post-injection site care and monitoring. *See* 73 Fed. Reg. 43492, 43518 (proposed July 25, 2008). Furthermore, while keeping U.S. EPA's 50 year post-injection monitoring default rule in mind, IL EPA should establish a protective post-injection site monitoring time frame which allows for flexibility in increasing the period, should the length and scale of ADM's sequestration operation increase.

**Response: The Agency has employed the most stringent UIC regulations currently applicable, Class I UIC well regulations. The current regulations do not require post-injection monitoring.**

**These regulations prohibit the migration of injected fluids and therefore require monitoring of the lowermost underground source of drinking water during the injecting life of a well. If monitoring of this stratum indicates migration is occurring, corrective actions would be required by the Agency. ADM has provided modeling of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well even after 100 years.**

**If a post-injection site care and monitoring plan is ultimately what is required by the U.S. EPA's UIC program for carbon sequestration wells, the ADM permit will be modified to address any deficiencies between the current permit and U.S. EPA's requirements. That is not to say that further long-term, post-injection monitoring may be required of ADM much sooner-- before any "carbon trading" system would allot "carbon credits" for the sequestration project.**

**Comment 23:** The permit should impose a RCRA-like duty upon ADM to accept and demonstrate financial responsibility for long-term site care requirements. The interest of the public in preventing endangerment of aquifers, as well as maintaining health and safety within the local environment, dictates that ADM be required to assume all financial liability for post-injection management of the sequestration site.

The permit should require ADM to periodically demonstrate financial responsibility for the costs associated with long-term management of its sequestration site. In the draft

permit, IL EPA requires only limited information on financial responsibility for the “plugging and abandonment” phase of the project (which is estimated to cost only \$308,000), and completely ignores the post-injection phase associated with long term care. *UIC Draft Permit*, section H, ¶ 23. In contrast, U.S. EPA’s proposed regulations would require a general duty imposed on all owners and operators to demonstrate and maintain financial responsibility for long-term care of their sequestration site. 73 Fed. Reg. 43492, 45320 (proposed July 25, 2008). The U.S. EPA goes further by asserting that “[i]t may be appropriate [for operators] to re-demonstrate financial responsibility on a periodic basis.” *Id.* After evaluating the desirability of various financial responsibility instruments, U.S. EPA’s RCRA program has issued a comprehensive financial responsibility strategy. *Id.* This strategy should be applied to carbon sequestration projects. Particularly, pay-in period trusts should be implemented as a form of financial assurance for sequestration projects. Under this model, as envisioned by U.S. EPA, the owner would deposit into a trust, over the course of three years, the total funds necessary to cover the cost of long-term management of the sequestration site. 73 Fed. Reg. 43492, 43521 (proposed July 25, 2008). This way, if owners go into financial distress later in the operation, the trust will be funded. *Id.* The Three-year pay-in trust model is the most effective because it requires owner-operators to demonstrate a direct measure of financial responsibility, early-on in the project.

From a public policy perspective, many of the potential hazards that favor imposing strict financial responsibility/liability requirements in RCRA situations are also present in carbon sequestration projects. Like many hazardous substances, the unanticipated release of sequestered CO<sub>2</sub> can cause a number of disastrous consequences. Migration of CO<sub>2</sub> into underground sources of drinking water can cause the mobilization of contaminants (like arsenic and lead) and create changes in groundwater flow. 73 Fed. Reg. 43492, 43495 (proposed July 25, 2008). It is undisputed that, in large quantities, CO<sub>2</sub> can function as an asphyxiant, causing both chronic and acute health effects in humans and animals. *See Id.* The immediate effects of increased CO<sub>2</sub> on humans are well-documented. Studies show that when CO<sub>2</sub> levels exceed 3%, human breathing rates increase substantially and hearing and vision may become impaired<sup>xiv</sup>. At 10% levels, unconsciousness can occur<sup>xv</sup>. When CO<sub>2</sub> levels reach 30%, death occurs within minutes (Benson et al., 2002<sup>xvi</sup>; Oldenburg et al., 2002<sup>xvii</sup>; Rice, 2003<sup>xviii</sup>). Although many humans can adapt to air containing as much as 3% CO<sub>2</sub> (Benson et al. 2002<sup>xix</sup>), vulnerable populations such as individuals with pulmonary disease, panic disorder, and people with cerebral disease or head trauma remain at increased risk (Rice, 2003<sup>xx</sup>; Rice and Rhudy, 2004<sup>xxi</sup>). Even though sequestered CO<sub>2</sub> is categorized as a non-hazardous substance, its potentially harmful effects on humans compel the conclusion that, as ordinarily required under RCRA, operators of carbon sequestration sites must be required to assume full financial liability for any activities related to the long-term management of sequestration sites.

States should not be required to assume financial responsibility for sequestered gas. Under the “Clean Coal Project Indemnity Act,” (proposed legislation addressing liability concerns under the now-abandoned FutureGen project), it was advanced that the state of Illinois should assume financial responsibility and liability for sequestered gas by taking

title to the gas. Absolving private corporations of potential liability for sequestered CO<sub>2</sub> encourages these corporations to engage in minimal post-injection site care and monitoring. Without the threat of liability, a major incentive for private operators to ensure that the sequestration site is being properly maintained, there is a heightened chance of site malfunction due to mismanagement. In addition, the taxpayers of the state of Illinois should not be forced to bear the financial burden of any potentially serious consequence caused by a massive CO<sub>2</sub> leakage. As discussed above, concentrated releases of CO<sub>2</sub> have the potential to be very destructive and, consequently, very costly.

**Response:** Assured sequestration is an issue beyond the scope of the UIC permitting program. The UIC permit program is not a function of the RCRA program therefore “RCRA-like” post-closure financial assurance regulation of the UIC well is not required. The UIC permit program is a function of the Safe Drinking Water Act; consequently, protection of underground sources of drinking water is a primary concern of the regulations. ADM has provided modeling of CO<sub>2</sub> migration indicating that the CO<sub>2</sub> will not reach the confining layer nor will it migrate beyond 1500 feet from the UIC well even after 100 years.

The Illinois EPA requires ADM maintain financial assurance to provide for a third party to perform the plugging and abandonment of the well after injection ceases as prescribed by the UIC regulations. The policy issue of continued financial responsibility and liability for sequestered gas beyond the life of the UIC permit cannot be addressed in the UIC permitting process under the current regulations. The commenter will have to refer this issue to the General Assembly, the state legislature of Illinois. However, a special condition is in the permit that allows the Illinois EPA to reopen the permit and incorporate any additional conditions that may result from any finalized new federal regulations.

**Comment 24:** Clarification should be given as to the future of ADM’s geologic sequestration project. It is unclear what actions will be taken by ADM and IL EPA once the current permit expires.

The Draft Permit is unclear with respect to both future permitting requirements and the permissible scope of the project. In its permit application, ADM states that the life of the injection well will be 30 years or longer, provided there is significant interest in geologic sequestration. *See ADM UIC Permit Application*, p.11). The permit application expresses “an interest to continue injection into the wells,” after the research is completed, potentially “for the entire period of the injection permit and potentially via permit extensions beyond the initial permit period.” *Id.* Under the current Illinois regulations, UIC permits are “not to exceed 10 years.” 35 IAC 720.161.

Clarification of these issues will significantly assist the public in understanding the scope of ADM’s project. Clarification will also aid the public in understanding the Illinois EPA’s approach to permitting long-term geologic sequestration projects.

Given the anticipated length of ADM's project in relation to the UIC permitting scheme, in addition to the permit application's suggestion that the injection well may be used beyond the anticipated life of the project, the following questions develop:

If ADM decides to substantially increase the amount of CO<sub>2</sub> injected during the duration of this permit, what, if any, modifications will be made to the requirements of the permit?

**Response:** The Illinois EPA would consider an increase in the amount of CO<sub>2</sub> to be injected during the 10-year lifetime of this permit to be a significant modification to the permit. Significant modifications require public notice and comment unless they are denied.

**Comment 25:** If ADM wishes to extend the injection period beyond the time-frame allotted by this permit, will this change trigger a re-permit or simply a permit modification?

**Response:** If a permittee wishes a permit beyond the 10-year lifetime of the original permit, a permit renewal application must be prepared and submitted 180 days prior to the expiration of the original permit. A permit renewal goes through the same public involvement process as the original permit did (public notice of a draft permit and 30-day public comment period).

**Comment 26:** In the future, will other sources of CO<sub>2</sub> (from other industrial operations, for example) be injected into ADM's injection well for the purpose of sequestration? Additionally, what type of permitting scheme would be required for additional industrial producers of CO<sub>2</sub> to utilize ADM's injection well?

**Response:** The Illinois EPA has no application in-house indicating that other sources of CO<sub>2</sub> from the ADM facility will be injecting into the ADM well. Whether the additional sources of CO<sub>2</sub> from ADM or from another industrial CO<sub>2</sub> producer would require a significant modification to the permit, would depend on the source generating the CO<sub>2</sub>. Any proposal would most likely require a significant modification to the permit unless the new CO<sub>2</sub> stream was generated in the same manner and also shown to be virtually identical to the CO<sub>2</sub> currently produced by ADM.

**Comment 27:** What are the other contemplated uses, if any, for ADM's injection well after the current CO<sub>2</sub> injection process is concluded?

**Response:** The Illinois EPA has no information on future contemplated uses of the injection well beyond this permitted CO<sub>2</sub> injection process. Please discuss this issue directly with ADM.

**Comment 28:** What role will public participation and comment play with respect to all of the above changes in the scope of IL EPA’s permitting and the future potential uses of ADM’s CO<sub>2</sub> injection site?

**Response:** Unless a modification of the permit is classified as a minor modification under 35 IAC 704.264, the same public notice process followed during the original permitting process would be required. If the modification requested was more significant than a minor modification, the Illinois EPA would review the proposed modification and draft a decision. If the draft decision was to approve the modification, staff would prepare a draft permit and a public notice would be issued soliciting comments on the draft permit modification. The Agency would then evaluate any public comments and make a final determination on whether to issue or deny the proposed permit modification.

**Comment 29:** In light of prior adjudications of non-compliance, IL EPA should impose much more stringent permit terms and conditions on ADM.

The Illinois Environmental Protection Act authorizes the IL EPA to consider a permit applicant’s past acts of non-compliance in making permit determinations. The Act states:

“In making its determinations on permit applications under this section the Agency may consider prior adjudications of noncompliance with this Act by the applicant that involved a release of a contaminant into the environment. In granting permits, the Agency may impose reasonable conditions specifically related to the applicant’s past compliance history with this Act as necessary to correct, detect, or prevent non-compliance.” 415 ILCS 5/39(a).

According to U.S. EPA’s Enforcement & Compliance History Online database (“ECHO”), ADM has been the subject of enforcement actions by the U.S. EPA and IL EPA. A true and accurate copy of data acquired through ECHO is attached to these comments and labeled as Sierra Club Exhibit 3. By way of summary, ECHO identifies the following enforcement activities:

| Primary Law/Section | Case Number  | Case Type | Lead Agency | Case Name              | Issued/Filed Date | Settlement Date | Federal Penalty | SEP Cost    | Comp Action Cost |
|---------------------|--------------|-----------|-------------|------------------------|-------------------|-----------------|-----------------|-------------|------------------|
| CAA/§165            | 05-2001-0710 | Judicial  | EPA         | Archer Daniels Midland | 04/09/03          | 08/22/03        | \$757,506       | \$332,558   | \$225,201,860    |
| CERCLA/103          | 05-2002-1037 | Admin.    | EPA         | Archer Daniels Midland | 09/16/02          | 09/29/03        | \$15,468        |             | \$100            |
| CAA/ §165           | 05-2006-5089 | Admin.    | EPA         | Archer Daniels Midland | 09/25/06          | 09/25/06        | \$325,000       | \$1,045,000 | \$75,000         |

In addition, ECHO identifies three additional “formal enforcement actions”, including two actions in which the IL EPA was the lead agency:

| Statute | Source ID  | Type of Action                          | Lead Agency | Date     | Penalty |
|---------|------------|---|-------------|----------|---------|
| CAA     | 1711500005 | 113 APO<br>Complaint Filed              | EPA         | 09/25/06 | \$0     |
| CAA     | 1711500005 | State<br>Administrative<br>Order Issued | IL EPA      | 06/18/04 | \$0     |
| CAA     | 1711500005 | State<br>Administrative<br>Order Issued | IL EPA      | 07/15/04 | \$0     |

Finally, ECHO identifies four separate quarters between July, 2005 and March, 2008, when there was “Non-compliance in Quarter” under the Clean Water Act.

In order to understand the relevance of this compliance history in reviewing the present permit application, it is instructive to review the nature of the non-compliance alleged in two enforcement initiatives against ADM. In the civil judicial action that culminated in a Consent Decree entered on or about August 22, 2003, the Department of Justice alleged that ADM failed to accurately estimate its emissions from process units and expanded other units without the installation of required pollution control technology. In keeping with the allegations of ADM’s failure to accurately estimate emissions, the Consent Order imposed a slate of highly prescriptive protocols, including environmental audits, continuous emission monitoring and an environmental management system, to ensure ADM was correctly characterizing and reporting emissions from its process units. A complete copy of this Consent Decree can be found at:

<http://www.epa.gov/compliance/resources/decrees/civil/caa/admcd.pdf>

Less than two years after the entry of this Consent Decree, on March 16, 2005, U.S. EPA initiated an administrative enforcement action targeted at ADM’s Decatur facility. Again, U.S. EPA alleged that ADM failed to do required equipment testing, monitoring and reporting. Moreover, U.S. EPA alleged “...ADM also violated rules to protect stratospheric ozone by, among other things, failing to track leaks of chlorofluorocarbon refrigerant from chillers at the facility.” According to U.S. EPA, these leaks were initially discovered during an U.S. EPA inspection. The resolution of this administrative enforcement action included enhanced leak detection and repair systems. The October 4, 2006 U.S. EPA press release accompanying the entry of this agreement is included in Sierra Club’s Exhibit 3.

Sierra Club’s concerns about the adequacy of the Draft Permit’s provisions relating to monitoring, recordkeeping, reporting, leak detection and repair are appropriately viewed in light of “...prior adjudications of noncompliance with this Act by the applicant that involved a release of a contaminant into the environment.” 415 ILCS 5/39(a). It is equally appropriate that the Agency impose conditions specifically related to the applicant’s past compliance history with this Act as necessary to correct, detect, or prevent non-compliance. *Id.* In light of this enforcement history, a significantly heightened level of scrutiny would be appropriate for any subsequent permit sought by this applicant.

These concerns are even greater in light of the unique nature of the permit application now before IL EPA. Simply stated, the entire purpose of conducting this project is to provide a credible assessment of carbon sequestration through underground injection, during processing, transporting, injection and storage operations, now and for the indefinite future. Stakeholder confidence can only be achieved if the permit applicant is required by the Draft Permit to employ stringent protocols for monitoring, recordkeeping, reporting and for identifying and immediately responding to leaks. Moreover, these are the very aspects of ADM's past performance that have been subject to judicial and administrative enforcement. Because of this enforcement history and the need for absolutely accurate monitoring, recordkeeping and reporting for the present permitted activity, Sierra Club asserts there is every justification for IL EPA to require the enhancements contained in these comments.

**Response: The primary issue raised here is that of the facility's permit compliance history and how that history relates to permit decision-making. The review of a permit application and subsequent permit decision-making is entirely independent of the enforcement process. During permitting, the Agency must base its decision whether to prepare a draft permit and issue a final permit on the application provided by the applicant and the applicable regulations rather than on a facility's compliance history. The Agency must base its permit decision on whether the application provides information that the applicant's operations, procedures, equipment and discharge or emissions can consistently meet the state's standards. If so, the Agency is required by law to grant the permit. The facility will then be required to operate within the limits provided by the permit. The enforcement process, often culminating in a Consent Order, is designed to bring a facility back into compliance but may also be punitive. Thus imposing a slate of highly prescriptive tracking protocols, including environmental audits, continuous emission monitoring and an environmental management system, is intended not only to bring the facility back into compliance but also to discourage the facility from violating permit requirements again.**

That said, Section 39(a) of the Act allows conditions to be added to the permit to assist the facility in avoiding violations of the Act. Section 39(a) of the Act reads in pertinent part: "...the Agency may consider prior adjudications of noncompliance with this Act by the applicant that involved a release of a contaminant into the environment. In granting permits, the Agency may impose reasonable conditions specifically related to the applicant's past compliance history with this Act as necessary to correct, detect, or prevent non-compliance. . ."

Compliance issues can be considered by the Agency in the permitting process to the extent that special conditions can be placed in a permit to correct, detect, or prevent recurrences of previous compliance problems. A permit indicates to the permittee and inspector what the acceptable operating conditions are; the ADM UIC permit can only minimize the likelihood of non-compliance with the applicable UIC regulations and does so by very clearly identifying the regulatory requirements the

**facility must meet. These permit requirements already include stringent monitoring of the injection well, the injection zone aquifer and the lowermost usable source of groundwater.**

**Potential permit violations at every facility are investigated and, where necessary, enforcement procedures are implemented in accordance with Title VIII of the Act. These enforcement procedures, independent of and separate from the permit process, must provide the incentive for compliance with the permit conditions.**

**Comment 30:** Finally, ECHO's Compliance Summary Data also includes reference to a "VIOLATION UNADDRESSED; EPA HAS LEAD ENFORCEMENT/ Current As of 09/20/2008/," based on 12 quarters of non-compliance at the Decatur facility. However, the nature of this reference could not be independently verified by Sierra Club in preparing these comments. Consequently, in light of IL EPA's authority to assess the compliance history of permit applicants, Sierra Club requests IL EPA to determine if there is ongoing enforcement activity against ADM at its Decatur facility, the nature and extent of any alleged non-compliance, and the importance of any alleged non-compliance for the present permitting activity. Sierra Club requests IL EPA to address this issue in its Responsiveness Summary.

**Response:** The ECHO database's AIR Compliance Status chart for ADM provided a bit more information than provided in the Compliance Summary Data chart; the allegations cited in the above comment concern the Clean Air Act, a specific source id: 1711500005, and the violation(s) cited with no compliance schedule ("V-NO SCH") are in the category "CFC Tracking." The ECHO database defines Unaddressed as: the facility's violations have not yet been addressed with a formal enforcement action or the decision to do so has not yet been made. Because U.S. EPA is designated the lead agency and no enforcement activity has taken place, the Illinois EPA's enforcement staff could not provide any further guidance on the source and nature of the alleged violation(s). Please contact the U.S. EPA for further information concerning this question.

**Adjudicated issues can form the bases of "...reasonable conditions specifically related to the applicant's past compliance history with this Act as necessary to correct, detect, or prevent non-compliance." However, since these alleged violations of the CAA have not even had an enforcement action initiated, much less a court ruling made, they do not fall into the category of "prior adjudications of noncompliance with this Act..." Consequently, these ECHO notations cannot be considered in the current permitting process.**

**Comment 31:** IL EPA should defer permitting activities until DOE demonstrates its action to fund this project complies with its obligations under the National Environmental Policy Act of 1969.

In order to comply with the National Environmental Policy Act of 1969, all agencies of the federal government shall include in major federal actions significantly affecting the

environment a detailed statement by the responsible official on the environmental impact of the proposed action, adverse environmental effects which cannot be avoided should the proposal be implemented, alternatives to the proposed action and other environmental issues. 42 U.S.C.A. § 4332(C). The preparation of this statement must include consultation with any federal agency which has jurisdiction or special expertise with respect to any environmental impact involved. *Id.* As implemented through regulations developed by the Council on Environmental Quality in 40 C.F.R. 1500 *et. seq.*, the development of the detailed statement – the Environmental Impact Statement (EIS) – occurs through a carefully prescribed process that includes opportunities for public participation through scoping, a public hearing, written comments and review of agency action.

On a programmatic level, the Department of Energy initially provided notice of its intent to perform a PEIS as part of its overall carbon sequestration initiative. 69 Fed. Reg. 21514 (April 21, 2004). The Department identified 13 environmental issues that it intended to address “...when considering the potential impacts of the Carbon Sequestration Program alternatives and technologies for CO<sub>2</sub> capture, sequestration, MMV, and breakthrough concepts.” *Id.* at 21517 (a true and accurate copy of the FR page containing the list of 13 environmental issues is attached and labeled as Sierra Club Exhibit 4). Later, and with little explanation, the DOE withdrew its previous commitment. 72 Fed. Reg. 8363 (February 26, 2007). Absent further explanation from the DOE justifying this decision, Sierra Club believes the DOE’s decision was ill-advised and not in compliance with NEPA.

For purposes of the ADM pilot project, Sierra Club questions if DOE’s subsequent actions to provide funding for pilot sequestration projects like the ADM project are NEPA compliant. From Sierra Club’s perspective, DOE’s decision to provide funding for this project appears to be NEPA-triggering activity within the meaning of 42 U.S.C.A. § 4332(C) and CEQ regulations. This appears to be consistent with DOE’s own February 26, 2007 assertion in the Federal Register that “DOE will continue to perform project-specific NEPA reviews of its carbon sequestration research, development and demonstration activities.” 72 Fed. Reg. 8363 (February 26, 2007). Sierra Club is currently assessing what pre-decisional environmental review, if any, was conducted by DOE as part of funding the project now before the IL EPA.

Sierra Club recognizes that IL EPA is not subject to the National Environmental Policy Act. Nonetheless, in order to be clear with every stakeholder in this process, Sierra Club believes a complete environmental impact statement would not only have been beneficial to analyze the environmental impacts of this proposal and reasonable alternatives, it may also be a legal requirement under NEPA. Consequently, Sierra Club requests IL EPA to provide information about whether an environmental assessment or environmental impact statement was completed prior to DOE’s decision to fund the project which is now subject to permit review. If IL EPA determines that legally-mandated NEPA review was not completed, Sierra Club requests it defer permitting activity until the DOE completes this pre-requisite.

**Response:** The commenter correctly recognizes that Illinois EPA is not subject to the National Environmental Policy Act (NEPA) nor is an Environmental Assessment or Environmental Impact Statement required prior to the issuance of this UIC permit. However, the Agency attempts to respond to comments beyond the scope of our authority whenever possible to help clarify issues critical to understanding a project such as this. An Environmental Assessment has been prepared by the Department of Energy. For more information, please contact: [pierina.noceti@netl.doe.gov](mailto:pierina.noceti@netl.doe.gov) .

**Comment 32:** In conclusion, IL EPA's Draft Permit fails to set high enough standards for this project and leaves open too many significant questions about the construction, operation and monitoring of this plant. While IL EPA may not have the authority in the context of this permit application to reach the larger policy issues of what role carbon sequestration should have in the reduction of global warming gases, IL EPA has the right and the responsibility to assure that this plant meets all applicable regulations and will not harm the very environment it is designed to protect. This is not a plant producing a product where some degree of environmental harm is unavoidable; this is a project whose only goal is to reduce the emission of global warming gases into the atmosphere. Therefore, it is entirely appropriate for IL EPA to apply its regulatory authority so as to avoid harm to public health or the environment. The sequestration of CO<sub>2</sub> from the air into land and water resources must be carefully monitored to assure that the promised goal of CO<sub>2</sub> reduction is achieved in a manner that does not merely shift the risk of harm to other environmental media.

**Response:** The Illinois EPA is confident that this permit meets the applicable requirements of the Class I injection well regulations under which it was developed and is protective of drinking water, both groundwater and surface water. We reiterate the appropriateness and adequacy of applying the current UIC Class I regulations and structure to address this UIC permit application, and we defend the use of a Compliance Schedule to acquire certain additional information necessary to ensure a protective permit prior to ADM's use of the proposed well. We also require ADM to provide specific required information in the form of permit modification requests in order to allow appropriate public review and comment.

The Illinois EPA's UIC permit does not directly address the carbon sequestration issues of this project; our authority under the UIC permitting program extends to the viability of the injection process, the structural and engineering integrity of the well, and the stability and integrity of the geological formations to contain the fluid and prevent migration of the injected fluid into usable groundwater.

#### **Additional Information**

Copies of this Response Summary and its Attachment 1 will be available to the public. A Final Decision Notice with information about how to acquire a copy of the Response Summary will be provided to everyone who offered comments or participated in the public hearing on the draft permit. An electronic copy will be available at the Illinois EPA's web site at the following link: <http://www.epa.state.il.us/public-notices/general->

[notices.html](#) (scroll down the page to Archer Daniels Midland - Underground Injection Well Permit Hearing where a listing of available documents will include “Responsiveness Summary” and “Attachment 1”). If you wish a paper copy to be sent to you, or if you have questions about this document, please contact:

Mara McGinnis, Office of Community Relations (MC #5)  
Illinois EPA  
1021 N. Grand Ave. East, P.O. Box 19276  
Springfield, Illinois 62794-9276

telephone: 217-524-3288  
e-mail: [Mara.McGinnis@illinois.gov](mailto:Mara.McGinnis@illinois.gov)

The following permitting documents are also available for examination and review via Freedom of Information Act (FOIA) requests:

Public Notice of the draft permit;  
Illinois EPA’s draft and final permits;  
Administrative Record for the draft permit decision; and  
Administrative Record for the final permit decision.

Please submit a request at <http://www.epa.state.il.us/foia/> or contact Jan Ogden at [Jan.Ogden@illinois.gov](mailto:Jan.Ogden@illinois.gov) for information about making a FOIA request for any of these documents.

### ***Thank You***

*The Illinois EPA staff involved in this UIC permit for the Archer Daniels Midland Company facility in Decatur, appreciate the interest of community members. Thank you to those who attended the hearing and provided comments on the draft UIC permit. We hope that this Response Summary has helped the community better understand our responsibilities for administering the Underground Injection Control permit program. Community and facility comments and the changes to the permit incorporated in response, have helped improve the final UIC permit.*

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<sup>i</sup> Atmospheric Monitoring and Verification Technologies for CO<sub>2</sub> storage at Geosequestration Sites in Australia. Etheridge, D., Leuning, R., DeVries, D., Dodds, K., Trudinger, C., Allison, C., Fraser, P., Prata, Fred., Bernardo, C., Meyer, M., Dunse, B., and Luhar, A. *October 2005 CO<sub>2</sub>CRC Report No: RPT05-0134, 8.*

<sup>ii</sup> The coupling of geochemical modeling, fluid monitoring and tracer injection programs optimize a monitoring program at the Otway Basin CO<sub>2</sub> Storage Pilot Perkins, E., Kirste, D., and Stalker, L.. 2008 *CO<sub>2</sub>RC Center for Greenhouse Gas Technologies 1.*

<sup>iii</sup> *Id.*

<sup>iv</sup> IPCC 2005: Intergovernmental Panel on Climate Change Special Report on Carbon Dioxide Capture and Storage. Prepared by Working Group III of the Intergovernmental Panel on Climate Change [ Metz, B., O.

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Davidson, H.C. de Connick, M. Loos, and L.A. Meyer (eds.)] Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 442 pp. **203-204.**

<sup>v</sup> *Id.*

<sup>vi</sup> Emissions Control Needs Atmospheric Verification. Nisbet, E. 2005 *Nature*, Vol. 433, **683.**

<sup>vii</sup> United States Environmental Protection Agency Technical Support Document: Vulnerability Evaluation Framework for Geological Sequestration of Carbon Dioxide. July 10, 2008. U.S. Environmental Protection Agency EPA430-R-08-009 **14.**

<sup>viii</sup> National Energy Technology Laboratory Project Facts: Low Cost Open-Path Instrument for Monitoring Atmospheric Carbon Dioxide at Sequestration Sites. U.S. Department of Energy. 04/2008

<sup>ix</sup> *Id.* at 2.

<sup>x</sup> *Id.*

<sup>xi</sup> Theme 2: Prediction, Monitoring and Verification of CO<sub>2</sub> Movements. In: IEA GHG Weyburn CO<sub>2</sub> Monitoring and Storage Project Summary Report 2000-2004, White, D. (ed.), M. Wilson and M. Monea (eds.), 2005 Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies (GHGT-7), Volume III, p 73–148.

<sup>xii</sup> Separation and capture of CO<sub>2</sub> from large stationary sources and sequestration in geological formations. Air and Waste Management Association. Chow, J.C., J.G. Watson, A. Herzog, S.M. Benson, G.M. Hidy, W.D. Gunter, S.J. Penkala and C.M. White, 2003: (AWMA) *Critical Review Papers*, **53**(10), October 2003. <http://www.awma.org/journal/past-issue.asp?month=10&year=2003>.

<sup>xiii</sup> Overview of monitoring techniques and protocols for geologic storage projects, IEA Greenhouse Gas R&D Programme Report. Benson, S.M., E. Gasperikova and G.M. Hoversten, 2004.

<sup>xiv</sup> United States Environmental Protection Agency Technical Support Document: Vulnerability Evaluation Framework for Geological Sequestration of Carbon Dioxide. July 10, 2008. U.S. Environmental Protection Agency EPA430-R-08-009 **9.**

<sup>xv</sup> *Id.*

<sup>xvi</sup> Lessons Learned from Natural and Industrial Analogues for Storage of Carbon Dioxide in Deep Geological Formations. Benson, S.M., R. Hepple, J. Apps, C.F. Tsang, and M. Lippmann. 2002 LBNL-51170. Lawrence Berkeley National Laboratory, Berkeley, CA.

<sup>xvii</sup> Health, Safety, and Environmental Screening and Ranking Framework for Geologic CO<sub>2</sub> Storage Site Selection. Oldenburg, C.M. 2005. LBNL-58873. Lawrence Berkeley National Laboratory, Berkeley, CA. September 20.

<sup>xviii</sup> Health effects of acute and prolonged CO<sub>2</sub> exposure in normal and sensitive populations. Rice, S.A. 2003. In *Second Annual Conference on Carbon Sequestration*. May 5-8.

<sup>xix</sup> Lessons Learned from Natural and Industrial Analogues for Storage of Carbon Dioxide in Deep Geological Formations. Benson, S.M., R. Hepple, J. Apps, C.F. Tsang, and M. Lippmann. 2002 LBNL-51170. Lawrence Berkeley National Laboratory, Berkeley, CA

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<sup>xxi</sup> Health & ecological risk assessment. Rice, S.A. and R. Rhudy. 2004. In *Risk Assessment Workshop*. February 11-12, London, UK.