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August 20, 2014 Hearing Transcript

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NUCLEAR REGULATORY COMMISSION

Title: Powertech USA, Inc.: Dewey-Burdock in Situ Uranium Recovery Facility

Docket Number: 40-9075-ML

ASLBP Number: 10-898-02-MLA-BD01

Location: Rapid City, South Dakota

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ATOMIC SAFETY AND LICENSING BOARD PANEL

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HEARING

In the Matter of:	: Docket No.
POWERTECH USA, INC.	: 40-9075-ML
	: ASLBP No.
(Dewey-Burdock In Situ	: 10-898-02-MLA-BD01
Uranium Recovery	:
Facility)	:

Wednesday, August 20, 2014

Hotel Alex Johnson

Ballroom

523 6th Street

Rapid City, South Dakota

BEFORE:

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DR. RICHARD F. COLE, Administrative Judge

DR. MARK O. BARNETT, Administrative Judge

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9:00 a.m.

CHAIRMAN FROEHLICH: Good morning, all. We'll come to order.

The first item of business for today is the continuation of our discussion having to do with newly-acquired data. The Board is anxious to get an understanding of exactly what this data is and how this data is used or could be used in relation to the admitted contentions.

Since much of the discussion is going to revolve around geology and hydrology, I think we're going to rely a great deal on our expert witnesses, rather than the attorneys who are translating what they've been told. And to accomplish that, I would like at this point to ask the witnesses in Panel 2 to please rise. Raise your right hand. Do you solemnly swear or affirm that the statements you make in this hearing before the ASLBP will be true and correct to the best of your knowledge and belief?

And while we have you standing, do you adopt your pre-filed testimony as your sworn testimony in this proceeding?

The record will reflect the witnesses responded affirmatively to both. You may be seated.

Thank you, Ms. Henderson.

I'm only going to begin this inquiry, and you'll have to excuse me because I am only a lawyer by training. The Exhibit OST-19 is a press release that Powertech issued dated July 16, 2014. And in there it states that "the data that has been acquired by the company is historical drillhole logs and maps prepared by TVA from the '70s and '80s when the Dewey-Burdock uranium deposit was originally discovered, as well as digitized data generated from this work." To be complete, I'll finish the paragraph. "This data is expected to assist Powertech's planning of wellfields for the Dewey-Burdock uranium property, providing additional quality data to complement Powertech's existing database."

What I'd like to know, I suppose, is what are drillhole logs and how are they used in the industry? We have many qualified experts.

I'd like to hear from the Powertech witnesses. I'm not sure if Mr. Demuth or Mr. Lawrence wants to take the first shot at it.

MR. LAWRENCE: I'll take the first shot. I am Errol Lawrence. I have been a practicing hydrologist for about 25 years now. I wasn't expecting to testify on this particular issue, but I

do have some background with the logs. I was a wireline engineer with Dresser Atlas in the late '70s and a wireline engineer basically runs the electric logs, although that was for oil and gas applications, but a lot of the principles are the same.

There's a wide variety of electric logs that can be run to evaluate subsurface conditions, reservoir conditions. Typically, in the uranium industry, it's a more limited sweep. We are looking at gamma ray logs, self-potential or spontaneous potential logs, and resistivity logs.

Gamma logs, as you might expect, measure natural radiation that comes from the formations around the borehole. Let me back up. The way logs are actually procured is typically when you finish drilling a well, you will lower an instrument down to the bottom of the well, and as you retrieve it, you detect -- you have instruments that pick up various responses from the formation, depending on what that instrument is. You can gather different physical characteristics about the formation.

JUDGE COLE: What kind of characteristics, sir?

MR. LAWRENCE: Some of them, for instance, resistivity measures literally the resistance of the

formation to an electric current. A gamma ray measures the natural radiation that comes off the formation. Spontaneous potential measures the difference between the ground surface and the --

JUDGE COLE: You've got different instruments taking different measurements?

MR. LAWRENCE: Absolutely. Different instruments taking different measurements. What's important to note is the measurements themselves are not necessarily intrinsic measurements of lithology. It's the interpretation of that data, the signal that allows a geologist to look at a log and determine whether he's in a sand or shale or limestone sequences. So there's an interpretational stage now that goes beyond just gathering the logs.

JUDGE BARNETT: I understand that. Let me ask you, are you familiar in general with the data that we're talking about here?

MR. LAWRENCE: Yes, I am.

JUDGE BARNETT: What kind of logs are in that data?

MR. LAWRENCE: Okay, I was getting to that. The data that has been procured is similar to the data that's already been used. In fact, it's the exact same kind of data. It is the gamma ray log. It

is the resistivity and some of the logs have the self-potential, not all of them, probably about half of them. And maybe --

JUDGE COLE: Self-potential. What does that mean?

MR. LAWRENCE: It measures the potential, the difference in electrical energy between -- usually, you have a ground probe and then you have a probe on the instrument. So it's just a relative difference. And typically, you're going to use a self-potential curve to identify lithologic differences, the difference between basically a sand or sandstone versus a shale or a clay. So it's very commonly used for that.

Gamma ray also is typically used to some degree, to a lesser degree for lithology definition or distinction. However, in the uranium industry, the gamma ray's primary role is to identify mineralization since it's measuring natural radiation, as you'd expect. If you run across a uranium mineralized zone, you're going to get a spike or a kick in terms of radioactivity. So that's the primary purpose that gamma ray logs are used for. And they're very good for that.

JUDGE COLE: So all of these different

instruments are on one probe that you insert down into the well. You do it separately.

MR. LAWRENCE: It depends. Sometimes there can be a series of instruments that are tied together. For instance, the gamma ray is a different instrument than the resistivity log. But a lot of times you can run them in sequence so it's a single run and that's most typically the way it's done. If you were running a more elaborate suite of logs, you might have to do several runs in the hole to get all the logs that you wanted to get. Yes.

I guess -- can I pull up an exhibit to show a log?

CHAIRMAN FROEHLICH: Yes.

MR. LAWRENCE: Okay, this is one of the exhibits, it would be APP-016(b) on page 27. And that's a type log, sort of a representative log that was included in the application, primarily for illustrative purposes. You might want to try and zoom in a little bit, the quality of that -- well, you're on the right page, but just if you could zoom in a little bit so we can see the lines on the log a little bit more clearly. Okay.

So the log itself obviously doesn't come with those horizontal lines that are indicating the

different zones that have been identified out of this log. What you can see, the right hand most log is a resistivity log. And you can see the nomenclature on the right side where we talk about or show the Fall River formation, the Fuson member, and beneath that is the Chilson member of the Lakota formation.

And so you can see there are some distinct responses there as you go into different lithologic units. I'm not sure, I think the gamma ray -- if you can scroll down a little bit, yes, okay. So the gamma ray log is the one on the farthest right hand side -- left hand side, excuse me. I might have said the thing backwards. And you can see where you have a very large kick in that gamma ray log. I think that's gamma ray. Keep going down even further. Yes. Just above where we have the Morrison contact there, you see a pretty nice kick in that gamma ray log. And that's typically an indication of mineralization.

JUDGE COLE: And with that, you can get the depth of the deposit also.

MR. LAWRENCE: Absolutely, absolutely. And that's really the primary use.

JUDGE COLE: Primary location of it and how far.

MR. LAWRENCE: You got it

. Now a single log by itself doesn't really give you much information. If I just gave you that log you could look at it and say well, I can kind of see the depth of the ore. I can maybe pick the thickness of an interval, but where a log becomes valuable is when you have a lot of logs and then you can start to correlate them and demonstrate the continuity of your deposits, whether there are any breaks in that, basically the geologic dip. So you can get a lot of information, but it comes out of the interpretation of the logs and usually the more logs -- if you have quite a few logs in the area, then you can develop a better picture of what the subsurface looks like.

JUDGE COLE: So you have to know exactly where it's located starting at the surface, so that you can see how far they are apart and compare different levels and what's one level compared to another level.

MR. LAWRENCE: That is correct.

JUDGE COLE: You can pick out discontinuities maybe that way?

MR. LAWRENCE: Yes, you could, if they were present, you would see them.

JUDGE COLE: At a certain elevation at

this particular level it doesn't exist, so it went somewhere?

MR. LAWRENCE: Absolutely, yes, sir, Your Honor.

JUDGE COLE: Okay, thank you.

MR. LAWRENCE: One of the things to keep in mind is these are fluvial deposits. Most of my work was done where you had kind of marine deposits that are very extensive. They go for miles and they don't really change. In this case, things change very quickly locally. You can have some changes in the thickness of the sand bodies.

As you can see on that particular cross section, the Chilson has been subdivided into several subunits and the same thing with the Fall River and the upper portion of the log. They don't just look at well, this is Fall River and this is Chilson. They have enough control here to subdivide these into discrete sand packages.

JUDGE COLE: Why would you do that?

MR. LAWRENCE: Because the ore zones typically are fairly discrete packages. They might be associated with one small sand member out of that --

JUDGE COLE: You're trying to pinpoint the location of the uranium?

MR. LAWRENCE: Correct.

JUDGE COLE: Thank you.

CHAIRMAN FROEHLICH: Mr. Lawrence, I think you described two of the lines. Is the third line --

MR. LAWRENCE: That is the spontaneous potential.

CHAIRMAN FROEHLICH: Thank you.

MR. LAWRENCE: And depending on the environment, that particular curve can be very useful and other times it can be very frustrating because it depends a lot on how good of a connection you have of the surface and some other things. It's a more difficult log to -- it's not necessarily consistent from hole to hole like the gamma ray and the resistivity logs.

JUDGE COLE: You said spontaneous retention?

MR. LAWRENCE: Spontaneous potential.

JUDGE COLE: Oh, potential. Sorry, thank you.

MR. LAWRENCE: Also, it's commonly called a self-potential. You'll hear both terms used.

JUDGE BARNETT: Are these kind of logs, if interpreted by a qualified hydrogeologist, relevant to Contention 3, that is, whether or not there is

adequate hydrogeological information to demonstrate ability to contain fluid migration and assess potential impacts to groundwater?

MR. LAWRENCE: The development of the geologic and hydrogeologic models are dependent largely on the logs, primarily the geologic model. And if I could call up another exhibit, to show you a map --

JUDGE BARNETT: I want to follow up. So I guess I didn't quite hear. Was the answer to your question yes, no, or something in between?

MR. LAWRENCE: It is yes.

JUDGE BARNETT: Thank you. Any other experts from Powertech that would like to answer that question? Is data like this available to a qualified hydrogeologist relevant to whether or not there's adequate ability to contain fluid migrations and assess potential impacts to groundwater?

MR. LAWRENCE: Can I add a little bit more since when you rephrase that question it popped in my head a little bit some additional information I'd like to put forth. The logs, the e-logs, they give us borehole data information about the geology. They don't tell us anything about the fluid properties of the aquifer. Wells will do that. When we put in

wells and we measure water levels, when we conduct pumping tests, when we extract samples for water quality analysis, that's what gives us the hydrologic information. Together we combine those to come up with our hydrogeologic model. So by themselves, if I just had logs and nothing else, I wouldn't really know much about the hydrogeologic --

JUDGE BARNETT: But they would be part of something that would be relevant to helping you answer the question in Contention 3?

MR. LAWRENCE: Yes. They are and they have been used extensively. I can show you.

JUDGE BARNETT: Would any of the other Powertech experts like to answer that question?

MR. DEMUTH: Yes, sir. If I might, Hal Demuth. First, with all due respect, the relevancy issue, to me that has a legal terminology. So as the technical experts, if we could say useful, we might use that.

JUDGE BARNETT: I meant it in a technical sense.

MR. DEMUTH: Okay. Some of this discussion, there's a question of how much data are necessary. And so if I might talk for a minute about how much information do we need to make an informed

decision?

In this case, there was information from over 1,800 wells that was used in the permit application. Data from those wells were reviewed by the NRC. They made a determination in the SER that it could safely be conducted. So as an example, if I may, if we're looking at a foundation design, how much geotechnical information do we need? Well, we need enough information to make the decision. Could more data be obtained than the data that were used for a decision? Certainly. Are they necessary or warranted? Well, in some cases they might be and in others they're not.

And so in this case, I would suggest that the information that Powertech used was sufficient for NRC to make a determination. And in addition, NUREG-1569 talks about a phased process of data accumulation.

JUDGE BARNETT: Okay, so now you're getting into legal things, so I want to ask the question as a hydrogeologist.

MR. DEMUTH: Okay.

JUDGE BARNETT: Is the data that is in these e-logs, if interpreted by a qualified hydrogeologist, could it be relevant to Contention 3?

MR. DEMUTH: In my professional opinion, Powertech has demonstrated that --

JUDGE BARNETT: That's not the question I was asking.

MR. DEMUTH: If I could continue, please?

JUDGE BARNETT: Well, if you could answer the question, and then you can explain your answer.

MR. DEMUTH: There's no more data that are necessary to support the application.

CHAIRMAN FROEHLICH: May I interrupt? I'd like to hear from Dr. Moran and what use or what information would be useful from these logs in addition to -- I suppose what we've heard is how Powertech is using this data. I guess I'm concerned with how others might be able to use this data. Perhaps start with Dr. Moran.

DR. MORAN: Good morning.

CHAIRMAN FROEHLICH: Good morning.

DR. MORAN: Let me ask a procedural question. When I start talking, this is automatically on?

CHAIRMAN FROEHLICH: Yes. In fact, it's always on, so if you want to talk or whisper, whatever, to your colleague there, you hit the off button.

DR. MORAN: Thank you.

JUDGE COLE: And hold it down.

DR. MORAN: Thank you. I'm trying not to be long winded with this. There are all kinds of reasons why these logs are relevant. And let's begin with something that Mr. Lawrence said. And it is simply not correct that these logs don't tell you anything about the water quality. That's just untrue.

These logs will tell you, especially when interpreted together, a great deal about the rock types, the depths at which the formations occur, sometimes where people interpreting logs encountered water, whether it was high conductivity water, meaning somewhat -- it contained high dissolved solids in it, low, etcetera. It can show you, depending on different kinds of logs because we don't really know what logs are there, they could show you whether there a currents, flow areas, fractures.

CHAIRMAN FROEHLICH: Can I interrupt you? May I ask Powertech are all these logs that have been discussed, are they all the gamma ray logs that Mr. Lawrence described?

MR. LAWRENCE: Gamma ray or resistivity and spontaneous potential. To my knowledge, there are no fracture-type logs, frack load or anything that

would identify joints or fractures in the suite.

JUDGE COLE: Also, is this the same kind of equipment you use to determine where the water levels are and other things other than the three that are shown on the chart on the e-log? Do you determine where the water levels are by when you're drilling the well before you put instruments down?

MR. LAWRENCE: Yes and no. The logs themselves can give you an indication of where the water is because the resistivity log won't work when it's not in water. So when you first pick up a signal, you'll see the water level. However, that water level is usually not representative of static conditions because they've been drilling, typically with some type of a drilling mud and so the system is not -- that's not a true water level indication. That's a different type of measurement you would take later and hopefully in a well instead of a borehole.

CHAIRMAN FROEHLICH: Okay, I think we interrupted Dr. Moran.

DR. MORAN: I don't really know how far we want to take this. If I were in your position, I would have heard enough to know these are really useful. If you want me to go on, I will.

JUDGE COLE: What is really useless?

DR. MORAN: No, useful.

JUDGE COLE: Oh, useful.

DR. MORAN: I think that an independent group of investigators working with those logs could gain a great deal of information, especially if they integrated them with the information they've already got.

One last comment, they used these logs to create the basis for their computer model, for their cross sections, etcetera. We can talk a long time about this, if you like.

JUDGE COLE: They used the 1,400 logs that they used in their application?

DR. MORAN: If I'm correct, I think I heard Mr. Demuth say 1,800. And to put that in perspective, I've seen various Powertech documents saying that there are more than 4,000 up to 6,000 boreholes on the site. So it would be useful to know some more information from more boreholes.

JUDGE COLE: In your view, the 1,800 logs might not be enough to make the demonstration?

DR. MORAN: I think you'd have to look at the new data. Then you'd have to evaluate it. It's more data. Somebody -- TVA collected that information for a reason. They spent a lot of money to do that.

And if I could add one last thing. In my experience, when an operator purchases a property, they normally have all of these logs right from the beginning. They buy the whole package. They buy the maps that are available. They buy the logs, everything they can. If there were old feasibility studies, we know that in this case. Probably they would have been transferred years ago.

JUDGE BARNETT: I would like to follow up with Mr. Demuth if I could, please. Could you pull up APP-061(g), please?

Good. Just keep scrolling down. Okay, right there. Is this figure, and there are many figures like that in there, relevant to Contention 3?

MR. DEMUTH: Yes, they are.

JUDGE BARNETT: Was this figure constructed, at least in part, from the kinds of data that we're talking about now?

MR. DEMUTH: Yes, it was. In fact, this figure demonstrates that NRC had requested some more level of detail in certain areas and so there was some cross sections that were constructed. Those cross sections do have the electric logs which are shown.

I might add that of these new data that are in the point of discussion, the discussions with

Powertech, only 200 of those logs apparently are new, new information. Twelve hundred of them, they had logs on a reduced scale that they already have in their possession. So I think it's important to understand that in terms of distinctly new information, I think that may be somewhat of a misnomer. There's some additional data. But again, the data density, if I might, 1,880 data points that were used for the application on 10,580 acres is an average of 113 logs per square mile. Obviously, the distribution of those data points is not equal across the site because the focus was on the areas where the ore exists.

These new data are also focused on the area where the ore exists, so there's even more data density. So if 113 logs on average per square mile are not sufficient, how many do you need?

CHAIRMAN FROEHLICH: What use has the Staff made of well logs in the review of the Powertech application? I don't know which Staff witnesses are best able to answer. Mr. Lancaster or Mr. Prikryl?

MR. PRIKRYL: Sir, we used the electric logs -- the electric logs were used to create the isopach maps, the structure maps, the cross sections that were included in Powertech's application. So we

reviewed -- in this case, for instance, the cross sections here, we reviewed to make sure that these e-logs were representative of the entire suite of logs that were -- that Powertech used. So we tried to determine whether the density of data was sufficient for our review and to come to a conclusion whether we could do our analysis. And so we determined from the density of data that was provided in the application that we were able to do an assessment under NEPA.

CHAIRMAN FROEHLICH: Just so I'm clear, the density of data, so that first, the data that you reviewed is representative of the data that they had. And then is it representative of the area to be mined?

MR. PRIKRYL: Yes. We looked at the locations, of course, of the electrical logs first to determine if there was an adequate density covering the ore zones.

CHAIRMAN FROEHLICH: And I think you had said that you used the well log data to prepare or confirm isopach maps and something else. Tell me how this data was used by the Staff?

MR. PRIKRYL: Well, what we did was we determined from our guidance, we looked at our guidance to determine if the Applicant had submitted sufficient information to do our analysis. Based on

our review, our review procedures, we determined that the Applicant, in our acceptance criteria, we determined if they had submitted the adequate information to do our assessment.

JUDGE COLE: Is that principally based on the number of logs per square mile?

MR. PRIKRYL: No, I don't think it would be based on that.

JUDGE COLE: Did you review very many of the logs yourself?

MR. PRIKRYL: We reviewed the logs that were, for instance, here in the cross section. We reviewed those logs.

JUDGE COLE: But they were taken from a larger group of logs selected as being representative of the others. Is that correct?

MR. PRIKRYL: That's right.

JUDGE COLE: Now of the 1,880 different logs, I had mentioned 1,400, but I misspoke there. Thanks for correcting me there. Of the 1,880 logs, were all of those drilled by Powertech or is that information from other sources?

MR. PRIKRYL: My understanding is that they all came from Powertech.

JUDGE COLE: But did Powertech drill these

holes and where did they get the information?

MR. PRIKRYL: These are TVA logs. That's my understanding, they're TVA logs. So they purchased them or acquired them from TVA.

JUDGE COLE: So this was not the 4,000 logs we're talking about today that they purchased. These are other --

MR. PRIKRYL: It's a subset of those logs.

JUDGE COLE: A subset of those logs?

MR. PRIKRYL: Yes. So the 1,800 logs that Powertech has in their possession were used to -- in the application are a subset of the 4,000 logs that we're talking about today.

JUDGE COLE: Okay, thank you.

JUDGE BARNETT: I don't have any more questions about relevance to Contention 3. I did have a question about relevance to Contention 2 which had to do with baseline groundwater quality.

Mr. Lawrence, you stated that you did not get water quality information from these logs, is that correct?

MR. LAWRENCE: Well, one slight correction, with an SP and a resistivity combined, you can come up with sort of general conductance of the formation. But it's not like a laboratory analysis

where you would have a definitive number that you would hang your hat on or a defensible number because the SP fluctuates enough where you can get sort of, I guess, order of magnitude changes in water quality based off of that for conductivity, if that makes sense.

JUDGE BARNETT: Dr. Moran.

DR. MORAN: It's incredibly useful. It gives you vertical variations in the general water quality of the water entering from the different horizontal levels. And then when you start comparing those through time, I'm sorry, through space in neighboring boreholes you can start seeing patterns.

And if I might add one other thing and I've said this in my written testimony, when these various investigators were doing aquifer tests, if they had been doing the same kinds of resistivity measurements, they would have learned a lot about the interpretation of their tests. So what I'm saying is yes, in this borehole information you can get a lot of ideas about water quality.

JUDGE BARNETT: You say a lot of ideas, so you can get salinity or conductivity, TDS?.

DR. MORAN: Yes.

JUDGE BARNETT: Anything else?

DR. MORAN: And then when you tie it to the condition of your other logs, you are, of course, getting information on natural radioactivity in your gamma logs. Again, we don't know. They may have other logs in here, too. But they're interpreted in combination. They're usually not interpreting one set of logs by themselves.

Could I suggest one thing? We submitted a PowerPoint presentation that I was to give last year at the state hearing, to you people. I assume it's an official exhibit. I only wanted to show one slide from it. Is there an easy to bring that up? I don't know what its OST number is.

MR. PARSONS: Excuse me, that would be OST-005.

DR. MORAN: On my copy, I'd like to show you the 20th slide, number 20, if you can just skim down. That's the one. And maybe make it a little bigger.

This is a Powertech document. I would come back out a little bit so we can see the box. Basically, what this is showing is the drillhole map. Again, I don't know how many of all of these drillholes this represents. Is it the 1,800? Is it the 4,000? Is the 6,000? But my point of bringing it

up is look at the distribution. It's mostly in a few areas. That's normal because as they've said they're focusing on the uranium. But if we're looking at overall hydrogeology, wouldn't you want to know something about the intervening areas? And therefore, wouldn't it be useful to see what's in these new logs?

MR. DEMUTH: Your Honor, might I add to that if I could? And I appreciate having this figure up there because I would like to imagine that we have data from approximately 1,500 points here. And what the dots on the map represent is locations that Powertech is aware that there were historic holes drilled. From that, there's approximately 1,800 that were used to assess the site geology. And then there are some additional data which they did not have in their possession, but they were aware that there was a location and a well drilled at that location.

So in this case, as I mentioned before, approximately out of the 1,400 new logs they've received, 200 of them are actually new data. So if you could, look at this map and say the focus of those would be where the ore is because it's for wellfield development. So pick out 200 points in that map and say what more does that tell us?

JUDGE COLE: Mr. Demuth, could you review

how you got the 200 from 4,000?

MR. DEMUTH: The 200 is based on discussions with Powertech this morning. Out of the data set in question here or what's referred to as the new data, that approximately 1,400 of those data set or well logs have been attained and only 200 of those are truly new data points. They had data previously for those points anyway.

So again, if you pick out 200 locations in the data density here, does it tell the operators some new information? Yes, it tells them information about the concentration of uranium and wellfield development.

If I could also follow up on Dr. Moran's statement, the logs in question are single point resistivity. We don't have a deep medium shell induction log on which we can really do accurate calculations for salinity.

As Judge Barnett had asked about, can we calculate salinity concentrations? Well, to do that from a resistivity log, first of all, we need a porosity log which we don't have. If we're going to use Archie's equation to calculate salinity from a resistivity log, which is the normal way of doing it, it's a function of porosity squared. So we can't make

that calculation from especially these logs. They're single point resistivity and we don't have porosity logs either.

So I would submit to you that the best data for water quality are from the monitored wells that are actually sampled.

JUDGE COLE: For future.

MR. DEMUTH: Well, the logs that were included in the application where we actually have distinct monitored wells that were sampled and we have real samples and analytical results from the lab.

JUDGE COLE: As part of the application?

MR. DEMUTH: Yes, sir.

MR. LAWRENCE: Can I make a clarification because we're getting confused with numbers a little bit. The initial package of the new data that Powertech has received included 1,400 logs. Those logs are all concentrated in the area of the first proposed Burdock wellfield. Out of that 1,400, there were only 200 new data points.

And if I could pull up one map to show you the density of data, can you go back to that APP-16(d) and it would be the next to last figure on that. Not 16(d), I'm sorry. Hold on one second here. 15(d), page 18. I apologize. I think it's just above this

figure right here. That does not look like the right figure. Page 18, I'm sorry. Keep going down. Can you go back to the side where we can see the -- I apologize.

JUDGE BARNETT: Which exhibit are you looking for?

MR. LAWRENCE: It's the Fuson isopach map.

JUDGE BARNETT: Which exhibit is it in?

MR. LAWRENCE: It's --

MR. PUGSLEY: It's APP-015(d) as in dog.

CHAIRMAN FROEHLICH: Thank you, counselor.

MR. LAWRENCE: Yes, that's the one right there. Okay, if you kind of scroll down to the lower portion and you see in the box there, that's the first proposed Burdock wellfield. And the inset on the lower left-hand side is a blow up of that. And if you shoot in even more, you're going to have to really zoom in on that area. And what you're going to see is -- keep zooming in. Keep going.

Okay, those are values. Those are data points that were used to construct this map. And you can see from the density there that you have an awfully good control for an area. A lot of those borings are less than 100 feet or approximately 100 feet apart. And what they do is they follow the ore

zone.

I know Dr. Moran said yes, we like to know what's going on outside the ore zone, but really it's within the wellfield that's the concern of a potential fluid migration, subsurface movement of fluids. We have incredibly dense control already. Adding a few more points in there is not really going to improve our picture. We've already got an abundance of data in the area of interest, in the area where injection and extraction is going to occur. And for -- I've been on several license applications. This amount of data far exceeds what I've seen in previous license applications. So I don't really see the relevance of adding additional data into this for licensing this site.

Once they get ready for production, they will have even more data points within that area. They will conduct pump tests. They will have a monitoring well around the entire wellfield, monitoring points above and below. So the additional data is still to come. That's the phased process for conducting ISR.

I know Dr. Moran thinks a couple of guys could knock out something pretty quickly. These maps have been in progress for about six years by a

geologist who has spent most of his life working this data and understands these types of formations and these types of roll-front deposits very well. But it's not something that's very easy to do. It takes a full time dedicated geologist to develop this information. That's why the NRC, they only review portions of that, particularly in areas that are contentious or in this particular instance they also wanted to see the Fuson isopach map. They requested the data and generated their own maps and were able to reasonably replicate what Powertech has done.

So again, more density, yes, I'm a scientist. I always want more data. But at the same time, when do you stop? This process is going to continue on. They're going to continue to collect more data throughout the entire production of the project.

CHAIRMAN FROEHLICH: Let me ask you just a couple of questions. Not on the data itself, but in the way it currently exists. When we're talking about 1,400 well logs, are we talking about paper well logs at this point or how many of them have been digitized?

MR. LAWRENCE: Many of them have been digitized, but most of them are still in paper format. I have some examples I would be happy to share with

you, although they're not technically exhibits since we didn't know that this was an upcoming event. I can show you what the digitized version looks like in the logs.

CHAIRMAN FROEHLICH: Where are the paper logs currently?

MR. LAWRENCE: I couldn't tell you that. It's in Powertech's possession. The portion of the original -- they haven't received all of the data at this point.

JUDGE COLE: Which is it easier to work with, the digitized or the paper?

MR. LAWRENCE: Depends on your age. I kind of like paper, but nowadays, we're going more and more toward electronic format for everything and probably will be used --

JUDGE COLE: For comparison purposes with other logs would the digitized be a much easier way to compare them?

MR. LAWRENCE: Not necessarily. I know most people who are skilled at correlating logs typically will still slide logs, you call it. You place them side by side and adjust them and see where your zones are lining up.

JUDGE COLE: You just roll out the papers

and compare them?

MR. LAWRENCE: Yes. I've tried to do it electronically on some programs. I find it frustrating. I go back to the paper.

JUDGE COLE: I understand. I think for purposes of the motion to -- whether these documents are discoverable or not, I don't think there's any serious question or if there is I'm sure counsel will tell me that this data is either useful or relevant to Contention 3 based on what I've heard from our gamma geological experts this morning. Is there any doubt that this is relevant or relates to the conditions that affect the ability of various layers to confine liquids to address the issues that are before us in Contention 3?

MR. PUGSLEY: Your Honor, thank you for the opportunity. I think one perspective that is lacking in the evaluation here is what -- when we say is it relevant to Contention 3, it is what is Contention 3? Contentions in this proceeding and the issues before the Board is whether or not the information in the record of decision to characterize the Dewey-Burdock site pursuant to 10 CFR Part 40, Appendix A, Criterion 7, requirements for baseline data, is satisfied.

This data we have said in our pleadings, dated August 12th, and we said yesterday, that the relevance of this data, what is it relevant to? This data is relevant to the development as has been cited in OST-019 which is the press release. It says in there to the development of wellfields, okay? We are not as a -- when we were a license applicant, we're not allowed to develop a wellfield. We are prohibited from doing that lest we run the risk of denial of our license under 10 CFR 40.32(e) or otherwise known as the construction rule.

So therefore, we are required by regulation and guidance to submit adequate site characterization data which, as you heard from NRC's experts, was deemed adequate after, and I'd like to supplement that answer which is after the application and the responses to their requests for additional information, where they did request additional data of this type.

What this data that we have acquired is relevant to is as it says in the press release, the development of wellfields which is done post-license issuance, but pre-operations. Pursuant to the Hydro Resources case, the Commission determined under its policy of performance-based licensing that wellfield

packaged data, the data itself and what is in there and what is looked at by NRC Staff in their pre-operational inspection before you quote unquote flip the switch on the operation, is not subject to litigation.

What is subject to litigation in this proceeding, especially under Contention 3 is the procedures that Powertech proposes for the development of those wellfields which includes the use of data such as this. That is subject to litigation.

However, I can find nowhere in the Consolidated Intervenors' or the Oglala Sioux Tribe's pleadings where they have challenged those procedures. So as far as Powertech is concerned and the reason we deemed this not to be relevant to Contention 3 is because what it is relevant to per Commission precedent is not subject to litigation in this proceeding regardless of how Contention 3 is worded.

If the Tribe and Consolidated Intervenors wish to state that additional data, NRC Staff should have gotten additional data to render an initial licensing decision on site characterization pursuant to Criterion 7 and NUREG-1569, Chapter 2, they are free to do so and in fact, they have. And that is fine. Our experts are prepared to deal with that

issue in your questioning of Panel 2 that is soon to come. But we made a determination that it was not relevant for the very reasons that we just stated. So that is our position.

JUDGE BARNETT: Can I ask you a hypothetical?

MR. PUGSLEY: Yes, sir.

JUDGE BARNETT: You go out to a site and you want to characterize it and you take 100 data points. Your experts decide they only need 80 to develop the license application. The Staff reviews it. They're okay with that. But those other 20 points, even though you didn't use them, are in your possession. Are those discoverable?

MR. PUGSLEY: No, they are not because they were not used to characterize the site. And I think you made a very important point, Judge Barnett, which is it's not just that Powertech's experts and the hypothetical would have determined the 80 data points to be adequate, the reviewing expert agency determined them to be adequate under Commission regulations. So as far as we would be concerned, those 20 data points, would they be used at the end of the day before we flip the switch? Yes. But they would be used in the wellfield package that is

developed post license issuance, along with other drilling that we would be required to do because as our experts stated, you can't get a full picture of what's there until you actually put in a wellfield with a complete monitor well ring, which as I said before, we're prohibited from doing.

So to answer your hypothetical, Judge, will those additional 20 data points be used? Yes, but not for purposes of an initial licensing decision which is the subject --

JUDGE BARNETT: Are they discoverable? That's my question.

MR. PUGSLEY: I don't believe they're discoverable because they're not relevant to a contention on an initial licensing decision.

JUDGE BARNETT: I'd like to ask Mr. Clark the same hypothetical. The Applicant goes out, takes 100 samples. They only use 80 of them in developing their application. The Staff says the 80 are fine. But there are 20 additional data points that they have in their possession. Are those discoverable in a contention -- in a hearing?

MR. CLARK: Based on Mr. Lawrence's statements, the Staff wouldn't object to the claim that they're relevant in some way or useful in some to

the Staff's findings. Again, I agree with Mr. Pugsley that the focus should be on the analysis in the Final EIS when it was issued in January of 2014. If the Staff had these data, they would conceivably considered them. So the Staff doesn't object to a finding of relevance in some limited sense or some potential, that there's some potential use of these data to support some of the claims the Intervenors made in Contention 3.

JUDGE BARNETT: Thank you.

JUDGE COLE: But it's the Staff's view that they had received sufficient information to justify the issuance of a license based upon their reading of the requirements?

MR. CLARK: Correct. The Staff is confident they had enough information to make the findings on hydrogeology in the Final EIS. The Staff would also note that as Mr. Pugsley explained and as Mr. Lawrence explained, new information continuously comes in. There's new information now. There will be new information months from now, new information a year from now. The Board's role is to rule on the contentions that were admitted and if the Board continues to wait for new information, there will never be any resolution to this hearing.

JUDGE BARNETT: Well, my hypothetical was specifically for data that is in hand now.

MR. CLARK: Correct. And Your Honor, did I answer your question?

JUDGE BARNETT: Yes, you did. Thank you.

CHAIRMAN FROEHLICH: But in your answer, Mr. Clark, the Staff, as well as the parties are under a continuing obligation to disclose data, not that the people are waiting for data, but to disclose data that's relevant to the contentions up to and including the time that the Board issues its decision. Is that correct?

MR. CLARK: That's correct, Your Honor, although they may also -- in this case, they would likely not disclose any data, but log the data as privileged. And depending on the Board's views, the Staff would also like to discuss, although perhaps not now, the form of disclosure. We're talking voluminous data that could only be reproduced, according to Mr. Clement's affidavit, at great cost. And I think under the NRC's rules at 10 CFR 2.336(a), those take into account the difficulties and the costs and time of reproducing certain data. So I submit that for another issue the Board may want to address.

CHAIRMAN FROEHLICH: But should they be

found relevant to the contentions, they would be made available. We would have to determine under what terms and perhaps a confidentiality agreement because I guess some of this data is proprietary and business related. There would have to be restrictions, I'm sure, as well.

MR. CLARK: It would also be consistent with Commission precedent and federal case law to provide an opportunity to view the exhibits rather than requiring Powertech to reproduce the exhibits for the convenience of the Intervenors.

CHAIRMAN FROEHLICH: That may be one way to handle it, thank you.

From the Intervenors, would you care to be heard as to the scope of your contention and the characterization by the Applicant?

MR. PARSONS: Sure, Your Honor. That's a new argument being made here and so it's -- without having dissected it a little more carefully, I'm not sure I fully grasp, it seemed to me, very subtle distinctions Mr. Pugsley was trying to make. Our contention pleadings clearly discuss the inadequate characterization based on inadequate data and now we have data that we're finding out exists not just as newly-acquired data, but apparently there's additional

borehole logs that were not used in the application that were not disclosed. Presumably, that's part of the information that I referenced yesterday that was included in that motion on Saturday. But I think any fair reading of the pleadings includes within this contention components of lack of adequate data to characterize, adequately characterize the hydrogeology.

I think Mr. Pugsley's characterization of our contention is off-base. I would be happy to brief it in a much more formal manner and comb through all of our pleadings and point out specifically for the Board where we make those points, but I don't think that's necessary. I think that as the Board has already indicated, the relevance question which is not a high burden in these proceedings has been overcome.

CHAIRMAN FROEHLICH: Okay. Any further argument on this from counsel?

MR. PUGSLEY: Your Honor, just one additional point. And certainly counsel for the Intervenors can feel free to weigh in on this. I know I've been working in this business as counsel for over 13 years and my co-counsel has been in for close to 3 times that much. Our experts have already told you their qualifications. Unless any of these people I've

mentioned would like to contradict what I'm about to say which they can feel free to do, I am not aware of any ISR license application and subsequent record of decision where an applicant or a licensee who is seeking an amendment for a satellite wellfield was ever required to disclose every single electronic log they had because it's not, as I said previously, what was necessary for an initial licensing decision under Commission regulations. That is basically how this is done under the regulatory program. So I would respectfully submit that point as well.

CHAIRMAN FROEHLICH: It appears that these documents, these logs are relevant, to use the legal term, or would be useful to use the geological term, to people who are trying to characterize a particular site, to submit with their application support of a position that it would be contained, it wouldn't contained. There's connection, there's not connection. It seems like the data that would come from these type of logs would be relevant to questions that are contained in or subsumed in Contention 3 and therefore, applying the Commission's rules on disclosure, all parties are required to disclose any and all documents and data, compilations in their possession, custody, and control that are relevant to

those contentions.

Now I fully appreciate that this data set is voluminous, would be expensive to duplicate, but I am of the opinion and the Board has concluded that it is relevant in a legal sense to the issues in Contention 3.

I don't know and I don't think anyone can know until they've had a chance to look at this whether it supports the conclusions that the Staff reached when it viewed the initial tranche of data or whether it contradicts or provides additional support for the position that the Intervenors advocate that the sites are not well suited for the proposal and that there's communication between various strata.

What we need to do is move forward with our cross examination today. But in addition, set up some opportunity for this data to be viewed by all parties to the case so that they may draw whatever conclusions, both supportive or in opposition to the positions they've already taken in the record of this case. We'll provide an opportunity in the very near future for them to file supplemental testimony, if necessary, either supporting that position or elaborating on positions already taken, not to expand the contentions, because then it would be, as Mr.

Clark pointed out to me yesterday, a new contention, an amended contention. But in the context of the contentions that we have before us, the Board finds that this data is relevant and must be disclosed.

I had asked one of the witnesses this morning where it is physically located. I think that it should be made available wherever it is and the digitized data to the extent that can be reviewed efficiently. I would hope that the parties would be able to come to some conclusions, some kind of resolution on how this could be viewed or how the electronic data can be viewed.

I also would be willing to use the protective order that we have already in place or to amend it as may be necessary to protect this data from disclosure beyond the purposes of this case.

Mr. Pugsley?

MR. PUGSLEY: Judge Froehlich, a few things, if I may, because obviously we'll be the disclosing party.

CHAIRMAN FROEHLICH: Right.

MR. PUGSLEY: One, I'd like my objection to this ruling noted for the record. Secondly, if it would help the Board, I believe Powertech is going to discuss the term how a disclosure is best accomplished

for the Consolidated Intervenors and the Tribe. And prior to the cross examination of Panel 3 tomorrow, we would be happy to provide you with a report on potential options for how this can be done. And I think that's it.

CHAIRMAN FROEHLICH: Okay. Yes, Mr. Ellison.

MR. ELLISON: I guess I would like to get an understanding better than I have. It was my understanding that the data that we're talking about was not 1,400 or 1,800 or 200, that we were talking about the purchase of all of the TVA borehole data. And I'm hearing a lot of different numbers. And I would respectfully request that Powertech give a definitive statement as to the number of drilling logs and maps and what not that they have acquired and also why they didn't get the rest if they didn't get the full number. Because what I'm concerned about is that as Dr. Moran said, this data is usually acquired when the property is acquired. And now we're finding out that it's apparently not the 4,000 to 5,000 which would be the overwhelming majority of the holes.

Powertech made a commitment to the NRC, according to NRC communications, that they were going to locate and plug all the boreholes. So it seems

illogical to me that that could be accomplished by purchasing less than half or maybe a third of the data. So can we get some kind of an understanding as to the number that was actually acquired and why the rest was required, if it wasn't?

MR. PUGSLEY: Yes, Your Honor. I find Mr. Ellison's request acceptable for a statement of what this quote new data is about. We will provide that tomorrow for you.

Secondly, noting for the record that when we're talking about the number 6,000 boreholes at this site, the location of those were disclosed in the license application. So I don't think that's an issue here, but in terms of Mr. Ellison's request for a statement, that's perfectly fine.

MR. ELLISON: May I add? Thank you, Your Honor. May I add just one thing? I guess for the purposes of the record, I would, on behalf of Consolidated Intervenors, want to object to inquiry on Contention 3 until we have an opportunity to look at this data because unless what the Board is suggesting by a procedure, not only would there be potentially supplemental testimony, but a supplemental hearing whereby there would be examination. I guess I would object.

CHAIRMAN FROEHLICH: Your objection is denied. We're going to go forward with the cross examination of Panel 3. You will have access to this additional data and any subsequent data of like as it becomes in the custody and control and possession of Powertech and to the extent there is information in that data that causes you to file a new contention or to amend an existing contention, you have that right, keeping in mind the Commission's burdens.

However, we will have a deadline or a date for additional testimony that would either support, supplement or maybe nothing will come of it. I can't tell at this point, but we will put in an opportunity after we get a feel for how long it will take for them to get it together and for you to look at it. Have your experts go through it. If, after your examination of that material it changes anything in what you have already filed and what we have already cross examined, you'll have the opportunity to file additional testimony on this existing contention. And we'll take it up as we have. But we'll go forward with the examination on Contentions 2, 3, and 4 today.

MR. PUGSLEY: Your Honor, may I respectfully request a 15-minute recess?

CHAIRMAN FROEHLICH: That's fine.

Granted. We'll reconvene in 15 minutes and we'll start with the cross examination of Panel 2.

MR. PUGSLEY: Are there going to be opening statements as well?

CHAIRMAN FROEHLICH: Yes.

MR. PUGSLEY: Thank you, sir.

CHAIRMAN FROEHLICH: Absolutely.

(Whereupon, the above-entitled matter went off the record at 10:06 a.m. and resumed at 10:28 a.m.)

CHAIRMAN FROEHLICH: We'll be back on the record.

We have now Panel 2 before us, which covers Contentions 2, 3 and 4. We'll begin with opening statements on these three contentions from each of the parties. Please limit your statement to about five minutes, and then we'll proceed with cross-examination of these witnesses. I believe with Panel 1 we had Staff go first. How about we go first with Powertech today?

MR. PUGSLEY: Thank you, Judge Froehlich. May it please the Court, for Panel 2 today Powertech's approach to site characterization of groundwater at the Dewey-Burdock project is consistent with NRC Regulations at 10 CFR Part 4 and Appendix A criteria

as implemented under the Atomic Energy Act of 1954, as amended, and NRC Staff's guidance at NUREG-1569, which is Exhibit NRC 013, which represents Staff's expert interpretation of the Commission's Regulations as delegated to under 10 CFR Part 1.41(b)(18) and (19), and "NRC Office Manual," Chapter 0124 at 0321.

With respect to Contention 2, Powertech's license application in the Record of Decision contains more than adequate baseline groundwater quality in accordance with NRC Regulations at Part 40, Appendix A, Criterion 7, and Commission guidance at NUREG-1569, Chapter 2.

A fundamental legal question that sets the stage of Contention 2 is how the Commission's ISR Regulatory Program addresses two stages of groundwater quality data and analysis, the first being the aforementioned Criterion 7, baseline groundwater quality for initial licensing decision and Criterion 5(b)(5), Commission-approved background post-license issuance and pre-operational.

As a general matter, Criterion 7, baseline groundwater quality, is all that is required for an initial NRC licensing decision such as the grant of license SUA-1600. For Criterion 5, Commission-approved background, a license applicant

submits procedures for how additional groundwater quality data post-license issuance are obtained and submitted to NRC Staff for review prior to the commencement of operations. Such procedures are implemented by license condition; in this case, license conditions 10.10, 11.3 and 11.4 in NRC Exhibit 012. Criterion 5, Commission-approved background, can only be determined after an entire wellfield, including monitor well network, is installed, which, as stated earlier today, is not permitted under the Commission's construction rule at 10 CFR Part 40.32(e).

As stated previously, NUREG-1569 guidance, the Staff's expert interpretation of ISR Regulations is delegated to them by the Commission. License applicants and their consultants follow this guidance as it defines what is expected of a license applicant in order to satisfactorily satisfy Commission requirements for a license. With that said, Powertech's license application provides more than adequate groundwater quality data.

Powertech submitted this data to reflect site characterization of groundwater at the site at the time of application submission, which is what is required by Commission Regulations. Powertech's

characterization of this actually went beyond what is required in the guidance. And as a standard practice, license conditions are imposed to require additional groundwater data.

NRC's FSEIS also addresses many of these issues and other additional issues including, for example, potential cumulative impacts related to the Black Hills Army Depot and other past, present and reasonably foreseeable actions, including mining operations. This approach to pre and post-license groundwater quality data and analysis is explicitly endorsed in Commission precedent in the Hydro Resources case. Two sample citations: LBP 05-20 and CLI 0601. Issues associated with this contention will be addressed by Powertech's experts, Mr. Hal Demuth and Mr. Errol Lawrence.

With respect to Contention 3, the same arguments apply as we just articulated in Contention 2 from a legal perspective regarding Criterion 7 and Criterion 5.

Major points of contention in this contention involve potential presence of unplugged boreholes, breccia pipes, faults and/or fractures at the site. These issues have been addressed in the license application and the Record of Decision through

extensive research of site-specific reports, discussing such features and on-the-ground studies to determine if they are present. However, Powertech does submit that this does not preclude post-license data gathering and analysis to address these issues, however, it is done post-license and is not subject to litigation in this proceeding.

Opposing counsel have failed to offer any concrete data studies or analyses that show any of these features are present at the Dewey-Burdock site or will not be dealt with prior to the commencement of the operations. Again, issues associated with this contention will be addressed by Mr. Hall Demuth and Mr. Errol Lawrence.

With respect to Contention 4, Powertech's license application and the Record of Decision adequately address groundwater quantity consumption issues and potential impacts associated with that issue. Major issues in this contention include net groundwater extraction rates during operations and restoration, potential local and regional impacts to private supply wells and water balance.

With respect to extraction rates, Powertech supplied its projections for these rates based on typical ISR processes and in accordance with

NUREG-1569 guidance such as the continuous recirculation of native groundwater with only a one-and-a-half to three percent bleed rate, water disposal via class 5 underground injection control wells or land application and typical restoration rates using commonly accepted water treatment processes such as reverse osmosis.

Project extraction rates are also compared in our expert testimony to a typical center pivot system used for irrigation, which was provided for as an analogy. Opposing testimony completely mischaracterizes the groundwater consumptive use at the project over the life of the project, which is demonstrated in our expert testimony.

With respect to potential local and regional impacts of private supply wells, opposing counsel did not offer any concrete evidence that Powertech's license application and NRC Staff's FSEIS analyses and Record and Decision do not adequately address this issue. Powertech's license application has a comprehensive numerical groundwater model that fully supports its conclusions and NRC Staff's conclusions.

And finally, with respect to water balance, both Powertech's license application and the

Record of Decision provide detailed discussions and analyses of the water balance at the time of the application, including all necessary input and output parameters such as production and re-injection rates, bleed rates, waste water disposal rates and other factors associated with both operations and restoration, and issues associated with this will be addressed by Powertech's witnesses, Mr. Demuth, Mr. Lawrence and Mr. Doyl Fritz.

The last point I would like to make, if I may, is as has been stated in several of our pleadings at no time during this proceeding did Consolidated Intervenors or the Oglala Sioux Tribe attempt to migrate their contentions from Powertech's license application to the NRC's safety evaluation report detailing the safety review of Powertech's license application and RAI responses. Thus, those conclusions in that document are not subject to litigation in this proceeding. It is important to note that many of those conclusions that are not subject to challenge are inextricably linked to the conclusions rendered in the FSEIS. We respectfully request the Board take that into account when rendering its decision.

And thus, in conclusion I would say

Powertech's position is with respect to Contentions 2, 3 and 4 that this Board should find that none of those contentions constitute ground for modification of the Record of Decision or Powertech's NRC license. Thank you.

CHAIRMAN FROEHLICH: Thank you, Mr. Pugsley. Commission Staff?

JUDGE BARNETT: Actually, I have a question for Mr. Pugsley, if that's okay.

CHAIRMAN FROEHLICH: Oh, please. Please.

JUDGE BARNETT: Mr. Pugsley, so make sure I understand. Is it your position that satisfying all the requirements of NUREG-1569 will automatically satisfy all the relevant requirements of NEPA and 10 CFR Part 40?

MR. PUGSLEY: Yes, it is our position.

JUDGE BARNETT: Okay. Do you have any citations or authority that binds the Board to that conclusion?

MR. PUGSLEY: I do indeed, Your Honor. In NUREG-1569, which was a document issued for public comment on two occasions, there was a response to comments in there that addresses this issue, if I'd be maybe given a moment, or I can provide the citation to you later, whichever is easier.

JUDGE BARNETT: That will be fine, if you would like to do that.

MR. PUGSLEY: All right. Thank you, sir. I will provide that to you at the end of opening statements.

JUDGE BARNETT: Thank you.

CHAIRMAN FROEHLICH: Okay. Thank you.

Mr. Clark?

MR. CLARK: As the Staff explained in its written testimony and as it will explain further today, the Staff thoroughly considered the baseline quality of groundwater in the Dewey-Burdock area, the hydrogeology in the area and the amount of water Powertech will use during the Dewey-Burdock project.

The Staff's witnesses on all contention are Jim Prikryl, a geochemist and geologist, and Tom Lancaster, who's the hydro-geologist. Both Mr. Prikryl and Mr. Lancaster have extensive experience in their fields.

The Staff's findings draw support from the extensive information it considered during its review. This includes the information Powertech submitted with its application. This also includes significant new information that Powertech submitted in the Staff's numerous requests for additional information. The

Staff found that Powertech's application, including the RAI responses. met the NRC Standard Review Plan for in situ recovery applications. That's NUREG-1569, which Mr. Pugsley referred to. And in the record that's Exhibit NRC 13. This is the NRC's guidance for determining whether an applicant has met both the safety and the environmental findings necessary for the Staff to issue a license.

Now, the Intervenors argue that Powertech needs to provide more information in several areas, but particularly baseline water quality and hydrogeology. There are two important points, however, that the Board should keep in mind.

First, the Standard Review Plan acknowledges that it's appropriate for an applicant to submit certain information after it receives a license. This includes certain information relevant to both baseline water quality and hydro-geological confinement. In other words, this information doesn't need to be included at the pre-license stage.

Second, and as Mr. Pugsley noted, the NRC's commission has ruled that this approach complies with both the Atomic Energy Act and the National Environmental Policy Act. The best example is the case which Mr. Pugsley cited, the January 2006

decision in Hydro Resources. And I'm referring to pages 5 and 6 of that decision. I don't know the NRC volume, but it's the first decision, so it begins at page 1 of that volume.

As the Commission further explained in Hydro Resources, it's appropriate for the Staff to use license conditions to require a licensee to submit additional information on water quality in aquifer confinement after it receives a license. In this case I'll mention the NRC's license that the Staff issued to Powertech is Exhibit NRC 12.

In this case, again as Mr. Pugsley mentioned, one of the more significant license conditions is License Condition 10.10. This condition requires Powertech to submit more information on baseline water quality and also confinement. Powertech needs to submit this information before it can begin operations in specific wellfields. Now, License Condition 10.10 lists 11 specific types of information Powertech needs to provide. In this proceeding, while the Intervenors object generally to the use of license conditions to gather more information, they fail to specifically challenge the sufficiency of License Condition 10.10 and they fail to address specifically those 11 data sets that

Powertech will need to submit in the future.

But also note that apart from License Condition 10.10, Powertech's license includes numerous other conditions that are relevant to protecting groundwater. For example, License Condition 10.5 requires mechanical integrity testing of wells. Condition 10.6 describes the groundwater restoration process and all the steps that Powertech needs to follow to restore the groundwater in the aquifers. Condition 11.5 requires Powertech to monitor for any possible excursions of wellfield solutions and to take corrective actions if necessary.

Turning to Contention 4, the Staff also closely considered the amount of water Powertech will use during the Dewey-Burdock project. The Staff reviewed a water balance that Powertech submitted with its application and this provides comprehensive information on water inputs and outputs for various phases of the Dewey-Burdock project. The Staff also prepared itself a numerical modeling report to estimate drawdown in the Madison aquifer. And as the Board on Monday, the water in the Madison aquifer is very important to the citizens of Hot Springs, Rapid City and also Edgemont. The Staff from that Powertech's water use will not affect the water

supplies even in Edgemont, which is the city closest to the project.

In addition, the Staff considered the water rates applications that Powertech filed with the State of South Dakota. It's important to note that the state found that Powertech's annual water consumption will not exceed the recharge rates of either the Madison aquifer or the Inyan Kara aquifer, which the Board also heard about on Monday.

In sum, the Staff carefully considered each of the issues raised in Contentions 2 through 4, and Mr. Prikryl and Mr. Lancaster look forward to answering the Board's questions.

CHAIRMAN FROEHLICH: Thank you.

JUDGE BARNETT: I have a question for Mr. Clark.

CHAIRMAN FROEHLICH: Okay.

JUDGE BARNETT: I'm going to ask the question I did of Mr. Pugsley. I think I know the answer, but I just want to make sure I get this explicit.

So, is it your position, is it the Staff's position that satisfying all the requirements of NUREG-1569 will automatically satisfy all of the relevant requirements of NEPA and 10 CFR Part 40?

MR. CLARK: That is the Staff's position. As I mentioned, the guidance in NUREG-1569 is directed to both the safety and environmental findings and it reflects the Staff's judgment that if an applicant provides sufficient information in the areas addressed in the NUREG, then the Staff can make the findings required under NEPA.

JUDGE BARNETT: Do you have any citations or authority that binds this Board to that conclusion?

MR. CLARK: The numerous decisions in Hydro Resources relied on the Staff's review and the findings that the Staff made consistent with the Standard Review Plan. In terms of a direct case stating that compliance with the NUREG satisfies NEPA, I'm not aware of any recent Commission precedent. I'd be happy to look into that and report back.

JUDGE BARNETT: Okay. Yes, if you can find citations or authority that binds this Board to that conclusion, that would help me. And I know that in your arguments both of you have addressed this with Hydro Resources. And I've looked through some of that and I can't find anything really explicit, but maybe I missed it.

MR. THOMPSON: Your Honor, let me just say guidance is not a regulation. We understand that.

And we understand that even the licensee is not bound by the guidance. But if you want to do something different, you have to justify it in much greater detail. If you follow the guidance, you're supposed to be able to get your license. So if the Board finds the guidance inadequate, it presumably will have to have some rather serious technical and scientific justifications to do so.

MR. CLARK: And, Judge Barnett, if I could just mention that the Staff is aware of the Board's footnote toward the end of its recent ruling and summary disposition motions in Strata.

JUDGE BARNETT: That's exactly where this question came from.

MR. CLARK: And we're not aware of any Commission precedent saying that the Staff's guidance is binding on this Board, but our argument is that the guidance is sufficient to comply with NEPA and the Board should -- for the same reasons the Staff adopted the guidance, the Board should likewise understand that the guidance ensures that an applicant provides sufficient information to allow the Staff to make the findings. But we're aware of that footnote and we're also aware that -- is it Judge White from the Strata Board is in attendance?

JUDGE BARNETT: Yes.

MR. CLARK: So we want to make sure that the Staff fully recognizes the issues raised in Strata.

MR. PUGSLEY: And to answer your question, Judge Barnett, the first citation -- I concur with Mr. Thompson's opinion. The citation I would give you is 68 Federal Register 51034, which is --

JUDGE BARNETT: Just a little bit slower, please.

MR. PUGSLEY: I'm sorry.

JUDGE BARNETT: I've 68 Federal Register --

MR. CLARK: 51034.

JUDGE BARNETT: 034.

MR. CLARK: And the pin cite is 036 with a quote of, "Standard practices that have been found acceptable in demonstrating compliance at in situ leach uranium extraction facilities have been placed in the Standard Review Plan as one approach that the Staff may use in determining in compliance." And I would respectfully submit that while I do agree with you that the Hydro Resources cases do not have a specific statement saying the Board is bound to the guidance, it is worth noting that the guidance, the

final version of the guidance in 2003 was developed after those Hydro Resources decisions, so it goes -- it would make you think that the Staff would take Commission precedent into account when developing its guidance.

JUDGE BARNETT: Certainly I do want to take Commission precedence into account, but I want to take the explicit precedence into account.

MR. CLARK: Understood, sir.

CHAIRMAN FROEHLICH: All right. Next from the Oglala Sioux Tribe?

MR. PARSONS: Thank you, Your Honor. With respect to Contention 2, failure to -- deals with the failure to adequately determine water quality, baseline water conditions at the site. What we have in this case essentially is a deferral of substantial baseline data collection until a time in the future. You heard Mr. Clark talk about the license conditions that specifically defer collection of baseline data to the future. I understand that there is an additional package of data that comes in with wellfield development, but Criterion 7 in 10 CFR Part 40, Appendix A specifically requires a pre-operational monitoring program to, quote, "provide complete baseline data on the site in its environs."

Mr. Pugsley asserts that the construction rule somehow prohibits them from providing that complete baseline data, but the construction rule exempts baseline data collection. So that is not an impediment to complying with Criterion 7, which requires that complete, again complete baseline data.

The current data and methodology are not adequate to assess the environmental impacts under NEPA either. NEPA requires all relevant data be included in an EIS. To the extent that an EIS -- it is argued that an EIS is not intended to be a research document, I think is the words used in the briefing on this matter. And our NEPA Regulations at 1502.22, 40 CFR 1502.22 do require agencies to gather additional data and evidence unless the costs are exorbitant. No such argument or showing has been made here. The testimony confirms that the FSEIS lacks the detailed analysis of water quality as we briefed and as we submitted. Under NEPA this data is critical to informing the public and the decision makers and in assessing the environmental impacts.

With respect to Contention 3, which deals with the failure to assess the hydro-geological conditions at the site, a key aspect in this contention is the lack of sufficient data and improper

assumptions regarding the connectivity or lack there of of underlying aquifers. The testimony in our briefly thus far in this case shows that the application and the FSEIS ignored extensive evidence and failed to gather evidence of faults, fractures, breccia formations, collapses and historical boreholes, again deferring that information to some point in the future.

It's our contention that in order to have a complete baseline in order to comply with NEPA you must present that data on the front end and not simply defer it to later analysis. Instead of assessing this information, as with water quality, this data is simply deferred and this analysis are deferred to the future. This approach violates NRC Regulations and NEPA.

Contention 4 deals with a failure to assess water quantity impacts, particularly a failure to adequately review and determine the water consumption for the project. A central feature of this argument is the lack of an appropriate water balance capable of showing the amounts of water that will be used and consumed in this process. Again, the lack of this analysis violates NEPA, cannot under NEPA be deferred to a later time and deprives the public

and decision makers of an opportunity to meaningfully review the impacts from this project.

JUDGE BARNETT: I have a question for Mr. Parsons, if it's okay.

So is it your position that the procedure for FSEIS review outlined in NUREG-1569 is not consistent with the relevant requirements of NEPA and/or relevant NRC Regulations?

MR. PARSONS: Thank you. I think that as was explained, NUREG-1569 is guidance. It's not a regulation. It's not a statute. It's not case law. And so while it provides a road map, the requirements for compliance with NRC Regulations and NEPA are only found in those themselves. So I understand that it provides aid to companies and NRC Staff in developing their NEPA, but it's not conclusive. And so to the extent that there are identified gaps in the data or analyses that are incomplete, I don't think -- and don't meet to the level of the regulations or the statutes, that a guidance can somehow cover for that or overcome those requirements. So I'm not as familiar with the proceedings in other cases as Mr. Clark. I have made notes and will be sure to be researching that. But guidance is just guidance.

JUDGE BARNETT: Thank you.

JUDGE COLE: Sir, you agree that if you're going to do something different than the guidance in the NUREG-1569, you have to make a demonstration of that and convince the Staff that this is a proper way to do it?

MR. PARSONS: Well, I think guidance is a general approach to things. What we have I think in this case is based on the site-specific characteristics. We have a unique situation here. We have a site that's been extensively explored with boreholes and other disturbances. And so to the extent that a site-specific case requires that additional analysis, I don't think you need some vast justification to provide additional data. NEPA requires that hard look. And to the extent that a -- the guidance or the approach taken at another mine site that may not pose the same complications doesn't -- to the extent that that general guidance doesn't provide for a hard look at this particular site, then I would say that you need to follow the regulations and the statute and provide all the information necessary.

JUDGE COLE: Thank you.

CHAIRMAN FROEHLICH: All right. The Consolidated Intervenors, please?

MR. ELLISON: Thank you. Echoing what Mr. Parsons said, we certainly concur that NEPA requires that all available data be reviewed in the FSEIS process, and one of the things that we believe the evidence would show that one of the failures was to include pre-mining baseline data that should have been available from TVA from those earlier studies as to the pre-mining baseline water quality. The evidence clearly shows that the baseline water quality varies sometimes dramatically within the various parts of the proposed project area within Burdock and within Dewey.

And I guess one of the questions that I have, because I'm confused -- I keep hearing a lot of references to baselines of each wellfield, but it's confusing to me whether that means some kind of a parameter of baseline water data up to the eight large wellfields that are being proposed, or is this being talked about for each of the individual seven wells? And because if it is the larger grouping, multiple wellfields lumped together as one wellfield, then the question would seem to me to become is it the best water quality or the worst water quality which should have been looked at and presented and to determine what in fact the baseline would be for that particular wellfield?

As to Contention 3, does the hydrology and geology of the area allow for containment of the mining solutions under existing technology? And noting that the down-flow impact of -- you know, once operations are over or an excursion are currently under study at the Smith Ranch. And again, the NRC should have looked at all available data, both pro and con. This concept of a certain minimal threshold doesn't seem to me to be the hard look that is required under NEPA, but yet which is being suggested by NRC Staff and Powertech and seems to be a rather constant theme throughout the proceedings.

The FSEIS does not mention that there were two rejections by the DNER, that the Powertech had failed to show the state agency that it was not able to protect water resources and that in fact Powertech in its 2009 application for application of the Inyan Kara -- that the Inyan Kara was so leaky it was treated as one aquifer. And then upon DNER recommendations was changed to, well, it's still sufficient to contain these mine solutions. Was there a hard look at that? Was it simply language change or was there some evidence that was presented that would have cause for a different conclusion?

Also there's a question of the simple

modeling that was used by Powertech and assumingly approved by the NRC Staff. We would submit it shows it was not really based on real site conditions, but on some kind of generalized statement leaving out all of the most difficult parts such as showing whether the Fuson layer was actually a confined layer which sufficiently isolates an ISR process.

We've already discussed there is new data regarding potentially thousands of boreholes that had not been disclosed to Staff and analyzed with regard to the preparation of the FSEIS and a question as to when that data was obtained, when it could have been obtained, when Powertech was aware of the existence of such data. And there's no evidence that I think the Board is going to hear as to when the NRC Staff concludes that there is sufficient hydro-geological characteristics within the Dewey-Burdock area to with existing technology contain these fluids. There's no evidence that was presented showing of a similar ISR site that had really the same site characteristics with a plan to mine two hydrologically connected aquifers at the same time which overlap each other.

And then there of course is the absence of much of a discussion even though Powertech in one of its exhibits discusses how the area at the

Dewey-Burdock area has an oxidized core and how that might affect such things as mitigating or even controlling excursions, let alone ultimate reclamation.

There's also -- lacks a study of the so-called -- the reduction area that's supposedly down-flow outside of the project area. Between the Burdock area down-flow of that immediately is that open pit which is exposed to the rain, which goes all the way down to the top of the Fall River formation, which would seem to be providing additional oxidation. That's in the flow. Has that been really studied so that once these mine solutions hit that what then is the effect as it goes further as it travels initially southwest from the project area?

The evidence from Dr. Moran and Dr. LaGarry will also show that in addition to potential new data potentially showing faults and fractures with the borehole data that satellite photographs in fact show that there are faults and fractures within this area. We've heard some testimony about earthquakes in the area, but it doesn't really address what would happen if there was a five point magnitude earthquake in the area. A 4.8 one was not too far away. How would that affect the ability to prevent migration of

fluids? Same thing if it damaged piping.

There's also the question of flooding of the mine site with the holding ponds being in the 100-year flood area. Last May there was a flood through that area with rainfall twice the 100-year level, and that doesn't seem to be addressed in terms of protecting surface waters.

There was a fire in 2012 very close to this site, and the FSEIS has not seriously discussed that fire. Well, it doesn't discuss it at all. It doesn't seriously address what would happen if a fire swept through that area in terms of any issues in terms of keeping the pumps going, you know, affecting the ability of those pumps to keep operating and prevent excursions.

And there's also a serious lack within the FSEIS of worst case scenarios situations. What happens if a 500-year flood comes through? What happens if a catastrophic earthquake occurs, or a fire, or there are unknown geo-hydrological features that create a serious problem? We know from Three Mile Island, Chernobyl and Fukushima that regulators told the public -- were told by the companies that the projects were safe, that an unspeakable catastrophe would never happen. If an unspeakable catastrophe

were to happen at this site, we feel the FSEIS fails to seriously address that.

As to Contention 4 regarding groundwater quantity impacts, notice that there seems to be a lot of guessing that's going on as to -- and it's back to gross estimate. It's the amount of recharge that would be of the Inyan Kara right in this particular area. It's generally a very low rainfall-type of type area. And with 9,000 gallons per minute being used -- because it's our position that contrary to Powertech's position that you really only looked at the bleed. If you further contaminate water, isn't that a use of that water? And that the FSEIS fails to consider that that increased contaminated water -- and in some areas here there were drinking water wells within the project area that Powertech has now bought up. So if there is a contamination at 9,000 gallons per minute, there's nothing really about the full volume within this entire 16-square-mile area that is potentially going to be impacted. And is that not a use? We would submit that it was and it should have been something that would be looked at by the FSEIS.

And I apologize. I'm not feeling very well today. I will end my remarks there. Thank you.

JUDGE BARNETT: I was going to ask a

question of the Consolidated Intervenors. It doesn't have to be to you, Mr. Ellison, if -- yes, you don't look like you're feeling very well. Hope you feel better soon.

MR. ELLISON: Thank you.

JUDGE BARNETT: Same question that I asked the tribe. Is it your position that the procedures for FSEIS review that is outlined in NUREG-1569 is not consistent with relevant requirements in NEPA and NRC Regulations?

MR. FRANKEL: Thank you, Your Honor. David Frankel speaking for Consolidated Intervenors. It is our position -- we echo the position that Mr. Parsons described, that this is simply a guidance, while extremely helpful and generated with much industry and regulatory input. We're not saying it's entirely inconsistent, but we're saying it's not always automatically adequate and compliant.

JUDGE BARNETT: Fair enough.

CHAIRMAN FROEHLICH: Thank you for the opening statements. If my colleagues are ready, we can begin.

JUDGE BARNETT: Mr. Ellison, do you need a break for just a minute?

MR. ELLISON: With other counsel here, I'm

fine. Thank you.

JUDGE BARNETT: Okay. I want to say before I get started I appreciate the questions submitted by the parties. I looked through all those very carefully and I will go through them again. It was probably not possible time-wise to ask everyone's questions; there were a lot of them, but I did look at them and in some cases incorporated them. And so I appreciate that.

Also, to the witnesses, I have been in your shoes before. So I served as an expert witness on cases, not uranium mines, but I know that's challenging to do. So I appreciate your willingness to be here.

My first question is for Dr. Moran, and this is in relation to Contention 2, failure to include necessary information for adequate determination of baseline groundwater quality. Would you please briefly describe your professional experience with ISR facility licensing or operation?

DR. MORAN: I'd have to go back and look at my résumé for all the details, but truthfully I don't have much licensing, formal licensing experience. I have a lot of experience looking at the hydrogeology and the geochemistry and water quality of

various kinds of uranium sites and other radioactive sites, but I'm -- let me think a little bit more about specific licensing experience. Not much. Let's leave it at that.

JUDGE BARNETT: Okay. Thank you. You state, and I'm looking at OST-1 at page 17; I'm quoting here, "The delayed production of this critical baseline information until after licensing is not scientifically defensible as it prevents establishment of a baseline on which to identify, disclose and analyze the environmental impacts, alternatives and mitigation measures involved with the Dewey-Burdock project proposal. Scientifically defensible monitoring and mitigation of operating project is not possible based on the baseline data and analyses I have reviewed," close quote.

And I understand you're not a lawyer, but what is your understanding? Is there a specific regulation that you believe is not being met?

DR. MORAN: Again, I'm not going to try to talk about the legal aspects of that. I'm not trying to avoid answering your question. Part of what I'm saying is a lot of the area in three dimension of the Dewey-Burdock site, in my opinion, hasn't been characterized either geochemically, water quality,

etcetera, just by my definition.

When I look also at the relevant documents from EPA where they've been sort of coerced into commenting on the new ISL guidance. I think they started getting pushed in about 1999 to start giving their opinions on it. They also say that you have to have a more stringent kind of baseline and they say that it has to be released before application approval. That's their guidance. But it's in TENORM documents. It's not in NRC documents.

JUDGE BARNETT: Okay. Is it in anything that's in evidence in this case?

DR. MORAN: Yes.

JUDGE BARNETT: The EPA regulations that you were just citing?

DR. MORAN: Their guidance.

JUDGE BARNETT: Or the guidance. I'm sorry.

DR. MORAN: Yes, would you let me take one minute?

JUDGE BARNETT: Sure. Go ahead. If you could just tell me the exhibit number, that's fine.

DR. MORAN: I'm not sure I can. What I've got are some notes to the document. Maybe it would be more useful if I give it to you later, but --

JUDGE BARNETT: That's fine. That's fine.

DR. MORAN: Yes.

JUDGE BARNETT: That's fine.

DR. MORAN: The point is it's in the EPA TENORM documents that NRC requested EPA to give them guidance on and it's suggesting changes to procedures. And one of the sections which I'll give you talks about providing the information before application approval.

JUDGE BARNETT: Okay. Thank you. You also state; I'm quoting from your testimony here, OST-1 at 18, quote, "Analytical results that rely entirely on data provided by the project proponent are not considered reliable by professional hydro-geologists and other water experts." Is that your opinion or do you have a more authoritative reference for that?

DR. MORAN: That's my opinion, but I would add that it's the opinion of most of the people I've ever worked with in way more than 42 mores of doing hydrogeology when they're able to say what they really think. You want independent sources of information.

JUDGE BARNETT: Okay. You state also on the same page, quote, "The employment of self-serving analytic methodology does not stand up to accepted

scientific methods," close quote. What self-serving analytical methodology are you referring to there?

MR. ELLISON: Well, one of them would be if I were beginning the application process myself let's say five or six years ago, you certainly would have added in a section to look at geologic structure using air photos and satellite imagery and then you would integrate it with all of the other information rather than having them be kept in separate boxes.

I this situation they haven't done any significant satellite imagery interpretation, air photo interpretation. They did bring up some agricultural imagery after we criticized the fact that they hadn't in one of the earlier stages of review. They've not integrated the water quality and the hydrogeology. So all of these are in separate boxes. That's part of what I mean by that section.

JUDGE BARNETT: Okay. Thank you. What is your understanding of the relationship of NUREG-1569, which is, quote -- or the title is, "Standard Review Plan for In Situ Leach Uranium Extractions License Applications to NEPA Compliance?" Are you familiar with NUREG-1569?

DR. MORAN: I've read large portions of it. Again, to me it's guidance. It leaves out a

great many important specifics. I don't think I'm the right person to say how it relates to NEPA guidance. Probably that's a legal issue.

But let me just add one other thing: In my experience there are many aspects of at least the water quality and the hydrogeology that I think the -- and the geochemistry which NUREG-1569 doesn't specifically talk about, which I think would be required in NEPA. But that's a technical opinion, not a legal one.

JUDGE BARNETT: Yes, I understand. I'm not a lawyer, too, so --

DR. MORAN: Okay.

JUDGE BARNETT: -- you're walking a fine line, but you're not talking to an attorney.

DR. MORAN: Okay. Good. Thank you.

(Laughter.)

JUDGE BARNETT: So I'm a technical person also.

Okay. Following up on that, in NUREG-1569 there is a statement -- that's in Exhibit NRC 13. There's a statement on page 12 that says, quote, "The Standard Review Plan is general guidance to the Staff on the type of information that is commonly acceptable for evaluating the environmental impacts of a proposed

license action," close quote.

Do you agree with that statement?

DR. MORAN: Would you highlight that again? So let me read it again.

I would assume that's reasonable and that's their guidance, yes.

JUDGE BARNETT: Okay. Same document at 143 states that pre-operational monitoring is conducted as part of site characterization and is addressed in Section 2 of this technical evaluation report, whereas restoration monitoring is conducted during groundwater restoration and is addressed in Section 6 of this technical evaluation report.

Do you agree that all the relevant portions of NUREG-1569 regarding pre-operational monitoring occur in Section 2?

DR. MORAN: I can't answer that. I don't know that to be the case.

JUDGE BARNETT: Okay. Continuing on, same document at 63, Table 2.7.3-1 lists typical baseline water quality indicators to be determined during pre-operational data collection. The accompanying text at page 64 also says, "At least four sets of samples spaced sufficiently in time to indicate seasonal variability should be collected and analyzed

for each listed constituent for determining baseline water quality conditions," close quote.

Are there water quality indicators in that table that were not measured, or are you alleging that not enough samples were taken to satisfy that criteria in NUREG-1569?

DR. MORAN: Let me break that up into one question.

JUDGE BARNETT: Sure.

DR. MORAN: I'm not sure I understand exactly how you worded it, but let me try a shot at it since we're not in a court. I don't know if every one of those constituents was included on every sample that they took. There's just so much information in so many different places I can't say.

What I am -- well, first, what I would say is there are several other constituents I would require if I were doing this myself, and have done it in similar cases. And these are not just to be picky. These are really hydro-geologically important constituents and --

JUDGE BARNETT: Well, what would you pick that's not there?

DR. MORAN: For one, one of the most common metals that's in a roll-front water quality is

strontium. Lithium. But again, this is off the top of my head.

JUDGE BARNETT: Sure.

DR. MORAN: Did I understand your question correctly, sir?

JUDGE BARNETT: Yes, I think so. What I'm asking is are there things in that table that are missing? And as I understood, your answer was you could not answer that specifically because there's so much data. Is that right?

DR. MORAN: Of this specific table --

JUDGE BARNETT: Correct.

DR. MORAN: -- compared to what they actually determined?

JUDGE BARNETT: Correct.

DR. MORAN: That I can't answer. I mean, it's voluminous.

JUDGE BARNETT: Sure.

DR. MORAN: But what I am also saying is that there are constituents that are obviously hydro-geologically important --

JUDGE BARNETT: That aren't --

MR. ELLISON: -- and they're also in EPA-recommended documents for ISL.

JUDGE BARNETT: Okay. Thank you. That's

fair enough. Are you familiar with NRC Exhibit 091? It's title is "Staff Assessment of Groundwater Impacts From Previously Licensed In Situ Uranium Recovery Facilities." It's a memorandum to Chairman Jaczko, Commissioner Klein and Commission Svinicki from C. Miller 2009?

DR. MORAN: Yes.

JUDGE BARNETT: If so, do you disagree with the statement there that, quote, "The Staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded; (2) the use of a water supply well has been discontinued; or (3) a well has been relocated because of impacts attributed to an ASR facility?" Do you agree with that statement, or do you disagree with that statement?

DR. MORAN: Well, again, let me walk that fine line. A statement is possibly true in the strictest legalistic sense, but only because based on my review of the literature and the information that supposedly was included with this memo they haven't made public the information necessary to really answer the question. There's supposedly data from three sites that this memo refers to. When you go to the actual document, the data aren't there. They have

statements about the data, but the data themselves are not there. And that's for 3 sites out of maybe 30 or 40 that have operated. So to me it's not a -- they really haven't answered the question.

JUDGE BARNETT: So if I understood correctly, you say that the Staff does not have proper foundation for that conclusion? Is that what --

DR. MORAN: I think, yes, that's a good way to say it.

JUDGE BARNETT: Okay. Finally, and then I'll move on to someone else, have you submitted any evidence that either the Black Hills Army Depot or past mining activities have impacted the baseline groundwater quality at the Dewey-Burdock site?

DR. MORAN: We have not submitted any information about the -- what will we call it, the Igloo site. What's the other term for that site? Yes. Well, we don't have any specific data. I do not anyway. We haven't submitted any for that. But there's plenty of information in the historical documents that we've referenced in my opinions talking about the impacts from the historical mining.

JUDGE BARNETT: Okay. Thank you.

DR. MORAN: Sure.

JUDGE BARNETT: Mr. Demuth, you stated;

I'm looking at Exhibit APP 013 at pages 7 and 8, quote, "NUREG-1569 clearly defines three phases of groundwater monitoring." Then you're quoting NUREG-1569. "There are three distinct phases of groundwater and surface water monitoring: pre-operational, operational and restoration."

So the operational and restoration monitoring, will that occur outside of the NEPA process?

MR. LAWRENCE: Are you addressing the question to me?

MR. DEMUTH: He's asking me.

JUDGE BARNETT: Oh, I'm sorry. Mr. Demuth. I'm sorry.

MR. DEMUTH: Judge Barnett, I'm not sure I understand that question in terms of the legal aspects of it. Certainly that operational monitoring will occur under the regulation and reporting to NRC. And so those data will be collected, analyzed and reported in the manner specified by 1569, and certainly in a manner specified in the TR and the ER. To what extent that jumps to NEPA, I'm not the lawyer, so I can't answer that question.

JUDGE BARNETT: Well, who will have access to that data and can it be challenged? I'm talking

about the operational and restoration data now. Will that data be publicly available, or just the applicants have that data?

MR. DEMUTH: My understanding is that information will be submitted to NRC. It will be publicly available certainly on ADAMS. NRC Staff could specify the exact method. But that would be public information that could be reviewed by anyone.

JUDGE BARNETT: Okay. You also on page 8 of your testimony, quote NUREG-1569 as follows: "Wellfield hydrologic and water chemistry data are collected before in situ leach operations to establish a basis for comparing operational monitoring data. Hydrologic data are used to: (1) evaluate whether the wellfield can be operated safely."

So you need additional information other than what's available today to determine whether the wellfield can be operated safely? Am I reading that correctly?

MR. DEMUTH: Yes, you are. It would be additional confirmatory information on a wellfield scale, and that is one of the premises of 1569 and historic regulation of ISR facilities. 1569 mandates us really to collect data on a regional scale for a permit application which is prudent and warranted. As

we move into a wellfield scale, then there's additional information. And one example is the pump test where you verify that your monitor wells are connected and there are valid monitoring points and also demonstrate confinement above and below. So, yes, that would be further confirmation, but it's part of a well-established process.

JUDGE COLE: In the latter part you're referring to the information contained in well packages?

MR. DEMUTH: Yes, sir.

JUDGE COLE: Prior to operation?

MR. DEMUTH: That is correct.

JUDGE BARNETT: Okay. Something that doesn't have anything to do with this hearing, but were the sampling results from the domestic wells shared with the property owners?

MR. DEMUTH: I can't answer that question. I would guess that it would be, but Powertech would have to answer that question, sir.

JUDGE BARNETT: Okay. If those wells are still being used, I would recommend that be done. Doesn't have anything to do with this hearing.

Finally, have you testified in NRC proceedings about other ISR projects?

MR. DEMUTH: No.

JUDGE BARNETT: Okay. Thank you. Same question to Mr. Lawrence. Have you testified in NRC proceedings about other ISR projects?

MR. LAWRENCE: No, I have not.

JUDGE BARNETT: Thank you. That's all I have on Contention 2.

JUDGE COLE: Dr. Moran, you were asked a lot of questions about NUREG-1569. I assume you're familiar with that. If the Applicant meticulously follows the procedures in 1569, is it your view that that is or is not sufficient to qualify for obtaining a license from NRC?

DR. MORAN: Well once again, I don't like to avoid answering simply, but the truth is I don't know the permitting process that well, so I'm not sure I can say. But to me technically a lot of information I would require for just a hydro-geologic study that's reasonable isn't in there, in the document, in the NUREG-1569.

JUDGE COLE: In the well tests that they have to conduct after licensing and prior to operations, are you familiar with what the Applicant has to do then?

DR. MORAN: I am in general, yes, but --

JUDGE COLE: Has to conduct a well package?

DR. MORAN: Yes.

JUDGE COLE: What does he have to do in that well package? What kind of information does he have to present?

DR. MORAN: Well --

JUDGE COLE: Let me give you a little more information. First of all, he has to have a wellfield. And before he operates the first one he has to conduct all those tests necessary to present the well package to NRC. Are you familiar with the things he has to do to collect the information in that well package?

DR. MORAN: In a general sense I am.

JUDGE COLE: Yes.

DR. MORAN: Can I respond a little bit further?

JUDGE COLE: Sure.

DR. MORAN: When I have asked colleagues about the availability of the information from comparable well package studies at other sites, nobody can point to any of them being public. So for me, part of the reason I'm pushing on this issue is if we wait to allow them to do that after permit approval,

then that data goes into a black box. I don't disagree at all that they have to do some significant work, but a lot of it I'm arguing should be done earlier.

Can I add one other thing related to that?

JUDGE COLE: Sure.

DR. MORAN: If you compare the quality of the studies done by TVA in the late '70s and early '80s to the quality of the kinds of studies done now and the detail, what I'm arguing is they did most of what we're talking about pre-license approval in the late '70s and early '80s. We would probably have many fewer arguments if that level of work had been done.

JUDGE COLE: Yes, but they weren't under the NRC supervision either, too.

DR. MORAN: Well, they were doing this under AEC, as I recall.

JUDGE COLE: Okay. The purpose of this well test is to make sure that the system will function properly and they run through -- not a lixiviated solution, but regular water through this system to check to see if they have connection between the monitoring wells and whether the system is hydraulically functioning property, they've got the right amount of flow coming in. Is that your

understanding also, sir?

DR. MORAN: We're talking about the --

JUDGE COLE: The test --

DR. MORAN: -- post-approval?

JUDGE COLE: -- associated with the pump package.

DR. MORAN: Post-license?

JUDGE COLE: Post-licensing, pre-operational.

DR. MORAN: Yes, that's my general understanding.

JUDGE COLE: Now, what would they learn from this information in the well package? Would this identify problems they have with operation prior to actual operation?

DR. MORAN: If the testing is designed in a manner that's complete, they will learn those details, but if it isn't, they won't.

JUDGE COLE: Well, they're going to conduct a test. They're just not going to use lixiviated water. They're going to us plain water and they're going to run a pump test and they're going to collect samples that's going to -- they'll run samples and collect the information contained in Table 7.3-1, which is quite similar to the table that you were

shown before with all the chemicals on it, about 20 or 25 chemicals. Looks like a pretty complete list.

So if they were to have a problem with boreholes or some hydraulic flow problems, would they be identified at this stage?

DR. MORAN: The reason I was being a little circular in my previous answer is it depends on who designed the locations of the wells and the completions of them. I mean, I seem to recall in some documents, the tens of thousands of pages we've all seen, that Powertech has been arguing that in many of these post-approval well packages that they not have to monitor some of the aquifers below the production zones. I'm not really trying to argue whether that's exactly correct. What I'm saying is you get the information you need if you put the wells in the right places and you run the tests correctly. And I can't control that here.

JUDGE COLE: So you're saying that you're not sure whether they test for any excursions during this pre-operational test into the lower level or the aquifer above and outside of the aquifers containing uranium?

DR. MORAN: I'm sure they'll do some of that. What I'm arguing is how extensive will it be?

That's my answer.

JUDGE COLE: I don't know what you mean by how extensive.

DR. MORAN: Well --

JUDGE COLE: They're going to have an established connection and they'll run the test for so long to see if there is any hydraulic connection between the monitoring wells and the upper aquifers.

DR. MORAN: Right.

JUDGE COLE: And also they've got monitoring wells in this aquifer some distance out from the location of the wells.

DR. MORAN: Well, I can't speak exactly to what they're going to do in the future, but what we can already see from the thousands of pages of documents that they disagree with the existing literature. Most of the literature says there's leakage there. And they, Powertech, have disagreed with that. So I can envision similar problems in the future.

JUDGE COLE: Okay. But if there is leakage and it would -- and sufficient leakage such that the aquifer is not isolated, what's the consequence of that, and when you're looking at the results of the pump package?

DR. MORAN: Could you repeat the question?

JUDGE COLE: What's the consequence of that when that when the Staff looks at it? Do you know?

DR. MORAN: Well --

JUDGE COLE: Maybe we should ask the Staff.

DR. MORAN: Yes, clearly the key is that the Staff has to have severe or really significant oversight capability here. But I mean, these are kind of theoretical questions to me right now, because I don't know the placements of the wells and the durations of the tests and so on.

JUDGE COLE: Well, let's ask the Staff members. Are you familiar with the subject we just discussed right now?

MR. PRIKRYL: Yes, I am.

JUDGE COLE: If you were to -- in your review of the pump package information what kind of problems would you be looking for and what would be the consequence of certain kinds of problems?

MR. PRIKRYL: Well, basically what the package has to demonstrate; and I think you already alluded to this, that the hydrologic test package has to demonstrate that the production zone is confined.

That is, the monitor wells are in hydrologic communication with the production zone and also that any underlying or overlying wells are hydrologically isolated from the production zone.

JUDGE COLE: But how long do you have to have that test run to determine whether they are isolated?

MR. PRIKRYL: To tell you the truth, I'm not a hydrologist.

JUDGE COLE: I mean, are we talking about three days? Two days? Two hours? A week?

MR. LANCASTER: Yes, it wouldn't be hours. They have to have the flow rate that they would have in production and it would be not hours. That's for sure. But we'll be looking for isolation of the production aquifer and hydraulic connection between the patterned wells the monitoring wells that are in the same aquifer. In this case we'll also be looking specifically at this issue with the abandoned boreholes that weren't properly abandoned and are causing some leakage possibly. Those we'll have to --

JUDGE COLE: How would that manifest itself in the information in the well test package?

MR. LANCASTER: Well --

JUDGE COLE: Hydraulic flows?

MR. LANCASTER: It would be manifested in the case of a communication of fluids through the Fuson into their ore zone. During the pump test -- let's say it's in the lower Chilson and you have monitoring wells in the Fall River above the Fuson, then during that pump test if there is a reaction, a drawdown of the Fall River, that would signify that there's a communication. In this case the Applicant has committed to abandoning the bore holes that have been shown to be linked to this communication in the pump tests that have been done thus far.

JUDGE COLE: What kind of demonstration do they have to make for plugging these boreholes? Because there's caps and their plugs and then there's real plugs. What do they have to do?

MR. LANCASTER: Well, their commitment is plugging in accordance with state requirements, as I recall, the abandonment and plugging. And that should suffice from what I understand or recall at this point.

JUDGE COLE: Now, let's say they have an excursion during this pump test but you're not using lixiviant. What do you measure oat the stationary well if you're just pumping water in the system?

MR. LANCASTER: Yes, you're measuring --

it's measurements of head. The measurements of water levels, if you will.

JUDGE COLE: Okay.

MR. LANCASTER: Or head.

JUDGE COLE: Water elevation, yes.

(Simultaneous speaking.)

MR. LANCASTER: -- service measurements. It's not measurement -- it's not using lixiviant obviously. It's not in the chemical realm.

JUDGE COLE: But that's the procedure you would use during the initial test?

MR. LANCASTER: Procedure? I'm not following you.

JUDGE COLE: Well, you said we're running the tests necessary to develop the well package.

MR. LANCASTER: Yes.

JUDGE COLE: Which the Applicant then has to present to the NRC to demonstrate that the system is working fine, there are no problems.

MR. LANCASTER: Right.

JUDGE COLE: What kind of problems do you look for and how do we measure -- is it just elevation at that point, water elevation?

MR. LANCASTER: Well, it's here in 1569 under Section 5783, Acceptance Criteria No. 4. It

specifies what we were just talking about. It also talks about verification of the accepted conceptual model of hydrology; that is, the conceptual model that has been defined under the licensing action. It will verify that as well, as well as these other actions we're looking at.

JUDGE COLE: Yes, do they also --

MR. LANCASTER: It talks to that.

JUDGE COLE: Do they also mention the drawdown?

MR. LANCASTER: Well, the way it's worded here is hydraulic -- let's see here. Isolation -- let's see here. Let me see if I can see how it's stated in here. Yes, so hydraulic isolated from the vertical excursion monitoring wells.

JUDGE COLE: Right.

MR. LANCASTER: So they're demonstrating hydraulic isolation of their production zone from the vertical monitoring wells, the overlying monitoring wells. In this case we don't have underlying, and that's a whole other -- that's defined in the SER why that's not be done.

JUDGE COLE: Okay. And you do that by the elevation of the water?

MR. LANCASTER: Yes.

JUDGE COLE: In the upper monitoring well?

MR. LANCASTER: Right. And those pump tests that you were referring to --

JUDGE COLE: Yes.

MR. LANCASTER: -- when you were --

JUDGE COLE: Yes.

MR. LANCASTER: Okay.

JUDGE COLE: Do they also take measurements on the hydraulic grade line?

MR. LANCASTER: Hydraulic?

JUDGE COLE: Hydraulic grade line. The elevation of the water with a drawdown towards the center well, towards the production well. Do they measure that during the test to demonstrate what it is?

MR. LANCASTER: I haven't directly reviewed a wellfield package yet, but they will be measuring for hydraulic connectivity between the patterned wells and the perimeter monitoring wells which are in the production aquifer, and those measurements will be hydraulic heads to show that there is a hydraulic connection. And that's the purpose of --

(Simultaneous speaking.)

JUDGE COLE: Okay. But they also measure

flow in each of the pipe systems so that --

MR. LANCASTER: Yes. Yes, right.

JUDGE COLE: -- you know what goes in, comes out or stays there?

MR. LANCASTER: That's right. Right. So they'll be reporting flow to us as well.

JUDGE COLE: Well, maybe we'll ask one of the Applicant's witnesses --

MR. LANCASTER: Sure.

JUDGE COLE: -- if they want to add to that situation with respect to the well pump packages.

Are you familiar with the work that's being done on the well packages, development of a well package? Have you ever done that?

MR. DEMUTH: Yes, sir. If I could answer that question?

JUDGE COLE: Okay.

MR. DEMUTH: Several things. The development of a wellfield package starts with a pump test design. Commonly there's interaction with NRC Staff, so they have some understanding of what the wellfield looks like, what the duration is going to be, those types of things. In some cases we'll perform numerical modeling to assess how long the test should be run based on the hydraulic parameters of the

formation so that we see that we can actually have a cause and effect of we pump the well in the middle and we see a response at the monitor wells and that effect can be distinguished between background fluctuations, barometric fluctuations, etcetera.

And just so you know, sir, we have had instances where there were problem wells. And so the wellfield test does exactly what it's supposed to do, in that we run a test and we see that there's a problem.

JUDGE COLE: Now this is a system where you have the injection wells just as it is when you're going to go into full-time operation, and the production well is in the center, and you run through just as if you're putting in lixiviant material. Is that how you conduct your test?

MR. DEMUTH: No, sir. This would be what we call a pumping test where there's no injection that happens during this test. So we have a production well in the middle of a wellfield. We have monitor wells which are horizontal monitor wells surrounding the area outside where the patterns would be developed. And then we also have monitor wells in overlying and underlying sands as appropriate.

JUDGE COLE: Okay. So the injection wells

are not used in the development of the pump package?

MR. DEMUTH: Commonly not. We have done some test scenarios where we've done some injection, but the typical pump test for wellfield development is a pumping process, not a pumping and injecting process. And the reason is when we're pumping and injecting during wellfield operation, the stress on the system is relatively low because most of the water is being re-injected, whereas during a pumping phase we can stress the system, as Mr. Lancaster said, to a greater degree than we'll see during operations. And also at that point we don't have approval to inject lixiviant. We only have approval to pump water out for the purposes of the pump test.

JUDGE COLE: Okay.

MR. DEMUTH: But we have founds wells that were a problem. We've gone and fixed those wells and we've rerun the test. Likewise, we've had cases where we may have a geologic pinch-out between the pumping well and a monitor well, and 1569 tells us that we have to show that this monitor well is a valid monitoring point. If we don't see a hydraulic connection between the two in the same zone, then it's not a valid monitor point.

JUDGE COLE: So if the water level in the

monitoring well is going lower, you have a problem?

MR. DEMUTH: Not if you're in the same zone. We would expect it to --

JUDGE COLE: Oh, I understand that. I'm talking about above the aquiclude.

MR. DEMUTH: Correct. And so we've had instances where we've seen that and we've gone and plugged wells and we've rerun the test to show that that problem was fixed. We've also had instances where geologically a well wasn't in the right spot and we've put additional wells in to make sure that we have sufficient monitor wells to monitor that operation. So in that sense the hydraulic test packages and that approach it works to assure the safe operation of that wellfield.

JUDGE COLE: Prior to the time you used the pumping test or conduct the pumping test do you have to have the injection wells in place?

MR. DEMUTH: No, you do not. And in fact --

JUDGE COLE: Well, it's not a complete package, right?

MR. DEMUTH: Well, 1569 and the NRC Regulations do not allow us to construct all the injection wells before we have approval for the

wellfield package.

JUDGE COLE: Okay. But you do have to conduct your monitoring wells and the center production well?

MR. DEMUTH: That is correct, as well as we have monitor wells within the area that will be mined that are also installed. But they're only monitor wells. They're not production wells at that point.

JUDGE COLE: Okay. All right, sir. Thank you.

DR. MORAN: Is it possible to ask a question?

JUDGE COLE: Did you want to say something, sir?

DR. MORAN: I wanted to ask a question.

JUDGE COLE: I might not know how to answer it, but go ahead.

(Laughter.)

DR. MORAN: Well, it's sort of a rhetorical question. If you wanted to understand more about this process, wouldn't it be wise for us to be able to go to the various state and federal agencies that hold the historic data for these well packages and put that information together and see how well

we've done with all of this historically?

JUDGE COLE: How many instances has the preparation and conduct of a -- development of a well package identified problems that resulted in additional work and correction of problems? Is it a common thing or is it an uncommon thing?

MR. DEMUTH: I would say that we've done at least 40 wellfield pump tests over the years and probably 4 of those have identified some problems that resulted in additional work. So 10 or 20 percent might reveal that there needs to be some modification in terms of the wellfield design. The more normal circumstance is that it does not, and in fact it confirms the regional geology and the regional understanding that was presented during the original application.

JUDGE COLE: I understand. And according to the NRC rules don't they have to go through the same process for every additional wellfield that they construct before they operate it? So if they've got -- this is an example, they have five, six injection wells and a production in the middle. They conduct the necessary tests on that. Before they go to the next one they have to do the same thing. Is that your understanding?

MR. DEMUTH: That is correct. Each wellfield has to be tested, not only the pumping test to determine hydraulic characteristics, connection for the monitor wells, etcetera, but also water quality monitoring.

JUDGE COLE: Right. All right, sir. Thank you.

This is a question for Dr. Moran. Chapter 5 of the FSEIS assesses the cumulative impacts on groundwater from past, present and reasonably foreseeable future actions including past mining activities. Is that your understanding, that that's correct?

DR. MORAN: I don't recall if that's the correct wording. I'll accept that you're reading it as it's stated, but I don't recall seeing that they did what I would call a reliable cumulative evaluation.

JUDGE COLE: There's been some discussion about what's required under Criterion 5 and Criterion 7 in 1569. Are you familiar with the difference there between --

DR. MORAN: No, I'm not.

CHAIRMAN FROEHLICH: -- Criterion 7 and Criterion 5?

DR. MORAN: No, I don't recall.

CHAIRMAN FROEHLICH: You can't do much with Criterion 5. You got to complete Criterion 7 first and then Criterion 5 requires you to collect information on really prior to operational systems. If you're not familiar with that, I can't ask a question on that.

DR. MORAN: I'm not familiar with the details.

JUDGE COLE: Yes. I think the Intervenors have criticized the Applicant, and it looks like there's some confusion about what's required under Criterion 5 and Criterion 7. Are you familiar with that situation, sir? I'll ask the NRC Staff.

MR. PRIKRYL: Yes, in the testimony that has been submitted by the Intervenors it seems like they don't understand the difference between Criterion 7 and Criterion 5. Yes.

JUDGE COLE: And what do we have to do under Criterion 5? We have to develop a certain kind of water quality data that's identified as Commission-approved data?

MR. PRIKRYL: Yes, under Criterion 5 the Applicant or the Licensee will have to -- based on its hydro-geologic test packets and the water quality data

that is collected there they will have to establish what's called Commission-approved background. And this is used to set aquifer restoration goals and it also is used to establish what's called upper contaminant levels for excursion monitoring.

JUDGE COLE: Yes, and they have to do that over what period, minimum period prior to operation? Is this the criterion that says you have to collect four samples over a one-year period and then collect your water quality data and average the data to start developing the Commission-approved standard?

MR. PRIKRYL: Yes, the criteria for establishing -- I believe it's four samples over a yearly -- quarterly sampling, yes. And that's to include the constituents that are included in NUREG-1569. The table; I believe it's 2.3.7-1, has to include all those constituents.

JUDGE COLE: Yes, but I've got a different number. But is it the same thing as the background water quality parameters and indicators for operational groundwater monitoring?

MR. PRIKRYL: Could you clarify that question, please?

JUDGE COLE: Is it the same list of chemicals? And it's identified as background water

quality parameters and indicators for operational groundwater monitoring. It seems to have the same number of chemicals on it.

MR. PRIKRYL: Yes. Yes. That's correct. Yes.

JUDGE COLE: All right. Thank you.

CHAIRMAN FROEHLICH: While on the subject, at page 26 of the Staff testimony, I guess answer 2.10, there's a discussion where the Staff wishes to emphasize that, quote, "Powertech provided an analysis of historical water quality data collected by TVA and recent water quality data at or near the Dewey-Burdock site only to demonstrate the consistency of groundwater quality over time."

With that statement in mind, at the end of the paragraph the Staff concludes, "For that reason pre-operational baseline groundwater data should not include data from historical groundwater conditions which might bias the data set." Could you explain for me? I'm not quite sure -- if you're looking at historical or what it is, how does that bias the data?

MR. PRIKRYL: Well, the TVA groundwater data was collected back in the late '70s, early '80s, so there's really no way to determine whether that groundwater quality is representative of the

groundwater quality that currently exists at the site.

JUDGE COLE: Because there are still people drilling holes?

(Laughter.)

MR. PRIKRYL: Yes. So in a NEPA analysis what we're doing is we're looking at -- we're trying to describe the affected environment for baseline conditions or existing conditions, or existing groundwater conditions at this time so we can do our NEPA analysis. We can compare the impacts of the proposed action on existing conditions. So using the TVA data would possibly -- if it's not representative of existing conditions, it's going to bias the data set.

JUDGE COLE: It might be better. It might be worse.

MR. PRIKRYL: Exactly.

CHAIRMAN FROEHLICH: Okay. Thank you. That clarifies it.

I see from my colleagues that they have completed their questions, I think for the most part, on Contention 2. I note also it is noon. Would this be a convenient time to take our lunch break and then begin with the Board's cross-examination on Contention 3 after lunch? Is this a convenient time?

MR. PUGSLEY: NO objection.

MR. PRIKRYL: Your Honor, it turns out that everyone goes to the same closest restaurants and then they get jammed up. And would it be possible; I don't know where we are with the schedule, to have an extra 20 minutes for the lunch break to accommodate being able to get our food and consume it?

CHAIRMAN FROEHLICH: Seems reasonable. If we start at 1 hour and 20 minutes from when we break -- if we start promptly, that's certainly fine.

Why don't we break then for 1 hour and 20 minutes and resume here at 1:20? Our intention is to begin cross-examination on Contention 3.

(Whereupon, the above-entitled matter went off the record at 11:59 a.m. and resumed at 1:20 p.m.)

CHAIRMAN FROEHLICH: Good afternoon, all. We'll be back on the record. At this point, I'd like to swear in the remaining three witnesses for this panel so that we can proceed with questions. So if Linsey McLean, Susan Henderson, and Marvin Kammerer would rise, please? Raise your right hand, please?

Do you solemnly swear or affirm that the statements that you will make in the hearing before the ASLBP will be true and correct to the best of your knowledge and belief?

Remain standing. Do you adopt your pre-filed testimony as your sworn testimony in this proceeding?

The record will reflect that all three witnesses responded in the affirmative. Thank you. You may be seated.

Judge Barnett, I believe you had a follow up on Contention 2?

JUDGE BARNETT: Yes, in reference to NRC-091. Ms. Henderson?

MS. HENDERSON: Yes.

JUDGE BARNETT: Thank you for coming today. What I have here, if you remember earlier this morning I asked another witness this question. This is NRC-091 and it's a memorandum to the Commission from Ms. Miller in 2009 called Staff assessment of groundwater impacts from previously licensed in situ uranium recovery facilities. And there is a statement there that -- well, you can read the statement.

So my question is do you have any information that would contradict that statement?

MS. HENDERSON: I would tell you that the process for testing for chemical warfare agents is extremely expensive and difficult. There are only six laboratories in the United States that test for these

things. The Government has long manufactured these things under extreme secrecy. They have been unwilling to divulge what they have in those chemicals. The chances that anyone could have easily tested for it would be surprising to me.

JUDGE BARNETT: Thank you. Mr. Kammerer, same question to you, please. Are you aware of any information that would contradict that statement from NRC Staff to the NRC Commission?

MR. KAMMERER: My awareness of these weapons is rather limited. However, we don't know the consequences of this type of activity, unfortunately.

JUDGE BARNETT: Thank you.

MS. HENDERSON: Could I make an additional comment?

JUDGE BARNETT: Sure.

MS. HENDERSON: Many years ago, we began to have difficulties with dead animals on the Black Hills Army Depot which is a 21,000-acre site. And I had a neighbor that lost 1,200 sheep in a 4-day period on the east side of the depot. The animals died of violent convulsions. They had grass in their mouth. No flies would land on the carcasses. We posted the carcasses with the state veterinarian in Brookings and he said I have no idea what this is. It is not an

animal disease. It is not anything that I've ever seen before.

Now, the problem that we have with detecting contamination is we don't know exactly what chemicals are there. We don't know what the breakdown has been of them and then we have the secrecy of the Federal Government. The Federal Government does not want to admit that it is killing anybody's 1,200 sheep.

We went to Washington to try to get somebody to help us with this. The CDC came out and said whatever you do, don't give up on this because there are terrible, horrible things there that can kill any kind of animal or human life that is exposed to it. We know there's a huge problem here, but we are powerless to deal with it.

JUDGE BARNETT: Okay, thank you. And I will note that Mr. Kammerer, do you have something else you'd like to say?

MR. KAMMERER: I wish to inform you that I had a brother and a nephew who died, a brother who had very much complications with Agent Orange and a nephew who died of the same in 'Nam.

JUDGE BARNETT: Okay, thank you and I will note that I have read your testimony and appreciate

that in this case.

CHAIRMAN FROEHLICH: Let's move on to Contention 3.

JUDGE BARNETT: Okay, Dr. Moran, in support of this contention, you site references that the Fuson shale, am I pronouncing that correctly?

DR. MORAN: I've heard Mr. Demuth say it differently. What's the correct pronunciation?

MR. DEMUTH: Fuson.

JUDGE BARNETT: Fuson. I'll probably butcher that several times, but I'll try to get it straight. In support of this contention, you cite references that the Fuson shale is leaky. Is that correct?

DR. MORAN: Yes.

JUDGE BARNETT: Are you alleging that any other confining layer at the site is leaky?

DR. MORAN: I don't think we know. I don't think we have adequate information from these studies to say.

JUDGE BARNETT: But you're not alleging based on any information that you have that anything else is leaky. Your testimony is you just don't know. Is that correct?

DR. MORAN: In general, I don't think

we've done the testing to answer it, yes.

JUDGE BARNETT: Understand. Okay, I'm going to throw out this question to the experts from the Applicant and I'm going to ask the Staff the same question so whoever wants to answer can. Is the Fuson shale necessary to contain ISR fluid migration at this site?

MR. LAWRENCE: I would say no, it is not. Some of the testing that has been done at the site has identified some vertical impediments to flow within the Chilson and within the Fall River. If you remember the type log that we had up earlier where we had subdivisions within the Fall River and also in the Chilson, some of the pump tests that were conducted had wells that were completed in different intervals within those two stratigraphic units. And there were delays in the response during pumping which would indicate there is some vertical restriction to groundwater flow.

JUDGE BARNETT: I understand that, but is this necessary? If that is leaky, does it make a difference in the environmental impact of this site if it is leaky?

MR. LAWRENCE: I don't think so. It just has to be taken into consideration in your wellfield

design and how you produce the -- or how you extract the minerals.

JUDGE BARNETT: I ask the same question to the Staff, either one can answer.

MR. PRIKRYL: I believe the question is whether the Fuson is leaky or not and whether those would cause a greater impact?

JUDGE BARNETT: Yes, the question is not whether it's leaky, but are you depending on it not being leaky to approve the site? It is a confining layer in terms of approving the site is my question?

MR. PRIKRYL: No, no. I don't think so.

JUDGE COLE: Sir, and why is that? Because there are aquitards above and below that could take the place of the Fuson?

MR. PRIKRYL: Well, I guess maybe I didn't understand the question, but there are thick aquitards both above and below the Inyan Kara aquifer which consists of the Fall River and the Chilson member.

JUDGE COLE: But if the Fuson were a very leaky aquitard, is there a way you could operate mining uranium without the help of any barrier in the Fuson aquitard?

MR. PRIKRYL: I think it would be the degree of leakiness would probably play into it.

JUDGE COLE: Let's say it's infinitely leaky.

MR. PRIKRYL: If it's infinitely leaky, then yes, it would play a role in the mining operations.

JUDGE BARNETT: Well, it would play a role, but would it play a role in containing the fluids?

MR. PRIKRYL: If it was infinitely leaky, it would not.

JUDGE COLE: So you could just use uranium mining from the Fall River and the Chilson, so two aquifer for mining.

MR. PRIKRYL: That's a possibility, yes.

JUDGE COLE: Has that been considered?

MR. PRIKRYL: I'm not sure if the Applicant or the Licensee has considered that, no.

JUDGE COLE: Thank you.

MR. DEMUTH: Judge Barnett, if I could weigh in on that question?

JUDGE BARNETT: Yes.

MR. DEMUTH: Sometimes the definition of leaky can become kind of nebulous. The room is kind of dark here, well, what's dark to me is different than what's dark to you.

And so 1569 states that we have to have demonstrated that we can control fluids and there's different ways to do that. One way to do that is with geology. One way to do that is operational practices where you maintain a net bleed or a combination thereof.

JUDGE BARNETT: Maintain what, sir?

MR. DEMUTH: A net bleed meaning you over produce, you produce more fluid than you re-inject.

JUDGE COLE: That's what controls the flow.

MR. DEMUTH: Correct.

JUDGE COLE: Where you have a hydraulic radiant that's flowing towards the collection wells.

MR. DEMUTH: Even -- well, 1569, the verbiage is an aquitard, meaning restricting flow, not an aquiclude meaning that it doesn't allow any flow to occur at all. So concrete, depending on how long it's cured has a permeability that one can measure under enough stress. We refer to it typically as impermeable.

So in this case, the Fuson shale, has it been demonstrated that it is a confining unit such that ISR operations can be safely conducted. Yes, it has. But to add to that, we've had sites before where

we had what looked like an unplugged exploration borehole that penetrated the confining zone, but yet, through engineering practices and hydraulic control, we were able to safely mine that as well.

JUDGE BARNETT: Okay, could we put up APP-017, please? And I believe this is page 2. I'm not trying to trap anybody here, I'm just trying to make sure I understand. Is it possible to blow that up a little bit so we can read the formations?

So as I understand it, the recovery is going to be done in the Chilson member of the Lakota formation and the Fall River formation, is that correct

MR. DEMUTH: Yes.

JUDGE BARNETT: So my question is if the Fuson shale is leaking, what difference does that make?

MR. LAWRENCE: It depends on the locations. The wellfields in some areas you might only have a Chilson wellfield or a Chilson mineralized zone that you're going to extract from. In other areas, it might just be the Fall River. There are locations where they are stacked where you have ore in both units. We're required, the Applicant is required, to maintain the fluids within the wellfield

that's being mined. So in the case where you would have an overlying Fall River that did not have mineralization and you were producing from the Chilson, you would be required to maintain your fluid control in that Chilson. So you would place monitoring points in the Fall River to demonstrate that you were not losing control of your fluids.

JUDGE COLE: So you wouldn't have any screens taking in liquid from the Fall River?

MR. LAWRENCE: No stream, no, sir.

JUDGE COLE: Screen.

MR. LAWRENCE: Oh, screen. Correct, yes, right. The wells will be designed so that they are discretely screened in the zones that they need to be for purposes of monitoring. If we are trying to monitor, if there are impacts to the overlying aquifer, then those monitor wells would be screened specifically in that zone and not through the confining unit into the deeper zone.

JUDGE BARNETT: So if I understood it then, you do need for the Fuson shale to be relatively impermeable. Is that correct?

MR. LAWRENCE: Correct.

JUDGE COLE: Unless you're going to mine two aquifers.

MR. LAWRENCE: You would technically still need to maintain fluid control in each of the specific wellfields. At the end of the day you have to go through restoration for both of those wellfields, so it might be a little confusing if fluids are moving back and forth. But you still have to clean them both up to a year.

JUDGE COLE: Wouldn't it be one wellfield with a leaky aquitard in the middle?

MR. LAWRENCE: Well, keep in mind the Fall River and the Chilson are both over 100 feet thick. Typically, your ore zones are only 5 to 10 to 15 feet at the maximum. So when we kind of look at the Chilson, we say we're going to produce out of the Chilson, it's actually a very small portion of the Chilson that we're really producing out of. So those wells, the screens are set up so they're screened only across the mineralized portion of aquifer. So it's a very controlled system.

Each one of these well patterns, there's typically 100 feet on the side, so a little bit bigger than this room. We have very tight control in the geology. We have very good control on how the fluids are being transferred back and forth where they're being injected and how they're being pumped out.

And so we're not really -- we look at the Chilson, but we're not producing the entire thickness of the Chilson or the entire thickness of the Fall River at any one point.

JUDGE COLE: So using two mines is a pretty rare event?

MR. LAWRENCE: It happens. You can have contiguous production, but you get into difficulties because you start getting interference between the different pumping units. So it's a lot easier to produce one unit and typically I think what they'll do is they'll start from the bottom and work their way up. Keep in mind, you might have two or three different ore bodies just within the Chilson and they may be stacked vertically. So you'd want to produce one and extract as much as you could. Do the restoration, and then move up the hole, up the stratigraphic sequence.

JUDGE COLE: Thank you.

JUDGE BARNETT: Mr. Clark, what is the exhibit number for the FSEIS? I'm having trouble finding that.

MS. JEHLE: 009, NRC-009. It's four or five -- five or six parts.

JUDGE BARNETT: I didn't mark my citations

as clearly as I had hoped.

MS. JEHLE: Excuse me, 008A through B.

JUDGE COLE: The Final EIS is four parts, NRC-008-A1, A2, B1, and B2.

JUDGE BARNETT: So on page 3-34 of the FSEIS, I'm going to address this question to the Staff and the Applicant. It's page 206 of the PDF.

Go to the last paragraph. There you go, right there, it's fine.

So I'm reading from the second sentence of the last paragraph in the FSEIS and it says, "Based on the 1979 aquifer test, Boggs & Jenkins, 1980, suggested there may be a direct connection between the Fall River and the Chilson aquifers with the Fuson. Additional aquifer pumping tests conducted in the Burdock area in 2008 also demonstrated hydraulic connection between the Fall River and the Chilson through the intervening Fuson shale. Interpretations of both the 1979 and 2008 pumping test results were found to be consistent with a leaky confined aquifer model. The Applicant developed a numerical groundwater model using site-specific geological hydrologic information. Based on the results of the numerical model, the Applicant concluded that vertical leakage through the Fuson shale is caused by

improperly installed wells or improperly abandoned boreholes."

So it appears in the FSEIS that it acknowledges that it is leaky, whether it's coming from boreholes or whatever else, it is leaky.

I'll ask the Staff, is that correct? Am I reading that correctly?

MR. PRIKRYL: Yes, that's correct.

JUDGE BARNETT: Would you concur with Powertech experts -- concur that the Fuson is leaky, for whatever reason? Improperly plugged boreholes or whatever reason?

MR. LAWRENCE: You're asking Powertech?

JUDGE BARNETT: Yes, asking Powertech.

MR. LAWRENCE: Yes, there were certainly conditions that demonstrated communication.

JUDGE BARNETT: Back to my question, if these things -- if it has to be -- if you're depending on it not being permeable and it is leaky, regardless of what's causing it, how then are you meeting your criteria for not impacting the environment?

MR. LAWRENCE: That goes back to the development of the wellfield data package. If you run a specific test in the area that you plan to mine, and identify leakage that is occurring, particularly if

you can identify that it is an improperly abandoned borehole or improperly constructed well, as was the case in these tests, you can remedy that situation, plug that borehole, rerun the tests and show that basically you have retained confinement.

JUDGE BARNETT: And all that would occur outside the FSEIS?

MR. LAWRENCE: Yes.

JUDGE BARNETT: Also, if I go to OST-9 please. And this is at page 61. It's actually on page 63 of the document. I'm sorry, 63 of the exhibit, page 53 of the document. Right there. Actually, you can see somebody has made the notation in the margin there.

So I'm reading from this. This was TVA's report of how do you respond -- I'm going to ask this of the Applicant and the Staff, how do you respond to TVA's conclusion that the "results of the aquifer tests at the project site suggested that the Fuson shale is not an effective barrier near and northeast of the shaft site"?

MR. LAWRENCE: If you'll notice in the top of that paragraph, the very first line says "a second aquifer test was run in which an inflatable packer was used to isolate the two aquifers."

The problem with these tests was they drilled one well as you pointed out and screened it in both intervals at the same time and they counted on running an inflatable packer between the two zones of interest to run two different tests. Personally or professionally, I would never do that. I'm not sure why they ran it that way. Some people feel like packers are an adequate way to isolate zones, but in a case like this where you're trying to demonstrate you have isolation, I think that was a terribly designed pumping test.

JUDGE BARNETT: So your conclusion is TVA was incorrect?

MR. LAWRENCE: I am.

MR. DEMUTH: If I might add to that, Judge Barnett, the objective of these tests were to evaluate underground mining operations. This was not conducted for ISR operations. And in addition, the pumping rate as noted in the second to top paragraph was 261 gallons a minute.

A different objective is a different type of test.

JUDGE BARNETT: I understand that, but if the aquifer -- I'm sorry, the aquitard is leaky, it's leaky, right? It doesn't leak under certain tests and

not under others. Maybe you can see it better in certain tests and not others, but if it's leaky, it's leaky. Is that correct?

MR. DEMUTH: I would not dispute that, but again, what type of flux do you need to have where it's a problem or it's not a problem?

JUDGE BARNETT: That's what I'm asking you.

MR. DEMUTH: Okay. Well, in this case, our data indicates that there is not sufficient flow across the Fuson where it's an issue, except in one area where we have a well which is completed in both zones and allows it to communicate. There may be one or two unplugged exploration boreholes which are identified in the application. So in that area, the wellfield, any wellfield test is going to have to be examined very carefully.

Other areas of the site we don't see the same issues.

JUDGE BARNETT: So do you contend now that based on the information you have, the Fuson shale is not leaky?

MR. DEMUTH: I'm not saying that. I'm saying that the Fuson shale has properties which support safe ISR mining for the site. And again,

leaky is kind of a nebulous term. We have to define that. How much flow do we have across there? An aquifer sufficiently restricts flow such that ISR operations can be safely conducted. That's what we're looking for.

JUDGE BARNETT: I'll ask the Staff the same question. How do you respond to that statement from TVA, their conclusion that the Fuson was leaky or I'm sorry, that it is not an effective barrier near and northeast of the shaft site, understanding there's no shafts in this case? I understand that.

MR. PRIKRYL: Judge Barnett, I don't see that statement on this page anywhere.

DR. LaGARRY: Judge, I think as you were scrolling down from where you initially stopped on the page, I think one or two pages upwards I believe I did see that statement.

JUDGE BARNETT: Correct, correct, you're right. It's at the bottom of that page. Bottom of document page 53. Do you see it there now? I'm sure I saw it a minute ago. I have it in my notes.

DR. LaGARRY: Right at the bottom of page 51 in the document.

JUDGE BARNETT: Oh, page 51, okay.

DR. MORAN: I thought it was on page 53.

JUDGE BARNETT: Yes, I see it.

MR. PARSONS: Your Honor, if I may, Jeff Parsons, over here. It is on page 51. It appears to be in the third full paragraph.

JUDGE BARNETT: There we go. Third full paragraph, right there. "Results of aquifer tests at the project site suggest that the Fuson shale is not an effective barrier near and northeast of the shaft site." What is the Staff's response to that?

MR. PRIKRYL: Well, I'm not familiar with this pump test, what shaft they're talking about or what the location of the pump test itself.

JUDGE BARNETT: So this is --

MR. PRIKRYL: So I don't know if I can comment on this.

JUDGE BARNETT: This is in evidence. It is OST-009, TVA Draft Environmental Statement Edgemont Uranium Mine. So has the Staff looked at that document?

MR. LANCASTER: 1979 document or 1980 something document?

DR. MORAN: It's 1980.

JUDGE BARNETT: Has the Staff looked at that document?

MR. LANCASTER: These TVA -- we requested

this information in our REIs and I think as I recall their conclusions were it's leaky because of a variety of reasons. And one could be the boreholes not being properly abandoned or not being abandoned at all with the correct procedure for plugging and that sort of thing.

We recognize that the pump tests show that there is leakiness. We also recognize that the modeling of effort performed by Powertech that we reviewed as far as it's set up and assumptions and input data and that sort of thing.

That model, as I understand it, that Powertech did using the site data showed that this leakiness can only be explained by -- or the model would only work if it was a leaky borehole situation. And so, with the pump test showing this leaky nature and the model effort showing that it's plausible or a plausible explanation would be the unplugged boreholes.

Errol could respond to this better than I could, but we've looked at these documents under the safety review.

JUDGE BARNETT: Yes, I'm not doing that. My question is how do you respond to TVA's conclusion that there was not an effective barrier? Do you

reject their conclusion? You've looked at it.

MR. LANCASTER: Well, their wording of effective barrier, that's sort of an ambiguity to me. What are they really trying to say there? Effective barrier. An aquitard -- and depending on the use of the groundwater, what you're trying to do, it could be you may need hydrologic conductivities that are much higher and thicknesses that are much higher. It depends on the application.

I would -- see, that's -- as far as the effective barrier question, I don't want to skirt the answer here, but I would say that Staff recognize that we're dealing with a leaky aquitard and our conclusion was that it's associated primarily with the borehole situation. Does that answer the question?

JUDGE BARNETT: My understanding, see if I've got this right, from the Applicant and the Staff is you can see that it is leaky. Your conclusion is that it's due to unplugged boreholes. Am I correct in that?

MR. LAWRENCE: For the most part correct. Now the data that was derived out of these pump tests was incorporated into the numerical model to address the site conditions. So we didn't ignore this data. The numbers that you see up there for the Fuson

vertical hydraulic conductivity, the permeability of the Fuson are on the order of the 10 to the minus 4 feet per day. The conductivities, the hydraulic conductivities for the Chilson and the Fall River, are more on the order of one to ten feet per day. So there's a five order of magnitude difference between the horizontal hydraulic conductivity of the zones we want to mine and the vertical conductivity of the confining it.

If you look at standard textbooks, Freeze & Cherry will tell you a ten-fold difference -- a one order difference in magnitude is enough to cause predominantly horizontal flow when you've got a pumping scenario going on. So even though there is some measurable drawdown in the overlying or underlying units when we run the pump test, it is small relative to the impact within the aquifer that's going to be mined. And I think that was shown well with the modeling that honored this data.

JUDGE BARNETT: Can you answer questions about the model?

MR. LAWRENCE: Yes, I can. I developed the model.

JUDGE BARNETT: So the model, as I understand it, it's been a long time since I've had

groundwater, the model as I understand it, you're fitting a drawdown curve with your model. Is that correct?

MR. LAWRENCE: No, actually, this is a numerical model where we construct --

JUDGE BARNETT: It's a numerical model. But you're trying to fit a drawdown curve -- drawdown data, not a curve.

MR. LAWRENCE: It's more extensive than that. You're talking about using an analytical curve matching methods?

JUDGE BARNETT: No, I don't mean that. The data that you're trying to model is the water levels, is that right?

MR. LAWRENCE: Water levels, drawdowns, correct. But on a regional scale.

JUDGE BARNETT: But you had to add leakiness of this aquitard to fit your data, is that correct?

MR. LAWRENCE: What I did was I put the parameter values in that were measured in the field. So I was honoring the data that was available and again, we get back to this nothing is impermeable. Under enough stress, you can cause concrete to leak. So these particular tests were designed to evaluate

for dewatering of an open pit mine. They were much higher rates. They were ten times greater than the type of rates that we're going to see certainly any particular well pattern. So the stresses were greater in this than they would be for ISR mining.

JUDGE BARNETT: But your modeling showed that that Fuson was leaking, correct? Your conclusion was that it was unplugged boreholes, but it was leaking. You had to add that to your model to fit the data, is that correct?

MR. LAWRENCE: Yes.

JUDGE COLE: So if you were planning to use that for ISR mining, the commitment that the Applicant has to plug these holes would apply. Is that correct?

MR. LAWRENCE: That is correct. That is a license condition.

JUDGE COLE: Then you have to change your model to account for that.

MR. LAWRENCE: If the Applicant wishes to use the model for additional predictive simulation, yes, we would have to update the model. But then again, if that was the case, we would update the model based on whatever new information we'd gathered from additional well installation, additional pumping

tests.

JUDGE COLE: When you describe it as an effective barrier, it's not perfect. It has some leakage, but it's within a range that you considered to be acceptable and it will not modify what you want to do significantly?

MR. LAWRENCE: That is correct. It is in the same range that we see at other ISR facilities that operate.

JUDGE COLE: Thank you.

MR. DEMUTH: If I might add to that, Judge Cole, it also has to be within a range that NRC Staff who have reviewed the wellfield data package feel is acceptable. So it's not just the opinion of Powertech. NRC Staff would review that information.

JUDGE COLE: So the Staff has some parameters that they apply to this to say what's acceptable to become an effective barrier?

MR. DEMUTH: Yes, sir.

JUDGE COLE: All right, thank you.

JUDGE BARNETT: Okay, Dr. Moran. So still on the leakiness or not of the Fuson shale. In Mr. Demuth's written testimony, he says that if two aquifers are hydraulically connected, the potentiometric surfaces will be approximately the

same. Do you agree with that?

DR. MORAN: Could I see the original?

JUDGE BARNETT: Yes. It is Exhibit APP-013 at Answer 32. Answer 32, it is the next to the last sentence in the first paragraph, "If there were a strong hydraulic connection between the two aquifers at this location, the water elevations would be similar." Do you agree with that?

DR. MORAN: I would agree with it in a static situation, unpumped, unstressed.

JUDGE BARNETT: Okay. Then if we look at APP-017, it's the third figure, I believe, right there. This is from Mr. Demuth's testimony and he's showing that there is differences in the head between the Fall River and the Chilson and he's alleging that if it was leaky those heads would be approximately the same. What is your conclusion based on that figure?

DR. MORAN: I don't know that I would conclude much from the figure. It's again that these are static situations and we have a lot of other information from active pumping tests where we see evidence of leakage. And the authors of the actual pump tests did not claim that it -- they made mention of the fact that in some cases there could be leakage through boreholes, but in other cases they were

alleging or interpreting the results as though it was general leakage through the confining unit.

JUDGE BARNETT: I need just a minute if somebody else wants to go.

JUDGE COLE: This is for Dr. Moran and Dr. LaGarry. I don't know whose pre-filed testimony this appeared in, but you refer to regional structural features such as the Dewey fault zone. This might have been yours, Dr. LaGarry. And the Long Mountain structural zone. Now the location of those, the Dewey fault zone is about one mile north of the mining area.

DR. LaGARRY: Yes.

JUDGE COLE: And the Long Mountain structural zone is about 14 miles southwest.

DR. LaGARRY: Yes.

JUDGE COLE: So they're not contained within the mining area.

DR. LaGARRY: Yes.

JUDGE COLE: You suggested features associated with these zones may provide pathways for ISR solutions to migrate outside the production zone.

DR. LaGARRY: Yes.

JUDGE COLE: However, you do not refer to any publications identifying site-specific faults within or adjacent to the Dewey-Burdock site unless

you consider a mile away close.

DR. LaGARRY: I do consider a mile away close.

JUDGE COLE: Even when the groundwater is traveling, you know, somewhere between one and six feet per year?

DR. LaGARRY: In my previous experience, I was a geological mapper and stratigrapher with the Nebraska Geological Survey. And we mapped many, many, many faults in northwestern Nebraska and adjacent South Dakota. And our finding is that these things occur in sets. And so you would have perhaps scores of joints and faults all aligned, going in the same direction because the rocks they pass through are brittle.

So then what's quite often the case is that the most dominant of these features stands as a representative for the whole set. So if somebody found a fault and they called it the Dewey fault, then what they might, in fact, be seeing is a zone several miles wide in which the largest crack with the most offset is, in fact, the one they identified.

This is true of well-known faults like the Toadstool Park fault; the White Clay-Sandoz Ranch fault in which a major fault of perhaps 100 meters of

offset is well noted in the scientific literature. But you can go north and south of the White Clay fault and find multiple sets of these things. And the reason why I considered the faults noted close to Dewey-Burdock is that faults and fractures are ubiquitous throughout the entire region and it seemed entirely implausible to me that these sets of faults across the entire southern Black Hills region prevalent in rocks that we've been mapping for upwards of 20 years, that there should suddenly be a blank spot in a map.

It seemed far more likely to me that whatever United States Geological Survey studies that were done used this practice of assuming that the joints don't matter or the small offset faults don't matter and that instead they identify and recognize the major fault. These things are such that if you're not specifically looking for them, then you often don't find them and for some structural geological purposes all you have to do is identify the major one. For example, in the case of the White Clay fault which goes from the southern Black Hills into Nebraska to the border of Cherry County, there is one fault in the scientific literature.

However, we repeatedly demonstrated and

published that there are scores of ancillary things. It's called an imbricated fault in which the entire region is fractured. The faults might be a couple of tenths of a mile apart, but the largest crack is chosen as a representative of the entire set. And so that's why in my opinion that a well-marked, well-known fault identified in the -- prior to the work there at Dewey-Burdock could, in fact, be a representative of a standing of an entire set of faults.

JUDGE COLE: Okay, so you say it's possible.

DR. LaGARRY: In my opinion, it's most likely that that fault represents --

JUDGE COLE: Even though there are no reports of faults or structural problems within the 16 square mile area proposed for ISR mining?

DR. LaGARRY: Prior to geological mapping that we conducted with the Nebraska Geological Survey, there were no faults recognized in northwestern Nebraska either, except for these major ones that had been noted in the older literature.

Depending on what a geologist's purpose is, sometimes they note them, sometimes they don't. Other times, they are so ubiquitous and so common that

the geologist doing the work just assumes that everybody is aware that they're there. So in the case of this mining activity in a place such as Dewey-Burdock, it's no different than the areas in northwest Nebraska that had gone 150 years of geological research, at least research going back to the early 1890s, didn't notice any of these faults. However, they are there and we've discovered them subsequently. So to me, it's clear that in an area that hasn't been prospected specifically for sets of joints and faults, that they might not have been noted in the older scientific literatures.

JUDGE COLE: We've got 6,000 holes poked in the 16 square mile area.

DR. LaGARRY: That's right.

JUDGE COLE: Wouldn't these have identified faults somewhere in that area?

DR. LaGARRY: If the faults are not -- if the boreholes are not cherry picked, because let's say there's 4,000 boreholes --

JUDGE COLE: I don't know what that means, cherry picked.

DR. LaGARRY: Cherry picked means picking the ones that support what it is you want to do.

JUDGE COLE: I assume they didn't do that.

They were looking for something else.

DR. LaGARRY: Now the discussions earlier about the new data that's available, it's very likely that if you have 4,000 boreholes to look at --

JUDGE COLE: Six thousand.

DR. LaGARRY: Six thousand. But then you select say a thousand of those, you select one sixth that suits your purpose. There may be faulting, fracturing, jointing, all sorts of secondary porosity present that you could see in the ones you didn't select because not all of these things are going to go through. Let's say your interest is an ore zone and you're interested in defining where the thickest parts of the ore is. Very few of them might actually go through the orebody, but there may be scores of them surrounding the orebody that could eventually have some bearing on the activity being conducted.

JUDGE COLE: TVA poked a lot of holes in the ground some years ago.

DR. LaGARRY: They did.

JUDGE COLE: In any of TVA's reports that you might be familiar with, did they indicate that there might be some faults in structural zones there?

DR. LaGARRY: That one that was just shown that we were just discussing, the TVA concluded that

the leakage might have been caused by an unplugged borehole or some previously as yet undescribed structural feature in that very page we were just reviewing.

JUDGE BARNETT: Yes, actually, if I can follow up here, Judge Cole.

JUDGE COLE: Sure.

JUDGE BARNETT: Could we pull up OST-009 again at 60. This is the TVA environmental report. I think what we're looking for is page 51 again. Actually, page 50 of the document. I'm sorry, page 50 of the report. Page 60 of the exhibit. Go down to the next to the last paragraph. There you go, right there.

So I'm reading the next to the last paragraph. "Faults and fractures associated with the Dewey and Long Mountain structural zones which trend northwesterly (sic) through northwestern Fall River County are believed to affect groundwater movement and may be of considerable influence in future aerial effects of drawdown caused by mining."

I'd like to have the Applicant and the Staff respond to that. How do you interpret that? How have you addressed that?

MR. LAWRENCE: That looks to me more like

a statement of recognition that we have the Dewey and Long Mountain structural zones. It doesn't say that those faults are within the permit area.

JUDGE BARNETT: They are wherever they're going to cause considerable influence in future effects of drawdown.

MR. LAWRENCE: And that's true. One of the things that happened in the test that was done up near Dewey was they put a well on the north side of the Dewey fault and that well had no response during the pumping test. When I developed the groundwater model, I used that as a no-flow boundary, because that's what the data had shown us.

In other words, I was limiting, so there was no flow across either way. Well, if you have a boundary when your drawn down cone expands out with time, once you intercept that boundary, that's as far as it can go. So it would limit the drawdown certainly from the pumping. That doesn't mean that it's going to, in any way, control the migration of fluids out of your control.

JUDGE BARNETT: I believe that Powertech's conclusion was that there were no faults or fractures on the site. Is that correct?

MR. LAWRENCE: Correct, on the site.

JUDGE BARNETT: Does this paragraph seem consistent with that?

MR. LAWRENCE: Again, I think that is regarding the faults and fractures in the zones that are outside the permit area.

JUDGE BARNETT: I'd like to hear the Staff's response to that.

MR. PRIKRYL: Well, with regard to the faults and fractures, the Dewey fault zone is outside the license area and it's about one mile outside the license area. And the Long Mountain structural zone is about 14 miles southeast of the licensed area.

JUDGE BARNETT: So TVA's conclusion, it may be of considerable influence in future aerial effects of drawdown caused by mining, that's happening outside of the area? Is that not in the Dewey-Burdock site, but outside?

MR. LAWRENCE: Correct. You get a drawdown cone that expands out. The modeling that I did show that you have some effects a couple of miles away from the site in terms of drawdown, but into the north, you're limited, and to the east because you actually run out of Fall River and Chilson, it's eroded away there. So in those areas outside of the permit boundary, you are still going to have some

impacts from mining and that's been demonstrated with the model.

JUDGE COLE: Dr. Moran?

DR. MORAN: I would actually like to take a quick fluid break myself before continuing because I think there are some important things to add on that, but I'd like to -- is that possible?

CHAIRMAN FROEHLICH: We can keep going.

DR. LaGARRY: Can I direct you to the next paragraph below the one we just reviewed? "According to Walcott and Bowles, large volumes of water may migrate upward from the Minnelusa along solution collapses in breccia pipes associated with fractures." So the TVA recognizes that the area is fractured, but yet those individual fractures have remained unmapped.

So the older literature, in my experience, considers a lot of the things that concern me. I mean it doesn't have to be a fault with offset. There's joints. Joints are cracks in the rock, often closely spaced. They don't show any offset or structural movement. But these joints fall under what hydrologists call secondary porosity. They can hold and transmit water. But if they're ubiquitous in an area, they're often unmapped and ignored because they're ubiquitous.

So what people are after is the new, the different, the unique, the showy, the big offset of a big fault that you can tie to some sort of other events in the region. So this TVA report recognizes that the whole area is fractured and that breccia pipes form along these fractures, but they didn't make it into the scientific literature for maps. But if I was to take a geological mapping field crew out there, we would find them because we're looking for them.

JUDGE COLE: With these 6,000 plus boreholes in this relatively small area, wouldn't there be some evidence there of discontinuities in the --

DR. LaGARRY: If we could review them all, there very might well be. And in fact, there may be many because that's the -- although that kind of data density isn't necessarily useful for something like defining an orebody or perhaps hydrological modeling, for stratigraphic work which is what I do, they're essential because if you have 100 feet between 2 data points, between 2 boreholes that can accommodate dozens of joints that would be invisible otherwise. So the more data you have, the more data points with 6,000 boreholes to look at, one very well might find many, many, many of these cracks and fractures and

might be able to trace them all through the project area.

JUDGE COLE: Well, in looking at an e-log, how -- is it easy or difficult to identify if there's a fault somewhere in that pile?

DR. LaGARRY: You have to look at the closely spaced ones and look for small differences in offset between them. And so it will largely depend on the quality of the logs, but if the logs are standard quality and there's enough of them and you can follow lithologic breaks as noted in the logs, you will see small amounts of offset. It's typical, the example I cited earlier of the White Clay fault which has the big one that everybody maps, has tens of meters and sometimes scores of meters of offset. But you go to the ancillary ones, the ones that radiate north and south of it and they might have a meter, two meters, three meters, four meters, five meters of offset which the original investigator didn't think was worthy of mentioning so they only mapped the big one. But for the purposes of such projects and containing fluids and the maintenance of confining layers, you know if you can recognize these things, what you're doing is you're recognizing an open pipe across which -- through which fluids can migrate, both up and down and

side to side. So the more dense the data, the better.

JUDGE COLE: And you're saying that this hasn't been investigated?

DR. LaGARRY: It hasn't been specifically investigated. I would find it -- enough of these things might be fatal to such an activity, and so there's really no incentive to spend a lot of time hunting for faults and joints, unless of course, that's your structural geologist or geologic mapper and you're looking for faults and joints.

JUDGE COLE: So the people that were reviewing these logs just weren't looking for that kind of thing?

DR. LaGARRY: They may not have been. One of the things I find in my own work is that prior to the widespread adoption of plate tectonics theory in the 1980s and '90s, and this includes a lot of the older scientific literature from this region, people made the assumption that rocks were more bend-y than break-y. And so they would go around -- because they used modeling clay. They used Plasticine and a big vice and they pressed the vice and they watched all the Plasticine bend and they said oh, yes, that's the geological structure we've got here. But since the advent of plate tectonics theory and the idea that the

earth's crust is thin and brittle, work that's done in the 1990s and younger, makes this assumption in their work that any time there's a fault or a fold, people expect to see lots of these joints and fractures in the rock.

So it's a thing commonly overlooked in older scientific literature which is why site characterization on the ground is so important in a situation like this because as mining goes forward and they get to the wellfield specific data and they go forward in mining, these things pop up. And they're not considered and they're not taken into account.

From my reading of the technical reports and the maps provided, you can -- there's faults in the area are visible from outer space, from space shuttle radar. We've used them at other ISL sites in northwest Nebraska to locate faults that bisect the orebodies that were never found in Environmental Impact Statements or planning documents for mines. If you're specifically looking for them, then you find them. If you're not specifically looking for them or your focus is some other aspect of the geology, then typically you don't see them.

JUDGE COLE: Mr. Moran, you had indicated to me that you had a contribution to make in this

other discussion we were having and part of this.

DR. MORAN: What I've heard of Dr. LaGarry's comment, I totally agree with, first. Secondly, essentially all of the old TVA-related reports and the AEC-funded reports and the old USGS reports from the '60s, '70s, and '80s, all state that there are faults and fractures that affect groundwater movement in the area. In most cases, it is true that they're not talking specifically about that specific site, but many of them are right around it. And when you overlay the site boundary for Dewey-Burdock on top of some of the new satellite images, you can see that you're darn close and that some of the other structure goes right through it.

MR. DEMUTH: Dr. Cole, if I could add to that. I agree with Dr. LaGarry in some situations. In regional structures, you can have multiple features. They're not a line on the map. And often you can have a disturbed zone that might occur over several miles and we see that with mapping that's been done on the Long Mountain structural zone and with the Dewey fault. The southernmost identified portion of the Dewey fault is to the north of the site and does not occur on the site.

Secondly, contrary to what Dr. LaGarry

stated, Powertech is in the business of moving fluid to produce uranium. So a thorough understanding of the subsurface geology is really key to that. And if there are faults that impacts their operation in terms of producing uranium. So their interest, rather than being to not pay attention to the details rather is to pay great attention to the details.

In addition, we have worked several ISR projects that successfully mined with faults in the orebody. So the fact that there might be some small scale features in the orebody is not a deal killer and in addition, as hydrogeologists, we have other information. We have water level information. We have gradient information. We have all this other information that tells us about continuity or lack thereof in the groundwater system. So there's more than just the geology. There's more than a surface liniment that goes into understanding the conceptual model. So we have lots of pieces of information to support the conceptual model that's been presented here.

JUDGE COLE: All right, thank you.

JUDGE BARNETT: Okay, we've talked about the leaky aquitards or not, and faults and fractures a little bit. So I want to switch gears and talk

about breccia. And my question is for Dr. Moran. I'm going to quote something from your testimony here and you can see it if you want. As you state, "Breccia pipe solutions or collapsed features are present in the project area that are critical to analyzing the hydrological baseline and project impacts." Is that your testimony?

DR. MORAN: Could I see the original, please?

JUDGE BARNETT: Sure. OST-1 at 21. So your expert opinion. Is that -- do you stand by that?

DR. MORAN: Yes.

JUDGE BARNETT: Okay. In the FSEIS which is NRC-008-A1 and it's at 191, and the very last paragraph. And I will let you read that. Very last paragraph about breccia pipes.

DR. MORAN: Okay.

JUDGE BARNETT: And I'm going to ask a question about the last sentence. "The Applicant presented further evidence against the presence of breccia pipes in the proposed project area including field investigations for breccia pipes, a valuation of Inyan Kara water temperatures, regional pumping test results, and evaluation of color infrared imagery."

Have you examined that data?

DR. MORAN: Yes.

JUDGE BARNETT: And that is the basis of your expert opinion is from looking at this data, that there are breccia pipes?

DR. MORAN: It's from the review of the whole package of everything I've read, all the data, all the other reports. It's the sum total.

JUDGE BARNETT: So you disagree with the Staff's conclusion here as stated in the last sentence? Do you disagree with the Staff's conclusion?

DR. MORAN: Yes.

JUDGE BARNETT: Thank you. You've also cited Mr. Demuth's testimony that "results of pumping tests will be provided to NRC and EPA Staff for review and will have to demonstrate adequacy of the minestream that worked prior to our breaking each wellfield." Is that correct?

DR. MORAN: Could I see the original? I don't remember how I said that.

JUDGE BARNETT: Sure. That's OST-018 at pages 3 and 4.

DR. MORAN: And what was your question, sir?

JUDGE BARNETT: Let me pull it up here to make sure I'm getting it right. Okay, it's the very top paragraph on page 3.

So your contention is that the results of this pumping test aren't there now, is that correct? And that they need these results to evaluate the site?

DR. MORAN: Correct. I'm assuming those are the detailed testing that they're proposing to do after license approval.

JUDGE BARNETT: Right. So your contention is that needs to be done now, is that correct?

DR. MORAN: Yes.

JUDGE BARNETT: Based on the procedures that they've outlined, do you have any concerns with the tests that they've proposed doing other than they should have been done now?

DR. MORAN: I don't know the details of all of what they're proposing to do in the future. My main concern was for the public and the regulators to really understand these issues, they have to be able to see the detailed information first, not at the same level that they're going to do later, but at greater level than what we have now.

JUDGE BARNETT: Okay, Dr. LaGarry. This is with reference to your testimony. INT-020 at 1.

I'm looking in your -- looks like the third sentence in your first paragraph there. It says "appears by their testimonies that the Demuth and Lawrence concede that there will be excursions."

DR. LaGARRY: Yes, and what I mean by that is that in the reviews of the technical reports and the Final Environmental Impact Statement, all those documents concede that there are unplugged boreholes, that the confining layers are leaky. But the purpose of the licensing process is not to address those issues individually, that those issues will be addressed individually as individual wellfield plans are developed and pumping begins.

So in our discussions, in the discussions presented here earlier about the -- I consider the Fuson to be not -- to be unconfined. I mean that's not a confining layer. There are the TVA reports and other documents support this idea that the confining layers leak. They might be boreholes. They might be unrecognized structural features, but the bottom line is that they leak. And when the Applicant concedes and the experts, the Applicant's experts concede that yes, this is leaky and it's okay because when we develop a wellfield plan, we're going to detect these things and we're going to fix them as they happen.

The question arose earlier about the pump tests that go on without lixiviant, but when one pumps lixiviant into one of these orebodies, I mean the purpose of the lixiviant is to mobilize what was once a stable mineral contained in a sandstone and mobilize it along with everything else associated with it and then suck it out of the orebody.

So the process of adding lixiviant, let's say I'm going to create a hypothetical situation since we haven't established that there's faults and fractures, but suppose the area was riddled with joints and faults and these were full of the mineral of interest and then when you do a pump test, they're corked up and they're plugged with minerals and they don't have any impact on the pumping test.

But then once you begin to dissolve these things and extract the minerals from the cracks and the joints, you're essentially uncorking the pathways that were previously corked and so now fluids can migrate around. So when writing my opinion, I envisioned a scenario where a wellfield plan was developed and it was tested and provided sound and adequate. But then as the wellfield continues to develop, some of these unplugged boreholes come into play. Some of the unrecognized faults, joints, and

fractures come into play. And then the mineralization being taken away from the -- in the pore spaces in the sandstone and any cracks that might pass through there, are creating a situation that the mining process, as it develops, reveals a continuous string of small excursions and minor problems that go on as the mining progresses. Because in my opinion, the site isn't adequately characterized. So that's what I intended to convey in that sentence and also in the following paragraph.

JUDGE BARNETT: Okay, let me go on. Mr. Demuth and Mr. Lawrence, do you concede that there will be excursions?

MR. DEMUTH: No, I do not.

JUDGE BARNETT: Mr. Lawrence?

MR. LAWRENCE: No, I do not.

JUDGE BARNETT: Okay, Dr. LaGarry, you don't question the advisability of having an excursion plan in place, the advisability of including a plan to deal with possible excursions in the FSEIS and in the various documents. It's not a problem that you have procedures to deal with an excursion in the event that they happen. You're not saying that, is that correct?

DR. LaGARRY: That's correct. What I'm saying is in my professional opinion, they'll likely

happen and once they do happen, the genie is out of the bottle. What I would have preferred to see through the entire permitting process is rather than defer site characterization to the wellfield stage, I would have liked, like the other expert here to my left to have seen that information to characterize the site beforehand. Otherwise, the potential risk to the public and to the contamination of other aquifers, in my opinion, it's impossible to evaluate that risk adequately.

JUDGE COLE: But they do characterize a site before they start drilling?

DR. LaGARRY: They do.

JUDGE COLE: Before they start mining uranium?

DR. LaGARRY: They do. They --

JUDGE COLE: You mean they do do that?

DR. LaGARRY: They do do that.

JUDGE COLE: Okay.

DR. LaGARRY: But it's like being in a dark room, dark means different to different people. So what's adequate for the purposes of getting a permit in mining is not adequate enough for me to feel safe drinking the local groundwater once mining begins.

JUDGE COLE: I understand, sir.

MR. LAWRENCE: Can I make one point of clarification? An excursion is not a violation of the Clean Water Act. It is an indication that some fluids are moving away from the control of the operator and it allows them the opportunity to adjust their operating parameters so that they can pull those fluids back. So yes, excursions do happen, but that's the whole point of having the monitoring system in place so that they're identified early enough that they can be reversed.

And usually, the indicated parameters are constituents that are not particularly dangerous. They're chloride, conductivity, alkalinity. Those are relatively conservative constituents. They travel basically at the same speed and power.

JUDGE COLE: Well, they're just indicators of what's there.

MR. LAWRENCE: They're indicators. So that is the whole point. We have the monitoring system in place to let us know if there is a problem and then allow sufficient time to respond to that using engineering controls. And you can do a lot of things with pumping a well. You can control things pretty well.

JUDGE COLE: Well, what are the tools at your disposal to control an excursion?

MR. LAWRENCE: Typically, the first thing that would be done is you would change up your operating parameters. Often, when you have an excursion it may be a system, a situation where you have a slightly out of balance wellfield or well pattern. Maybe one of your injectors is putting in a little bit too much water on the corner and so you don't have the hydraulic containment you need. So the quickest way to resolve that is either shut that injector off so that now you get a greater draw in toward the pumping well than you would if the injector was operating. So it's hydraulics. We've been doing this kind of stuff for 50 years. The Russians have been doing it a long time very successfully. It's not new technology. And it's effective.

Where it doesn't work is where you have an undetected release that goes on for a long period of time, then it's a little bit more difficult to pull it back.

JUDGE COLE: How could they have undetected release? Aren't you required to check for excursions in a relatively short time period?

MR. LAWRENCE: Yes. It's usually every

two weeks.

MR. LANCASTER: Your Honor, just if I may refer to a license condition, 11-5. It's every two weeks. We've memorialized their excursion monitoring requirement as well as establishing the upper control limits that he talked about, the chloride, alkalinity, and conductivity.

JUDGE COLE: Yes, I was wondering about that. They're relatively easy to test for. That's why they're indicators because they'll increase if you have an excursion. So if you have an increase in that by a certain percentage, hey, I've got a problem, so I've got to use the tools that I have to take this, get this under control.

But they're so easy to measure. Why don't you do it continuously, rather than once every two weeks? Or do we do it continuously?

MR. LAWRENCE: I don't believe any operators do it continuously. It's certainly an idea. The technology is getting better where you can potentially put continuous monitoring devices in the hole. At that point, I'm sure it's probably a cost issue, just to maintain that equipment.

MR. LANCASTER: Well, I would interject that looking at our existing facilities, I don't think

there would be increased benefit to that.

JUDGE COLE: So it's not a problem when you just check this every two weeks in operation?

MR. LAWRENCE: That's right.

JUDGE COLE: And during that two-week period, you also collect some chemical samples, right? Every two weeks during operation.

MR. LAWRENCE: You collect chemical samples if you have an indication based on your excursion parameters that you have an excursion occurring. Then you would go back out and resample, make sure that you still do have a legitimate excursion and then I forget the exact sequence or the timing, but that sort of initiates the whole series of more aggressive sampling to determine if you have any constituents other than the excursion parameters that are showing up.

JUDGE COLE: I thought that in operation every two weeks you check your indicator chemicals and then collect the sample, run everything on that series of chemicals.

MR. LAWRENCE: I don't believe that is every two weeks. I think it's just the excursion parameter because as you said --

JUDGE COLE: Whatever the rules say. That

was my read on it.

JUDGE BARNETT: Dr. LaGarry, I'm going to ask you the same question that I've asked several other witnesses. Are you familiar with NRC-091 which is the Staff assessment of groundwater impacts from previously licensed in situ uranium recovery facilities?

DR. LaGARRY: Is that the one that was shown previously that you had highlighted in yellow? Yes. Well, not in the scientific literature. I mean I've been at other hearings like this, not on necessarily a panel, but in the peanut gallery, where a local dentist reported lixiviant coming out of his tap and a local landowner five miles north of the in situ leach mine talked about drilling a water well that turned out to be an artesian fountain spewing yellow-green lixiviant into her yard.

JUDGE BARNETT: Do you have any documentation, anything in the record, any exhibits that will contradict that statement?

DR. LaGARRY: Just the ones that come from the discussion, the testimony presented in 2008 at a hearing like this one. So in the documentation from the Crow Butte case, just those anecdotal instances I mentioned which I believe are in the record of that

proceeding.

JUDGE BARNETT: So based on that, you do not agree with that statement, is that correct?

DR. LaGARRY: I disagree with that statement, yes, that's correct.

JUDGE BARNETT: Thank you.

CHAIRMAN FROEHLICH: Dr. LaGarry, in your testimony, INT-013 at page 5, there's a sentence there, you read it one way or you're not familiar exactly what the strata that are being referred to or what's meant by the strata. I guess it would cause some concern. That's the first -- second sentence after perforations by new and existing wells. It's the parenthetical there. The parenthetical says "Along with wells that supply drinking water (the uranium bearing strata that are a local drinking water supply and water for the livestock)" -- can you explain maybe to me what you meant there and the connection between the uranium-bearing strata and local drinking water supplies?

DR. LaGARRY: Okay, so the third pathway --

CHAIRMAN FROEHLICH: Mr. Welkie, it's the fourth line after perforations in the parenthetical. There we go. Thank you.

DR. LaGARRY: Okay, it was my understanding from the documentation I read that the rocks being mined, people drink out of.

CHAIRMAN FROEHLICH: Beg your pardon?

DR. LaGARRY: People drink out of the rocks being mined.

CHAIRMAN FROEHLICH: That's your understanding of the document?

DR. LaGARRY: The documentation I read, yes.

CHAIRMAN FROEHLICH: Could I hear from the Staff and the applicant as to the parenthetical there because at least to a lay person this seems like it would be of concern.

MR. PRIKRYL: If I could take that question?

CHAIRMAN FROEHLICH: Please.

MR. PRIKRYL: The licensee is going to have to get a permit from the EPA to exempt the uranium-bearing aquifer before operations begin. So it would not be a local drinking water supply.

JUDGE COLE: But they could be before they exempt it?

MR. PRIKRYL: Yes. And I think there are some wells that people are drinking the water out of

those wells. And I wouldn't advise them to do that.

JUDGE BARNETT: If this site eventually goes forward and everything is restored and Powertech has moved on and there's no evidence out there of Powertech anymore, how will that groundwater exemption be enforced? What would keep somebody new from coming along and then putting a well in the Inyan Kara even though you're not supposed to do that any more?

MR. PRIKRYL: I'm just not sure about how the state or the EPA would enforce their regulations.

JUDGE BARNETT: Fair enough.

MR. DEMUTH: Judge Barnett, if I could weigh in on that. Aquifer exemptions through 40 CFR 146, the underground injection control program, those are permitted exemptions. So that water is removed from being considered as a source of drinking water. However, it's not the entire permit area. The aquifer exemption that's been applied for in the Class III UIC permit prepared by Powertech is an area that surrounds the proposed wellfields and if more wellfields were discovered, then it would be around those wellfields. And within those areas, there certainly would not be an area that somebody would want to go in 50 years post and install a drinking water well. But it wouldn't be of the quality where they would want to do

it today anyway.

MR. LAWRENCE: And that exemption applies for drinking water. The wells can be utilized again for stock irrigation purposes if it's suitable for that.

JUDGE COLE: Question for the Staff on excursions, the Applicant or the Licensee, is obligated to -- when they determine an excursion, they've got to pass that information on to the NRC Staff. What are the requirements, time requirements for them to do that?

MR. LANCASTER: Yes, Your Honor, that's also within the same license condition that I referred to before. I think it was 11-5 here. But as soon as they -- the licensee shall notify the NRC project manager by telephone or email within 24 hours of confirming a lixiviant excursion. And then seven days later, they have to submit a letter, something in writing concerning this.

And the requirement goes on with the 60 days, they've got to send us a report, a follow-up report of the corrective actions that were taken and the results of the corrective actions.

JUDGE COLE: Including chemical analyses?

MR. LANCASTER: Yes. So these

requirements are all aid out in our license. We memorialized what has been written and what -- it's consistent with 1569.

JUDGE COLE: License conditions.

MR. LANCASTER: Its license conditions is consistent with 1569, the license condition for excursion monitoring and associated reporting.

JUDGE COLE: Okay. Now so the Staff is then kept up to speed on what's happening and what sort of time limits are involved in that before the Applicant and/or the Staff must do something?

MR. LANCASTER: Well, if it hasn't been corrected within -- I think it's 60 days. Give me a moment, Your Honor.

JUDGE COLE: Okay.

MR. LANCASTER: Okay, yes, so within this license condition which again is consistent with NUREG-1569, if an excursion is not corrected within 60 days of confirmation, the licensee shall either terminate injection of lixiviant within the wellfield until the excursion is corrected, or increase their surety amount, surety estimates, the amount to cover a third-party cost to correct -- cost of correcting and cleaning up the excursion.

JUDGE COLE: That happens after 60 days?

MR. LANCASTER: Sixty days, after 60 days.

JUDGE COLE: Do you have any information on the number of excursions that a typical line operator might have? How often do they get excursions? Are they rare? Do they get one every two years? Do they get one every three months? And on average, how long does it take them to correct the excursion? Do you have any information on that?

MR. LANCASTER: Yes, I don't have any --

JUDGE COLE: Ballpark.

MR. LANCASTER: Well, I deal with a particular operating facility, but I don't deal with all the operating facilities. From my experience with that one operating facility, you know, maybe one to four a year at the most it seems like. These excursions, and some of them are related to fluctuations of groundwater and other things. And it's hard to discern. But regardless, I don't think it's every day that we get an excursion, if that's what you're trying to -- we get reports on excursions.

JUDGE COLE: I don't know. I was asking the question.

MR. LANCASTER: For other operating facilities, I can't talk about those, you know. I'm not involved with those other operators.

JUDGE COLE: Okay, but you have some experience with at least one plant?

MR. LANCASTER: Yes.

MR. PRIKRYL: Judge Cole, can I say something? I think there may be some information about excursions in the GEIS which may provide some information on how many excursions might have occurred during the year or every couple of years or whatever. Thank you.

JUDGE COLE: Do you have any information about frequency of excursions? I'll get to you in a minute, Ms. Henderson.

MR. LAWRENCE: I believe the SER identifies or makes some statements that most excursions are recovered within a day or several days or weeks, so they're relatively short lived.

JUDGE COLE: Ma'am?

MS. HENDERSON: There is a wonderful website called wise-uranium.org that has a huge report on excursions on ISL mining throughout the West, hundreds and hundreds and hundreds of examples where the operator never did anything about it, sometimes for years. And I submit, gentlemen, that a great many of these problems that we are having with groundwater are occurring because of these excursions.

I also would refer you to a National Research Defense Council report called "Uranium Mining, the Dirty Little Secret of Uranium Mining."

JUDGE COLE: Thank you, ma'am.

JUDGE BARNETT: Okay, Dr. Moran, you stated that in your OST-001 at 21 and 22, that "satellite imagery 'shows clearly that this area is intersected by numerous faults and features.' Both circular topographic features can be seen on modern satellite imagery of the D-B site and surrounding area. It is my opinion that these circular features likely represent solution collapsed structures."

Do you remember that?

DR. MORAN: I do. I'll assume that you're reading it as is.

JUDGE BARNETT: Have you introduced any satellite images into the record?

DR. MORAN: I gave to our attorneys last fall a PowerPoint presentation. I was going to give to the state hearing groups and it was sent in to your group last fall.

MR. PARSONS: Your Honor, if I may, the Exhibit 005, those are slides contained within Dr. Moran's PowerPoint.

JUDGE BARNETT: This looks like the

twelfth slide maybe, even thirteenth? Is that what you're referring to?

DR. MORAN: Yes, those images, yes.

JUDGE BARNETT: So I would like to ask the Applicant and the Staff how they would respond to his testimony in that figure?

MR. PRIKRYL: Well, first off, I would probably ask Dr. Moran if he's done any -- had any ground truthing to determine if those are actually faults.

JUDGE BARNETT: Okay, let's ask Dr. Moran. That you done any ground truthing to determine if those are fault?

DR. MORAN: I've been on the site, but I haven't done formal ground truthing, no.

JUDGE BARNETT: Thank you. I interrupted you.

MR. PRIKRYL: And that's also the case for the sinkhole. He's arguing that that possibly could be a breccia pipe. Is that true?

JUDGE BARNETT: Is that the case?

DR. MORAN: That's the case. What I'm -- if I might elaborate a second?

JUDGE BARNETT: Sure.

DR. MORAN: As I said earlier, to me this

is just fundamental work that should have been done years ago in this study and it's not -- I don't have all of this confirmed, but I'm simply making the suggestion that these images, one of the most likely interpretations of these images is you've got these kinds of sinkhole features, collapsed structures, yes. Yes, that's my interpretation.

JUDGE BARNETT: Applicants, any response?

MR. DEMUTH: Judge Barnett, if I could, there are USGS publications that have mapped features in and around the site, peer-reviewed documents. So as a scientist, I could take such a satellite image and draw some lines on it, but that would be my opinion and it would really hold no bearing unless there were other experts that had looked at it, reviewed it, and there was some basis in my opinion.

So with all due respect, there's no evidence for this type of interpretation.

JUDGE BARNETT: So you argue that he's interpreting it incorrectly or that he does not have an adequate basis for his interpretation?

MR. DEMUTH: I would not agree with his interpretation.

JUDGE BARNETT: Have you looked at satellite images of the site?

MR. DEMUTH: We've looked at color infrared radar, yes, images, in pretty good detail.

JUDGE BARNETT: Yes, Dr. Moran.

DR. MORAN: If the figures that they have made public are the ones he's talking about, they're not radar.

MR. DEMUTH: You are correct. It's color infrared imagery. Excuse me.

DR. MORAN: I would also add, let me emphasize. I'm saying this is a preliminary interpretation, but I had two of the very best remote sensors in the world confer with me when I put it together. They helped to train the earliest of the astronauts.

MR. LANCASTER: Yes, I would concur, it is very preliminary. I mean this is not hard evidence.

JUDGE BARNETT: Let me interrupt you. I agree it's -- it has been filed as evidence for a long time. I'm asking you now how do you respond to it?

MR. LANCASTER: Well, my response is with my colleague here, ground truthing is always necessary for a preliminary review of aerial photographs and things like that to pinpoint areas where you want to concentrate your study. In this case, we have plenty of data for this area that Staff feels has

demonstrated our conclusions. And those conclusions don't agree with this preliminary evaluation method or this information that's being displayed here. We don't see any evidence of this.

JUDGE BARNETT: Did you ground truth this?

MR. LANCASTER: I didn't.

JUDGE BARNETT: Did the Applicant?

MR. LANCASTER: That was our question to -- our question to Dr. Moran is did you ground truth this?

JUDGE BARNETT: And now my question is these satellite images are in the record. Have you ground truthed it?

MR. LANCASTER: Have I gone back into the application documents and ground truthed it? I know we have data in this area and we've come to our conclusions. We don't see -- like for example, for that sinkhole to be a breccia pipe, I'm not sure of the scale of this, but I guess maybe 100 feet.

Dr. Moran, what's the scale on this?

DR. MORAN: I'd have to back up to some of the other images. I'm not sure. But could I clarify one other thing? You can't ground truth it by just looking at the documents. It was submitted, I think, in September or October of last year and part of the

reason that I submitted is so that either members of the Board or members of Powertech would go out into the field and ground truth with their own imagery or air photos or something because we're not the permit applicants.

MR. LANCASTER: That sinkhole, what was the answer to the question whether that's -- you were trying to display a breccia pipe maybe? Is that the case here? I need the answer to that question. Is that sinkhole a depiction of a breccia pipe?

DR. MORAN: What I'm saying is it looks like a sinkhole and in the bigger context of the larger image, it's repeated multiple times in other places. And the most logical conclusion of my own conclusion, and these two other absolutely world class remote sensors, is it's probably a solution feature that's being expressed at the surface. And the most likely explanation in this geology is the surface expression of a breccia pipe. And if I might add, numerous government scientists over decades have been alleging that in the area. And I admit that they haven't nailed it down firmly within your site, but it's the most logical explanation given all of the information. And it's up to you guys to have ground truthed it.

MR. LAWRENCE: Can I make a comment? We have wells, monitor wells in that area. If it was a breccia pipe and it was supplying a significant amount of water, we would see evidence of it in terms of the potentiometric surface. We would see a huge recharge mound where that water is coming up. We don't see anything like that. We certainly don't see a huge discharge -- it looks like maybe there's moisture there, but I don't know if that's a topographic effect. There's certainly no running water at the surface. So even if it was a breccia pipe, what's the significance of it based on the data that we have in the area?

MR. LANCASTER: Errol, that's what I was going after was what was our evaluation. Recognize that the underlying aquifers underneath the Inyan Kara are at a different potentiometric situation, so if there is a breccia pipe that comes up through the Minnelusa up into the Inyan Kara, we would have what you were describing or possibly -- you would have some effect on the potentiometric surface and we would see that.

As far as the fault zone there, the -- you're talking about a major fracture system so I'm assuming it's a fault zone. We would see the

displacement in the structure maps that were provided. As far as -- I can't read what those two circles down there -- they're dotted, but I mean if you were to take the effort to take the data from the application that's specific to this area and as far as the hydrogeology data, the whole conceptual model that Staff accepted, and all the data that supports that model, I see disagreement in terms of just initial ground truthing.

JUDGE BARNETT: So Dr. Moran states in his testimony, "Neither Powertech nor the NRC Staff have presented any detailed interpretations of the D-B structural geology using high quality satellite imagery." Is he correct?

MR. LAWRENCE: Other than the color infrared, I would say that is correct.

JUDGE BARNETT: Staff?

MR. PRIKRYL: That's my understanding, yes.

MR. LANCASTER: That is our understanding.

JUDGE BARNETT: So why are satellite images not needed? What is your opinion about why you don't need to do that?

MR. LAWRENCE: If we were in an area where we had no subsurface control and doing initial

reconnaissance, I would say absolutely, that would be the easiest and quickest way to get a rapid assessment of the site conditions. But keep in mind we have something like 4,000 to 6,000 boreholes of data here that have been used to do extensive subsurface mapping. And that's what we're concerned about is those subsurface units. So it's extra information. It wouldn't hurt, but I think given the stage of this project, it wasn't deemed necessary.

JUDGE BARNETT: Staff.

MR. PRIKRYL: We agree with that. We reviewed the cross sections and the structural maps and they don't indicate any kind of displacement of beds which would indicate a fault.

JUDGE BARNETT: Thank you. Dr. LaGarry, you state in your -- in several places, example OST-013 at 5, that the Applicant and the FSEIS concede that the Inyan Kara is unconfined in some places in the project area. I'm not quoting you exactly there.

DR. LaGARRY: I agree with that statement.

JUDGE BARNETT: Okay. And now quoting, you say "based on this admission, confinement does not exist at the site." Is that your --

DR. LaGARRY: Yes. That's correct. I said that earlier right in front of this microphone.

JUDGE BARNETT: Are you aware that the application states that Powertech does not propose ISR operations in the Fall River and there is where the Fall River is geologically unconfined?

DR. LaGARRY: I do a lot of stratigraphy. And my experience is specifically in terrestrial rocks like these. And most of these things, like I think Bob Moran had a slide that we saw in his presentation, but the systems that create the sandstones, the sandstones are in the shape of ribbons and so depending on the density of data available, if these deposits are generally -- well, there's areas that are discontinuous.

In my opinion, the density of data presented does not conclusively demonstrate that these areas are unconfined. So in the technical report and in the Final Environmental Impact Statement, those two documents acknowledge that it's a leaky aquifer to boreholes or unidentified structures or thinning to zero of the confining layers. They have been -- that situation has been recognized in different places and in different spots.

But I also recognize that based on my mapping experience that without the significant, without more dense data, if you find say a dozen

places where it's unconfined, there may, in fact, be several dozen places where it's unconfined. So what I want to see from the Environmental Impact Statement, I want to see if I'm going to look at these studies and be confident oh, and say that's a confined mining situation, I don't want to see admissions and concessions that they found places where it's unconfined.

JUDGE BARNETT: Back to my original question though, are you aware that the application states that Powertech does not propose ISR operations in the Fall River areas and areas where the Fall River is geologically unconfined?

DR. LaGARRY: Yes.

JUDGE BARNETT: Thank you. So this is Exhibit NRC-081 at page 7 on the PDF. So this is that USGS report. I'm going to ask the Applicant and the Staff, are you familiar with that report? It's a Staff exhibit.

MR. PRIKRYL: Yes.

JUDGE BARNETT: Is the Applicant familiar with that exhibit? Okay. I notice that on page 7 and let me -- go on down, please. Yes, stop right there. So I'm looking at the next to the last paragraph, last sentence or two starting with the word "collapse of

beds." See where I am there? There you go. Wait a second. Let me make sure I'm at the right place here.

Does everybody see where I am there? I'm reading "collapse of beds overlying the evaporite zone resulted in substantive breccias and breccia pipes that extend upward to the Inyan Kara group. The same process continues today at the margin of the Black Hills. Breccia pipes constitute part of a plumbing system through which artesian waters transported low concentrations of uranium into the formation of the Inyan Kara where sandstone uranium deposits were formed."

Does that have any relevance to the FSEIS?

MR. PRIKRYL: Yes, I think we cite this publication. And also note that we agree that there are breccia pipes near the margin of the Black Hills and these have been identified, but again, no breccia pipes, we don't see any evidence of breccia pipes within the licensed area.

JUDGE BARNETT: Applicant?

MR. DEMUTH: Yes, sir. One of the challenges of permitting this project has been distinguishing the site geology from the regional geology. And there's a lot of good, published information regarding regional geology to Black Hills.

And we certainly don't dispute in any way that there are breccia pipes associated with Black Hills.

However, Gott's own map which is APP-015(f) at 5 clearly shows us that he did not map any breccia pipes on the site. Moreover, the dissolution --

JUDGE BARNETT: I'm sorry, so Gott -- you're referencing his figure?

MR. DEMUTH: I am. Correct.

JUDGE BARNETT: And what exhibit is that?

MR. DEMUTH: APP-015(f) at 5. And this is Gott's map with -- if you could zoom in on kind of the middle left portion, yes, right in there. As you'll notice, the Dewey-Burdock permit area is listed, shown in the black here. And Gott discussed breccia pipes in that they are found in proximity to the outcrop of the Minnelusa formation which is up in this area.

Gott and other USGS researchers have identified a dissolution front. And basically what they're saying is that the breccia pipe features have occurred between the outcrop and down to the front, but they've not been identified in other areas farther downdip. And in particular, he shows no evidence of those features on the site.

JUDGE BARNETT: So this figure in Gott's

report, he comes to the -- I know he wasn't talking about the Dewey-Burdock site, but that dissolution front is his -- that's his or that's something you've drawn in there?

MR. DEMUTH: That dissolution front is from the previous page 4 of this attachment which is a USGS base and they have identified a dissolution front which you'll have to kind of zoom in up in this area. And that dissolution front that is mapped on Gott's figure came from this USGS work. So if I understand, if I read that report more carefully, you contend that I will find that where he is talking about does not extend out to Dewey-Burdock, is that correct?

MR. DEMUTH: Yes, sir.

JUDGE COLE: Is that because the material, the conditions required for formation of breccia pipes involves a certain chemical like anhydride and something else? And when those aren't present, both of them you're not going to have breccia systems?

MR. DEMUTH: That is correct. It's dissolution in the anhydride that results in the collapse features.

JUDGE COLE: Dr. Moran?

DR. MORAN: I'm going to be a little bit

careful and just say I very much disagree with the conclusions that have just been mentioned and I'll say that my opinions on that are in writing. But I'll just add that that dissolution figure is not Gott's original figure. Gott's original figure has been submitted with my written testimony.

JUDGE BARNETT: What exhibit is that?

DR. MORAN: It's in my PowerPoint. I don't know the number. If you want to go back to that PowerPoint, we can.

JUDGE COLE: Number 5 is it?

DR. MORAN: I don't recall. You might back up one just for context. This is a re-drawing of Gott's -- one of his figures. And you'll notice at the top, the stratigraphic position of uranium deposits, just to sort of give you a feel for what he thinks, thought was going on. I'll just add that these were done, the field work was done years before '74. And it would have been before satellite imagery was used routinely. But the figure I was going for is a little further on.

There is the version that Powertech has created. And I think we have, if you go another figure beyond, this is Gott's actual figure. I think I'd rather just be quiet and stick with my written

testimony.

JUDGE BARNETT: Well, one of the problems with your testimony is I don't believe that you referred specifically to these figures in your PowerPoint presentation.

DR. MORAN: I thought I did, but maybe I'm wrong.

JUDGE BARNETT: If you can find that, I'd be -- I'd like to see it. I could not find it.

DR. MORAN: Can we find the actual language on the slide of my OST-1?

JUDGE BARNETT: Why don't we take a break and see if we can find it?

CHAIRMAN FROEHLICH: All right, I believe a ten-minute break would be in order. We'll reconvene at 3:34.

(Whereupon, the above-entitled matter went off the record at 3:19 p.m. and resumed at 3:37 p.m.)

CHAIRMAN FROEHLICH: We'll come to order. We'll be back on the record.

MR. PRIKRYL: Judge Froehlich?

CHAIRMAN FROEHLICH: Yes?

MR. PRIKRYL: Could I add something?

CHAIRMAN FROEHLICH: Yes. Yes.

MR. PRIKRYL: I just wanted to get this

into the record. Judge Cole asked about data on excursions earlier.

JUDGE COLE: Yes.

MR. PRIKRYL: And that information is in the GEIS, and that's Exhibit NRC 010-A-1 at page 141.

JUDGE COLE: Could you repeat that, please? I just put my fan in my hand.

MR. PRIKRYL: Okay. It's Exhibit NRC 010-A-1, and page 141.

JUDGE COLE: Thank you. Appreciate that.

MR. LANCASTER: Yes, while we're at it, as far as this operating facility I'm working with, it's more like maybe two every three years that we have excursions reported. I said one to four per year. It's a lot less than that. But it's relatively small. It's not every day. That was the whole point of that, but for the record there you go.

JUDGE COLE: Okay. Thank you.

JUDGE BARNETT: Dr. Moran, I think we left off -- and I'd asked you was that figure cited in your testimony somewhere, I believe. Is that where we were?

DR. MORAN: Yes, and I was reminded that it's on page 22 of my written testimony. OST-1, is it? The second full paragraph I think is what you're

asking about.

JUDGE BARNETT: Okay.

MR. LAWRENCE: Can we go back to that map? I would like to see where exactly it is that Dr. Moran seems to think that breccia pipes were located within the permit boundary.

JUDGE BARNETT: Yes, do you have an exhibit number so we can pull it up?

MR. LAWRENCE: It's that one right there.

JUDGE BARNETT: Oh, okay. I'm sorry.

MR. LAWRENCE: Yes. Could you zoom in on the area then where you see the kind of little dog leg and the pink-colored -- yes.

JUDGE BARNETT: Dr. Moran, can you show me where you think the closest breccia pipe to the site would be?

DR. MORAN: Let me respond slightly differently. I have here a paper version of that, which is the original Gott figure. And if you go down and to the right a bit, you'll start to see -- actually, maybe it's better to go to the key, the legend over on the explanation of the -- yes. I'm sorry. Up above. Keep going up, please, and a little bit to the right. Up.

So right in the right-hand column, third

grouping from the bottom, topographic depression in Inyan Kara group or Younger rocks. That's what the team that worked with Gott mapped. So anything with a symbol like that or the ones above, area containing structures of possible solution origin, those are what I'm referring to. And several of those symbols are down below. If we go back onto the map, you can see where the USGS in the early '70s had mapped several of those within the Inyan Kara rock.

Now, you have to enlarge it a bit. And some of them would be -- yes, let's go -- it may break up if you enlarge it more, I don't know, but I can hand you the paper copy.

MR. LAWRENCE: Because the permit boundary starts a little bit south of the word "Dewey" there and extends down and over. It starts somewhere about -- in here is about the northern extent and goes down here. So I'm not seeing anything in that area.

DR. MORAN: I think we're doing two things that get us all in trouble, but -- because now you've got the permit boundary going into the Dewey fault zone. But what I'm really saying is --

MR. LAWRENCE: I said south of the Dewey. It says down here.

DR. MORAN: I'm saying that the other

figure which you showed misrepresents what Gott and his field team were saying. And their information on their original map gives you -- maps several locations of possible collapse structures. He didn't prove that there were breccia pipes, but they again are these depressions that a logical geologist would say, hey, I better go out and ground truth it.

JUDGE BARNETT: And your contention is that some of those are on the site, the project site?

DR. MORAN: Or very close, yes.

MR. LAWRENCE: Not according to that map.

DR. MORAN: Well, do you have one of the figures in front of you here? Or we can show it to --

MR. LAWRENCE: No.

JUDGE BARNETT: We can't do this.

DR. MORAN: Do you want to take it back?

JUDGE BARNETT: How do you want to handle this.

CHAIRMAN FROEHLICH: Is that map -- the one that's there, I mean. Is that --

DR. MORAN: It is that figure.

CHAIRMAN FROEHLICH: That's that figure? And can we make lines on the map like we do in Rockville? Can you draw?

PARTICIPANT: I cannot draw.

CHAIRMAN FROEHLICH: Can't draw?

MR. LAWRENCE: If you go back up to the previous -- our version of the map or Powertech's version of the map, you can kind of get a sense of where that property boundary is. And it's basically in the area that's -- where there's nothing.

JUDGE BARNETT: How hard would it be to tonight just hand sketch the site on that and give it to us tomorrow? Is that possible? It doesn't have to be neat or anything, just --

MR. LAWRENCE: I think we could do that.

JUDGE BARNETT: Dr. Moran, could you do the same thing?

DR. MORAN: It's already done on some of the other figures.

JUDGE BARNETT: Well, but it's not on that one.

DR. MORAN: You want it on that particular one?

JUDGE BARNETT: Yes.

DR. MORAN: Well, I mean, it can be done. But it's already on several of my other slides.

JUDGE BARNETT: In this exhibit?

DR. MORAN: No. Of the OST-1, yes. No, I'm sorry. Whatever this is. This is OST-5? Is

this --

JUDGE BARNETT: Yes, there no figures in OST-1, I do not believe.

DR. MORAN: Oh, I'm sorry. I misspoke.

CHAIRMAN FROEHLICH: Much of this dialogue won't be helpful since we're going to be working from a written record. I think what has to be done is if there are those depressions or the breccia pipes, you'll have to indicate in what quadrant on the grid that is in this map they appear. And then Mr. Demuth and Mr. Lawrence can look and see if in that quadrant, in that dotted line, that square or rectangular box there is a -- well, I don't think by pointing or drawing we're going to get it very clear. Would that help? Can you --

DR. MORAN: We can do that tonight, sir.

CHAIRMAN FROEHLICH: -- do that tonight?

DR. MORAN: Yes.

MR. PARSONS: Your Honor, if I might add as well, when the question of breccia pipes came up three years ago, the Powertech Staff, including their chief geologist, went and researched and individually looked for these features. In addition, the features that Dr. Moran listed on his satellite imagery, they went on and looked for those features as well.

CHAIRMAN FROEHLICH: Let me make sure I understood that. So they have taken, someone from Powertech took the satellite images that Dr. Moran has introduced into the record and ground truthed those?

MR. PARSONS: That is my understanding, yes, sir.

CHAIRMAN FROEHLICH: Is that person here to testify today?

MR. PARSONS: He's here. I don't know if we can put him under oath or not.

CHAIRMAN FROEHLICH: There's nothing to prevent us from doing that. I'm not sure how many questions we'll have for him or how far you want to take this. If it's just a matter of corroborating whether that had been ground truthed and logical follow-ons from that and it's very limited, there would be no problem, at least from the Board's perspective. I don't know if Staff or the Intervenors would object to such a procedure.

MR. PARSONS: Your Honor, if I may, it sounds like there may have also been some analysis done or some report or other information that I'm not sure -- I mean, we're getting back into some of the issues of disclosure. If there are additional data or any other information like that, documents, I think

that that may be part of the inquiry as well.

CHAIRMAN FROEHLICH: Do I understand that you don't oppose the swearing in of a live witness in the proceeding to follow up on the questions that have been raised thus far?

MR. PARSONS: I may need to confer with co-counsel. I'm not sure we've had any presentation of any qualifications or other indication that this witness would be qualified to do what they say he did or she did.

CHAIRMAN FROEHLICH: I'd be glad to voir dire him or her prior to that. And if there are any gaps, you'd be allowed to follow up.

MR. PARSONS: Would you give us a moment to confer?

CHAIRMAN FROEHLICH: Yes.

(Pause.)

MR. PARSONS: Thank you, Your Honor. I appreciate that courtesy. I think with those caveats that we would like to make part of the inquiry as to whether there's any documents or data or other indication of other disclosures that may not have been made related to this inspection, we would not object to swearing in a witness if they're amenable.

CHAIRMAN FROEHLICH: Keep in mind we're

not authorizing a data fishing expedition here. We're merely confirming or clarifying the exhibit that shows the satellite image exhibit.

Powertech, do you have any objection?

MR. PUGSLEY: No.

CHAIRMAN FROEHLICH: And Commission Staff?

MR. CLARK: No objection.

CHAIRMAN FROEHLICH: Who is this witness that you refer to, Mr. Demuth?

MR. DEMUTH: I would defer to counsel, if he would introduce, please.

MR. PUGSLEY: The witness Mr. Demuth is referring to is Mr. Frank Lichnovsky who is the senior geologist for Powertech.

CHAIRMAN FROEHLICH: Okay. Without objection from the parties, if you'd he'd forward, raise his right hand?

PARTICIPANT: Your Honor?

CHAIRMAN FROEHLICH: Yes, sir?

PARTICIPANT: If I might, my client, Mr. Dayton Hyde has shown up and taken his seat. While you're swearing in witnesses, if you wouldn't mind including him.

CHAIRMAN FROEHLICH: Yes, you need not stand however.

PARTICIPANT: Thank you, Your Honor.

CHAIRMAN FROEHLICH: Okay. Sir, would you raise your right hand? Mr. Hyde as well. Thank you. Do you solemnly swear or affirm the statements you are about to make in this hearing before the ASLBP will be true and correct to the best of your knowledge and belief?

MR. HYDE: Yes.

MR. LICHNOVSKY: Yes.

CHAIRMAN FROEHLICH: Okay. The record will reflect that each witness has responded in the affirmative.

And do you, Mr. Hyde, adopt your pre-filed testimony as your sworn testimony in this proceeding?

The witness has responded in the affirmative. Thank you. You can take a seat in the back row, please.

Would you please state your name and employer for the record?

MR. LICHNOVSKY: Frank Lichnovsky with Powertech.

CHAIRMAN FROEHLICH: And what is your position with Powertech?

MR. LICHNOVSKY: I'm chief geologist.

CHAIRMAN FROEHLICH: And are you familiar

with OST-005 which Dr. Moran has been referring to?

MR. LICHNOVSKY: Is that the map on the screen?

CHAIRMAN FROEHLICH: No.

JUDGE BARNETT: Well, I believe that comes from that exhibit, yes.

CHAIRMAN FROEHLICH: Okay.

MR. LICHNOVSKY: Yes.

CHAIRMAN FROEHLICH: Yes? All right. And what was the question here?

JUDGE BARNETT: Where is the satellite image in there?

CHAIRMAN FROEHLICH: Right.

JUDGE BARNETT: It's the satellite images on page 13 or slide 13.

CHAIRMAN FROEHLICH: Okay. Got it. Now ask your question.

JUDGE BARNETT: Have you seen this before?

MR. LICHNOVSKY: Yes.

JUDGE BARNETT: So Dr. Moran has testified that this image is what he believes could potentially be a sinkhole at the site. So my question is have you done anything to confirm or refute his interpretation of this image?

MR. LICHNOVSKY: Yes, I went out and

looked at the site. It is not a circular feature on the ground. It's open to the southwest. It's just a low spot that a little bit of drainage goes through.

JUDGE BARNETT: I guess I'm confused. Isn't that a sinkhole?

MR. LICHNOVSKY: No.

JUDGE BARNETT: A low site that a little bit of drainage goes through?

MR. LICHNOVSKY: Yes, it's more of an erosional feature. It's not a sinkhole.

JUDGE BARNETT: So drainage just goes in there?

MR. LICHNOVSKY: It goes through it.

JUDGE BARNETT: Through it? Okay.

MR. LICHNOVSKY: Yes.

JUDGE BARNETT: Okay. That's all I have.

CHAIRMAN FROEHLICH: Okay. We now have the opinion as to whether this is a sinkhole or a breccia pipe. Are there any questions from counsel to follow up with this witness?

We're going to need about a five-minute break while we adjust the sound system.

(Whereupon, the above-entitled matter went off the record at 3:55 p.m. and resumed at 3:55 p.m.)

CHAIRMAN FROEHLICH: I believe we're back

in business. Take your seats, please.

Mr. Parsons, did you have any questions for the witness?

MR. PARSONS: Thank you, Your Honor. I appreciate it.

Just one question as to whether as part of that assessment there were any written reports or other documents or data produced as a result?

CHAIRMAN FROEHLICH: You may answer.

MR. LICHNOVSKY: No. I took a picture of it and I thought I sent it to the Petrotek guys here, but they don't seem to have gotten it, so, no, there was not.

CHAIRMAN FROEHLICH: Staff, do you have any questions of the witness?

MR. CLARK: No questions, Your Honor.

CHAIRMAN FROEHLICH: Mr. Pugsley?

MR. PUGSLEY: Just one, Your Honor. If that feature on the map was indeed a breccia pipe, would it be possible for the orebody label there to be going through it?

MR. LICHNOVSKY: No.

JUDGE BARNETT: And why is that?

MR. LICHNOVSKY: It would be limited porosity and permeability and the solution just would

not have flowed into it.

JUDGE BARNETT: In the breccia pipe?

MR. LICHNOVSKY: Yes.

JUDGE BARNETT: I thought the whole thing with the breccia pipe is solutions flowed quickly through it.

MR. LICHNOVSKY: It would be down-dropped and you'd have the shale from above down in there. It would disrupt the sands.

JUDGE BARNETT: So it's impossible to have a breccia pipe in the ore zone? Is that your testimony?

MR. LICHNOVSKY: No, in the -- or -- I lost it -- Grand Canyon area the breccia pipes do contain ore, but here it would not.

JUDGE BARNETT: Okay. I'm almost finished with Contention 3, fortunately, and that was the one I had the most questions about.

So I have a question for the Applicant. You refer to this process of operating a mine in accordance with NUREG-1569 as a phased process, is that correct, to collect some data up front and then as you go and install the wellfields you're collecting more data. Is that correct?

MR. DEMUTH: That is correct.

JUDGE BARNETT: Okay. So my question is when you collect new data is that evaluated outside of the NEPA process, and who will have access to that data and can it be challenged, or is that just your data then?

MR. DEMUTH: I can't speak to the legal aspect of the NEPA process. What I can tell you is that the information will be submitted to NRC and it will be public information within the guise of regulatory reporting. Now, does that mean that Powertech is under obligation to submit all data that might refer to the grade of ore that they see in their logs? I would think not. In terms of data to support the source material license in the SER, absolutely that would be public information.

JUDGE BARNETT: And challengeable information?

MR. DEMUTH: I would have to defer to the NRC Staff in terms of whether that could be challenged or not.

JUDGE BARNETT: Mr. Pugsley, your argument is this is a phased process in accordance with 1569?

MR. PUGSLEY: It's a phased process in accordance with regulation and 1569, yes.

JUDGE BARNETT: Okay. For data that comes

up later, does Powertech have an obligation to share that data with anyone?

MR. PUGSLEY: Okay. Just making sure I understand your question, are you talking, for example, data in a wellfield package?

JUDGE BARNETT: Correct.

MR. PUGSLEY: Okay. We have an obligation to share it with NRC because per license condition; and I referenced this previously, but I'll do it again, the verbiage in license conditions now for wellfield packages come in three sets. They're called review, review and written verification, review and approve. Powertech has some of that in different license conditions. But the most basic one is review.

Now that means that NRC has to receive a copy of the wellfield package in the information, and any information that is not declared protected under 10 CFR 2.390 is -- when submitted to NRC, NRC makes it publicly available under ADAMS database. And I would ask NRC Staff counsel to tell me if I'm wrong, but that would make it publicly available. However, the data itself in those is not subject to litigation per the Hydro Resources case in this proceeding.

JUDGE BARNETT: Mr. Clark?

MR. CLARK: If I could address that? I

think Mr. Pugsley is correct, there are a few nuances. When the Staff receives information, as Mr. Pugsley said, it will apply 10 CFR 2.390 to determine whether information is public or non-public. Staff also applies Management Directive 3.4, which is titled, "Release of Information to the Public." So before we see this information it would be difficult to give a good idea of just which information would be released and which wouldn't, but I believe the vast majority of the information would be released.

In terms of review, review and verification and review and approval, that is the licensing scheme. Review and approval, if the Board -- can I ask to bring up Exhibit NRC 12 at page 9 of the PDF. This is an example where Powertech will need a license amendment. I'm referring to the very top. This is License Condition 10.10(b). Powertech will submit for NRC review and approval hydrologic test packages for Burdock wellfields 6, 7 and 8. Powertech will need to submit a license amendment. The review and approval means the Staff will need to review and approve, if appropriate, the packages before Powertech can operate in those wellfields.

Any time there's a license amendment, there's an opportunity under the Atomic Energy Act

under Section 189 for members of the public to request a hearing. There's also the obligation under 10 CFR Part 51 for the Staff to either perform an environmental assessment or prepare an environmental impact statement. I do not believe any of these actions would be categorically excluded from NEPA review. So the short answer is for these types of license conditions there will be further NEPA review and the public will have additional opportunities to request a hearing.

Now for review and review and verification, all that means is that Powertech will not necessarily need to seek a license amendment. If Powertech submits information and the Staff can't confirm that it satisfies the license conditions, the Staff will notify Powertech and inform them that if they proceed, they'll be in violation of their license conditions and that would lead to an enforcement action.

In that case, Powertech will either need to not take action so that they won't be violated their license conditions or they will need to seek a license amendment so that their license can be amended to conform with their planned course of action. In that case there will be another request for a license

amendment, there will be another opportunity for the public to seek a hearing, and there will be further NEPA review.

JUDGE BARNETT: So if I remember 1569, Chapter 2 is the pre-operational data, is that correct?

MR. CLARK: Yes, sir.

JUDGE BARNETT: And then Chapter 5, what is that?

MR. PUGSLEY: That's entitled, "Operations."

JUDGE BARNETT: Right.

MR. PUGSLEY: That is post-license.

JUDGE BARNETT: Right. So that's specifically what I'm asking about. That data there, will that be available to the public and can it be challenged?

MR. PUGSLEY: I believe that the data in Chapter 5 is not subject to challenge unless it is subject to a license amendment proceeding. If it's under review, it's simply the hydrologic packet. The wellfield package is submitted to NRC and it is made -- unless it's protected under 2.390, it is made publicly available.

MR. CLARK: If I could respond?

JUDGE BARNETT: Sure.

MR. CLARK: And I guess to reframe the question, if the data show a need for a -- if there is a licensing action, there's an opportunity for public hearing requests and also a requirement that the Staff do additional NEPA review. The question is whether the additional data show the need for a licensing action or whether they fall within this licensing action that's before the Board today.

In terms of whether the data will be made available for public review, some data may be proprietary, and consistent with 10 CFR 2.390 it may be withheld from public view, but the vast majority of the data will be entered into the NRC's Agencywide Documents Access Management System.

JUDGE BARNETT: Okay. Thank you. That's all I have on 3.

Ms. McLean, thank you for coming today. I have a question about your testimony in INT-014, and that is, could you just briefly summarize your testimony with regards to the concerns about the pond lining?

MS. McLEAN: Yes. One second here. The ponds are a shallow design and this is designed to allow for more contact, what you get between the

highly chemical active wastewater and the plastics in the liner facilitating faster degradation. All the plastics do degrade over time even without this chemical exposure. We know plastics do degrade. The high levels of oxidizing chemicals will speed degradation dramatically. And this is what these chemicals do and why they are used in the ISL process to degrade the rocks.

The plastics used in the liners are polypropylene and polyethylene. That's taken from the permit. These are common plastics we use every day. These plastics are so easily degraded that they are the principal plastics used in the food and bottled water industry and they're easily recycled by adding chemicals to degrade and disintegrate them, and hence that's the ones that we recycle. The warranty by the manufacturer is only one year for the polypropylene and two years for the polyethylene in the project, and that is without being exposed to highly degrading chemicals. And the project is supposed to last 20 years.

The strips of plastic will be bonded together by seams of heat or glue, and these have been shown in other EPA tests to leak. The plasticizers that are integral in all plastics give them their

softness and pliability and are well known endocrine disrupters and hormone mimics. We've known that since probably the early '90s. And they're also well known to leach into foods, hence the warnings of plastic bottled juices, foods and waters. When these plasticizers are leached from the plastics, the plastics also become brittle and will then break and leak, which is why we see plastic bags that are fractured and become brittle lying on the sides of the highway and in woods after exposure to air, ozone and sunlight.

I would expect these --

MR. PUGSLEY: Your Honor, we'd like to register an objection to this testimony as I am having trouble -- I'd like an offer of relevance to hydro-geological information.

CHAIRMAN FROEHLICH: Your objection is noted. I believe Ms. McLean's testimony, pre-filed INT-014, discusses the problem with the ponds and the potential for water within that pond to leach into the groundwater. And I believe the bottom line of her testimony is that none of this data or this concern has been considered in the environmental assessment.

MR. PUGSLEY: Your Honor, I appreciate you noting my objection. Thank you.

CHAIRMAN FROEHLICH: Okay. Is that an accurate statement?

MS. McLEAN: Yes.

CHAIRMAN FROEHLICH: Okay. All right. Thank you, Ms. McLean.

MS. McLEAN: When these plasticizers are leached from the plastics by the lixiviants, the plastics become brittle and will break and then leak. And then that's why we see plastics that have been lying on the side of the road even exposed to UV light, you know, sunlight and ozone in the air and stuff over time, and rain and such -- they fracture and break and pulverize.

CHAIRMAN FROEHLICH: Okay. Thank you. And I will read your testimony in detail, but thank you for summarizing it briefly.

MS. McLEAN: Okay. I'm not finished yet.

CHAIRMAN FROEHLICH: You've submitted the written testimony. I think that's --

MS. McLEAN: Okay.

CHAIRMAN FROEHLICH: I think I can get the details out myself. Thank you.

And I would have, I guess, one follow-up for the NRC Staff and ask if the concerns with the liner and the ponds are addressed in any of the

environmental documents?

MR. PRIKRYL: Yes, I'm looking for that right now. Just give me a second.

CHAIRMAN FROEHLICH: Sure.

MR. PRIKRYL: Okay. I think I found it. If we go to -- I believe this is Exhibit 008-A-1.

CHAIRMAN FROEHLICH: The EIS?

MR. PRIKRYL: This is the SEIS. And if we go to page 2-22. Now you go to the -- right above the bullets. I'll just go ahead and read this paragraph right above the bullets. "The classified injection well disposal option requires surface impoundments or ponds for storage and settling of uranium before injection into the deep disposal wells." And as described in SEIS Section 2.1.1.2.1, these problems are going to be designed following NRC requirements. So they have to be designed -- NRC requirements.

Now if we go to page 225, and let's look at the second paragraph. And do you all want to just -- let's see. This describes how the ponds are going to be designed, or the liners for the ponds.

JUDGE COLE: Now the purpose of the liners is just to prevent flow downward?

MR. PRIKRYL: Yes. Yes, to prevent contamination. If you back to the middle of the

paragraph, the radium settling, spare and central plant ponds will be constructed with a lining system consisting of the following: An 80-mil HDPE primary liner, 60-mil HP secondary liner. And then there's going to be a clay liner beneath that and then a geonet drainage layer sandwiched between the primary and secondary liners. It will also have a leak detection and sump access port system. So this is how they designed in order -- so that water will not leak through the ponds.

JUDGE BARNETT: Okay. And Ms. McLean had submitted testimony regarding her concerns for the plastic, and we will evaluate that.

MR. PRIKRYL: Yes.

JUDGE BARNETT: And along with all your entire testimony. So thank you.

MR. LANCASTER: Just to add to that, License Condition 12.25 requires that monitoring wells that surround these ponds further adds for leak detection.

MS. McLEAN: Can I add something, please?

CHAIRMAN FROEHLICH: Yes, go ahead.

MS. McLEAN: HDPE is high-density polyethylene. The chemical is the same and the constituency is the same not matter how thick you make

it. It just takes maybe a little longer to eat through. But the chemical constituency still only has a one to two-year length of life, and that is without being exposed to the high oxidative processes of the stuff in the ponds. So you can layer it and layer it and layer it and it will still eat through because it's the same type of plastic constituency.

And clay is not considered to be an adequate barrier either. We found that with Superfund sites in Michigan where I came from.

JUDGE BARNETT: Yes, I did read that it in your testimony. I remember reading that.

MS. McLEAN: Yes.

JUDGE BARNETT: So, thank you. That's all I have for Contention 3.

JUDGE COLE: Yes, just one more question. This is both Dr. Moran and Dr. LaGarry. In your previous testimony you indicated that Powertech needs to provide additional hydro-geological data on specific wellfields in the Dewey and Burdock area. Mr. Clark was talking about special conditions in the permit and he talked about special conditions in Permit 10.10(b), but are you aware that Special Permit Condition 10.10(a) has 11 specific items pertaining to hydro-geochemical testing and actions that are

necessary for the well package design and operation?

DR. LaGARRY: Oh, am I aware of that? I don't recall the details of that.

JUDGE COLE: Yes, that's on page 8 of the permit. You have a copy of the permit.

DR. LaGARRY: Yes.

JUDGE COLE: But it lists 11 hydro-geochemical geological actions that have to be taken in conducting the well package, so it's a requirement that the Applicant has to abide by.

DR. MORAN: Okay. My comments were simply intended to allow the public to understand more before the license was awarded.

JUDGE COLE: This is for pre-operational.

DR. MORAN: Right.

JUDGE COLE: This is what you have to do to prepare the well package.

DR. LaGARRY: Yes, my comments were intended to convey my reservations about -- I mean, I limited my initial testimony to the issues of confinement, which is within my area. And it tied into something that I was asked about earlier about the phased process and the fact that there be the ongoing excursions issue, so that it's all part of that same thing I was trying to bring up that for me

as a scientist and for the public at large we would like to have the confidence of knowing that things aren't going to be patched as they go.

With every iterative effort or requirement to try to patch an issue as it goes forward, it would be better in my professional opinion to deal with those at the front end so that we the public and the we scientific community can look at that and say, okay, look, this wellfield isn't going to be a continuous serious of excursions and patches and problems and issues. It's all been dealt with up front and we're confident that mining can proceed more or less problem free. There's always unanticipated things.

But if the Applicant is conceding that the confining layers are perforated or leaky, then it comes to question that if they know it's going to be leaky and they know there's going to be a series of iterative issues that follow on once mining starts, why don't we get an opportunity to address and potentially forestall those at the front end of the proceeding? So that was my intent with that particular part of my opinion.

JUDGE COLE: Thank you.

CHAIRMAN FROEHLICH: All right. We will

move now I guess to Contention 4 dealing with groundwater quantity impacts.

JUDGE BARNETT: Okay. Can we see OST-001 at 27, Dr. Moran's testimony? Search for detailed water balance.

Okay. Your first sentence there and the basis for your opinion says, "In order to evaluate the adequacy of mine water-related data and management practices, it is standard practice for EISs and similar mine environmental reports to include a detailed water balance." Is that correct?

DR. MORAN: Yes.

JUDGE BARNETT: Can you cite any NRC-led EISs that include the kinds of detailed water balances that you're referring to?

DR. MORAN: No.

JUDGE BARNETT: Okay. Can we see NRC 008-A-1 at 130? Correct. Can we see the whole -- yes, there you go.

Okay. There's the figure. It's from FSEIS Figure 2.1-14. What do you contend that's either missing or out of balance there?

DR. MORAN: One of the issues I was trying to bring out is how much water will be lost through evaporation, for example, from the holding ponds if

they choose to go in that direction. So you need to quantify it, or it's standard practice to do it in mining projects. The same would be how much water will be say pumped out of the Inyan Kara and then injected into some other aquifer if that is concluded to be the approach for waste disposal? Those details aren't in this document.

JUDGE BARNETT: Okay. If you can give me just a second here to catch up. It's hard to --

DR. MORAN: Sorry.

JUDGE BARNETT: Okay. So do make any contention that the flows that are shown there do not balance?

DR. MORAN: No, that's not what I said.

JUDGE BARNETT: Okay. I'm making sure I get it correct. So would you concur that the flows that are shown there do balance? Is that correct?

DR. MORAN: The truth is I haven't gone through to see if they balance. My point is that I was trying to bring up the issue that a reader can't discriminate what part is related to what. For example, evaporation and road watering and things like that, those are huge amounts of water.

JUDGE BARNETT: Okay. That's a fair question. I'd like to ask the Applicant how does

water lost to evaporation -- how does that figure into this? I guess one of Dr. Moran's concerns is that there's no evaporation shown in the water balance.

MR. DEMUTH: Your Honor, I believe that that is addressed in some of the responses. First of all, the evaporation that I believe Dr. Moran is referring to in the case of small ponds prior to the Class 5 disposal, that doesn't affect the water balance. If there's some evaporation from the ponds, then less goes down the well. So the evaporation in that situation is not an issue. Either you have some that evaporates or you have less that evaporates and it goes down the disposal well. So with due respect, I fail to see the magnitude of concern of the question.

JUDGE BARNETT: So your conclusion is that evaporation is effectively shown in stream I and N, is that correct?

MR. DEMUTH: That would be correct.

JUDGE COLE: Evaporation is a maximum in those two because there might be some putting down underground?

MR. DEMUTH: Yes, the vast majority would be underground. In that situation the evaporation would actually be very small.

JUDGE BARNETT: Where else could evaporation occur in the process other than those ponds?

MR. DEMUTH: In the deep disposal well option there should be no other evaporative losses simply because the water that's pumped out of the wellfields runs through the plant and it a contained system and it either goes to the disposal wells or it goes back to the wellfield. So we don't have an opportunity for great evaporative losses.

JUDGE BARNETT: Staff, would you like to weigh in on this on the --

MR. PRIKRYL: The Staff --

JUDGE BARNETT: Yes, anyone from the Staff, would you like to weigh in on Dr. Moran's concern that evaporation is not shown explicitly in the water balance?

CHAIRMAN FROEHLICH: We would sort of agree with Powertech's explanation. In the Staff's view water loss to evaporation is basically counted for in this water balance, and this is because evaporation would only take place for the wastewater that is diverted to the radium settling and holding ponds for disposal. So the diverted wastewater represents the water consumed by the project and

therefore evaporation would not represent any additional consumptive use.

JUDGE BARNETT: Dr. Moran, what was your other concerns besides evaporation?

DR. MORAN: I think I'll just stay with my written testimony. In most of the mining world this is not a water balance. The specific ins and outs and water losses are not specified in this table.

JUDGE BARNETT: Well, I guess that's why I'm struggling. What is missing from this table, I guess is what --

DR. MORAN: Well, as I said, there is no --

JUDGE BARNETT: Evaporation? Okay.

DR. MORAN: Is one.

JUDGE BARNETT: Okay. But what else?

DR. MORAN: Any infiltration through the bottoms of the ponds. None of that is specified. If water is taken out of the Inyan Kara and then later you have to pump the residual water into a different deep formation, that's lost to the Inyan Kara. But we haven't quantified it here. At a theoretical level it's being recirculated, but not in fact.

JUDGE BARNETT: Is it correct that water taken from the Inyan Kara and injected in deep wells

would be counted for inflows I and N? Is that the Applicant's and the Staff's --

MR. PRIKRYL: That's correct, yes.

JUDGE BARNETT: Anything else about this?

MR. FRITZ: I'd like to say something about that. If you'd scroll up to the upper part of the figure, it does show the -- if you look to the left, the amount that's coming Fall River and Chilson and the amount from the Madison, those streams are shown for both the Dewey and the Burdock wellfield as inputs to the water balance.

JUDGE BARNETT: Anything else you'd like to say, Dr. Moran, about the water balance?

Okay. If we could see OST-1 at 26 and NRC 008-A-2 at 360?

MR. CLARK: I think I heard the page number as 360. Is that correct?

JUDGE BARNETT: Correct, of NRC 008-A-2. Oh, I'm sorry. Yes, I'm sorry. It's getting late. It's document page 360. Well, it's page 55 in the PDF. Now, could you go down to the -- yes, the top of page 4-55. Okay. I'm referring to the first paragraph. So, Dr. Moran, you state that 274.2 acre-feet per year of water is to be withdrawn from the Inyan Kara as evidence that the groundwater quantity

impacts have not been properly assessed, is that correct?

DR. MORAN: That isn't what I said.

JUDGE BARNETT: Okay. What is your concern with the 274 acre-feet water?

DR. MORAN: I haven't mentioned any specific concern about that number.

JUDGE BARNETT: Okay. So I'm reading from page 26 of OST-1. Your expert opinion is that the Applicant will use and contaminate tremendous quantities of groundwater thereby preventing/restricting the use of these waters by others. Is that correct?

DR. MORAN: Where is that? I'm sorry, I didn't see where it was.

JUDGE BARNETT: It's getting late.

DR. MORAN: Oh, I'm sorry. Yes.

JUDGE BARNETT: Yes. Okay. Is that correct?

DR. MORAN: Right.

JUDGE BARNETT: And then a little bit lower you mention that -- you cite the figure of the 270.2 acre-feet of water from the Inyan Kara and the 888.8 acre-feet from the Madison, is that correct?

DR. MORAN: Correct.

JUDGE BARNETT: So now if I look at the first paragraph in the FSEIS -- and it says here; and I'll read this out: "Based on a review of the water permit application which concluded an analysis of water availability and existing water rights, South Dakota Department of the Environment and Natural Resources concluded: (1) approval of the application will not result in annual recharge withdrawals from Inyan Kara that exceed the annual recharge to the aquifer; (2) there is a reasonable probability that at least 274.2 acre-feet of unappropriated water will be available; (3) SDDENR Water Rights Program observation well data indicate that unappropriated water is available from the Inyan Kara; and (4) there is a reasonable probability that the withdrawals proposed in the application can be made without unlawful impairment of existing water rights or domestic wells."

Do you agree that the FSEIS correctly summarizes the South Dakota Department of Environmental and Natural Resources' conclusion?

DR. MORAN: I don't know if they've correctly summarized it. This is from the final SEIS, is that correct?

JUDGE BARNETT: Correct.

DR. MORAN: I have to assume that they have, but I don't know that for a fact.

JUDGE BARNETT: Okay.

DR. MORAN: But more importantly, I don't see any of the backup for defending those conclusions.

JUDGE BARNETT: Okay. And then the second paragraph, it looks like the last sentence of the second paragraph, in very similar kind of language, but in this case with respect to the Madison, the FSEIS also states, "Based on a review of the application which concluded an analysis of water availability and existing water rights SDDENR concluded: (1) there's a reasonable probability that unappropriated water is available in the Madison aquifer to supply the proposed appropriation; (2) approval of the application will not result in annual withdrawals from the Madison aquifer that exceed the annual average recharge to the aquifer; and (3) there is a reasonable probability that the withdrawal proposed in the application can be made without impacting existing water rights including domestic users."

Do you agree with the FSEIS' summary of SDDENR's analysis of the Madison withdrawals?

DR. MORAN: I don't agree with the

analysis. I'm willing to admit that they probably summarized it correctly, but I don't see any backup for those statements, technical backup.

JUDGE BARNETT: Okay. So you cite some numbers: 274 acre-feet per year from the Inyan Kara, 888 acre-feet from the Madison . And I can't remember the exact language in your testimony, but you were concerned with the quantity of water. And based on SDDENR's analysis as spelled out in the FSEIS, do you still allege that they failed to adequately analyze groundwater quantity impacts?

DR. MORAN: Yes.

JUDGE BARNETT: Okay. Thank you.

CHAIRMAN FROEHLICH: On that subject using the figures Judge Barnett just used, the 274 acre-feet and the 888.8 acre-feet, you come up with I guess a 20-year water consumption of 89.4 billion gallons over 20 years for the Inyan Kara and 5.8 billion gallons over 20 years. I was wondering if that is still your contention that that is the quantity of water to be used or taken for this project.

DR. MORAN: As described, yes.

CHAIRMAN FROEHLICH: Okay. As described. Then perhaps, Mr. Fritz, can you clarify or respond to the figures over the 20-year life that Dr. Moran has

put forth?

MR. FRITZ: Yes, I can. You're talking about the Inyan Kara water, right? The 274.2 acre-feet of water annually is the most we can have for a net diversion. We can't divert the 8,500 gallons per minute, which is how you have to convert in units to get to the other number because 98 percent of that water is re-injected as a part of the process. Our net diversion limited by the water right can only be a maximum of 274.2 acre-feet per year.

CHAIRMAN FROEHLICH: Okay.

JUDGE COLE: Could you put back on the flow diagram, the typical flow rates you had on before from figure TR RAI PNR-14 C-1, from the Dewey-Burdock RAI responses? I don't have it on this. It's in the RAI responses. You had it on earlier. It would be page 69. Here it is.

Now, I'd like to look at the top one there for the Fall River and Chilson and the flow diagram and look at the numbers that are coming in there. And if we follow through that flow diagram, it looks like we're taking out A from the Fall River and Chilson independent of the water that's recirculating 21 gallons per minute, and B coming out of the wellfield is 2,400 gallons per minute.

DR. MORAN: D is what you said?

JUDGE COLE: B.

DR. MORAN: B. I'm sorry.

JUDGE COLE: B. Then we pass it through an ion exchange, and in the ion exchange we remove the uranium. It's an ion exchange that's specific for uranium. Now, there are a lot of other chemicals in there that are not removed at that point. They're still in the solution, the lixiviant solution. And we take out less than one percent. And here it's 0.875 percent. That's about 170 gallons a minute. And that's what we consider to be taken out of the system. We send the rest back and recirculate it and we keep recirculating it, adding a certain amount and then -- well, before we do that we re-oxygenate it and send it back, but we've got contaminants that were picked up in the first cycle and we keep recirculating those. We get some dilution of that because we're taking about one percent each time. It's called a bleed.

Now, my question is the quality of that recirculated water deteriorates with time, and how many cycles can you have before it's a non-productive use of that water? Because there are more and more toxic chemicals being built up in that. So also, the bleed water, even the one percent, is going to be more

concentrated. Then we can either put that either directly in a pipe and pump it down to a deep well or we put it in a pond losing at that rate of 170 gallons a minutes. So maximum evaporation we can have is 170 gallons a minute. And how often do we have to treat this water that's being recirculated to maintain the quality that's going to effectively do the job of picking up additional uranium? And I don't know the answer to that, but is it anywhere in our record? And I'd like to ask both the NRC and the Powertech people, do they have answer to that?

MR. DEMUTH: Judge Cole, I'm not a chemical engineer, so with reservation I'll speak to that a little bit. The quality of that water, if it degraded to a point where it simply was not useful to optimize the mining process, they could certainly pull more bleed out of that and then run more down the disposal well. So it's to the operator's interest to maintain the quality of that water so that it's most beneficial for the mining process.

The exact specifics of how they would manage that in the plant, that would really be up to Powertech Staff to --

(Simultaneous speaking.)

JUDGE COLE: Yes, are you aware that

that's a problem?

MR. DEMUTH: I wouldn't call it a problem necessarily.

JUDGE COLE: All right.

MR. DEMUTH: I'm aware that it's something the plant operations has to include, but in terms of a problem, I wouldn't characterize it in that way.

JUDGE COLE: All right, sir. Yes, they have a reverse osmosis unit somewhere in that building, and it's got to be used for something.

And I'm also concerned about the quality of the water that's going to the pond, because that's going to have a radioactive material in it. It's going to have a lot of the contaminants; arsenic and selenium, that's going to go into the pond. Now, okay, they have barriers underneath it, clay barriers and different kinds of layers of protective material that prevent it from going downward, but what about the animals that would be using this for water? Is that a serious problem and how do you prevent that? And do they use the reverse osmosis treatment units that they have to bring the quality of that water up so that it's not as a danger as it seems to me to be?

MR. FRITZ: I can give a quick description of that. I'm not a chemical engineer either, but I'm

familiar with pond design and layout.

Remember in the application there are two basic methods of water disposal. One is the deep well injection and the other is land application. Deep well injection is the preferred method. If we can get our permits and if we can get suitable wells to inject the subsurface water, then the RO unit is used, because then we can get rid of the brine, which is the highly saline water that accumulates as you were saying.

JUDGE COLE: Wait a minute. I must have misheard your first part. If you can get permission to dump it into a deep well, it's then you want to use the RO unit?

MR. FRITZ: Yes.

JUDGE COLE: Why?

MR. FRITZ: Because the deep wells give us the only opportunity to get rid of the brine that's generated from an RO unit. RO unit, about 30 percent comes out as brine and 70 percent is real pure water and will go back into the process.

JUDGE COLE: But you're putting it into a deep well that probably has a lot of other contaminants in it. That's why it was selected as a well to accept wastewater.

MR. FRITZ: Yes, that's exactly right. That's the only way we can get it permitted to accept wastewater.

JUDGE COLE: Now tell me again why you would want to use a reverse osmosis unit to treat the water before you put it in there?

MR. FRITZ: Well, one of the big goals in all this is to minimize your waste stream, because there's regulatory and cost associated with water disposal. If we can reduce the waste stream by going through the RO unit down to a concentrated brine, then we can go to a deep injection well and take the other 70 percent and go back into the wellfield with it. It doesn't accumulate the dissolved solids that you were talking about.

If we can't for one reason or another inject the water into a deep disposal well and we go to land application, then we have to bring more makeup water from the Madison and go out to the land application because the brine from the RO unit would be too saline to put on a land application.

JUDGE COLE: Right. But you have to dilute it with the fresh water to use it on land?

MR. FRITZ: Yes, you wouldn't run it through the process as many times. It would go out to

the evaporation disposal.

JUDGE COLE: Yes, I would also think you'd want to use the reverse osmosis to remove the chemicals in it because you wouldn't want those; arsenic and selenium and other dangerous chemicals and radioactive materials, on the land application.

MR. FRITZ: Well, let me clarify one thing first. There's no radioactive chemicals going out to anything. That would be an 11(e)2 waste. That has to be taken out of these ponds by barium precipitation or some method. It can't be injected or go to the land application.

JUDGE COLE: But you precipitate the radium and the radium with barium sulfate in the ponds?

MR. FRITZ: Yes.

JUDGE COLE: And then you --

MR. FRITZ: Yes, there's no radioactive waste going out anywhere.

JUDGE COLE: Then you take the water from the top and remove the precipitate in the bottom?

MR. FRITZ: Right.

JUDGE COLE: And deal with it the same way you have to with radioactive materials --

MR. FRITZ: Yes, it goes out as an 11(e)2

waste during the clean-up of the site. That's right.

But to get back to your question about the RO unit, if we don't have a deep disposal well, we can't use the RO because it generates a brine that we can't go to land application with. It has to go down a deep well. So the preferred method is to get these deep wells permitted and proven for disposal.

JUDGE COLE: I understand.

MR. FRITZ: And that's a pending permit right now with the EPA.

JUDGE COLE: And the alternative is diluting it so it's satisfactory for use on a land application?

MR. FRITZ: Well, not exactly diluted, but not concentrating it to the level you were talking about before. That's right.

JUDGE COLE: Okay. Thank you.

CHAIRMAN FROEHLICH: Ma'am, you wanted to add something?

MS. McLEAN: Yes, I would. That's not totally true because there are heavy metals that are generated that have radioactive capabilities. Thorium, strontium. They don't even measure for strontium on their list. You know, chromium, vanadium. Those things are all radioactive and

they're going to be in the ponds.

And there's no fence that you can ever fence out Mother Nature. You're going to have small animals going in there, insects, whatever, to access the water. This is a dry area. This is a semi-arid area. And there's going to be animals and insects and all kinds of things going in there to seek that water that then take those hazardous compounds out into the environment to be bioaccumulated up the food chain. So there are going to be radioactive elements in there. There are.

RO actually kind of a misunderstood process really in that RO wastes about 10 times -- the typical RO wastes about 10 times more water than it purifies.

JUDGE COLE: Well, it dilutes what you have and you wind up with a certain percentage of pure water.

MS. McLEAN: It's not going to be pure, no. RO is not 100 percent. Only distillation --

JUDGE COLE: I understand.

MS. McLEAN: -- is 100 percent. So, and the other thing is is when you keep applying that over a period of 20 years you're going to increase the concentration of the stuff in the land anyway. So it

doesn't matter how much you dilute it. You're still going to concentrate the metals in the land that you're doing land application or water application anyway.

JUDGE COLE: Thanks.

JUDGE BARNETT: Ms. McLean brought up a good point, a good question. How do you keep birds out of these ponds?

MS. McLEAN: You don't. They're going to eat insects and they're going to eat any sort of crawly things that are going to go in there. There's no way to fence out Mother Nature. There's just not.

JUDGE BARNETT: I want to ask the Applicant. How do you keep birds out of these ponds?

MR. FRITZ: I can't tell you the exact page, but there's quite an extensive mitigation plan for the ponds to exclude wildlife in both the -- and I know it's in the state permits, the land application permit, which is a related permitting action that we have to do to get the land application. It is a permit from the state. And that's got an extensive wildlife mitigation plan in it.

MR. PUGSLEY: Your Honor, may I ask a question, please?

CHAIRMAN FROEHLICH: Sure.

MR. PUGSLEY: Judge Cole, was this question that you just asked that we were getting answers on was geared toward Contention 4? That's what we're discussing right now?

JUDGE COLE: Well, it might be a stretch, but I'm interested in it.

(Laughter.)

MR. PUGSLEY: No, I'm not questioning that, sir. I apologize. That totally came out wrong, sir.

(Laughter.)

MR. PUGSLEY: I apologize. I would like to note an objection for the record to Ms. McLean's response to this, because her CI INT-014 specifically states that she's offering testimony on Contention 3 and not on Contention 4. So I'd like to register an objection to her answer.

CHAIRMAN FROEHLICH: Noted.

MS. McLEAN: I'd like to add one more thing. The heavy metals that I track are not going to be degraded. They don't go into anything different. They don't change. They don't become toxic -- less toxic over time. And so, when Powertech in 20 years pulls up stakes and leaves, the heavy metals are going to be still there and there's no kind of fences that

are going to last as long as those radioactive heavy metals.

MR. PUGSLEY: Your Honor, same objection.

CHAIRMAN FROEHLICH: Noted. Your answer, Ms. McLean, though was related to the effect of the those heavy metals on groundwater? Am I correct?

MS. McLEAN: It will seep into groundwater eventually. Water always goes down.

CHAIRMAN FROEHLICH: Thank you.

MS. McLEAN: That's how nature recharges her aquifers.

JUDGE BARNETT: I have a question for Mr. Hyde. Mr. Hyde?

MR. HYDE: Yes.

JUDGE BARNETT: I have read your testimony. Thank you for including that. I want to make sure that I understand that one of your big concerns is that the Beaver Creek and Pass Creek flow through the Dewey-Burdock project area and into the Cheyenne River and that could potentially impact your wild horse sanctuary. Is that one of your big concerns?

MR. HYDE: Anything that flows into the Cheyenne is going to impact the wild horse sanctuary. We're talking 600 or so horses here that have to drink

every day, plus a lot of wildlife. We already know from testimony from my neighbor Byron Cox that during the mining of uranium in the Edgemont area the beaver were wiped out. There are no beavers left in that whole river. You've got to consider the effect of these things on the people that have to live here. Nobody's going to come along and sweep away the damage that people from somewhere else have done to us locals. So I have no compunction about --

JUDGE BARNETT: Okay. Thank you, sir.

MR. HYDE: -- getting a little bit worried about this. I've spent 25 years building this. It could be wiped out very shortly.

JUDGE BARNETT: Thank you.

CHAIRMAN FROEHLICH: I believe that the Board has concluded with its questions for Panel 2. I'd like at this point even though it's 5:00 to give the parties a few minutes to propose any follow-on questions that they might feel are appropriate to submit to the Board to ask of Panel 2.

Would 10 minutes be sufficient?

MR. PUGSLEY: Yes, sir.

MR. PARSONS: That would be fine. Thank you.

CHAIRMAN FROEHLICH: Okay. Let's take a

break for 10 minutes while the counsel prepare any proposed questions.

(Whereupon, the above-entitled matter went off the record at 4:59 p.m. and resumed at 5:17 p.m.)

CHAIRMAN FROEHLICH: We'll be back on the record. I'm pleased to report I've only received two questions that the parties have asked the -- I think going past 5:00 has its advantages.

(Laughter.)

CHAIRMAN FROEHLICH: Two follow-on questions. First for Mr. Demuth and Mr. Lawrence. Do you agree with the characterization of the license area as unique with respect to the presence of historical exploration drilling?

MR. DEMUTH: Your Honor, I would not consider that unique. It's very common for historic uranium projects to have thousands of exploration boreholes that there's been historic activities over time. So it's more common really than unique.

JUDGE COLE: Within 16 square miles 6,000 holes?

MR. DEMUTH: Yes, sir. It's very, very common that we have uranium projects, many cases smaller project areas than this with thousands of historic wells. This exploration activity has been

going on for a number of years.

CHAIRMAN FROEHLICH: For Drs. Moran and LaGarry. Do you agree that the net inward hydraulic radiant Powertech must maintain under License Condition 10.7 reduces the likelihood of fluids migrating away from the production zone?

DR. LaGARRY: I agree that it reduces it, but it may not eliminate it.

JUDGE COLE: It may not what?

DR. LaGARRY: Eliminate.

JUDGE COLE: Oh.

DR. LaGARRY: Yes, I agree with that statement. It does reduce it.

CHAIRMAN FROEHLICH: Dr. Moran?

MS. McLEAN: If we assume that it reduces it compared to a situation where you don't have it? Is that what we're saying? Is that what we're assuming?

JUDGE COLE: That's a fair assumption.

MS. McLEAN: Then I agree.

CHAIRMAN FROEHLICH: Okay. At this point we can dismiss Panel 2, except I realize some of the witnesses on Panel 2 will be joining us tomorrow as we'll take on Panel 3. Tomorrow we'll have to take care of a number of procedural matters, one of which

being the discussion that was held concerning the map. There was some disagreement between Witness Demuth and Witness Moran. If the parties could get together after today's session and perhaps come up with a single sheet of paper or whatever, a single map that shows the well depression, whatever it was that the conflict was between the two versions of the same map. If we could have one map that I guess depicts the points that both sides were trying to make, I think that would be helpful to the record. So if the parties could get together and come up with a single map that shows the line, or if we can take one of the exhibits that is currently in the record and adjust it, mark it in some way, make it so that it reflects accurately the arguments of both parties. If that's possible, I'd like to try to do that for tomorrow's record.

I'd also like the parties overnight to discuss how we're going to handle the additional disclosure, what protective measures we have to put in for the data, where it will be held, what kind of access the parties will have to it and some kind of a schedule so that it will be available to them for inspection. We'll also set a date for when any additional testimony based on that additional data

will have to be filed should there be any.

Are there any other procedural matters that I should consider overnight or that we need to address before we reconvene tomorrow morning?

MR. PARSONS: Your Honor, Jeff Parsons for the tribe.

CHAIRMAN FROEHLICH: Yes, sir.

MR. PARSONS: I just again wanted to flag for you the existence of a pending motion with regard to the additional disclosure matters. I realize that with the ruling this morning for additional disclosure some of the time pressure may not be quite as intense, maybe allowing for the normal course of briefing, if that's what the parties would like to do. But I just wanted to --

CHAIRMAN FROEHLICH: Right. I hadn't forgotten that. I was waiting to receive answers per our rules from the other parties, and then we'll be able to address that.

MR. PARSONS: Thank you, Your Honor.

CHAIRMAN FROEHLICH: Okay.

MR. PUGSLEY: Your Honor, would I be correct that per the rules any answers from Staff or Powertech would be due next Tuesday?

CHAIRMAN FROEHLICH: It came in on

Saturday?

MR. PUGSLEY: Ten days I believe, yes.

CHAIRMAN FROEHLICH: Yes, sir, 10 days.

MR. PUGSLEY: Okay. Thank you.

CHAIRMAN FROEHLICH: Are there any other matters that the Board should consider overnight? Mr. Clark?

MR. CLARK: Just the availability of witnesses for tomorrow. For the witnesses that won't be testifying on Panel 3, do they need to return tomorrow?

CHAIRMAN FROEHLICH: No. No, we'll begin tomorrow -- that's why we ran late. We've finished with Panel 2. So those people who are not on Panel 3 are excused and we thank them for their testimony.

MR. CLARK: Thank you.

CHAIRMAN FROEHLICH: Panel 3 includes those witnesses with filed testimony on Contentions 6 and 9.

All right. Nothing else being necessary for today, we'll stand adjourned until 9 in the morning.

(Whereupon, the above-entitled matter went off the record at 5:23 p.m.)

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-001	Dr. Lynne Sebastian Initial Testimony.	Identified and Admitted
APP-002	Dr. Lynne Sebastian CV.	Identified and Admitted
APP-003	Dr. Adrien Hannus Initial Testimony.	Identified and Admitted
APP-004	Dr. Adrien Hannus CV.	Identified and Admitted
APP-005	Representative Sample of ALAC Projects.	Identified and Admitted
APP-006	ACHP Section 106 Regulations: Text of ACHP's Regulations, "Protection of Historic Properties: (36 CFR Part 800) (incorporates amendments effective Aug. 5, 2004)".	Identified and Admitted
APP-007	National Park Service, Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, 1983	Identified and Admitted
APP-008	South Dakota State Historic Preservation Office, Guidelines for Cultural Resource Surveys and Survey Reports in South Dakota (For Review and Compliance), 2005.	Identified and Admitted
APP-009	Level III Cultural Resources Evaluation of Powertech (USA) Inc.'s Proposed Dewey-Burdock Uranium Project (Public Version), Vol. 3 Part 6; ML100670366.	Identified and Admitted
APP-010	Michael Fosha Initial Testimony.	Identified and Admitted
APP-011	Michael Fosha CV.	Identified and Admitted
APP-012	February 11, 2013 letter from Michael Fosha to SDDENR.	Identified and Admitted
APP-013	Hal Demuth Initial Testimony.	Identified and Admitted
APP-014	Hal Demuth CV.	Identified and Admitted
APP-015-A	Revised Technical Report (TR) for the Dewey-Burdock Project; Part 1 of 22; Transmittal Letter, Change Index and Revised TR RAI Responses; ML14035A052.	Identified and Admitted
APP-015-B	Revised TR for the Dewey-Burdock Project; Part 2 of 22; Text through Sec. 2.8.5.7; ML14035A029.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-015-C	Revised TR for the Dewey-Burdock Project; Part 3 of 22; Text Sec. 2.9 through 10.2; ML14035A030.	Identified and Admitted
APP-015-D	Revised TR for the Dewey-Burdock Project; Part 4 of 22; Plates 1.5-1 through 2.6-8; ML14035A031.	Identified and Admitted
APP-015-E	Revised TR for the Dewey-Burdock Project; Part 5 of 22; Plates 2.6-9 through 2.6-12; ML14035A032.	Identified and Admitted
APP-015-F	Revised TR for the Dewey-Burdock Project; Part 6 of 22; Plates 2.6-13 through 2.6-15; ML14035A033.	Identified and Admitted
APP-015-G	Revised TR for the Dewey-Burdock Project; Part 7 of 22; Plates 2.6-16 through 2.7-2; ML14035A034.	Identified and Admitted
APP-015-H	Revised TR for the Dewey-Burdock Project; Part 8 of 22; Plates 2.8-1 through 5.7-1; ML14035A035.	Identified and Admitted
APP-015-I	Revised TR for the Dewey-Burdock Project; Part 9 of 22; App. 2.2-A through 2.5-F; ML14035A036.	Identified and Admitted
APP-015-J	Revised TR for the Dewey-Burdock Project; Part 10 of 22; App. 2.6-A through 2.6-G; ML14035A037.	Identified and Admitted
APP-015-K	Revised TR for the Dewey-Burdock Project; Part 11 of 22; App. 2.6-H through 2.7-E; ML14035A038.	Identified and Admitted
APP-015-L	Revised TR for the Dewey-Burdock Project; Part 12 of 22; App 2.7-F through 2.7-G; ML14035A039.	Identified and Admitted
APP-015-M	Revised TR for the Dewey-Burdock Project; Part 13 of 22; App. 2.7-H 1 of 3; ML14035A040.	Identified and Admitted
APP-015-N	Revised TR for the Dewey-Burdock Project; Part 14 of 22; App. 2.7-H 2 of 3; ML14035A041.	Identified and Admitted
APP-015-O	Revised TR for the Dewey-Burdock Project; Part 15 of 22; App. 2.7-H 3 of 3; ML14035A042.	Identified and Admitted
APP-015-P	Revised TR for the Dewey-Burdock Project; Part 16 of 22; App. 2.7-J through 2.7-L 1 of 2; ML14035A043.	Identified and Admitted
APP-015-Q	Revised TR for the Dewey-Burdock Project; Part 17 of 22; App.2.7-L 2 of 2; ML14035A044	Identified and Admitted
APP-015-R	Revised TR for the Dewey-Burdock Project; Part 18 of 22; App. 2.7-M; ML14035A045.	Identified and Admitted
APP-015-S	Revised TR for the Dewey-Burdock Project; Part 19 of 22; App 2.7-N through 2.8-H; ML14035A046.	Identified and Admitted
APP-015-T	Revised TR for the Dewey-Burdock Project; Part 20 of 22; App. 2.8-I through 2.9-L; ML14035A047.	Identified and Admitted
APP-015-U	Revised TR for the Dewey-Burdock Project; Part 21 of 22; App. 2.9-M through 3.1-A; ML14035A048.	Identified and Admitted
APP-015-V	Revised TR for the Dewey-Burdock Project; Part 22 of 22; App. 3.1-B through 7.3-D; ML14035A049.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-016-A	Revised Response to the Request for Additional Information (RAI) for the Technical Report (TR) for the Dewey-Burdock Project; Cover Letter; ML11207A711.	Identified and Admitted
APP-016-B	Revised TR RAI Response; Text Part 1: ML11208B712.	Identified and Admitted
APP-016-C	Revised TR RAI response; Text Part 2; ML11208B719.	Identified and Admitted
APP-016-D	Revised TR RAI response; Text Part 3; ML11208B714.	Identified and Admitted
APP-016-E	Revised TR RAI Response; Exhibits Part 1; Exh. 2.6-1 through 2.6-4; ML11208B716.	Identified and Admitted
APP-016-F	Revised TR RAI response; Exhibits Part 2; Exh. 2.6-5; ML11208B763.	Identified and Admitted
APP-016-G	Revised TR RAI response; Exhibits Part 3; Exh. 2.6-6 through 3.1-1; ML11208B764.	Identified and Admitted
APP-016-H	Revised TR RAI Responses; Exhibits Part 4; Exh. 3.1-2 through 5.7-1; ML11208B767.	Identified and Admitted
APP-016-I	Revised TR RAI response; Appendices Part 1; App. 2.5-D through 2.6-G; ML11208B765.	Identified and Admitted
APP-016-J	Revised TR RAI response; Appendices Part 2; App. 2.6-H 1 of 3; ML11208B766.	Identified and Admitted
APP-016-K	Revised TR RAI response; Appendices Part 3; App. 2.6-H 2 of 3; ML11208B769.	Identified and Admitted
APP-016-L	Revised TR RAI response; Appendices Part 4; App. 2.6-H 3 of 3; ML11208B770.	Identified and Admitted
APP-016-M	Revised TR RAI response; Appendices Part 5; App. 2.7-B through 2.7-G; ML11208B771.	Identified and Admitted
APP-016-N	Revised TR RAI response; Appendices Part 6; App. 2.7-H 1 of 4; ML11208B777.	Identified and Admitted
APP-016-O	Revised TR RAI response; Appendices Part 7; App. 2.7-H 2 of 4; ML11208B778.	Identified and Admitted
APP-016-P	Revised TR RAI Response; Appendices Part 8; App. 2.7-H 3 of 4; ML11208B784.	Identified and Admitted
APP-016-Q	Revised TR RAI Response; Appendices Part 9; App 2.7-H 4 of 4; ML11208B827.	Identified and Admitted
APP-016-R	Revised TR RAI response; Appendices Part 10; App. 2.7-K; ML11208B832.	Identified and Admitted
APP-016-S	Revised TR RAI Response; Appendices Part 11; App. 2.7-L 1 of 4; ML112088833.	Identified and Admitted
APP-016-T	Revised TR RAI Response; Appendices Part 12; App. 2.7-L 2 of 4; ML11208B868.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-016-U	Revised TR RAI response; Appendices Part 13; App. 2.7-L 3 of 4; ML11208B864.	Identified and Admitted
APP-016-V	Revised TR RAI response; Appendices Part 14; App. 2.7-L 4 of 4; ML11208B865.	Identified and Admitted
APP-016-W	Revised TR RAI response; Appendices Part 15; App. Vol. 4 Cover; ML11208B870.	Identified and Admitted
APP-016-X	Revised TR RAI response; Appendices Part 16; App. 2.7-M; ML11208B872.	Identified and Admitted
APP-016-Y	Revised TR RAI response; Appendices Part 17; App.2.9-B through 2.9-K; ML112150229.	Identified and Admitted
APP-016-Z	Revised TR RAI response; Appendices Part 18; App. 3.1-A 1 of 2; ML11208B922.	Identified and Admitted
APP-016-AA	Revised TR RAI response; Appendices Part 19; App. 3.1-A 2 of 2; ML11208B924.	Identified and Admitted
APP-016-BB	Revised TR RAI response; Appendices Part 20; App. 6.1-A through 7.3-C; ML11208B925.	Identified and Admitted
APP-017	Figures to Accompany Demuth Initial Testimony.	Identified and Admitted
APP-018	USGS Water-Supply Paper 2220, Basic Ground-Water Hydrology, 1983.	Identified and Admitted
APP-019	National Mining Association's (NMA) Generic Environmental Report in Support of the Nuclear Regulatory Commission's Generic Environmental Impact Statement for In Situ Uranium Recovery Facilities; ML080170159	Identified and Admitted
APP-020	ISR animation (Video of ISR Operation).	Identified and Admitted
APP-021-A	Dewey-Burdock Project Technical Report (TR); re-submitted August 2009; Part 1; Text thru Sec. 2.7.1; ML092870298	Identified and Admitted
APP-021-B	Dewey-Burdock Project TR; re-submitted August 2009; Part 2; Text Sec. 2.7.2 thru 2.9; ML092870295.	Identified and Admitted
APP-021-C	Dewey Burdock Project TR; Re-submittal August 2009, Part 3; Text Sec 3 thru End; ML092870299.	Identified and Admitted
APP-021-D	Dewey-Burdock Project TR; Re-submitted August 2009; Part 4; Plate 1.5-1; ML092870313.	Identified and Admitted
APP-021-E	Dewey-Burdock Project TR; Re-submitted August 2009; Part 5; Plate 1.5-2; ML092870314.	Identified and Admitted
APP-021-F	Dewey-Burdock Project TR; Re-submittal August 2009; Part 6; Plate 2.5-1; ML092870315.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-021-G	Dewey-Burdock Project TR; re-submitted August 2009; Part 7; Plate 2.6-1; ML092870316.	Identified and Admitted
APP-021-H	Dewey-Burdock Project TR; Re-submitted August 2009; Part 8; Plate 2.6-2; ML092870317.	Identified and Admitted
APP-021-I	Dewey-Burdock Project TR; Re-submittal August 2009; Part 9; Plate 2.6-3; ML092870318.	Identified and Admitted
APP-021-J	Dewey-Burdock Project TR; Re-submittal August 2009; Part 10; Plate 2.6-4; ML092870305.	Identified and Admitted
APP-021-K	Dewey-Burdock Project TR; re-submitted August 2009; Part 11; Plate 2.6-5; ML092870306.	Identified and Admitted
APP-021-L	Dewey-Burdock Project TR; re-submitted August 2009; Part 12; Plate 2.6-6; ML092870307.	Identified and Admitted
APP-021-M	Dewey-Burdock Project TR; Re-submitted August 2009; Part 13; Plate 2.6-7; ML092870309.	Identified and Admitted
APP-021-N	Dewey-Burdock Project TR; re-submitted August 2009; Part 14; Plate 2.6-8; ML092870310.	Identified and Admitted
APP-021-O	Dewey-Burdock Project TR; Re-submitted August 2009; Part 15; Plate 2.6-9; ML092870311.	Identified and Admitted
APP-021-P	Dewey-Burdock Project TR; Re-submitted August 2009; Part 16; Plate 2.6-10; ML092870312.	Identified and Admitted
APP-021-Q	Dewey-Burdock Project TR; re-submitted August 2009; Part 17; Plate 2.6-11; ML092870320.	Identified and Admitted
APP-021-R	Dewey-Burdock Project TR; re-submitted August 2009; Part 18; Plate 2.6-12; ML092870321.	Identified and Admitted
APP-021-S	Dewey-Burdock Project TR; re-submitted August 2009; Part 19; Plate 2.6-13; ML092870322.	Identified and Admitted
APP-021-T	Dewey-Burdock Project TR; Re-submitted August 2009; Part 20; Plate 2.6-14; ML092870323.	Identified and Admitted
APP-021-U	Dewey-Burdock Project TR; re-submitted August 2009; Part 21; Plate 2.6-15; ML092870324.	Identified and Admitted
APP-021-V	Dewey-Burdock Project TR; re-submitted August 2009; Part 22; Plate 2.8-1; ML092870325.	Identified and Admitted
APP-021-W	Dewey-Burdock Project TR; re-submitted August 2009; Part 23; Plate 2.8-2; ML092870326.	Identified and Admitted
APP-021-X	Dewey-Burdock Project TR; re-submitted August 2009; Part 24; Plate 2.8-3; ML092870327.	Identified and Admitted
APP-021-Y	Dewey-Burdock Project TR; re-submitted August 2009; Part 25; Plate 3.1-1; ML092870328.	Identified and Admitted
APP-021-Z	Dewey-Burdock Project TR; re-submitted August 2009; Part 26; Plate 3.1-2; ML092870329.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-021-AA	Dewey-Burdock Project TR; Re-submitted August 2009; Part 27; App. 2.2-A thru 2.6-B; ML092870350.	Identified and Admitted
APP-021-BB	Dewey-Burdock Project TR; re-submitted August 2009; Part 28; App. 2.6-C thru 2.7-B(partial); ML092870351	Identified and Admitted
APP-021-CC	Dewey-Burdock Project TR; Re-submittal August 2009; Part 29, App. 2.7-B (Partial) thru 2.7-F; ML092870370.	Identified and Admitted
APP-021-DD	Dewey-Burdock Project TR; re-submitted August 2009; Part 30; App. 2.7-G thru 2.8-F (partial); ML092870354.	Identified and Admitted
APP-021-EE	Dewey-Burdock TR; Re-submitted August 2009; Part 31; App. 2-8.F (Partial); ML092870357.	Identified and Admitted
APP-021-FF	Dewey-Burdock Project TR; re-submitted August 2009; Part 32; App. 2.8-G thru 2.9-A; ML092870358.	Identified and Admitted
APP-021-GG	Dewey-Burdock Project TR; re-submitted August 2009; Part 33; App. 4.2-A thru 7.3-A (partial); ML092870343.	Identified and Admitted
APP-021-HH	Dewey-Burdock Project TR; re-submitted August 2009; Part 34; App. 7.3-A (partial) thru 7.3-B; ML092870344.	Identified and Admitted
APP-022	Geochemical Data from Groundwater at the Proposed Dewey Burdock Uranium In-situ Recovery Mine, Edgemont, South Dakota: U.S. Geological Survey Open-File Report 2012-1070.	Identified and Admitted
APP-023	Uranium In-Situ Recovery and the Proposed Dewey Burdock Site, Edgemont, South Dakota, Public Meeting Talk Given by Dr. Raymond Johnson, U.S. Geological Survey, in Hot Springs, SD on Feb. 7, 2013 and Custer, SD on May 22, 2013.	Identified and Admitted
APP-024	Pre-Licensing Well Construction, Lost Creek ISR Uranium Recovery Project; ML091520101.	Identified and Admitted
APP-025	Numerical Modeling of Hydrogeologic Conditions, Dewey-Burdock Project, February 2012; ML12062A096.	Identified and Admitted
APP-026	Update on USGS research at the proposed Dewey Burdock uranium in-situ recovery mine, Edgemont, South Dakota, presentation to EPA Region 8 in Denver, CO on Feb. 22, 2012, based on USGS OFR 2012-1070.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-027-A	Report to Accompany Madison Water Right Permit Application, June 2012; ML12193A239.	Identified and Admitted
APP-027-B	Report to Accompany Madison Water Right Permit Application, June 2012, Appendix A; ML12193A234.	Identified and Admitted
APP-027-C	Report to Accompany Madison Water Right Permit Application, June 2012, Appendix B; ML12193A235.	Identified and Admitted
APP-028	Report to the Chief Engineer on Water Permit Application No. 2685-2 [Madison Aquifer], ADAMS Accession No. ML13165A160, November 2, 2012.	Identified and Admitted
APP-029	Letter Agreement between Powertech and Fall River County Commission.	Identified and Admitted
APP-030	NUREG/CR-6733, A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees - Final Report, July 2001; ML012840152.	Identified and Admitted
APP-031	Decision of the TCEQ Executive Director regarding Uranium Energy Corporation's Permit No. UR03075.	Identified and Admitted
APP-032	In-Situ Leach Uranium Mining in the United States of America: Past, Present and Future, by D.H. Underhill, in IAEA TECDOC-720, Uranium In Situ Leaching, Proceedings of a Technical Committee Held in Vienna, 5-8 October 1992, September 1993.	Identified and Admitted
APP-033	Safety Evaluation Report for the Moore Ranch ISR Project in Campbell County, Wyoming, Materials License No. SUA-1596; ML101310291.	Identified and Admitted
APP-034	Safety Evaluation Report for the Nichols Ranch In Situ Recovery Project in Johnson and Campbell Counties, Wyoming, Material License No. SUA-1597; ML102240206.	Identified and Admitted
APP-035	Safety Evaluation Report for the Lost Creek Project in Sweetwater County, Wyoming, Materials License No. SUA-1598; ML112231724.	Identified and Admitted
APP-036	Safety Evaluation Report for the Strata Energy, Inc. Ross ISR Project, Crook County, Wyoming, Materials License No. SUA-1601; ML14002A107.	Identified and Admitted
APP-037	Errol Lawrence Initial Testimony.	Identified and Admitted
APP-038	Errol Lawrence CV.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-039	Materials License SUA-1597 for the Nichols Ranch ISR Project, July 2011; ML111751649.	Identified and Admitted
APP-040-A	Dewey-Burdock Project Environment Report (ER); Re-submittal August 2009; Part 1; Cover thru Sec. 3.4.2.1.1; ML09270345.	Identified and Admitted
APP-040-B	Dewey-Burdock Project Environmental Report (ER); re-submitted August 2009; Part 2; Sec. 3.4.2.1.2 thru 3.12; ML092870346.	Identified and Admitted
APP-040-C	Dewey-Burdock Project Environmental Report (ER); re-submitted August 2009; Part 1; Sec. 4 thru end; ML092870360.	Identified and Admitted
APP-040-D	ER Plate 3.1-1; ML092870380.	Identified and Admitted
APP-040-E	ER Plate 3.3-1; ML0921870381.	Identified and Admitted
APP-040-F	ER Plate 3.3-1; ML092870381.	Identified and Admitted
APP-040-G	ER Plate 3.3-3; ML092870383.	Identified and Admitted
APP-040-H	ER Plate 3.3-4; ML092870591.	Identified and Admitted
APP-040-I	ER Plate 3.3-5; ML092870386.	Identified and Admitted
APP-040-J	ER Plate 3.3-6; ML092870387.	Identified and Admitted
APP-040-K	ER Plate 3.3-7; ML092870388.	Identified and Admitted
APP-040-L	ER Plate 3.3-8; ML092870389.	Identified and Admitted
APP-040-M	ER Plate 3.3-9; ML092870390.	Identified and Admitted
APP-040-N	ER Plate 3.3-10; ML092870592.	Identified and Admitted
APP-040-O	ER Plate 3.3-11; ML092870586.	Identified and Admitted
APP-040-P	ER Plate 3.3-12; ML092870588.	Identified and Admitted
APP-040-Q	ER Plate 3.3-13; ML092870589.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-040-R	ER Plate 3.3-14; ML092870590.	Identified and Admitted
APP-040-S	ER Plate 3.3-15; ML092870394.	Identified and Admitted
APP-040-T	ER Plate 3.5-1; ML092870395.	Identified and Admitted
APP-040-U	ER Plate 3.5-2; ML092870397.	Identified and Admitted
APP-040-V	ER Plate 6.1-1; ML092870593.	Identified and Admitted
APP-040-W	ER Replacement Plates; ML093370652.	Identified and Admitted
APP-040-X	ER App. 3.3-A thru 3.3-E; ML092870411.	Identified and Admitted
APP-040-Y	ER App. 3.3-F thru 3.4-A; ML092870421.	Identified and Admitted
APP-040-Z	ER App. 3.4-B thru 3.4-E; ML092870414.	Identified and Admitted
APP-040-AA	ER App.3.5-A thru 3.5-F; ML092870416.	Identified and Admitted
APP-040-BB	ER App. 3.5-F thru 3.5-I; ML092870422.	Identified and Admitted
APP-040-CC	ER App. 3.5-J thru 3.6-C; ML092870407.	Identified and Admitted
APP-040-DD	ER App. 4.6-A; ML092870409.	Identified and Admitted
APP-040-EE	ER App. 4.14-C thru 6.1-G; ML092870413.	Identified and Admitted
APP-041	Using Groundwater and Solid-phase Geochemistry for Reactive Transport Modeling at the Proposed Dewey Burdock Uranium In-situ Recovery Site, Edgemont, South Dakota, presentation given to EPA on April 11, 2012.	Identified and Admitted
APP-042-A	Dewey-Burdock Project Revised Class III Underground Injection Control Permit Application, Revised July 2012, Cover Letter; ML12244A519.	Identified and Admitted
APP-042-B	Dewey-Burdock Project Revised Class III Underground Injection Control Permit Application, Revised July 2012, Text thru Sec. 4; ML12244A522.	Identified and Admitted

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
APP-042-C	Dewey-Burdock Project Revised Class III Underground Injection Control Permit Application, Revised July 2012, Text Sec. 5 thru 8; ML12244A520.	Identified and Admitted
APP-042-D	Dewey-Burdock Project Revised Class III Underground Injection Control Permit Application, Revised July 2012, Text Sec. 9 thru end; ML12244A521.	Identified and Admitted
APP-043	Revised Response to TR RAI 5.7.8-3(b), June 27, 2012, ML12179A534.	Identified and Admitted
APP-044	Results of Acceptance Review for TR RAI Responses; ML110470245.	Identified and Admitted
APP-045	Responses to Technical Review Comments for Dewey-Burdock Large Scale Mine Permit Application; ML13144A182.	Identified and Admitted
APP-046	Doyl Fritz Initial Testimony.	Identified and Admitted
APP-047	Doyl Fritz CV.	Identified and Admitted
APP-048	Report to the Chief Engineer on Water Permit Application No. 2686-2 [Inyan Kara Aquifer], ADAMS Accession No. ML13165A168, November 2, 2012.	Identified and Admitted
APP-049	Water Right Permit No. 2626-2 Application and Permit.	Identified and Admitted
APP-050	ER RAI Responses, transmittal letter and text; ML102380516.	Identified and Admitted
APP-051	Groundwater Discharge Plan (GDP) permit application, as updated with replacement pages through November 2012.	Identified and Admitted
APP-052	Dewey-Burdock BLM Site Determinations; January 10, 2014 letter from BLM to SD SHPO; ML14014A303.	Identified and Admitted
APP-053	Gwyn McKee Initial Testimony.	Identified and Admitted
APP-054	Gwyn McKee CV.	Identified and Admitted
~~APP-055~~	~~Greater Sage-Grouse Management Plan, South Dakota, 2008-2017; ML12241A215.~~	Not Offered
~~APP-056~~	~~A Report on National Greater Sage-Grouse Conservation Measures.~~	Not Offered
~~APP-057~~	~~Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report.~~	Not Offered

Applicant's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
~~APP-058~~	~~Endangered Species Act Consultation Handbook, Procedures for Conducting Section 7 Consultations and Conferences, U.S. Fish and Wildlife Service and National Marine Fisheries Service,1998~~	Not Offered
~~APP-059~~	~~Frequently Asked Questions on ESA Consultations, USFWS.~~	Not Offered
~~APP-060~~	~~Whooping Crane (Grus americana) 5-Year Review: Summary and Evaluation, USFWS.~~	Not Offered
~~APP-061~~	~~Division of Migratory Bird Management, Important Information for Sandhill Hunters, Fall Whooping Crane Sightings 1943-1999.~~	Not Offered
~~APP-062~~	~~Black-Footed Ferret Recovery Plan, Second Revision, Nov. 2013.~~	Not Offered
APP-063	Answering Testimony of Dr, Lynne Sebastian.	Identified and Admitted
APP-064	Dr. Adrien Hannus Answering Testimony.	Identified and Admitted
APP-065	Hal Demuth Answering Testimony.	Identified and Admitted
APP-066	Errol Lawrence Answering Testimony.	Identified and Admitted
APP-067	Figure to Accompany Errol Lawrence Answering Testimony.	Identified and Admitted
APP-068	Doyl Fritz Answering Testimony.	Identified and Admitted
APP-069	Figures to Accompany Doyl Fritz Answering Testimony.	Identified and Admitted
APP-070	Gwyn McKee Answering Testimony.	Identified and Admitted
APP-071	2013 Wildlife Monitoring Report for the Dewey-Burdock Project.	Identified and Admitted

Consolidated Intervenor's Exhibits			
ADAMS Number	**Exhibit Number**	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
INT-001		Testimony of Dr. Louis Redmond regarding Lakota Cultural Resources.	Identified and Admitted
INT-002		10/31/09 Report of Dr. Richard Abitz on Powertech Baseline Report.	Identified and Admitted
INT-003		Statement of Professional Qualifications of Dr. Louis Redmond.	Identified and Admitted
INT-004		Statement of Professional Qualifications of Dr. Hannan LaGarry	Identified and Admitted
~~INT-005~~		~~Statement of Professional Qualifications of Dr. Richard Abitz.~~	Excluded by Board Order (August 1, 2014)
INT-006		Declaration of Wilmer Mesteth regarding Lakota Cultural Resources.	Identified and Admitted
INT-007		Testimony of Susan Henderson regarding water resources issues and concerns of downflow rancher.	Identified and Admitted
~~INT-008~~		~~Testimony of Dr. Donald Kelley a former forensic pathologist regarding the radiological impact on humans and other animals.~~	Excluded by Board (At Hearing)
~~INT-008a~~		~~Dr. Donald Kelley Affidavit~~	Excluded by Board (At Hearing)
~~INT-009~~		~~Statement of Qualifications of Dr. Kelley.~~	Excluded by Board (At Hearing)
INT-010		Testimony of Peggy Detmers a Wildlife Biologist Regarding the D-B Site and Endangered Species.	Identified as Proffered
INT-010a		Statement of Qualifications of Peggy Detmers.	Identified as Proffered
INT-010b		Map - Beaver Creek Watershed.	Identified as Proffered
INT-010c		Map - Central Flyway.	Identified as Proffered
INT-010d		Map - Whooping Crane Route.	Identified as Proffered
INT-010e		Map - D-B Project Site.	Identified as Proffered
INT-010f		Google Photo - Dewey Project - close.	Identified as Proffered

Consolidated Intervenor's Exhibits			
ADAMS Number	**Exhibit Number**	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
INT-010g	Google Photo - Dewey Project - Medium Height.		Identified as Proffered
INT-010h	Google Photo - Dewey Project - Wide.		Identified as Proffered
INT-010i	Map - 5 state area - D-B Project.		Identified as Proffered
INT-010j	GPS Google Photo - D-B Project - Close-up.		Identified as Proffered
INT-010k	GPS Google Photo - D-B Project - Drainage.		Identified as Proffered
INT-010l	GPS Google Photo - D-B Project - wideshot.		Identified as Proffered
INT-010m	Map - D-B area.		Identified as Proffered
INT-010n	GPS Google Photo - D-B Project - triangle.		Identified as Proffered
INT-010o	Diagram - Whooping Crane Bioaccumulaton.		Identified as Proffered
INT-010p	Beaver Creek Final Fecal Coliform.		Identified as Proffered
~~INT-010q~~	~~IPAC~~		NOT FILED
INT-011	Testimony of Marvin Kammera, a rancher, on potential impacts on down flow ranchers as to Inyan Kara water quantity and quality.		Identified and Admitted
INT-012	Testimony of Dayton Hyde, Owner/Operator of Black Hills Wild Horse Sanctuary, on Potential Impacts and Concerns about Proposed ISL Mine on Downflow Surface and Underground Water Resources.		Identified and Admitted
INT-013	Testimony of Dr. Hannon LaGarry a geologic stratigrapher regarding fractures, faults, and other geologic features not adequately considered by Powertech or NRC staff.		Identified and Admitted
INT-014	Testimony of Linsey McLane, a Bio-chemist Regarding Bioaccumulation of Heavy Metals in Plant and Animal Species.		Identified and Admitted
~~INT-014a~~	~~Powerpoint of Linsey McLane, a biochemist regarding bioaccumulation of heavy metals in plants and animal species~~		NOT FILED
NT-014b	Linsey McLane Affidavit		Identified and Admitted

Consolidated Intervenor's Exhibits			
ADAMS Number	**Exhibit Number**	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
~~INT-15~~	~~INT Comments on DSEIS, with Exhibits~~		NOT FILED
INT-016	Petition to Intervene, with Exhibits.		Identified and Admitted
INT-017	Statement of Contentions on DSEIS, with Exhibits.		Identified and Admitted
INT-018	INT Statement of Contentions on FSEIS, with Exhibits.		Identified and Admitted
INT-019	Dr. Redmond Rebuttal Letter.		Identified and Admitted
INT-020	Rebuttal Written Testimony of Dr. Hannan LaGarry.		Identified and Admitted
INT-020A	Expert Opinion Regarding the Proposed Dewey-Burdock Project ISL Mine Near Edgemont, South Dakota.		Identified and Admitted
INT-021A	Violation History - Crow Butte ISL mine in Crawford, Nebraska.		Identified and Admitted
INT-021B	Violation History - Crow Butte ISL mine in Crawford, Nebraska.		Identified and Admitted
INT-021C	Violation History - Crow Butte ISL mine in Crawford, Nebraska.		Identified and Admitted
INT-022A	Violation History - Smith Highland Ranch.		Identified and Admitted
INT-022B	Violation History - Smith Highland Ranch.		Identified and Admitted
INT-022C	Violation History - Smith Highland Ranch.		Identified and Admitted
~~INT-023~~	~~Violation History – Irigaray-Christiansen Ranch~~		NOT FILED

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-001	Initial Testimony and Affidavits from Haimanot Yilma, Kellee L. Jamerson, Thomas Lancaster, James Prikryl, and Amy Hester	Identified and Admitted
NRC-002-R	REVISED - Statement of Professional Qualifications of Po Wen (Kevin) Hsueh.	Identified and Admitted
NRC-003	Statement of Professional Qualifications of Haimanot Yilma	Identified and Admitted
NRC-004	Statement of Professional Qualifications of Kellee L. Jamerson	Identified and Admitted
NRC-005	Statement of Professional Qualifications of Thomas Lancaster	Identified and Admitted
NRC-006	Statement of Professional Qualifications of James Prikryl	Identified and Admitted
NRC-007	Statement of Professional Qualifications of Amy Hester	Identified and Admitted
NRC-008-A-1	NUREG-1910, Supplement 4, Vol. 1, Final Report, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic Environmental Impact	Identified and Admitted
NRC-008-A-2	NUREG-1910, Supplement 4, Vol. 1, Final Report, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic Environmental....	Identified and Admitted
NRC-008-B-1	NUREG-1910, Supplement 4, Vol. 2, Final Report, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic Environmental	Identified and Admitted
NRC-008-B-2	NUREG-1910, Supplement 4, Vol. 2., Final Report, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic Environmental Impact Statement for In-Situ Leach....	Identified and Admitted
NRC-009-A-1	NUREG-1910, Supplement 4, Vol. 1, Draft Report for Comment, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic Environmental Impact Statement....	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-009-A-2	NUREG-1910, Supplement 4, Vol. 1, Draft Report for Comment, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic	Identified and Admitted
NRC-009-B-1	NUREG-1910, S4, V2, DFC, EIS for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Suppl to the GEIS for In-Situ Leach Uranium Milling Facilities (Chapter 5 to 11 and Appendices)....	Identified and Admitted
NRC-009-B-2	NUREG-1910, Supplement 4, Vol. 2, Draft Report for Comment, Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota: Supplement to the Generic	Identified and Admitted
NRC-010-A-1	NUREG-1910, Vol. 1, Final Report, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (Chapters 1 through 4) (May 2009) (ADAMS Accession No.	Identified and Admitted
NRC-010-A-2	NUREG-1910, Vol. 1, Final Report, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (Chapters 1 through 4)(May 2009) (ADAMS Accession No. ML091480244 Page 153-512	Identified and Admitted
NRC-010-A-3	NUREG-1910, Vol. 1, Final Report, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (Chapters 1 through 4) (May 2009) (ADAMS Accession No. ML091480244) Pages 513-704.	Identified and Admitted
NRC-010-B-1	NUREG-1910, Vol. 2, Final Report, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (Chapters 5 through 12 and Appendices) (May 2009) (ADAMS Accession No. ML091480188). Pages 1-272.	Identified and Admitted
NRC-010-B-2	NUREG-1910, Vol. 2, Final Report, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (Chapters 5 through 12 and Appendices) (May 2009) (ADAMS Accession No. ML091480188). Pages 273-612.	Identified and Admitted
NRC-011	Dewey-Burdock Record of Decision (Apr. 8, 2014) (ADAMS Accession No. ML14066A466).	Identified and Admitted
NRC-012	Materials License SUA-1600, Powertech (USA), Inc. (Apr. 8, 2014) (ADAMS Accession No. ML14043A392).	Identified and Admitted
NRC-013	NUREG-1569, Standard Review Plan for In-Situ Leach Uranium Extraction License Applications (June 4, 2003) (ADAMS Accession No. ML031550272).	Identified and Admitted
NRC-014	NUREG-1748, Final Report, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (Aug. 2003) (ADAMS Accession No. ML032450279).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-015	Dewey-Burdock ISR Project Summary of Tribal Outreach Timeline (Apr. 8, 2014) (ADAMS Accession No. ML14099A010).	Identified and Admitted
NRC-016	Submittal of Comments on Draft Programmatic Agreement for the Proposed Dewey-Burdock ISR Uranium Mining Project. (ADAMS Accession No. ML14077A002)	Identified and Admitted
NRC-017	Dewey-Burdock ISR Project Documents Pertaining to Section 106 of the National Historic Preservation Act (June 10, 2014), available at http://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/dewey-burdock/section-106-docs.html	Identified and Admitted
NRC-018-A	Final PA for the Dewey-Burdock Project. (ADAMS Accession Nos. ML14066A347).	Identified and Admitted
NRC-018-B	Final Appendix for the Dewey-Burdock Project PA. (ADAMS Accession No. ML14066A350).	Identified and Admitted
NRC-018-C	NRC PA Signature Page. (ADAMS Accession No. ML14098A464).	Identified and Admitted
NRC-018-D	Letter from ACHP finalizing Section 106. (ADAMS Accession No. ML14099A025).	Identified and Admitted
NRC-018-E	ACHP PA Signature Page. (ADAMS Accession No. ML4098A1550).	Identified and Admitted
NRC-018-F	BLM signature on PA; (Mar. 25, 2014) (ADAMS Accession No. ML14098A102).	Identified and Admitted
NRC-018-G	South Dakota SHPO PA Signature Page. (ADAMS Accession No. ML14098A107).	Identified and Admitted
NRC-018-H	Powertech PA Signature Page. (ADAMS Accession No. ML14098A110).	Identified and Admitted
NRC-019	Summary Report Regarding the Tribal Cultural Surveys Completed for the Dewey-Burdock Uranium In Situ Recovery Project. (Dec. 16, 2013) (ADAMS Accession No. ML13343A142).	Identified and Admitted
NRC-020	NRC Letter transmitting the Applicant's Statement of Work to all consulting parties. (May 7,2012). (ADAMS Accession No. ML121250102).	Identified and Admitted
NRC-021	3/19/2010 NRC sent initial Section 106 invitation letters to 17 tribes requesting their input on the proposed action. ADAMS Accession No. ML100331999.	Identified and Admitted
NRC-022	Letter to Oglala Sioux Tribe Re: Request for Updated Tribal Council Members Consultation (Sep. 8, 2010) ADAMS Accession No. ML102450647).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-023	Powertech Dewey-Burdock Draft Scope of Work and Figures - Identification of Properties of Religious and Cultural Significance (Mar.07,2012) (ADAMS Accession No. ML120870197).	Identified and Admitted
NRC-024	NRC Staff Letter Postponing fall 2012 tribal survey. (12/14/2012). ADAMS Accession No. ML12335A175.	Identified and Admitted
NRC-025-A	HDR, Engineering Inc., "Assessment of the Visual Effects of the Powder River Basin Project, New Build Segment, on Previously Identified Historic Properties in South Dakota and Wyoming"....	Identified and Admitted
NRC-025-B	HDR, Engineering Inc. "Assessment of the Visual Effects of the Powder River Basin Project, New Build Segment, on Previously Identified Historic Properties in South Dakota and Wyoming.""....	Identified and Admitted
NRC-026	WY SHPO (Wyoming State Historic Preservation Office). "Dewey-Burdock Line of Sight Analysis." Email (September 4) from R. Currit, Senior Archaeologist, Wyoming State Historic Preservation Office to H. Yilma,NRC. September 4,2013....	Identified and Admitted
NRC-027	ACHP, National Register Evaluation Criteria, Advisory Council on Historic Preservation. (Mar. 11, 2008) (2012 ADAMS Accession No. ML12262A055).	Identified and Admitted
NRC-028	Email from Waste Win Young to NRC Staff re SRST Comments Final Draft PA Dewey-Burdock SRST THPO Comments (Feb. 20, 2014) (ADAMS Accession No. ML14105A367).	Identified and Admitted
NRC-029	Letter to Cheyenne River Sioux Tribe re: Response Received Regarding Tribal Survey for Dewey-Burdock (Dec. 14, 2012) (ADAMS Accession No. ML12335A175).	Identified and Admitted
NRC-030	Standing Rock Sioux Tribe Comments - Final Draft PA Dewey-Burdock SRST-THPO Comments (Feb. 05, 2014) (ADAMS Accession No. ML14055A513).	Identified and Admitted
NRC-031	04/07/2014 Letter from the Advisory Council on Historic Preservation to the Standing Rock Sioux Tribe Concerning the Dewey- Burdock ISR Project, SD. ADAMS Accession No. ML14115A448.	Identified and Admitted
~~NRC-032~~		NOT FILED
NRC-033	09/13/2012 Summary of August 30,2012 Public Meeting with Powertech Inc, to Discuss Powertech's Proposed Environmental Monitoring Program related to the proposed Dewey-Burdock Project. ADAMS Accession No. ML12255A258.	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-034	Letter to Ponca Tribe of Nebraska Re: Invitation for Formal Consultation Under Section 106 of the National Historic Preservation Act (Mar. 4, 2011) (ADAMS Accession No. ML110550372).	Identified and Admitted
NRC-035	Letter to Santee Sioux Tribe of Nebraska Re: Invitation for Formal Consultation Under Section 106 of the National Historic Preservation Act (Mar. 4, 2011) (ADAMS Accession No. ML110550172).	Identified and Admitted
NRC-036	Letter to Crow Tribe of Montana Re: Invitation for Formal Consultation Under Section 106 of the national Historic Preservation Act (Mar. 04,2011) (ADAMS Accession No. ML110550535).	Identified and Admitted
NRC-037	12/3/2010 Yankton Sioux tribe requests face-to-face meeting to discuss past and current project as well as request for TCP survey. Sisseton Wahpeton and Fort Peck tribes also asked for face-to-face meeting via phone....	Identified and Admitted
NRC-038-A	Invitation for Informal Information-Gathering Meeting Pertaining to the Dewey-Burdock, Crow Butte North Trend, and Crow Butte License Renewal, In-Situ Uranium Recovery Projects (May 12, 2011)(ADAMS Accession No. ML111320251).	Identified and Admitted
NRC-038-B	Informal Information Gathering Meeting - Pine Ridge, SD Invitation to Section 106 Consultation Regarding Dewey-Burdock Project (ADAMS Accession No. ML111870622) (Package).	Identified and Admitted
NRC-038-C	Memo to Kevin Hsueh Re: Transcript for the June 8, 2011 Informal Information - Gathering Meeting Held in Pine Ridge, SD (July 8, 2011) (ADAMS Accession No. ML111870623).	Identified and Admitted
NRC-038-D	Attendee List - Informal Information Gathering Meeting Held in Pine Ridge, SD (July 8, 2011) (ADAMS Accession No. ML111870624).	Identified and Admitted
NRC-038-E	Transcript Re: Informal Information-Gathering Meeting Pertaining to Crow Butte Inc. and Powertech Inc. Proposed ISR Facilities (June 8, 2011) (ADAMS Accession No. ML111721938) (Pages 1-195).	Identified and Admitted
NRC-038-F	Presentation Slides for the Section 106 Consultation Meeting Pertaining to the Proposed Dewey-Burdock, Crow Butte North Trend, and Crow Butte LR In-Situ Uranium Recovery Projects (June 8, 2011) (ADAMS Accession No. ML111661428).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-039	Meeting Agenda for Informal Information Gathering Pertaining to Dewey-Burdock, Crow Butte. Accompanying NRC letter with map of the proposed project boundary and digital copies of the Class III	Identified and Admitted
NRC-040	Letter to Richard Blubaugh, Powertech, Re: NRC Information Request Relating to Section 106 and NEPA Reviews for the Proposed Dewey-Burdock Project (Aug. 12, 2011) (ADAMS Accession No. ML112170237).	Identified and Admitted
NRC-041	8/31/2011 NRC letter from Powertech letter and proposal in response to the Aug 12, 2011 request for NHPA Section 106 info. This letter enclosed a proposal which outlined a phased approach to	Identified and Admitted
NRC-042	10/20/2011 NRC provided copies of the 6/8/2011 meeting transcripts to all the Tribes. Thank you Letter to James Laysbad of Oglala Sioux Tribe Enclosing the Transcript of the Information-Gathering Meeting and Unredacted Survey Pertaining....	Identified and Admitted
~~NRC-043~~		NOT FILED
NRC-044	1/19/2012 NRC invitation letters to all THPOs for a planned Feb 2012 meeting to discuss how best to conduct the TCP survey. (ADAMS Accession No. ML12031A280).	Identified and Admitted
NRC-045	2/01/2012 (February 14-15, 2012 meeting agenda). (ADAMS Accession No. ML120320436).	Identified and Admitted
NRC-046	3/28/2012 - NRC transmitted transcripts of the NRC face-to-face meeting in Rapid City, SD to discuss how best to conduct the TCP survey. (ADAMS Accession Nos. ML120670319).	Identified and Admitted
NRC-047	Meeting the "Reasonable and Good Faith" Identification Standard in Section 106 Review (ACHP), availablae at http://www.achp.gov/docs/reasonable_good_faith_identification.pdf.	Identified and Admitted
NRC-048	NEPA and NHPA, A Handbook for Integrating NEPA and Section 106 (CEQ and ACHP), available at http://www.achp.gov/docs/NEPA NHPA Section 106 Handbook Mar2013.pdf.	Identified and Admitted
NRC-049	Letter to Crow Creek Sioux Tribe Re: Transmittal of Applicant's Draft Statement of Work (May 7, 2012) (ADAMS Accession No. ML 121250102).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-050	Letter to Oglala Sioux Tribe Re: Transmittal of Transcript from Teleconference Conducted on April 24, 2012 (June 26, 2012) (ADAMS Accession No. ML12177A109).	Identified and Admitted
NRC-051	NRC Email Re: August 9, 2012 Teleconference Invitation and Revised Statement of Work Transmittal (Aug. 07, 2012) (ADAMS Accession No. ML12261A375).	Identified and Admitted
NRC-052	NRC Request Re: Scope of Work with Coverage Rate, Start Date, Duration, and Cost (Aug 30, 2012) (ADAMS Accession No. ML12261A470).	Identified and Admitted
NRC-053	Letter to Tribal Historic Preservation Officer Re: Transmittal of Tribes' Proposal and Cost Estimate of the Dewey-Burdock ISR Project (Oct. 12, 2012) (ADAMS Accession No. ML12286A310).	Identified and Admitted
NRC-054	Letter to James Laysbad, Oglala Sioux Tribe, Re: Information Related to Traditional Cultural Properties; Dewey-Burdock, Crow Butte North Trend, and Crow Butte LR ISP Projects (Oct. 28, 2011) (ADAMS Accession No. ML112980555)	Identified and Admitted
NRC-055	Letter to Tribal Historic Preservation Officers Re: Request for a Proposal with Cost Estimate for Dewey Burdock Project (Sep. 18, 2012) (ADAMS Accession No. ML12264A594).	Identified and Admitted
NRC-056	H. Yilma Email Re: Draft PA for Dewey-Burdock Project (Nov. 22, 2013) (ADAMS Accession No. ML13329A420).	Identified and Admitted
NRC-057	Dewey-Burdock Project Draft Programmatic Agreement (Nov. 22, 2013) (ADAMS Accession No. ML ML13329A466).	Identified and Admitted
NRC-058	Draft Appendix A for Dewey-Burdock Project PA (Nov. 22, 2013) (ADAMS Accession No. ML13329A468).	Identified and Admitted
NRC-059	Table 1.0 - NRC NRHP Determinations for Dewey-Burdock Draft PA (Nov. 22, 2013) (ADAMS Accession No. ML13329A470).	Identified and Admitted
NRC-060	STB Finance Docket No. 33407, Dakota, Minnesota & Eastern Railroad Corporation Construction into the Powder River Basin: Request for Review and Comment on 21 Archaeological Sites, Surface Transportation Board....	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-061	Letter to Oglala Sioux Tribe Re: Transmittal of TCP Survey Report for Dewey-Burdock Project (Dec. 23, 2013) (ADAMS Accession No. ML13357A234).	Identified and Admitted
NRC-062	NRC Overall Determinations of Eligibility and Assessments of Effects (Dec. 16, 2013) (ADAMS Accession No. ML13343A155).	Identified and Admitted
NRC-063	Draft NRC NRHP Determinations - Table 1.0 for Draft PA (Dec. 13, 2013) (ADAMS Accession No. ML13354B948).	Identified and Admitted
NRC-064	Letter from John Yellow Bird Steele, President of the Oglala Sioux Tribe Re: Refusal to Accept Dewey-Burdock In Situ Project Proposal (Nov. 5, 2012) (ADAMS Accession No. ML13026A005).	Identified and Admitted
NRC-065	Letter from Sisseton Wahpeton Oyaye Tribe Re: Refusal to Accept Dewey-Burdock In Situ Recovery Project Proposal (Nov. 6, 2012) (ADAMS Accession No. ML13036A104).	Identified and Admitted
NRC-066	Letter from Standing Rock Sioux Tribe Re: Tribal Survey Using Persons Without Sioux TCP Expertise to Identify Sioux TCP (Nov. 5, 2012) (ADAMS Accession No. ML13036A110).	Identified and Admitted
NRC-067	Email from Standing Rock Sioux Tribe Providing Comments on Final Draft PA Dewey-Burdock SRST-THPO (Feb. 20, 2014) (ADAMS Accession No. ML14059A199).	Identified and Admitted
NRC-068	Email Re: Transmittal of a Follow-up Email Pertaining to an Upcoming Field Survey for the Dewey-Burdock Project (Feb. 08, 2013) (ADAMS Accession No. ML13039A336).	Identified and Admitted
NRC-069	Letter to Oglala Sioux Tribe Re: Notification of Intention to Separate the NHPA Section 106 Process from NEPA Review for Dewey-Burdock ISR Project (Nov. 6, 2013) (ADAMS Accession No. ML13308B524.	Identified and Admitted
NRC-070	Letter to J. Fowler, ACHP, Re: Notification of Intention to Separate the NHPA Section 106 Process from NEPA Review for Dewey-Burdock IS Project (Nov. 13, 2013) (ADAMS Accession No. ML13311B184).	Identified and Admitted
NRC-071	Letter from Department of State Re: Keystone XL Pipeline Project Traditional Cultural Property (TCP) Studies (Aug. 4, 2009).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-072	A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota, Vol. I, (Page 1.2 through Page 4.18)....	Identified and Admitted
NRC-073	A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota (Pages 5.53 through 5.106)....	Identified and Admitted
NRC-074	NRC (1980). Regulatory Guide 4.14, Radiological Effluent and Environmental Monitoring at Uranium Mills. ADAMS Accession No. ML003739941.	Identified and Admitted
NRC-075	NRC, 2009. Staff Assessment of Ground Water Impacts from Previously Licensed In-Situ Uranium Recovery Facilities, Memorandum from C. Miller to Chairman Jaczko , et al. Washington DC: USNRC, July 10, 2009d ADAMS Accession No. ML091770385.	Identified and Admitted
NRC-076	NUREG/CR-6705, Historical Case Analysis of Uranium Plume Attenuation.. (Feb. 28, 2001) (ADAMS Accession No. ML010460162).	Identified and Admitted
NRC-077	05/28/2010 NRC Staff Request for Additional Information for Proposed Dewey-Burdock In Situ Recovery Facility (ADAMS Accession No. ML101460286).	Identified and Admitted
NRC-078	09/13/2012 NRC Staff RAI: Summary of August 30, 2012 Public Meeting with Powertech Inc, to Discuss Powertech's Proposed Environmental Monitoring Program related to the proposed Dewey-Burdock Project. (ADAMS Accession No. ML12255A258).	Identified and Admitted
NRC-079	09/09/2013 NRC Staff RAI: Email Concerning Review of Powertech's Additional Statistical Analysis of Radium-226 Soil Sampling Data and Gamma Measurements and Request for Information. ADAMS (Accession No.	Identified and Admitted
NRC-080	12/09/2013 NRC Staff RAI: NRC Staff review of revised statistical analysis of the Radium 226 (soil) and gamma radiation correlation for screening surveys at the proposed Dewey-Burdock Project requesting additional information....	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-081	Gott, G.B., D.E. Wolcott, and C.G. Bowles. Stratigraphy of the Inyan Kara Group and Localization of Uranium Deposits, Southern Black Hills, South Dakota and Wyoming. ML120310042. U.S. Geological Survey Water Resources Investigation Report....	Identified and Admitted
NRC-082	Driscoll, D.G., J.M. Carter, J.E. Williamson, and L.D. Putnam. Hydrology of the Black Hills Area, South Dakota. U.S. Geological Survey Water Resources Investigation Report 02-4094. (ADAMS Accession No. ML12240A218). 2002.	Identified and Admitted
NRC-083	Braddock,W.A. Geology of the Jewel Cave SW Quadrangle Custer County, South Dakota. U.S. Geological Survey Bulletin 1063-G. (08 April 2013)....	Identified and Admitted
NRC-084-A	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survery for Edgemont, South Dakota, Wyoming. National Uranium Resource Evaluation (NURE) Program....	Identified and Admitted
NRC-084-B	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Edgemont, South Dakota, Wyoming. National Uranium Resource Evaluation (NURE) Program,....	Identified and Admitted
NRC-084-C	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Edgemont, South Dakota, Wyoming. National Uranium....	Identified and Admitted
NRC-084-D	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survery for Edgemont, South Dakota, Wyoming. National Uranium Resource Evaluation (NURE) Program....	Identified and Admitted
NRC-084-E	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survery for Edgemont, South Dakota, Wyoming. National Uranium Resource Evaluation (NURE) Program....	Identified and Admitted
NRC-084-F	Butz, T.R., N.E. Dean, C.S. Bard, R.N. Helgerson, J.G. Grimes, and P.M. Pritz. Hydrogeochemical and Stream Sediment Detailed Geochemical Survery for Edgemont, South Dakota, Wyoming. National Uranium	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-085	Darton, N.H. Geology and Water Resources of the Northern Portion of the Black Hills and Adjoining Regions of South Dakota and Wyoming. U.S. Geological Survey Professional Paper 65. 1909....	Identified and Admitted
NRC-086	Epstein, J.B. "Hydrology, Hazards, and Geomorphic Development of Gypsum Karst in the Northern Black Hills, South Dakota and Wyoming. "U.S. Geological Survey Water-Resource Investigation Report 01-4011....	Identified and Admitted
NRC-087	NUREG-1910, Final Report, Supplement 1, Environmental Impact Statement for the Moore Ranch ISR Project in Campbell County, Wyoming, Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities....	Identified and Admitted
NRC-088	NUREG-1910, Final Report, Supplement 1, Environmental Impact Statement for the Moore Ranch ISR Project in Campbell County, Wyoming, Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities....	Identified and Admitted
NRC-089	NUREG-1910, Final Report, Supplement 3, Environmental Impact Statement for the Lost Creek ISR Project in Sweetwater County, Wyoming. Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities....	Identified and Admitted
NRC-090	SDDENR. "Report to the Chief Engineer on Water Permit Application No. 2686-2, Powertech (USA) Inc., November 2, 2012." November 2012a. ADAMS Accession No. ML13165A168.	Identified and Admitted
NRC-091	NRC. "Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ Uranium Recovery Facilities." Memorandum to Chairman Jaczko, Commissioner Klein, and Commissioner Svinicki, NRC from C. Miller....	Identified and Admitted
~~NRC-092~~		NOT FILED
NRC-093	EPA comments on FSEIS; (ADAMS Accession No. ML14070A230).	Identified and Admitted
NRC-094	NRC Regulatory Guide 3.11, Rev. 3, Design, Construction, and Inspection of Embankment Retention Systems at Uranium Recovery Facilities, November 2008, (ADAMS Accession No. ML082380144).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-095	Letter to P. Strobel Re: EPAs Response Comment to FSEIS (Mar. 25, 2014) (ADAMS Accession No. ML14078A044).	Identified and Admitted
NRC-096	Comment (14) of Robert F. Stewart on Behalf of the Dept. of the Interior, Office of Environmental Policy and Compliance on Draft Supplemental Environmental Impact Statement (DSEIS), Dewey-Burdock Project.....	Identified and Admitted
~~NRC-097~~	~~Request for Information Regarding Endangered or Threatened Species and Critical Habitat for the Powertech Inc. Proposed Dewey-Burdock In-Situ Recovery Facility Near Edgemont South Dakota (Mar. 15, 2010).(ADAMS Accession No. ML100331503).~~	Not Offered
~~NRC-098~~	~~FWS. Whooping Cranes and Wind Development - An Issue Paper. (Apr. 2009)....~~	Not Offered
~~NRC-099~~	~~Avian Power Line Interaction Committee. "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (ADAMS Accession No. ML12243A391).~~	Not Offered
~~NRC-100~~	~~Informal Information Gathering Meetings Trip Summery (Dec. 9, 2010) (ADAMS Accession No. ML093631627).~~	Not Offered
~~NRC-101~~	~~Email from Mitchell Iverson of BLM. (June 25, 2012) & Wildlife Stipulations in the Current 1986 South Dakota Resource Management Plan. (ADAMS Accession No. ML12249A030).~~	Not Offered
~~NRC-102~~	~~USGS. "Fragile Legacy, Endangered, Threatened, and Rare Animals of South Dakota, Black-footed Ferret (Mustela nigripes)." (2006), available at http://www.npwrc.usgs.gov/resource/wildlife/sdrare/species/mustnigr.htm.~~	Not Offered
~~NRC-103~~	~~FWS. "Species Profile, Whooping Crane (Grus Americana)".~~	Not Offered
~~NRC-104~~	~~BLM. "Draft Environmental Impact Statement, Dewey Conveyor Project." DOI-BLM-MT-040-2009-002-EIS. (Jan. 2009b) (ADAMS Accession No. ML12209A089).~~	Not Offered
~~NRC-105~~	~~BLM. "Final Statewide Programmatic Biological Assessment: Black-Footed Ferret (Mustela nigripes)." August, 2005. Cheyenne, Wyoming: U.S. Bureau of Land Management, Wyoming State Office.~~	Not Offered

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
~~NRC-106~~	~~FWS. "South Dakota Field Office, Black-Footed Ferret," (Sep. 9, 2013), available at http://www.fws.gov/southdakotafieldoffice/b-fferret.htm.~~	Not Offered
~~NRC-107~~	~~FWS. "Black-Footed Ferret Draft Recovery Plan." Second Revision, (Feb. 2013), available at....~~	Not Offered
~~NRC-108~~	~~South Dakota State University. "South Dakota GAP Analysis Project." Brookings, South Dakota: South Dakota State University, Department of Wildlife and Fisheries Sciences (Jan. 13, 2012), available at http://www.sdstate.edu/nrm/gap/index.cfm.~~	Not Offered
~~NRC-109~~	~~South Dakota State University. "Suitable Habitat Predicted for the Black-Footed Ferret in South Dakota." available at http://www.sdstate.edu/nrm/gap/mammals/upload/blfootferret-model.pdf.~~	Not Offered
~~NRC-110~~		NOT FILED
~~NRC-111~~	~~Dewey-Burdock Record of Decision (Apr. 8, 2014) (ADAMS Accession No. ML14066A466).~~	Not Offered
~~NRC-112~~	~~Travsky, A., Beauvais, G.P. "Species Assessment for the Whooping Crane (Grus Americana) in Wyoming." October 2004.Cheyenne, Wyoming: United States Department of the Interior, Bureau of Land Management,....~~	Not Offered
~~NRC-113~~	~~Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered. 75 Fed. Reg. 13,909-13,959....~~	Not Offered
~~NRC-114~~	~~Habitat Assessment and Conservation Strategy for Sage Grouse and Other Selected Species on Buffalo Gap National Grassland, U.S. Department of Agriculture, Forest Service (Sep. 2005) (ADAMS Accession No.....~~	Not Offered
~~NRC-115~~	~~Email with Attachments from Mitchell Iverson, BLM, RE: Meeting at 11:30 EST(June 25, 2012) (ADAMS Accession No. ML12250A802).~~	Not Offered
~~NRC-116~~	~~Attachment 1, Appendix C, South Dakota Field Office Mitigation Guidelines (June 25, 2012) (ADAMS Accession No. ML12250A827).~~	Not Offered
~~NRC-117~~	~~Appendix D South Dakota Field Office Reclamation Guidelines.~~	Not Offered

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
~~NRC-118~~	~~BLM. Email Subject "Appendix E Wildlife Stipulations" and attachments. From M. Iverson, BLM, Acting Field Manager, South Dakota Field Office, to A. Hester, CNWRA, Southwest Research Institute. (June 25, 2012.)~~	Not Offered
~~NRC-119~~	~~BLM. Email Subject "Wildlife and Special Status Stipulations in the 1896 South Dakota Resource Management Plan" and attachment. From M. Iverson, BLM, Acting Field Manager, South Dakota Field Office, to H. Yilma, Project Manager....~~	Not Offered
~~NRC-120~~	~~Peterson, R.A. "The South Dakota Breeding Bird Atlas." Jamestown, North Dakota: Northern Prairie Wildlife Research Center. 1995.http://www.npwrc.usgs.gov/%20%20resource/birds/sdatlas/index.htm~~	Not Offered
~~NRC-121~~	~~BLM. "Newcastle Resource Management Plan."(2000) (ADAMS Accession No. ML12209A101).~~	Not Offered
~~NRC-122~~	~~Sage-Grouse Working Group (Northeast Wyoming Sage-Grouse Working Group). "Northeast Wyoming Sage-Grouse Conservation Plan." (2006) (ADAMS Accession No. ML12240A374).~~	Not Offered
~~NRC-123~~	~~SDGFP. "Sage Grouse Population Dynamics."(Nov. 20, 2009), available at http://gfp.sd.gov/hunting/small-game/sage-grouse-population-dynamics.aspx~~	Not Offered
~~NRC-124~~		NOT FILED
~~NRC-125~~	~~U.S. Fish and Wildlife Service Press Release and Draft Report to Help Sage-Grouse Conservation Objectives (August 23, 2012) (ADAMS Accession No. ML12276A248)....~~	Not Offered
~~NRC-126~~	~~U.S. Fish and Wildlife Service. "Greater sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report"(Feb. 2013), available at http://www.fws.gov/mountain-prairie/ea/03252013_COT_Report.pdf~~	Not Offered
~~NRC-127~~	~~Department of Environment And Natural Resources Recommendation Powertech (USA) Inc. Large Scale Mine Permit Application. (April 15, 2013), available at http://denr.sd.gov/des/mm/documents/Powertech1/DENRRec4-15-13.pdf.~~	Not Offered

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
~~NRC-128~~	~~SDGFP. "Colony Acreage and Distribution of the Black-Tailed Prairie Dog in South Dakota, 2008" (Aug. 2008), available at http://gfp.sd.gov/wildlife/docs/prairedog-distribution-report.pdf~~	Not Offered
~~NRC-129~~	~~S. Larson, FWS letter re Environmental Comments on Powertech Dewey-Burdock Project, Custer and Fall River County, South Dakota. (Mar. 29, 2010) (ADAMS Accession No. ML1009705560).~~	Not Offered
~~NRC-130~~	~~E-mail from Terry Quesinberry, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, to Amy Hester, Research Scientist, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute.....~~	Not Offered
~~NRC-131~~	~~E-mail from Terry Quesinberry, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, to Haimanot Yilma, Environmental Project Manager for Dewey-Burdock, Office of Federal and State Materials and Environmental....~~	Not Offered
NRC-132	Improving the Process for Preparing Efficient and Timely Environmental Reviews under NEPA.	Identified and Admitted
~~NRC-133~~		NOT FILED
NRC-134	Safety Evaluation Report for the Dewey-Burdock Project Fall River and Custer Counties, South Dakota. Materials License No. SUA-1600 (April 2014) ADAMS Accession No. ML14043A347.	Identified and Admitted
NRC-135	Safety Evaluation Report for the Dewey-Burdock Project Fall River and Custer Counties, South Dakota, Materials License No. SUA-1600, Docket No. 40-9075 (March 2013), ADAMS Accession No. ML13052A182.	Identified and Admitted
NRC-136-A	A - Palmer, L. and J.M. Kruse. "Evaluative Testing of 20 Sites in the Powertech (USA) Inc. Dewey-Burdock Uranium Project Impact Areas." Black Hills Archaeological Region. Volumes I and II. Archaeological Contract Series No. 251....	Identified and Admitted
NRC-136-B	Palmer, L. and J.M. Kruse Evaluative Testing of 20 Sites in the Powertech (USA) Inc. Dewey-Burdock Uranium Project Impact Areas Black Hills Archaeological Region Volumes I and II....	Identified and Admitted
NRC-136-C	Palmer, L. and J.M. Kruse. "Evaluative Testing of 20 Sites in the Powertech (USA) Inc. Dewey-Burdock Uranium Project Impact Areas." Black Hills Archaeological Region. Volumes I and II. Archaeological	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-137	Department of Environment and Natural Resources, Recommendation, Powertech (USA) Inc, Large Scale Mine Permit Application at 6 (April 15, 2013), available at http://denr.sd.gov/des/mm/documents/Powertech1/DENRRec4-15-13.pdf.	Identified and Admitted
NRC-138	Jack R. Keene (1973). Ground-Water Resources of the Western Half of Fall River County, South Dakota. South Dakota Department of Natural Resource Development, Geological Survey, Report of Investigations, No. 109, 90 pg....	Identified and Admitted
NRC-139	U.S. Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed June 20, 2014, from USGS web site: http//earthquakes.usgs.gov/regional/qfaults/.	Identified and Admitted
~~NRC-140~~		NOT FILED
NRC-141-A	Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009, Prepared by Powertech (USA) Inc. Greenwood Village, Colorado, CO. (Aug 31, 2009) (ADAMS Accession No. ML092870155). Pages 1-42	Identified and Admitted
NRC-141-B	Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009, Prepared by Powertech (USA) Inc. Greenwood Village, Colorado, CO. (Aug 31, 2009) (ADAMS Accession	Identified and Admitted
NRC-141-C	Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009, Prepared by Powertech (USA) Inc. Greenwood Village, Colorado, CO. (Aug 31, 2009) (ADAMS Accession No. ML092870155). Pages 124-132	Identified and Admitted
NRC-141-D	Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009, Prepared by Powertech (USA) Inc. Greenwood Village, Colorado, CO. (Aug 31, 2009) (ADAMS Accession No. ML092870155). Pages 133-143	Identified and Admitted
NRC-141-E	Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009, Prepared by Powertech (USA) Inc. Greenwood Village, Colorado, CO. (Aug 31, 2009) (ADAMS Accession No. ML092870155).	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-142	Submittal of Comments on Draft Programmatic Agreement for the Proposed Dewey-Burdock ISR Uranium Mining Project. (Mar. 17, 2014) (ADAMS Accession No. ML14077A002. Pages 5-1	Identified and Admitted
NRC-143	Letter to Oglala Sioux Tribe re: Invitation for Government-to-Government Meeting Concerning Licensing Actions for Proposed Uranium Recovery Projects. (Mar. 12, 2013) (ADAMS Accession No. ML13071A653).	Identified and Admitted
NRC-144	SRI (SRI Foundation). "Overview of Places of Traditional and Cultural Significance, Cameco/Powertech Project Areas." Rio Rancho, New Mexico: SRI Foundation. (June 8, 2012) (ADAMS Accession No. ML12262A113).	Identified and Admitted
NRC-145-A	Guidelines for Evaluation and Documenting Traditional Cultural Properties. National Register Bulletin, U.S. Department of the Interior. National Park Service. (ADAMS Accession No. ML12240A371). Pages 1-14	Identified and Admitted
NRC-145-B	Guidelines for Evaluation and Documenting Traditional Cultural Properties. National Register Bulletin, U.S. Department of the Interior. National Park Service. (ADAMS Accession No. ML12240A371). Pages 15-18	Identified and Admitted
NRC-146	2013/03/13 Powertech Dewey-Burdock LA - RE: field survey in the spring of 2013. (Mar. 13, 2013) (ADAMS Accession No. ML13078A388).	Identified and Admitted
NRC-147	2013/03/13 Powertech Dewey-Burdock LA - RE: field survey for Dewey-Burdock. (Mar. 13, 2013) (ADAMS Accession No. ML13078A384).	Identified and Admitted
NRC-148	Letter from Oglala Sioux Tribe in response to February 8, 2013 letter to Tribal Historic Preservation Officer March 23, 2013 (ADAMS Accession No. ML13141A362).	Identified and Admitted
NRC-149	2013/08/30 Powertech Dewey-Burdock LA - Request for Availability to discuss development of a PA for the Dewey Burdock Project. (Aug. 30, 2013) (ADAMS Accession No. ML13267A221).	Identified and Admitted
NRC-150	2013/11/14 Powertech Dewey-Burdock LA - Reminder: Teleconference to discuss the development of the PA for the Dewey Burdock project is scheduled for Friday. (Nov. 15, 2013. (ADAMS Accession No. ML13322B658).	Identified and Admitted
NRC-151	NRC Staff Rebuttal Testimony.	Identified and Admitted
NRC-152	Statement of Professional Qualifications of Hope E. Luhman.	Identified and Admitted

NRC Staff's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
NRC-153	Excerpt from Parker, P. and T. King. Guidelines for Evaluating and Documenting Traditional Cultural Properties, National Register of Historic Places Bulletin 38. (1990) (ADAMS Accession No. ML12240A371).	Identified and Admitted
NRC-154	Excerpt from Bates, R. and J. Jackson. Dictionary of Geological Terms 3rd Edition. (1984).	Identified and Admitted
NRC-155	Letter from South Dakota Historical Society re: Dewey-Burdock Project, (Jan. 2014).	Identified and Admitted
NRC-156	Johnson, R. H. "Reactive Transport Modeling for the Proposed Dewey-Burdock Uranium In-Situ Recovery Mine, Edgemont, South Dakota, USA." International Mine Water Association, Mine Water-Managing the Challenges. 2011.	Identified and Admitted

Oglala Sioux Tribe's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
OST-001	Opening Written Testimony of Dr. Robert E. Moran.	Identified and Admitted
OST-002	U.S. EPA, 2007, TENORM Uranium Occupational and Public Risks Associated with In- Situ Leaching; Append. III, PG 1-11.	Identified and Admitted
OST-003	US EPA, 2008, Technical Report on Technologically Enhanced Naturally Occurring Radioactive Materials from Uranium Mining, Volume 1: Mining and Reclamation Background: Previously published on-line and printed as Vol. 1 of EPA 402-R-05-007....	Identified and Admitted
OST-004	U.S. EPA, 2011 (June), CONSIDERATIONS RELATED TO POST-CLOSURE MONITORING OF URANIUM IN-SITU LEACH/IN-SITU RECOVERY (ISL/ISR) SITES, Draft Technical Report; [Includes Attachment A: Development of the Groundwater Baseline for Burdock ISL Site....	Identified and Admitted
OST-005	Powerpoint presentation prepared by Dr. Robert E. Moran.	Identified and Admitted
OST-006	Boggs, Jenkins, ?Analysis of Aquifer Tests Conducted at the Proposed Burdock Uranium Mine Site, Burdock, South Dakota,? Tennessee Valley Authority, Report No. WR28-1-520-109, May 1980.	Identified and Admitted
OST-007	Boggs, Hydrogeologic Investigations at Proposed Uranium Mine Near Dewey, South Dakota (1983).	Identified and Admitted
OST-008	Keene, Ground-water Resources of the Western Half of Fall River County, S.D., Dept. of Natural Resource Development Geological Survey, Univ. S.D., Report of Investigations No. 109 (1973).	Identified and Admitted
OST-009	TVA, Draft Environmental Statement, Edgemont Uranium Mine.	Identified and Admitted
OST-010	OST Petition to Intervene, with Exhibits.	Identified and Admitted
OST-011	OST Statement of Contentions on DSEIS, with Exhibits.	Identified and Admitted
OST-012	OST Statement of Contentions on FSEIS, with Exhibits.	Identified and Admitted
OST-013	OST Statement of Undisputed Facts submitted with OST Motion for Summary Disposition.	Identified and Admitted
OST-014	Declaration of Michael CatchesEnemy.	Identified and Admitted
OST-015	Declaration of Wilmer Mesteth.	Identified and Admitted

Oglala Sioux Tribe's Exhibits		
Exhibit Number	**Exhibit Title (as reflected in ADAMS)**	**Exhibit Status**
OST-016	February 20, 2013 letter from Standing Rock Sioux to NRC Staff.	Identified and Admitted
OST-017	March 22, 2013 letter from Oglala Sioux Tribe to NRC Staff.	Identified and Admitted
OST-018	Rebuttal Testimony of Dr. Robert E. Moran.	Identified and Admitted
OST-019	Powertech Press Release.	Identified and Admitted
OST-020	E-Mail from Chris Pugsley, Powertech, re NRC Proceeding.	Identified and Admitted
OST-021	Powertech Quarterly Management Discussion and Analysis.	Identified and Admitted