World Resources Institute

Carbon Capture and Storage Project
Siting Role Play Scenario Workshop
October 20, 2006
Meeting Notes

Attendees:

Judith Bradbury, Battelle/PNNL
Mike Dancison, American Electric Power
Andrea Disch, World Resources Institute
Julio Friedmann, Lawrence Livermore National Lab
Sallie Greenberg, Illinois State Geologic Survey
Anhar Karimjee, U.S. Environmental Protection Agency
Vello Kuuskraa, Advanced Resources International
Klaus Lambeck, The Public Utility Commission of Ohio
Kate Larsen, University of Texas
Jeff Logan, World Resources Institute
George Peridas, Natural Resources Defense Council
Jonathan Pershing, World Resources Institute
Don Sutton, EPA representative on the FutureGen task force
John Tombari, Schlumberger
Angela Zahniser, World Resources Institute

Introduction: As part of its Carbon Capture and Storage (CCS) project, the World Resources Institute formed two working groups—the Siting/Measurement, Monitoring, and Verification (Siting/MMV) working group and the Liability and Accounting working group—to help identify and provide guidance on issues related to CCS policy and regulatory framework design. The Siting/MMV group conducted a role play workshop on 20 October, 2006, where attendees simulated a public/regulatory hearing on the potential siting of a CCS project.

Purpose: The goals of the workshop were:

1.) To build upon the current CCS dialogue and explore questions that regulators and the public might ask about CCS siting. This information will feed into the CCS guidelines that WRI and its partners will develop.

2.) To learn how the role play might be packaged and "exported" so that others can recreate the experience in their own communities.

This role play workshop was considered an experiment in informing regulators and the public how and why a community was selected for CCS project implementation. It aided

in identifying important issues that citizens may be concerned about and where regulatory attention may be critical. The siting of a project, and the presentation of the project plans to the community, are crucial steps because they will dramatically influence downstream issues. The workshop also considered the implications of siting problems and issues in the context of moving from local to larger-scale CCS deployment.

Agenda: The agenda for the workshop is reproduced in Appendix I. The workshop began with an explanation of the purpose, the actors, and general rules of the road. "Time-outs," or brief periods where the actors can step out of their roles to ask clarifying questions, were allowed. Next, the participants assumed their roles and the "project development team" presented their plans for Greentown (the community for the selected project site). The community was given time for informational and clarification questions. Next, the project development team and the community split up to detail their concerns and strategies for presentation in the afternoon session. Next, there was debate over project details and agreement on actions needed to move the project forward. Lastly, the group stepped out of their roles and concluded with discussion on lessons learned from the day.

The Setting: The scenario is one in which participants act in a number of roles representing different stakeholder groups. A power company, Clean Power Industries (CPI), is attempting to gain community and regulatory support for a proposed CCS project. To do this, they decide to hold a forum where they present the site selection, development, and implementation processes to the community and ask for their feedback and input. 'Actors' assumed their roles throughout the day.

The background assumption is that the federal government has recently instituted a $35/ton carbon tax. In order to save money, CPI is proposing a CCS project initiative that has been estimated by consultants (CTI) to cost $33/ton, with a relatively high level of certainty. A detailed description of the siting project role play scenario and cast of characters is available in Appendix II of this document as well as on WRI's website, http://carboncapture.wri.org

The Presentation: The Chief Operations Officer (COO) of CPI gave a Powerpoint presentation of the company's project (see http://carboncapture.wri.org). The COO explained that CPI wants to continue using coal as the primary means of providing electricity. He also stated that CPI believes that carbon capture and storage will be required on fossil-fuel-based power units in the future, and continued to emphasize that CPI has a good environmental record. After showing graphs of what the geologic structure looks like and where the CO_2 will go, he also explained that the technology being used is not new; rather it is well-established and results in a near pure stream of CO_2. He explained that CPI chose a brine saline aquifer, and that they hired several consultants to investigate project issues and options.

The public outreach officer of CPI then spoke and emphasized that climate change is now a public concern, and it is the government that has introduced a carbon tax. She continually emphasized that it is important for everyone in the room to be a part of the

CCS project because everyone in the community depends on coal for their power and their economic livelihood. She encouraged all questions and supported direct community involvement. She also tried to steer away from complicated technical issues, defined ambiguous language, and used words that uninformed members of the community would be able to understand. She highlighted the fact that a lot of technology is not new, yet recognized that the existing technology is being used for a new purpose, so there are some new questions, which the team would be happy to answer. She also identified herself as a part of the concerned community by stating that she was a grandmother, and not just part of a corporate giant whose sole motivation is profit.

The next part of the presentation was an explanation about how CPI selected Greentown as a CCS site. Again, the presenter emphasized CPI's history of environmental compliance, and went through the site selection and evaluation process. He presented the details of the costs to implement such a project, and compared the costs of electricity with and without CCS. He presented a table that itemized costs and showed that, with CCS, electricity would cost 2½ times more for the average citizen of Greentown. He explained that more energy is used in the CCS process, and this is part of why costs are expected to go up. However, he did not present the cost estimates of a no-action alternative that compared the new federally induced carbon tax costs with the CCS project. The costs of electricity would be higher without CCS, and emphasizing this might have gotten greater community support.

CPI's technical consultant gave the last portion of the presentation, and included an explanation of how the CO_2 injection process works. The representative pointed out that the CO_2 is injected at great depths into rocks where it will remain for a long time. He highlighted that drinking water is closer to the earth's surface, and that the CO_2 sequestration site is over a mile underground. He also presented a diagram of the rock layers and showed how the CO_2 will not create a big bubble under the earth's crust; rather, it will seep into rocks through capillary forces and dissolve in water. He talked about relevant analogues to this type of project, and briefly pointed out the three existing large CCS sites now underway throughout the world: Sleipner in Norway, Weyburn in Canada, and In Salah in Algeria. He emphasized that Greentown's geology is ideal for a CCS project, and showed photos of geologic seals. He also talked about monitoring plans and assured the community that monitoring will be instituted in various places, including areas that are miles away from the underground plume. He also assured that water quality will be monitored. In addition, he explained that the only visible signs of this CCS project will occur when a seismic survey is conducted and during the construction phase when trucks will be coming in and out of the community. Other than these two signs, the community won't notice any difference of activity. Lastly, he again emphasized CPI's commitment to the community and solicited community members' advice about what information they wanted and how to best present it to the community at large.

Community Discussion Questions: Following the presentation, the community asked clarification questions. These questions could be used as a prototype of what to expect in

such a 'real-life' scenario. A list of the questions is included in Appendix III of these meeting notes.

Project Concerns and Debate: Following community discussion questions, the groups split into two (CPI team and community) over a working lunch to discuss the project in further detail. Among the community group, several issues presented themselves. The group outlined five of their most relevant concerns and presented them after reconvening:

1.) Greentown was not convinced there is a benefit in being the chosen community for this first CCS project. They suggested that CPI better address their concerns, or go to their next project site on their list.

2.) Assuming the project moves forward, there is a **need for transparency**. To what extent will the public have **access to their data** and monitoring information?

3.) Is there a technical standard for any of this data? Who has the **oversight** on this project? Is it a **third party**?

4.) What is the **long-term vision**? Will Greentown and its surroundings become a repository for huge quantities of CO2 since the geology is so promising?

5.) Explain **site closure**. What happens when the project is complete and the site closes? Will CPI continue to accept **risk and liability**? What are the impacts on the next generation?

Members of Greentown were reluctant to be a 'guinea pig' community. Their situation was likened to a reverse tragedy of the commons, where the local community is shouldering a lot of the risk for a problem that is global in nature. The consensus was that the risks outweighed the benefits in the scenario presented, and that CPI really needed to focus more on presenting the benefits the project could provide to the community. Perhaps they should even give back to the community. An incentive such as building a school may help persuade members.

CPI then responded to Greentown's concerns. They agreed to improve their presentation by doing the following:

1.) Identify both the pros and the cons to the community.
2.) Use the presentation and discussion forum as a basis for broader, in-depth discussion, i.e. agree that the forum is not a one-day event and that communication with the community and addressing their concerns is a long-term, evolving process.
3.) Be sensitive of how the community could perceive geologic CO_2 storage as a "dumping ground" even though it is being pitched as a local resource.
4.) Emphasize the positive economic effects on the community and the jobs it will create in the training, construction, monitoring phases.

Both CPI and Greentown stressed that transparency in its processes is important—however, there is a question of data ownership. If CPI pays for and therefore owns the geologic and monitoring data, they have discretion over if and what parts will be open to the public. The level of public access to the data needs to be further defined. Generally, the public wants instantaneous data, but most private companies probably wouldn't be willing to release raw data with commercial value. This led to discussion about data verification, and how CPI is going to prove how much CO_2 they are sequestering. The most logical solution to this is to make sure that a 3rd party is responsible for technical oversight.

In addition to the concerns presented to the project developer, it is worth noting other prominent discussions among the Greentown group, which included:

- Greentown members did realize that should they agree to the project, that they would have an ideal monitoring situation because they would be a pilot community.
- There was also a lot of talk about how long it would take for the federal government to create legislation and liability frameworks. It might be in their better interest to wait until there are federal CCS regulations.
- The community wanted to see a matrix depicting the sites that were being considered, and were very interested in how and why Greentown was chosen. This was not immediately apparent from CPI's presentation.
- They were also very interested in how this would affect property values, or if it would affect crops. Would CPI guarantee stable or increasing property values?
- They wanted to know how the risks will change over time.

Lessons Learned and Recommendations: The workshop concluded with reflections on the processes of the day and discussion about how the role-play could be improved.

- The initial guidelines or directions for the scenario should emphasize that this is an activity that is designed to either extract regulatory or local community issues of concern, but probably not both. In an actually situation, project developers would not chose to address a mixed audience. On the other hand, project developers need to be prepared for situations where they find themselves in "uncontrolled" environments with very mixed groups of interest.

- Including a legal perspective in the role play would have been helpful

- It was clear that some community representatives perceived CO_2 as a waste from the start. Initial perception is important in shaping the way a community perceives a project, and great care should be taken in this step. Questions of environmental justice could then become a concern if the community also happens to be economically disadvantaged.

- There should be a strategy that explains how to conduct role play scenario activities. Being able to reference a protocol when questions or situations come up would be helpful.

- Give broader economic implications more consideration in the presentation. There should be talk about climate change and how CCS is going to be necessary at some point.

- Generally, the use of time-outs was helpful. However, if too many are allowed or if a time-out is left to go on for too long, actors come out of their roles. Staying inside the roles and the Q&A period was problematic.

- There was a general tension between what element of the role play was most important. Role play designers might want to consider conditions for the role play, i.e. it should be decided that the community will accept the project but only needs to determine what qualifications are applied. In this particular role play, the community group decided they were not 'convinced' by CPI's initial presentation and that additional benefits would be needed for them to accept it. Without having considered this carefully in advance, it was easy for the community group to get hung up on deciding whether the project was supportable or not instead of identifying what needs to be addressed if the project were to move forward.

- CPI needed to know more clearly if they were pitching this project to the community or to regulators, and prepare accordingly.

- The role of the Trusted Advisor should be more unique and contain a greater level of detail.

- Additional work should be done on the front end of the role play. Actors and participants should be given information well in advance of the workshop so they can come to the table better prepared.

- The baseline scenario assumes away a lot of issues. This was seen as necessary for the sake of time; however, the inherent danger in this is that issues that are real and may be very pertinent to a community may be glossed over. For example, property rights were assumed to be solely in the hands of CPI, when this is very unlikely to be true in a real-life situation.

- A comment was made that in a real-life situation, it is not a good idea to bring together such a diverse crowd of people because different people have different interest and different levels of knowledge about CCS in general. However, for the purpose of a role-play activity, it is important to have representation from many niches in the community.

    - In a real-life situation, the recommendation would be to meet with the local community and focus on them. It is important to make state and

local officials are aware of the conversations; but catering to the needs of the local community should be a priority when trying to get project buy-in. This is because officials often tend to get caught up in the economics and the politics, and don't necessarily represent the attitudes of the local community. A suggestion is to give 3 separate presentations: one each to the regulatory officials, to the local officials, and to the local community.

Appendix I
CCS Siting Role Play Scenario
Agenda
October 20, 2006

09:00 – 10:00: Scene setting, objectives, and rules of the road (light breakfast available)

10:00 - 10:30: CPI will present its CCS plans for Greentown

10:30 - 11:30: Informational & clarification questioning

11:30 - 13:00: Working lunch with sub groups split out to detail their project concerns and positions for presentation in the afternoon session.

13:00-15:00: Project debate & agreement on actions needed to move the project forward.

15:00-16:00: Discussion/Wrap Up

Appendix II
WRI CCS Project Siting Role-play Scenario
20 October 2006

You are invited to a hearing from CleanPower Inc. (CPI), which will present and take questions regarding their proposed CCS project in Greentown, Greenstate.

Background:
Last year legislation was passed placing a value of $35 per ton on CO_2 injected into the subsurface for storage. CleanPower Inc (CPI) launched an initiative to capture & store CO_2 from one of its existing power plants. CPI has plans to add several large coal-fired plants over the next decade and wants to better understand the costs of engineering these plants with CCS in mind. To that extent, they launched an initiative to select and retrofit an existing plant for CCS and take advantage of the $35 incentive. Although many at CPI believe the knowledge and experience gained from this project adds significant value, they know the Board will not approve it unless, at a minimum, it can break even.

CPI contracted Trusted Advisor Inc (TAI) to perform a preliminary analysis on ten of its existing sites. TAI gathered all the pertinent information it could access and spent several months developing a ranking of the top three based on: economics, environmental impact, risk and public acceptance. The cost of each of the three projects averaged around $31 per ton leaving them $4 of profit based on the legislation.

TAI and the CPI project team presented the rankings and analysis to the CPI Board where several key geologic & environmental risks were highlighted adding uncertainty to the $31 per ton estimate. Despite the uncertainty the Board agreed that the Greentown site had the most promise and approved a $10 million dollar request for additional data & analysis that the team had requested in order to remove some of the major uncertainties in the Greentown case.

Clean Technology Inc. (CTI) was contracted to provide the new key data points which included seismic, a data well, and environmental sampling. Although the new data points changed the cost analysis to $33 per ton, the certainty was much higher and the Greentown site remained the preferred choice. A new presentation was made to the board who agreed to launch an effort to gain support for the project from: regulatory agencies, the Greentown community, NGO's, academia and their financiers. The Greentown storage site would be a deep saline formation described in the addendum below.

Unfortunately there is little experience with storage or any type of subsurface activity in Greenstate where Greentown is located. There has also not been a federal regulatory scheme put in place for approval of the site; however, there is a process for permitting wells. CPI is a large corporation with deep pockets but recognizes it can not afford to take any risks with respect to health, safety and the environment. Because of the regulatory gaps it will have to rely on an informal process of addressing the concerns of

stakeholders before committing to a final design. It is willing to listen to added requirements but knows that if more than $2/ton of new costs are added it will have to scrap the project and consider a different site.

A hearing has been set for 20 October where CPI and TAI will present their plans in a semi public venue inviting representatives from:

- the local community
- regulatory agencies
- NGO's
- Financiers and insurers
- academia and independent consultants.

You have been identified as one of those representatives. The meeting will progress as follows:

09:00 – 10:00: Scene setting, objectives, and rules of the road (light breakfast available)
10:00 - 10:30: CPI will present its CCS plans for Greentown
10:30 - 11:30: Informational & clarification questioning
11:30 - 13:00: Working lunch with sub groups split out to detail their project concerns and positions for presentation in the afternoon session.
13:00-15:00: Project debate & agreement on actions needed to move the project forward.
15:00-16:00: Discussion/Wrap Up

VENUE:
Holiday Inn on the Hill
415 New Jersey Ave, NW
Washington, DC 20001
(202)638-1616 (phone)
http://www.hionthehilldc.com/location.php

ROLES
CPI Project Team (3-4 participants):
TAI Consultants (1-2):
Greentown concerned citizens (2-3):
Greentown government officials (1-2):
Regulators (3-4):
Environmental NGOs (2-3):
Insurance Company (1-2):
Financier (1-2):
Academia/3rd Party Technical Consultants (3-4):

Addendum 1: Saline storage project proposal

Introduction

The Green Basin contains one of the largest brine bearing formations of North America named the Green Sand of the breadbasket group. The Green underlies 250,000+ square km of land that includes farms, small towns, large urban cities, and navigable waterways. Perhaps more importantly, over 150 large point sources overlie the Green. These include coal fired power plants, ethanol plants, and fertilizer plants with an aggregate annual emission greater than 500 million tons of CO2/year. In places, the Green formation daylights and crops out at the surface, where it is a fresh water aquifer. It is over 10,000' in depth at its deepest location, and over most of its areal extent it contains brines from 10,000 * 70,000 ppm. Although there are many small oil fields within the Green basin, few wells penetrate the Green in the basin center since it does not generally contain hydrocarbons; however, there is one substantial natural gas storage facility at relatively shallow depths (~6200'). While it has been used for hazardous wasted disposal for years, the current injection volumes are very small, only a few 100,000 barrels/year. Injection is considered at 8000' depth in flat-lying strata slightly offset from the basin center.

Characterization

TAI got its data from the State Geologist, U.S. Geological Survey and local universities, who have studied the Green. Much of this data lies in out-of-print journals and publications, MS theses of regional and state universities, and some proprietary industrial data sets. The paucity of deep wells makes characterization difficult, and there are few commercial quality 2D or 3D seismic surveys. As such, much of the characterization relies on interpolation of these scattered data sets. New seismic data & a data well were acquired recently by CPI and is in CTI's possession only.

Formation thickness varies from 800' to zero (where the Green laps onto basement). Local thickness variation and reservoir quality are substantial, even over short length scales. These properties were used for basic assessment, although proper capacity and injectivity assessment awaits Monte Carlo analysis of new data derived from an exploratory well:

Thickness:	200' (120 * 250)
Porosity:	11 % (4 * 15)
Permeability:	30 mD (1 * 120)
Brine composition:	42,000 ppm (29,000 * 59,000)
Rock composition:	95% quartz, 2% feldspar, 1% calcite, 1% other

The stratigraphic interpretation of the Green is a basal Eocambrian-Cambrian sandstone, with a high degree of internal connectivity and net sand percentage. The Green is directly overlain by 200-400' of shale (the Heifer Fm.) and several other thick, regionally disposed shale horizons. Regional mapping and limited seismic data reveal local large-offset faults, but these are fairly well documented and do not occur near the injection site. However, there remains the potential for local small-offset faults.

Moderate drilling records and mud logs exist for most wells, but many wells are old and poorly characterized. There are a suite of orphaned wells under state liability, but not all wells are accounted for. Open-hole and cased well electrical logs are common, but many

are e-logs on paper or raster copies * few digital data sets exits. Reservoir pressure data is rare.

Laboratory test data (permeability, porosity and saturations) derived from limited core have been used to produce petrophysical models of questionable fidelity.

Local Environmental Issues

Near the proposed injection site, the shallow groundwater contains elevated levels of arsenic. Although the local levels do not generally exceed EPA limits, many wells are close to the thresholds and some wells do exceed limits. These levels are naturally occurring, and do not represent a great threat to local water quality as more than 95% of water used is surface water. However, there are concerns regarding whether displaced brines or small leakage might cause an increase in arsenic levels

Modeling

This initial model was designed to evaluate important processes that control CO2 movement and evaluate performance by predicting reservoir capacity and maximum extent of CO2 migration. A reservoir model was developed using reservoir data collected from the natural gas storage site 30 km away. Using this model, coupled with Monte Carlo simulations and a predefined distribution of reservoir parameters and current initial conditions (based on existing data), we produced 99% confidence intervals for travel times and for maximum free-phase CO2 migration distances for a given injection rate/volume and well field configuration. Three long-reach injection wells injected 450,000 tons/year each, for 1.35 million tons/year over 40 years, for a cumulative injection of over 52 million tons, displacing nearly 600 million barrels of water

Performance & Risk Analysis

Local land uses, sensitive habitats and potential receptors were identified and entered into a database system as part of a site-specific risk assessment. The assessment also identified potential migration pathways, consisting primarily of known faults, and the spatial relation of these features to potential receptors. Due to the fact that this is a rural agricultural area, a very low risk to human health and safety was determined for the site. However, due to the arsenic concerns, a monitoring program was recommended by local regulators. The effectiveness of the monitoring program, which includes installation of shallow microholes instrumented with brine samplers, is questionable.

Appendix III

Community Discussion Questions: The following questions were asked by role-playing regulators and members of the Greentown community following the presentation by the project development team. These could be used as a prototype for types of questions a project developer should expect in such a real-life situation. However, the answers provided are the responses that occurred in the WRI Siting/MMV workshop and should not be considered script; they are subject to change, as they will be specific to each community. Not all questions were answered, or answered completely.

Q: Why is CPI retrofitting instead of building a brand new plant with IGCC technology?

A: Currently, almost anywhere in the world, power plants were built before the 1970's. This means there is a large pool of opportunity to retrofit current plants rather than having to build all new ones. IGCC is the best choice for new plants; however, a financial comparison analysis showed that retrofitting this one is more economically viable.

Q: If an average life span of a coal plant is 35 years, now much longer do you expect this one to last?

A*: Actually, the average life span is usually around 60 – 70 years. This was considered in the analysis, and the recommendation is retrofitting.*

Q: Are you allowed to pass costs to the rate base?

A: *That has yet to be determined through state or federal public utility law.*

Q: How will this affect my electricity bill?

A: *Your bill will go up. As stated, right now you pay $.034/kwh; with the CCS project, you will be paying about $.082/kwh. This is a significant increase. However, keep in mind that without this CCS mitigation project, your bill will go up anyway due to the new carbon tax. At the end of the day, you will be paying less if you support CCS than if we conduct business as usual.*

Q: Please talk about the costs and how they play out in my bill.

A: *Let's take a closer look at the table we introduced in the presentation:*

	Greentown Unit 1 Existing PC Supercritical w/o CCS	Retrofit PC Supercritical w/ 90% CCS Adjustments	Retrofit PC Supercritical w/ 90% CCS Totals		
Capacity, MW net	600	(150)	450		
Generation kwh @ 85% CF	4,500,000,000	(1,100,000,000)	3,400,000,000		
CO2 Tons / Year	4,260,000	(3,740,000)	416,000		
Fuel	$71 Million			$71 Million	$0.021/kwh
O&M	$30 Million	$5 Million	$1/Ton	$35 Million	$0.010/kwh
Capital cost $2006	$400 Million SCR/WFGD	$400 Million CO2		$800 Million	
Capital Carrying Cost	$50 Million	$50 Million	$14/Ton	$100 Million	$0.030/kwh
CO2 Transportation		$30 Million	$8/Ton	$30 Million	$0.009/kwh
CO2 Sequestration/mmv		$37 Million	$10/Ton	$37 Million	$0.011/kwh
Total Cost	$151 Million	$123 Million	$33/Ton	$274 Million	
Cost of Electricity	$0.034/kwh				$0.082/kwh

Q: What other options are there? Why CCS instead of nuclear? Why are you risking the citizens' health and safety when you could just do some form of renewable energy?

A: *The reasons are several. First, our current energy system is very complex and interdependent upon many factors, including market forces, laws, politics, technology, and natural resource availability (including sunlight, wind, and geologic structures). Sometimes, people don't seem to understand the complexity of the carbon based system and expect renewables to be an easy answer, when this in fact is not always the case. When controlling for these other variables that influence the system, our financial and risk analysis indicates that CCS is the best option for this area.*

Q: What is it that is being transported exactly? What is the content and exactly how far is it being transported before it is injected? The longer the transport pipeline, the bigger an issue this is.

A*: In the pipeline, CO2 will be about 95% pure. There will be zero water, so that pipeline corrosion is not an issue. The other 5% will be made up of nitrogen, argon, and oxygen—none of which are hazardous. Let me repeat, NO other dangerous gases will be in the pipe.*

Q: Is the transport pipeline going to be above or below ground?

A: *Below ground.*

Q: What is the environmental footprint for drilling of the injection wells?

A: *As much as possible, we will use existing rights of way so as to reduce the total amount of surface disturbance.*

Q: Are they doing an environmental risk assessment? Is NEPA required?

A: *NEPA is required only when operating on federally administered lands. Therefore, we will not follow the formal NEPA process; however we will hire consultants to conduct an assessment of the environmental effects and do our best to mitigate when we can.*

Q: Who owns the subsurface rights?

A: [This will be state specific.]

Q: Will an environmental assessment be made public?

A: *Yes, all assessments will be available online. I would again like to stress CPI's commitment to the environment and highlight our past record.*

Q: What is the timeline for this project? Be specific.

A: *It is likely to be a couple of years for project development and construction. However, before we create a specific timeline, we wanted to involve the community and gain your support before committing to anything in particular. The operational lifetime of the facility is yet to be determined.*

Q: What are the mitigation plans if there is a leak? Do you have a contingency plan?

A: *If there is a need, we could just vent into the atmosphere. This is what would happen as a no-action alternative anyway. If there is an unexpected rise in pressure (which is highly unlikely) and it was determined that a pressure release was needed, there is the option to drill a well, vent the CO2 and release the pressure.*

Q: How many other wells (water or oil and gas) already exist in the area?

A: [This is a very project specific question]

Q: Who is monitoring the wells? Is it EPA? An independent 3rd party?

A: *Yes we will hire a third party and require monthly reports. These will be made available to the public.*

Q: Are you going to accept other people's CO_2? Or just the CO_2 created by this plant?

[That's a great question because a lot of the answers and politics would change if the facility agrees to this. For the purposes of this role play exercise, it was assumed that the facility would not accept CO2 from other sources.]

Q: What prevents the Green Basin from becoming the nation's CO_2 reservoir? We don't want to be the next Yucca Mountain.

A: *One of the assumptions of this project is that we will not accept CO2 from other sources at any point during the operation of the facility.*

Q: How will this affect our community economically? Will this create local jobs or will you bring in your own experts? What level of job will be created? Technical or unskilled?

A*: It will create both skilled and unskilled jobs in the form of constructions as well as operation and maintenance.*

Q: How do you own mineral rights? And does this include pore space?

A: This is a state-specific question.

Q: What are the health effects of a leakage or spill? What about Lake Nyos?

A: *The incidence at Lake Nyos was a rare anomaly, and as far as scientists can tell is closely linked with volcanic activity in a tropical climate. A sudden explosion of CO2 is not a concern with this CCS project because, as we mentioned, CO2 is held in pore space and is stored among the geologic structure. There is no CO2 'bubble' as was the case with Lake Nyos.*

Q: What are your siting criteria?

A:

Q: How are risks quantified? And what can we expect from regulations?

A:

Q: Can this project move forward in the absence of regulation? Do you need regulation in order to move forward?

A: *There are some regulations in effect with respect to oil and gas wells and classes. We will use these to our advantage to guide the process. In this instance, the more regulation, the more guidance and insurance we have, and the happier we are. However, we do feel that the risk is low enough that we could move forward in the absence of federal regulations.*

Q: Considering the risk and liability, will you find an insurer? A re-insurer?

A: *Yes there will be no problem finding an insurer and a re-insurer. It is only a question of cost.*

Q: Can you provide more specific details on the geology and the numbers?

A:

Q: What about the secondary effects? Where's all the displaced underground water going to go?

A: We will develop models of the underground water movement. Secondary effects are important and should be considered in the cost/benefit project analysis.

Q: Can you give more clarification on the total storage capacity.

Q: How does this contribute/help with respect to CO_2 mitigation?

Q: How does this contribute to the basin/regional/national picture?

Q: How much of the other pollutants (NO_x and SO_x) will be mitigated in the process as well? What will be the practical effect, i.e. will this reduce regional haze or have any health benefits?

Q: What will you do with the amines, a byproduct of this process?