From:	McDonald, Jeffrey
To:	"rupp@indiana.edu"
Cc:	Bayer, MaryRose; Greenhagen, Andrew
Bcc:	Inci Demirkanli; Jann, Steven; Perenchio, Lisa
Subject:	RE: FutureGen application
Date:	Thursday, November 21, 2013 4:51:00 PM

John,

Thanks for considering looking at the geological characterization section (Section 2) from the FutureGen 2.0 permit applications. Although there are four proposed wells (and technically four applications), Section 2 applies to the project. Below is an excerpt from our SOP with some guidelines and questions for consideration. We would like to get a preliminary review of this section by mid-December if at all possible. I know this might be a relatively short time, but a preliminary review will give us confidence that the input parameters for the model are acceptable.

Thanks again and call me if you have any problems or questions,

Jeff

http://www.epa.gov/r5water/uic/futuregen/

http://www.epa.gov/r5water/uic/futuregen/pdfs/futuregen-permitapp-201303.pdf

FROM:

STANDARD PROCEDURES FOR CLASS VI PERMIT APPLICATION REVIEWS

Preliminary evaluation: Review the geologic data submitted by the applicant for completeness, quality, and representativeness of the site. Also identify any additional information needed to support a full technical evaluation (e.g., data on additional zones, data on geochemistry, etc.). The data may be in a variety of formats, and must be submitted about the following geologic aspects of a proposed site:

- Regional geology and geologic structure (required at 40 CFR 146.82(a)(3)(i,vi)). This information will likely be provided in maps and cross sections of the AoR and narrative reports, and may be supported by geophysical survey data or well logs.
- Geochemistry (40 CFR 146.82(a)(6)), including baseline geochemical data on subsurface formations. This information will be submitted as results of geochemical analyses of subsurface formations (e.g., fluid chemistry and bulk chemical analyses), geochemical models developed by the applicant, or historical water quality information.
- Structure/geomechanics (40 CFR 146.82(a)(3)(ii, iv)), including information on fractures, stress, ductility, rock strength, capillary pressure, and in situ fluid pressures within the confining zone(s) and the location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the AoR. This may be submitted as narrative reports, core sample analyses, geophysical survey results, or cross sections.

- Mineralogy/petrology/lithologic information of the injection and confining zones (40 CFR 146.82(a)(3)(iii)), including porosity and permeability, and their depth and thickness. This will be submitted based on/in the form of stratigraphic cross sections, isopach/isochore maps, analysis of geologic cores, outcrop data, well logs, or geophysical survey data.
- Hydrology and hydrogeology (40 CFR 146.82(a)(5)), including narrative descriptions of USDWs and the direction of water movement; or maps indicating USDWs, water wells, and springs in the AoR.
- Seismic history, including the presence and depths of seismic sources in the area (40 CFR 146.82(a)(3)(v)). Information may include maps of seismic sources, reports on seismic history or events, or seismic risk models.

The *Site Characterization Guidance* provides additional detail about the types and formats of site characterization information that Class VI permit applicants may submit.

Evaluating the geologic data submitted by the applicant should involve asking the following questions:

- Were appropriate testing methods used and were a sufficient number of parameters analyzed?
- Were surveys performed at an appropriate resolution or scale; does regional information cover the entire AoR?
- Are the data and results of high quality, properly collected, valid, and properly referenced?
- Do testing and analytical results demonstrate that relevant formations (e.g., the injection or confining zone) have appropriate properties that will allow them to receive and confine the anticipated volumes of carbon dioxide?
- Are results representative of the site, i.e., are samples or historical data taken from sufficiently close to the well and are the formations laterally homogeneous?

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From: McDonald, Jeffrey
Sent: Thursday, November 14, 2013 4:54 PM
To: 'rupp@indiana.edu'
Subject: RE: FutureGen application

John,

Sorry for the mix-up. I was talking to Rob about whether or not the ISGS could give us their opinion of the site characterization at the FutureGen site. For some reason, on a spreadsheet we have

from our meeting a couple of years ago, when I click on his email address, it put your email address in (hence the mix-up). Since Rob is in the thick of the Illinois basin and with their project, we thought they would be a good resource for this. This is asking for a favor of course and he needs to consider if there are any conflicts of interest that might preclude their helping us with this. If there are problems, I might be asking for your help yet again. I hope this is something you would consider. I can talk to you more about what we are doing if you have some time.

I hope all is well. I'd love to stop down sometime to visit. I remember how nice Bloomington was when my brother was going to school there. Anyway, I'll give you a call sometime.

Jeff

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From: McDonald, Jeffrey
Sent: Thursday, November 14, 2013 4:40 PM
To: 'rupp@indiana.edu'
Cc: Greenhagen, Andrew
Subject: FutureGen application

Rob,

It was good talking to you. Here are the links to our site with the application (sorry for the big file). Section 2 is the section on site characterization.

Jeff

http://www.epa.gov/r5water/uic/futuregen/

http://www.epa.gov/r5water/uic/futuregen/pdfs/futuregen-permitapp-201303.pdf

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