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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ATOMIC SAFETY AND LICENSING BOARD PANEL

5 + + + + +

6 HEARING

7 -----x

8 In the Matter of: :

9 CROW BUTTE RESOURCES, : Docket No. 40-8943-OLA

10 INC. : ASLBP No. 08-867-02-OLA-BD01

11 :

12 (License Renewal for :

13 the In-Situ Leach :

14 Facility, Crawford, :

15 Nebraska) :

16 -----x

17 Wednesday, August 26, 2015

18
19 Crawford Community Center

20 1005 First Street

21 Crawford, Nebraska

22 BEFORE:

23 MICHAEL M. GIBSON, Chair

24 DR. RICHARD E. WARDWELL, Administrative Judge

25 BRIAN K. HAJEK, Administrative Judge

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P-R-O-C-E-E-D-I-N-G-S

8:35 a.m.

CHAIR GIBSON: All right. If we could get on the record please. I guess my first question, I have a couple of housekeeping matters we need to address before we get back to our examination of witnesses. The first is, I believe that Dr. LaGarry got some homework last night to try to plot where the wells were sampled that were the subject of the testimony of one of the other witnesses yesterday. And it is my understanding that, that's been done, correct, sir?

DR. LAGARRY: It's in the process, your honor. I've consulted with your IT expert and with your law clerks about how best to do that and we'll have it done at our first opportunity this morning.

CHAIR GIBSON: Okay. But I don't really want to get into the merits of it. I just want to make clear what we need to do is we need to get that tied to the Board Exhibit 6, which was the oval you drew. Because that's very important for our discussions and our decision. So I want to be sure that, that oval is reflected on what you're going to be preparing as well.

DR. LAGARRY: It will --

1 CHAIR GIBSON: Okay. Fair enough?

2 DR. LAGARRY: It will be, your honor.

3 CHAIR GIBSON: Okay. And so we will have
4 -- that is going to be OST004, I think that's the
5 simplest thing, we'll just call that OST004. That can
6 be then provided to the other parties and then at that
7 point, we can deal with that evidence. Okay?

8 DR. LAGARRY: Yes, your honor.

9 CHAIR GIBSON: Okay. That's our first
10 housekeeping matter. The second housekeeping matter
11 is, Dr. LaGarry, you were going to have some dialogue
12 with your counsel there about the items on your thumb
13 drive so that you could try to specify which of those
14 studies indicated that there was this geologic
15 formation that you've discussed that has a new name
16 and that, the name of which escapes me, and that it
17 would be tied to that oval, again, on the Reservation.
18 Did you all figure out which of those studies have a
19 material bearing on that point you were making?

20 DR. LAGARRY: We did, your honor. We
21 discussed it last night and Counsel Ballanco is going
22 to take care of that.

23 CHAIR GIBSON: Okay, great. All right.
24 This is what I want you to do, Mr. Ballanco. I would
25 like for you to find some way to get that information

1 to counsel for the staff, the applicant, and the
2 Board. Okay? And what I would like to do just for
3 identification purposes right now is to call that
4 Board Exhibit 7. Okay? Those documents, we can deal
5 with them when you do that. I just want to be sure
6 that we are all on the same page to know how we're
7 going to proceed because we have a limited amount of
8 time today.

9 MR. BALLANCO: Thank you, your honor. I
10 emailed them to counsel and your clerks last night,
11 tentatively calling them INT, I believe, 072 through
12 --

13 CHAIR GIBSON: Okay. We can --

14 MR. BALLANCO: -- 077.

15 CHAIR GIBSON: For identification purposes,
16 we'll call them INT072 --

17 MR. BALLANCO: Through 077.

18 CHAIR GIBSON: INT072 to 077.

19 MR. BALLANCO: There were six different
20 documents --

21 CHAIR GIBSON: Okay.

22 MR. BALLANCO: -- your honor.

23 CHAIR GIBSON: Very well. And we'll be
24 getting that to them. Okay. Very well. And we also
25 had the model information, Ms. Simon?

1 MS. SIMON: Yes, your honor. That was sent
2 to everyone last night.

3 CHAIR GIBSON: Okay. And did you all
4 receive that?

5 DR. KREAMER: I received it and did a
6 preliminary review of it.

7 CHAIR GIBSON: Okay. Thank you.

8 DR. KREAMER: I'm prepared to talk about it
9 as well.

10 CHAIR GIBSON: Okay. Thank you.

11 DR. KREAMER: Dr. Dave Kreamer, sorry.

12 CHAIR GIBSON: Okay. Very well. Now, this
13 is what -- we need to take a slightly different path
14 than we've been intending to take. And I'll explain
15 why. There have been a number of materials that have
16 come to light since we commenced this hearing on
17 Monday. Some of which contain a substantial amount of
18 information that pertains to the Contentions that are
19 before us. And so, right before we recessed
20 yesterday, we directed the parties to draft proposed
21 questions that encompassed those new materials.

22 However, the Board conferred at some
23 length last night after our recess for the day and we
24 are of the opinion now that it is not realistic to
25 expect you to have evaluated that material in such a

1 short amount of time and certainly it's not enough
2 time for the Board to have evaluated that information
3 in this amount of time. And so, what we'll do is to
4 hold open the record, rather than closing it on Friday
5 after transcript corrections have been made, and allow
6 the parties to submit draft direct and rebuttal
7 testimony on these materials.

8 The early pump tests, which are Board
9 Exhibits 2a, b, and c. The USGS 2014 study, which is
10 Board Exhibit 3. The Souders article, which is Board
11 Exhibit 4. The Terry article, which is Board Exhibit
12 5. The map of the Pine Ridge Reservation on which Dr.
13 LaGarry drew an oval, which is Board Exhibit 6. The
14 groundwater studies on Dr. LaGarry's thumb drive that
15 purportedly show the groundwater flow in the oval
16 drawn on Board Exhibit 6, which will be marked as
17 INT072 to 077. The NRC modeling that was discussed
18 yesterday that I understand has been provided to the
19 parties that we will mark as Board Exhibit 8, although
20 it will not be available to the public because it
21 contains proprietary information. Is that correct,
22 Ms. Simon?

23 MS. SIMON: Yes. Your honor, I just wanted
24 to let you know that the staff believes that, that
25 actually can be made public. And so what we can do

1 is, it will take a few days to get the authority and
2 get it done in ADAMS, but we can have those made
3 public and then they can be made public exhibits.

4 CHAIR GIBSON: All right. That would be
5 great. What we will do in the interim is to just make
6 that a non-public document until such time as it's
7 been cleared. I don't want to make a bigger deal out
8 of this than it needs to be.

9 MS. SIMON: And we'll notify everyone when
10 it's been made public.

11 CHAIR GIBSON: All right. If there is any
12 other information -- oh, and then there's this thing
13 Dr. LaGarry's going to do, which we've decided to make
14 OST004, I believe.

15 DR. LAGARRY: Clarification, your honor.
16 This is Dr. LaGarry. The materials on the thumb drive
17 were to clarify the presence or absence of the
18 Chamberlain Pass Formation on the Pine Ridge
19 Reservation.

20 CHAIR GIBSON: Okay. Very well. I
21 misspoke, but that's fine. One of these days, I'll
22 remember the name of that formation. Now, if there's
23 anything else, we're not going to talk about it right
24 now, but if there's anything else that you all feel is
25 in this same category of new material that would --

1 that you're not having an adequate time or the Board
2 will not have an adequate amount of time to digest and
3 analyze, then let us know that. What I would like you
4 to do is to let us know that on Friday in the form of
5 a joint proposal from all three parties. And in that
6 proposal, we would like for you to provide a deadline
7 for written direct testimony on those materials, a
8 deadline for written rebuttal testimony on those
9 materials, and a proposed date for a one day telephone
10 hearing on this evidence.

11 Now, as you know, we do everything we can
12 to try to hold our hearings close to the facility in
13 question and the people that are interested in it, but
14 we are only talking now about hydrogeology, about
15 these limited materials, we know who these
16 hydrogeologists are, these experts in modeling and
17 other things, we'll be talking to them on the phone on
18 these specific questions. And I guess I should also
19 add, you can propose questions as well for us to ask.
20 But you can come up with a deadline by which that's
21 got to be done too, in camera. Okay? So we'd like
22 that done first thing Friday morning. If you all
23 would get together between now and then and make that
24 proposal.

25 MR. REID: Your honor, this is Andrew Reid

1 from the Tribe.

2 CHAIR GIBSON: Yes, sir?

3 MR. REID: I'm trying to keep track of
4 these. What is Board Exhibit 7?

5 CHAIR GIBSON: Board Exhibit 7 --

6 MR. REID: Because I think you skipped over
7 that one.

8 CHAIR GIBSON: Just a second. That is the
9 oval -- that is the -- I'm sorry.

10 DR. KREAMER: We renamed it.

11 CHAIR GIBSON: There is no Board Exhibit 7.
12 But there will be now. Because we will change that
13 around just so we're all clear. We'll make the NRC
14 model Board Exhibit 7. I'm sorry. Okay. Now, once
15 we've concluded that additional day of hearing and the
16 parties have filed their transcript corrections, we'll
17 then close the record for this hearing, we'll receive
18 the parties' proposed findings and conclusions on all
19 the Contentions, and we'll proceed to prepare a
20 decision on that. Are there any questions? Very
21 well. All right. Are there any other matters that we
22 need to attend to before Judge Wardwell resumes his --
23 oh, Mr. Smith, yes, sir?

24 MR. SMITH: Just a simple clarification
25 from --

1 CHAIR GIBSON: Yes, sir.

2 MR. SMITH: -- yesterday. It may not even
3 be necessary, but we didn't have a transcript to
4 review. Mr. Teahon was speaking yesterday about the
5 frequency of the leak detection of the double pipe
6 that goes under Squaw Creek and there was some
7 discussion among Crow Butte whether we said that the
8 testing was done monthly or weekly.

9 CHAIR GIBSON: Yes.

10 MR. SMITH: And for clarification, that
11 testing is done weekly.

12 CHAIR GIBSON: Okay. Very well. Thank
13 you, Mr. Smith. Is there anything else --

14 MS. MCLEAN: McLean.

15 CHAIR GIBSON: Yes, hold on just a minute.
16 Since you're not an attorney, I just need to know is
17 there something that you can speak for Ms. McLean
18 about? You don't know -- was there something you made
19 a mistake about, Ms. McLean?

20 MS. MCLEAN: Yes, I have several
21 corrections to my --

22 CHAIR GIBSON: Okay.

23 MS. MCLEAN: -- testimony.

24 CHAIR GIBSON: Well, I'll tell you what.
25 We'll let Judge Wardwell deal with that in just a

1 second, okay?

2 MS. MCLEAN: Okay.

3 CHAIR GIBSON: Is there anything else we
4 need to hear about from the parties? Okay. Very
5 well. Judge Wardwell, I think Ms. McLean has
6 something she wants to clean up and then you're ready
7 to go.

8 JUDGE WARDWELL: What if I don't ask her
9 about it?

10 (Laughter.)

11 JUDGE WARDWELL: Do you have something you
12 would like to clarify?

13 MS. MCLEAN: Yes. I have --

14 JUDGE WARDWELL: I thought you might.

15 MS. MCLEAN: I have several corrections to
16 my testimony. And the first is two corrections to the
17 Crow Butte rebuttal to their rebut. And it's the
18 fourth and fifth reference. And I apologize, those
19 need to be struck. I was in the process of trying to
20 finish this as my mother was dying --

21 JUDGE WARDWELL: Oh, I'm sorry to hear
22 that.

23 MS. MCLEAN: -- of a massive brain
24 hemorrhage. So I -- we're going to strike those two.
25 And the other thing is in the first testimony, the

1 original testimony, there are actually two more leaks
2 that I became aware of in the list of pond leaks. One
3 is March 14, 2013, Evaporation Pond Liner One leak.
4 And May 7, 2014, Evaporation Pond Liner One leak.
5 That needs to be added to the list that I have
6 referenced of pond leaks at -- the record speaks for
7 itself. That's it.

8 JUDGE WARDWELL: Thank you. And sorry to
9 hear about your mother. I know what a hole that
10 leaves. Appreciate it. Okay. I think we are ready
11 to move on to talk about excursions. I have weeded
12 out most of the repetition. We did spend some time
13 talking about it over the last couple days. But I
14 also may repeat some stuff just to make sure I heard
15 it correctly and to put it in the context of some
16 other sites. Starting off with NRC's testimony, 001,
17 Page 5 through 6, Answer A-2. This is all getting a
18 bit old, isn't it? As you listen to me ramble on
19 about this, it has to be. I mean, anyhow.

20 Staff discusses the requirements for a
21 monitoring well ring's location, stated in License
22 Condition LC10.4, the biweekly sampling, and other
23 excursion monitoring using procedures described in
24 more detail in Sections 5.8.8.2 of the License Renewal
25 Application and citing in that Exhibit 011 at 5-30.

1 And we did talk a bit about this, but I'd like to hear
2 it again and possibly ask a different way. But for
3 Crow Butte, would you have a handle on about the
4 average number of monitoring wells in the ore body and
5 the average number of wells in the aquifer for each
6 well-field that are used for this excursion
7 monitoring?

8 MR. TEAHON: Not by well-field, sir. But
9 we have a total of 150 monitor wells down in the
10 mining zone, the perimeter monitor wells that we call
11 CM wells for Chadron monitor wells. And we have 203
12 shallow monitor wells that are in the first overlying
13 aquifer above the Chadron Formation.

14 JUDGE WARDWELL: And that's in the entire
15 license area?

16 MR. TEAHON: Yes, sir.

17 JUDGE WARDWELL: Okay. And is that for --
18 were they designed and set specifically for monitoring
19 of excursions?

20 MR. TEAHON: Yes, sir.

21 JUDGE WARDWELL: So if we wanted to, we
22 could just divide by the number of mining units and
23 come up with the average per mining unit, couldn't we?

24 MR. TEAHON: Well, the mine units vary in
25 size.

1 JUDGE WARDWELL: Yes, but --

2 MR. TEAHON: Yes.

3 JUDGE WARDWELL: -- it was average.

4 MR. TEAHON: Yes. That's in 11 mine units.

5 JUDGE WARDWELL: I can do that.

6 MR. TEAHON: Yes.

7 JUDGE WARDWELL: Thank you. I appreciate
8 that. I think we said that differently yesterday and
9 so now it's nice to have it under this context of
10 being able to get a handle on those average number.
11 And do any of these wells have any relationship to the
12 observation wells used in the pump test? Or are these
13 completely different wells?

14 MR. BEINS: We have used several of the
15 monitoring wells that have been incorporated into that
16 perimeter monitoring well ring during the pump test as
17 we've moved into new areas. And then we also do
18 install additional observation wells.

19 JUDGE WARDWELL: Okay.

20 MR. BEINS: But there --

21 JUDGE WARDWELL: So there's a mix of those?

22 MR. BEINS: But there is some crossover,
23 yes.

24 JUDGE WARDWELL: Was there any installation
25 differences between those? And could you just quickly

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1 describe how you install this? Not to the degree of
2 --

3 MR. BEINS: You don't want to know --

4 JUDGE WARDWELL: -- specific gravities of
5 materials.

6 MR. BEINS: Certainly. Essentially the
7 perimeter monitoring wells that we place in the Basal
8 Chadron, they are screened through the entire
9 thickness of the sand with a screen-to-blank ratio not
10 to exceed 50 percent blank. So typically, we're
11 screening the vast majority of the sands. And we paid
12 particular attention to screen the areas that we know
13 we're producing from out of those individual sand
14 horizons. We make sure that we've got those covered
15 by screen intervals and do it that way.

16 JUDGE WARDWELL: And these screens were
17 pre-installed screens, design well screens, that you
18 then put up some type of packing around? Or was it
19 slotted casing that you put down there?

20 MR. BEINS: Our well installation, as I
21 mentioned yesterday, we use four and a half inch
22 casing. It's placed in an eight inch diameter drill
23 hole. We cement the wells in from pumping the cement
24 in at the top of the well, down the inside of the
25 well. The cement exits the bottom of the well casing,

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1 which is open at that point in time. The cement then
2 fills the annular space of the bore hole back to the
3 surface. We do cement the wells until we get cement
4 back to the surface. After that cement has had time
5 to set up, we then go back in, we drill out any
6 remaining cement in the inside of the well. We then
7 set the screens. And we use stainless steel slotted
8 well screen. And then we develop the well using an
9 air lift technique. Because of the unconsolidated
10 nature of the Chadron sands, we do not do a gravel
11 packing around the screens. The well development from
12 the air lifting creates its own natural gravel pack to
13 where we get good flow rates.

14 JUDGE WARDWELL: I guess I'm a little
15 confused on visualizing that. You drill a well using
16 casing, correct?

17 MR. BEINS: We drill the well with the
18 drill rig so you have an open hole.

19 JUDGE WARDWELL: Just an open hole with air
20 --

21 MR. BEINS: It's an open --

22 JUDGE WARDWELL: -- lifting or --

23 MR. BEINS: -- hole.

24 JUDGE WARDWELL: -- with air lifting or can
25 you --

1 MR. BEINS: It's a direct rotary process
2 with --

3 JUDGE WARDWELL: Okay.

4 MR. BEINS: -- the drill rig, with drill
5 mud circulated through the bore hole. So you've got
6 the open hole. We log the hole so we know what the
7 interval is.

8 JUDGE WARDWELL: You are using bentonite
9 mud during this process, you're saying?

10 MR. BEINS: That's correct.

11 JUDGE WARDWELL: Okay.

12 MR. BEINS: We log the hole. At that
13 point, we know where the sand intervals are, top and
14 bottom of the sand. We know where the Pierre Shale
15 location --

16 JUDGE WARDWELL: That's the geophysical --

17 MR. BEINS: -- is at.

18 JUDGE WARDWELL: -- log you're referring to
19 rather than just observing the chips or material --

20 MR. BEINS: That's correct.

21 JUDGE WARDWELL: -- that comes out the top?
22 Okay.

23 MR. BEINS: Yes. At that point in time
24 then, we pick the casing depth for the well. In the
25 case of a deep monitoring well like that, we will case

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1 to the top of the Basal Chadron sands. We install the
2 casing in the well. It has centralizers placed every
3 60 feet to keep the well casing centralized within the
4 bore hole. Once that casing's in place, we then pump
5 our cement down the inside of the casing.

6 JUDGE WARDWELL: Is that pure cement or is
7 it a bentonite cement slurry?

8 MR. BEINS: It's actually a bentonite
9 cement slurry. We add about 500 pounds of bentonite
10 to the cement. It's a Haliburton recipe that if we
11 need to we could provide you with a copy of that. But
12 we --

13 JUDGE WARDWELL: So it has a specific
14 gravity that. I do want the specific gravity of that
15 mixture.

16 MR. BEINS: Yes. But it's a type one two
17 cement slurry that we pump down hole. We're required
18 to maintain certain weight limits with that cement,
19 minimum weight limits, by the State of Nebraska.
20 They've got to meet those specs. If we do not get
21 cement return back to the surface, we're also required
22 to trim cement in from the surface to fill the
23 remaining annular space. Okay?

24 So once we've cemented the well, we allow
25 that cement to set up minimum of three days. More

1 realistically, it usually takes us two to three weeks,
2 sometimes even a month to get back to the well before
3 we're going to finish the completion of the well.
4 When we go back to complete the well, we drill that
5 remaining cement out of the inside of the casing,
6 flush the hole on down to the total depth that we
7 intend to have the screen interval set in just to make
8 sure the hole remains open there. At that point --

9 JUDGE WARDWELL: Can I interrupt you
10 quickly just for a point of clarification? Do you
11 initially only drill down to the top of the Basal
12 Chadron or do you extend the hole all the way through
13 it or part way through it to where you think you'll be
14 putting this monitoring well initially?

15 MR. BEINS: We generally drill clear down
16 through the sands and about 20 feet into the Pierre
17 Shale. That way we're able to get a good geophysical
18 log to make the picks for those depths that we want to
19 screen.

20 JUDGE WARDWELL: So when you're drilling
21 out the cement, part of the thing you're drilling out
22 is the cement inside the casing to the top of the
23 Basal Chadron and then the rest of it you're removing
24 out below and into the Basal Chadron itself?

25 MR. BEINS: Any cement or slough that may

1 have fell back into that open bore hole area, yes.

2 JUDGE WARDWELL: And there's, of course, a
3 difference in the diameter by a small amount between
4 the cased hole that you're drilling out and the hole
5 that you have in the Basal Chadron?

6 MR. BEINS: That's correct.

7 JUDGE WARDWELL: But there's no guarantee
8 that hole in the Basal Chadron has maintained its
9 diameter integrity anyhow due to potential caving and
10 that type of thing?

11 MR. BEINS: Certainly, yes. A lot of times
12 we'll see some sloughing, infilling of material,
13 swelling of clays, that sort of thing. So we go back
14 in, we make sure that, that space is open and ready
15 for us to install the screens. We then install our
16 stainless steel screens. We set them using a rubber
17 K-packer, is the term that we use for the rubber
18 gasket so to speak that fits tightly inside of the
19 casing. We set the screens to the selected depths and
20 then we develop the well.

21 JUDGE WARDWELL: And the screen is attached
22 to its own casing, it's coming up inside the other
23 casing that went down to the top of the Basal Chadron?

24 MR. BEINS: Yes, sir. But there's not a
25 pipe that comes clear back to the surface.

1 JUDGE WARDWELL: So the screen is set and
2 packed in at the bottom of the initial casing?

3 MR. BEINS: Yes, sir.

4 JUDGE WARDWELL: That's what that K--
5 packing you're referring to --

6 MR. BEINS: Yes, sir.

7 JUDGE WARDWELL: -- sort of deals with?
8 Okay. Thank you. I was curious on whether you've
9 done any analysis, or whether the industry has, to
10 demonstrate the effectiveness of these perimeter wells
11 in their potential capture zone associated with
12 excursions? Specifically, have you addressed anything
13 in regards to trying to analyze whether or not or to
14 what degree your effectiveness is in encountering an
15 excursion or the opposite tact, what's the likelihood
16 of an excursion getting between a couple of these
17 wells?

18 MR. TEAHON: Sir, we know from expanding
19 our mining units as that monitor well ring grows,
20 wells that are on the outer edge that get absorbed
21 into the next mine unit to become baseline restoration
22 wells, we know from past experience that we've had
23 some of those perimeter wells go on excursion. And as
24 we develop the mine unit next to it, we're testing the
25 baseline well and we don't see any impacts from prior

1 excursions impacting those adjacent mine units. And
2 that's summarized in Exhibit 20, a report that we did
3 based on that.

4 JUDGE WARDWELL: Thank you. Is there any
5 license requirement that assures biweekly testing
6 continues with these wells? Is that a License
7 Condition or --

8 MR. TEAHON: Yes, sir. We're required to
9 sample the wells biweekly. When they go on excursion,
10 we're required to increase the sampling frequency to
11 weekly. We have a DEQ permit requirement that once
12 the well goes off excursion, which means three
13 consecutive weekly samples below the excursion
14 parameters, we're required to sample an additional
15 three weeks to show that the well has stabilized.
16 Then it's returned back to biweekly monitoring.

17 JUDGE WARDWELL: Thank you. Anyone for the
18 Intervenors would like to comment on that approach?
19 Yes, Dr. Kreamer?

20 DR. KREAMER: Thank you. I am concerned
21 that they don't use gravel pack, particularly if they
22 use the same methodology in the Brule Formation. That
23 doesn't follow the -- there's no provision in NUREG
24 1569 for the construction of monitoring wells that
25 accounts for no gravel pack. Particularly in the

1 Brule where it might inhibit flow in. And EPA
2 guidance for monitoring well design, that's in direct
3 conflict with what EPA recommends. So I do have some
4 concerns as far as how that's developed. In the
5 abandoned wells, if there's annular space, they didn't
6 mention whether or not they did the same thing to
7 ensure that the annular space was filled as well. EPA
8 protocol sometimes --

9 JUDGE WARDWELL: I didn't question the
10 abandoned. This was dealing with the excursion wells.

11 MR. TEAHON: Just the excursion wells and
12 not the Brule wells? Okay. As far as the excursion
13 wells, there is some concern at the lack of a gravel
14 pack.

15 JUDGE WARDWELL: And staff, would you like
16 to comment about the lack of the gravel pack and your
17 review of their program?

18 DR. STRIZ: Yes, I would, your honor.
19 Also, I do have the number of perimeter and overlying
20 wells for each mine unit if you'd like to have it read
21 into the record.

22 JUDGE WARDWELL: I don't think I need it.

23 DR. STRIZ: Okay.

24 JUDGE WARDWELL: I really just wanted to
25 get a --

1 DR. STRIZ: I just wanted to let you --

2 JUDGE WARDWELL: -- rough feeling of what

3 --

4 DR. STRIZ: -- know.

5 JUDGE WARDWELL: -- how many we're dealing
6 with. Thank you anyhow.

7 DR. STRIZ: The construction of the
8 monitoring wells is dictated by the UIC permit from
9 the State of Nebraska, which is delegated to the State
10 of Nebraska by USEPA, which sets the standards for the
11 construction of the monitoring wells. So I believe it
12 meets the monitoring well standards for the UIC
13 program, so I don't question how they're --

14 JUDGE WARDWELL: Okay.

15 DR. STRIZ: -- installed.

16 JUDGE WARDWELL: Thank you. Crow Butte,
17 have these been approved by the DEQ for the UIC as
18 part of the UIC program?

19 MR. TEAHON: Yes, sir. We have three well
20 completion methods that have been approved in the
21 Class III UIC permit. And we also have a staff person
22 on site that observes the installation of these wells,
23 an NDEQ staff person on site.

24 JUDGE WARDWELL: You read my mind where my
25 question was going. Thank you. Crow Butte testimony,

001, Page 37, A72, quote, upper control limits, UCLs, are set for chloride, conductivity and total alkalinity. Upper control limits are set at 20 percent of the maximum baseline concentration for the excursion indicator. For excursion indicators with baseline averages below 50 milligrams per liter, the UCL may be determined by adding five standard deviations or 15 milligrams per liter to handle a baseline average for the indicator. And then it says, see NE permit, NE0122611 at 9, and that's Exhibit CBR017. I think you stated this yesterday, but I want to verify that these excursion wells are not tested for anything but the indicator parameters, is that correct or not in regards to just the chloride, conductivity, and total alkalinity?

MR. TEAHON: Yes, sir. In the early stages of mining, we also had to test for sodium and sulfate. And they found out that those two parameters weren't very good indicator parameters. In fact, we had four shallow monitor wells went on excursion due to the variability of those two. And those have since been removed from our requirements.

JUDGE WARDWELL: Do you know to what degree heavy metals accumulate in your process water as you recirculate that around?

1 MR. TEAHON: Well, we have to monitor our
2 waste water stream down the deep disposal well for the
3 RCRA metals so we know what the concentrations are
4 from those metals. And the only thing that we see in
5 the RCRA metals is occasionally we see some selenium
6 and some arsenic, and by that I mean just meeting the
7 detection limit for those two.

8 JUDGE WARDWELL: So it's your opinion that
9 these don't accumulate as you process the mining unit?

10 MR. TEAHON: No, they don't. We don't see
11 that in our lab results.

12 JUDGE WARDWELL: Thank you. And the excess
13 water that we're talking about is basically removed by
14 either deep injection or the evaporation ponds,
15 correct?

16 MR. TEAHON: Yes, sir. It's the bleed
17 stream from the restoration circuit and the production
18 circuit.

19 JUDGE WARDWELL: Thank you. Intervenors
20 testimony from Mr. Wireman, Exhibit 047, Page 8,
21 states that in regard to the 19 domestic water supply
22 wells monitored by CBR for uranium and radium-226 only
23 that trend data should be presented for these and
24 other monitoring wells and there should be a more
25 complete analyte list that includes metals, TDS, and

1 selected ions. And I guess I'll ask Mr. Wireman, why
2 do you feel those additional analytes are necessary
3 when we're talking about excursion monitoring? Why
4 isn't that handled by the conservative transport of
5 chlorides, conductivity, and alkalinity?

6 MR. WIREMAN: Because I don't believe those
7 three parameters tell a complete story about any
8 potential geochemical changes in the groundwater.

9 JUDGE WARDWELL: But is that what's of
10 interest? Aren't the purpose of these wells merely to
11 detect an excursion and why wouldn't these parameters
12 be the earliest detection of excursions that any of
13 the other analytes would possibly indicate?

14 MR. WIREMAN: Well, let me be clear here.
15 The recommendation for the complete analyte list is
16 for the domestic wells.

17 JUDGE WARDWELL: Okay.

18 MR. WIREMAN: For the excursion wells, I --

19 JUDGE WARDWELL: Yes, and I was talking
20 only -- I'm sorry, I had that on my notes and I
21 probably didn't say it. In regards to the excursion
22 monitoring wells, that's what my questions were going
23 for.

24 MR. WIREMAN: My recommendation for the
25 excursion wells is not as complete an analyte list as

1 I would recommend for the domestic wells. But I would
2 definitely recommend including uranium and radium for
3 the excursion wells. Those are also obviously
4 parameters of interest.

5 JUDGE WARDWELL: CBR, and I might note that
6 in your testimony, Exhibit 070, Page 2, you state that
7 uranium should be included as an indicator parameter
8 for excursion monitoring in addition to the chloride,
9 total alkalinity, and conductivity, so I appreciate
10 your segue into this next section that you just
11 provided. Crow Butte's testimony, 001, Page 38,
12 Answer 74, says, uranium is not a good excursion
13 indicator because although it is mobilized during
14 mining, it may be retarded by reducing conditions in
15 the aquifer. That is the rate of uranium transport in
16 the aquifer could be slowed by absorption and
17 precipitation, which would render it a poor leading
18 indicator of an excursion. How would you counter that
19 statement of CBR's?

20 MR. WIREMAN: I would counter it by saying
21 that you don't just do uranium alone. You add those
22 other three indicators. But clearly -- and they're
23 correct, uranium like most metals, absorbs quite
24 readily. But it -- to me, that's even an indication
25 of how important it is. If you have high uranium in

1 an excursion well, in full knowledge of the fact that
2 it does absorb, then you have an issue. Because
3 you've moved uranium to those excursion wells in spite
4 of the fact that it is retarded along the pathway. So
5 if you see high uranium, you've got a problem.

6 JUDGE WARDWELL: I'll turn to staff in
7 regards to their comments or opinions in regards to
8 adding uranium as an excursion indicator parameter.

9 MR. LANCASTER: Your honor, Tom Lancaster.
10 1569 states that uranium is not considered --

11 JUDGE WARDWELL: And what is 1569?

12 MR. LANCASTER: That's the Standard Review
13 Plan.

14 JUDGE WARDWELL: So it's a NUREG?

15 MR. LANCASTER: Yes.

16 JUDGE WARDWELL: Okay. Thank you.

17 MR. LANCASTER: You're right. NUREG 1569
18 states uranium is not considered to be a good
19 excursion indicator because although it's mobilized,
20 which is what you were just saying, by in-situ
21 leaching, it may be retarded by reducing conditions in
22 the aquifer. And I think I heard, with all due
23 respect, but I think I heard Dr. Kreamer talk about
24 how uranium is highly absorptive. And what we're
25 looking for, or what 1569 is telling us to look for in

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1 our review of an acceptable excursion indicator is one
2 what will move with groundwater as fast as groundwater
3 moves and not be retarded or precipitate.

4 JUDGE WARDWELL: Okay. And I think they
5 understand that and they are not saying don't keep --
6 they're not saying eliminate the conductivity,
7 alkalinity, and chloride, they're just saying --

8 MR. LANCASTER: Yes.

9 JUDGE WARDWELL: -- adding uranium.

10 MR. LANCASTER: Yes.

11 JUDGE WARDWELL: And would not the presence
12 of uranium certainly indicate that you have a problem?
13 The absence of it may not tell you anything --

14 MR. LANCASTER: Well --

15 JUDGE WARDWELL: -- but yet the presence of
16 it would tell you quite a bit if it showed up, would
17 it not? In case it didn't get retarded in a certain
18 flowpath. So why wouldn't that also be one of
19 interest to add?

20 MR. LANCASTER: Well, in accordance with
21 License Condition 11.5, this timely indication of an
22 excursion is for timely restoration. And this timely
23 restoration has to be done in accordance with that
24 requirement. And so we're interested in timely -- or
25 1569 is telling us that we need excursion indicators

1 for timely restoration of these excursions in
2 accordance with that requirement. And so the way this
3 is -- we follow our guidance and it was unanimously
4 approved by the Commission --

5 JUDGE WARDWELL: Okay, may I ask you this
6 then?

7 MR. LANCASTER: Yes.

8 JUDGE WARDWELL: Is uranium always retarded
9 in all geologic strata and under all conditions?

10 MR. LANCASTER: No, your honor. It's
11 liberated by the oxygen, but as it moves down gradient
12 into a reducing or into an environment, a different
13 geochemical environment, it will have reactive
14 properties and --

15 JUDGE WARDWELL: So an excursion -- it may
16 have some residual oxygen encouraging things could be
17 bringing that towards the well and then it's being
18 detected at the well? Could it not? Such that it
19 never reaches a reducing environment?

20 MR. LANCASTER: Yes. Let me go ahead and
21 pass that to --

22 JUDGE WARDWELL: Sure.

23 MR. LANCASTER: -- our geochemist here.

24 MR. FUHRMANN: This is Mark Fuhrmann.

25 JUDGE WARDWELL: Make sure you speak into

1 the mic because we have a -- it's a little hard
2 hearing you and I can't read your lips because the
3 monitor is in the way and I don't need to read your
4 lips.

5 MR. FUHRMANN: Okay. This is Mark Fuhrmann
6 from NRC. Certainly there are cases where uranium
7 will travel at a relatively rapid rate. That is
8 potentially as fast as the groundwater is moving. But
9 in that case, you would expect that the chloride or
10 alkalinity would also be -- it would be traveling
11 along with those. So we believe that there's no added
12 benefit of looking at uranium under normal conditions
13 because the other excursion indicators will be present
14 at the same time. There's no reason to expect that
15 uranium would not be with them, unless it is retarded.

16 JUDGE WARDWELL: Okay. I think we touched
17 upon this yesterday and we'll get into it more in
18 regards to Mine Units, I believe it's 6 and 8 where
19 there's a vertical excursion indicated, or debated
20 whether there is an excursion or not. But didn't you
21 as an agency require that uranium be added to the
22 excursion parameters? And if that's so, why doesn't
23 that support the case of why not having it for all
24 excursions monitoring?

25 DR. STRIZ: Once again, we only request

1 what is necessary to meet the requirement. And the
2 alkalinity and the chloride and conductivity are
3 sufficient. In addition, because they monitor every
4 two weeks, they're able to do these analyses in-house,
5 inexpensively. Whereas the assessment of uranium
6 would be required to be sent out, would be
7 substantially more expensive for them. So, again,
8 we've requested only what is necessary to give us the
9 early detection of an excursion.

10 JUDGE WARDWELL: Thank you. Now moving on
11 to talking about some actions that take place with
12 excursions, NRC testimony, Exhibit 001, Page 8 through
13 9, Answer A-5 notes that when CBR identifies an
14 exceedance of an upper control limits established for
15 a monitoring well has occurred, an occurrence with
16 License Condition 11.5 in its license, it places the
17 well on excursion status, notifies the NRC, begins
18 corrective action, and increases the sampling
19 frequency for the indicator parameters at the
20 excursion well to once every seven days to ensure that
21 the excursion is expeditiously corrected. And in the
22 testimony, it cited NRC Exhibit 010 at 78.

23 Crow Butte's testimony, Page 38 to 39,
24 Answer 75 says that correction actions include the
25 following. One is a preliminary investigation

1 completed to determine the probable cause. Production
2 and/or injection rates in the vicinity of the
3 monitoring well are adjusted as necessary to increase
4 the net over recovery and thus forming a hydraulic
5 gradient towards the production zone. Three,
6 individual wells are pumped to enhance recovery of the
7 mining solutions. And, four, injection into the well-
8 field adjacent to the monitoring well may be
9 suspended.

10 And then an excursion is considered to be
11 concluded when the concentrations of the excursion
12 indicators do not exceed the criteria defining an
13 excursion for three consecutive one-week samples. Dr.
14 Kreamer, would you like to have any comments on that?
15 And let me rephrase the question. I don't want any
16 comments on it. I would like to know what you would
17 add to that to make it a more effective program and
18 why would it make it more effective program?

19 DR. KREAMER: The program you describe,
20 your honor, is one intended to capture the indicator
21 parameters. As we discussed, uranium travels
22 differently. It's very common in all sorts of
23 groundwater hydrology to have a rebound effect. That
24 is where a contaminant is sequestered for a while and
25 then released later or at a different rate. The

1 process you just described, in pulling in the
2 indicator parameters, might be good for the indicator
3 parameters, but if uranium was progressively moving
4 out to more reducing zones, being sequestered
5 continually, the uranium would be moving different
6 than these indicating parameters. And so the process
7 in theory is pretty good at capturing things. But
8 because there's a differential movement of the
9 potential contaminants of interest and the indicator
10 parameters, they're not the same. And so, therefore,
11 to clean up the excursion of indicator parameters
12 doesn't necessarily meant the spatial orientation of
13 a potential contaminant is cleaned up as well.

14 JUDGE WARDWELL: And this would really only
15 apply, would it not, to the uranium that got beyond
16 the injection wells and was heading towards the
17 excursion monitoring wells? Because would not the
18 uranium that was moving out in that same flowpath, but
19 hadn't reached the production wells yet, be then swept
20 away by the subsequent production? Because production
21 isn't halted during that time frame. But you --

22 DR. KREAMER: That is correct.

23 JUDGE WARDWELL: But you are concerned
24 about that uranium that gets beyond that production
25 well towards the excursion well?

1 DR. KREAMER: Or even what gets beyond the
2 excursion well. The excursion well will measure what
3 arrives, but also some will go beyond. And the
4 oxidative zone will go beyond. And so if uranium were
5 to stop and get sequestered, it would be sequestered
6 beyond the excursion well. And with successive
7 oxidation, there would be a concern.

8 JUDGE WARDWELL: Crow Butte in their
9 testimony, or I should say Exhibit 020, Page 3 says,
10 under the conditions encountered at CBR, the total
11 distance uranium could be expected to travel would be
12 0.5 to 15 percent of the distance traveled by a
13 conservative parameter such as chloride or less than
14 40 feet beyond the active mining area. And I assume
15 that it's that 40 feet beyond the active mining area
16 that is of concern to you? That won't be recaptured
17 by any production effort?

18 DR. KREAMER: Yes, your honor. And in
19 addition, the oxidative zone that's created will
20 continually expand. There won't be as much reductive
21 capability as the process, the mining process goes on.

22 JUDGE WARDWELL: I'll turn to Crow Butte.
23 Would you like to comment about -- I see all kinds of
24 microphones being switched, so who's going to take
25 this in regards --

1 MR. TEAHON: I'll start first, sir.

2 JUDGE WARDWELL: -- to the potential
3 uranium getting beyond the production wells that is
4 going undetected?

5 MR. TEAHON: First thing I would note that
6 any Chadron monitor wells, CM monitor well down in the
7 Basal Chadron sands that goes on excursion is
8 automatically becomes a baseline restoration well.
9 And so, we have to clean that back up just like we do
10 all the other wells to baseline standards. So if
11 there were any potential for residual uranium to be
12 there, that area is restored back to baseline
13 conditions at the end of mining. So with that, I'll
14 let Mr. Lewis talk about the model.

15 MR. LEWIS: Your honor, you had referenced
16 the 40 foot distance in terms of the movement of the
17 uranium beyond the actual mining patterns. And my
18 observation there would simply be that there is a
19 normal flare or halo around the mining area as a
20 result of injection and production and that, that 40
21 foot distance that we're discussing is within that
22 normal halo that is created as a result of the
23 injection and the production geometries.

24 So there's no -- and there's no reason
25 within that halo, since it is essentially still the

1 mining zone, that you wouldn't expect to pull back
2 uranium at the same rate it moved out. So we're not
3 looking at some situation where uranium is moving out
4 into some zone that is not within the normal mining
5 zone and cannot be pulled back. It's the same
6 geochemical system is basically what I'm trying to
7 say.

8 JUDGE WARDWELL: And do you monitor for
9 uranium during the restoration process?

10 MR. TEAHON: Yes, sir. It's one of the
11 baseline restoration parameters.

12 JUDGE WARDWELL: Okay. Thank you.

13 DR. STRIZ: Judge Wardwell, may I add
14 something please?

15 JUDGE WARDWELL: Sure. You can see how
16 excited I am about that.

17 DR. STRIZ: No, I just wanted --

18 JUDGE WARDWELL: So keep that in mind and
19 I know you do and that's why this must be extremely
20 important. This is going to be an incredible
21 statement by you, I'm sure.

22 DR. STRIZ: It's that the requirement to
23 restore these excursion monitoring wells is a License
24 Condition in 11.5.

25 JUDGE WARDWELL: Thank you for that.

1 DR. STRIZ: Yes.

2 JUDGE WARDWELL: It was very useful, but
3 this is why -- it's hard to get back up where I was,
4 but thank you for that. Anyhow. Oh, yes, I know.
5 How many of your excursion wells after your mitigation
6 effects or remediation effects or whatever you happen
7 to call it, still show an excursion at this point in
8 time? Right today or as close to it as you can
9 estimate?

10 MR. TEAHON: Zero, sir.

11 JUDGE WARDWELL: None? They have all been
12 returned to --

13 MR. TEAHON: We still have one shallow
14 monitor well in Mine Unit 6 that has had it's second
15 weekly sample below the excursion parameters. And
16 next week, should that continue, we'll remove it from
17 excursion status. But as it stands right now, there
18 are no wells exceeding the excursion monitoring
19 parameters.

20 JUDGE WARDWELL: Okay. And I'll apologize
21 now because I'll probably ask you the same question
22 when I get to talk about 6 and 8. So I'll apologize
23 now for repeating myself. NRC testimony 001, Page 13,
24 Answer 8, staff testified that as described in Section
25 4.6.2.4, including Table 4-3 of the EA, and that's

1 Exhibit 010 of NRC at Page 79 to 80, and Section
2 5.7.9.3.2 of the SER, that being NRC Exhibit 009, Page
3 124 to 25, between 1995 and 2010, Crow Butte reported
4 13 perimeter monitoring wells have been placed on
5 excursion status and Crow Butte has identified 15
6 excursion events in 12 monitoring wells in the
7 overlying aquifer. Corrective action for the
8 perimeter ring wells primarily consisted of adjusting
9 the extraction and injection rates near the excursion
10 well to capture any outward flow.

11 None of these excursions are known to have
12 impacted the surrounding groundwater quality.
13 Referencing NRC 010 at 79. Considering it's your
14 testimony, I'll NRC, what is meant by 13 perimeter
15 wells on excursion status and 12 overburdened wells in
16 the overlying aquifer with 16 excursion status events?
17 I guess I'm a little confused on excursion status
18 provided to the 13 perimeter wells but yet -- and then
19 this 12 overburdened wells that have 16 excursion
20 status events. Could you clarify what is meant by
21 those statements?

22 MR. LANCASTER: Your honor, are you
23 referring to excursion status? Is that what your
24 questions is going towards?

25 JUDGE WARDWELL: My question is, I mean, I

1 read your testimony and you said this and it seems
2 like you're wording it different for the excursion
3 wells that are in the ore zone compared to the
4 overburden wells. You give it this excursion status
5 events. And did the 13 perimeter wells placed on
6 excursion status mean that's a status event? And why
7 are there 16 excursion status events for 12 overburden
8 wells?

9 MR. LANCASTER: Yes. Events --

10 JUDGE WARDWELL: How come some are blessed
11 with more than one?

12 MR. LANCASTER: Yes. Excursion status and
13 excursion events, it's referring to the same thing.
14 They're on excursion per License Condition, I think it
15 was 11.5.

16 JUDGE WARDWELL: Sorry? What did you --

17 MR. LANCASTER: As defined by License
18 Condition 11.5, they're --

19 JUDGE WARDWELL: Okay.

20 MR. LANCASTER: -- on excursion. Okay?
21 They were on excursion, should I say.

22 JUDGE WARDWELL: So if I understand -- so
23 then how did we get 16 excursion events in 12
24 overburden wells? Why wouldn't those 12 overburden
25 wells be put on excursion status?

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1 DR. STRIZ: They had separate events in the
2 same well. There were several --

3 JUDGE WARDWELL: Same well --

4 DR. STRIZ: -- events in the same well.
5 That's how that happens.

6 JUDGE WARDWELL: So the 12 wells -- there
7 were 12 wells that were put on excursion status --

8 DR. STRIZ: And they had multiple events in
9 some wells.

10 JUDGE WARDWELL: -- and --

11 MR. LANCASTER: That's correct.

12 JUDGE WARDWELL: Twelve wells had an
13 excursion event, that was addressed, it was taken off
14 of excursion status, and then put back on again at
15 some other point in time?

16 DR. STRIZ: Correct.

17 JUDGE WARDWELL: And there are four of
18 those if I did my high math correctly.

19 MR. LANCASTER: Yes, your math --

20 JUDGE WARDWELL: That was four times that
21 it happened?

22 MR. LANCASTER: Your math is correct, yes.

23 JUDGE WARDWELL: Good, okay. That makes
24 sense now. Whereas the 13 perimeter wells were put on
25 excursion status, were dealt with, and have been at

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1 peace since then?

2 DR. STRIZ: Correct.

3 JUDGE WARDWELL: Correct?

4 MR. LANCASTER: Correct.

5 JUDGE WARDWELL: Okay. That now makes
6 sense. In regards to these wells in the overlying
7 aquifer, that seems to connote some vertical
8 migration. And doesn't that refute your opinion in
9 regards to the Brule Aquifer being isolated? Either
10 that or that the indicator parameters really don't
11 target towards excursions from those mining
12 operations?

13 DR. STRIZ: The Licensee has continued to
14 explain those excursions as due to natural
15 fluctuations in the groundwater levels in Mine Units
16 6 and 8 that occur with precipitation events. Those
17 excursion events do not have the signature of a
18 production fluid movement where it continually rises
19 and we pick up the excursion. They're actually
20 related to the change in water levels with a
21 precipitation event, which doesn't look like what we
22 see from a production zone excursion in an overlying
23 monitoring well.

24 JUDGE WARDWELL: So all of these 12
25 overburden wells with the 16 excursion events were in

1 Mine Units 6 and 8?

2 DR. STRIZ: I can't -- no, they weren't
3 all. There were three wells in Mine Unit 4 that had
4 one each. And there were overlying excursions in Mine
5 Unit 7, there was one well that had two excursions
6 each. But the majority of them were in 6 and 8.

7 JUDGE WARDWELL: Still, the other ones are
8 there. And if we have such a great confining unit
9 with no fractures and no preferential pathways for
10 vertical migration, and we are detecting them in not
11 just 6 and 8, but other locations --

12 DR. STRIZ: I believe --

13 JUDGE WARDWELL: -- how can we say with any
14 confidence that we've got such a great confining
15 layer?

16 DR. STRIZ: The two in Mine Unit 3 were in
17 relation to a spill. They detected a spill at the
18 surface, so they function very well. So they were not
19 related to movement from the production zone. And --

20 JUDGE WARDWELL: And in regards to this,
21 and I think this was brought up yesterday, that --
22 well, let me ask you this. Do you know any more about
23 the details of that spill? Where it came from, why it
24 occurred? Or --

25 DR. STRIZ: Yes.

1 JUDGE WARDWELL: -- was it a pipe broken?
2 Was a guy carrying a bucket of stuff and spilled it?
3 Or what?

4 DR. STRIZ: My understanding is that it was
5 a pressure relief valves on one of the wells that was
6 -- but they can confirm that.

7 JUDGE WARDWELL: So this is hypothesized?
8 It's just --

9 DR. STRIZ: No, no, no. I've read the
10 report. I just don't have all the details.

11 JUDGE WARDWELL: Okay. Fine.

12 DR. STRIZ: I do know the report.

13 JUDGE WARDWELL: Then I'll ask them.

14 DR. STRIZ: But I think that they would
15 have more information.

16 JUDGE WARDWELL: I can see out of my
17 peripheral vision, they're getting a little antsy.

18 DR. STRIZ: Yes.

19 JUDGE WARDWELL: And so, but I'll get to
20 them in a minute.

21 MR. LANCASTER: Your honor --

22 JUDGE WARDWELL: But I --

23 MR. LANCASTER: -- to answer your --

24 JUDGE WARDWELL: No.

25 MR. LANCASTER: Okay.

1 JUDGE WARDWELL: No. I want to continue,
2 I don't want to lose my thought.

3 MR. LANCASTER: Okay.

4 JUDGE WARDWELL: The -- which you've just
5 managed to succeed in doing. You can see my thoughts
6 are pretty fleeting. I wanted to touch upon something
7 yesterday that I think might have been confusing and
8 I'll say it here again. With this hypothesis that
9 they have on this spill, there's no inference, is
10 there, that this spill went down between the casing
11 and the hole, but it was attributed by being a spill,
12 just went on the ground and down through to the
13 aquifer itself? It isn't necessarily directly related
14 to any inadequate sealing around the casing, is it?

15 DR. STRIZ: I'm afraid my memory of the
16 report's -- I believe it went through the soils and
17 did not go down a well. But, as I said, they could
18 elaborate on --

19 JUDGE WARDWELL: Okay.

20 DR. STRIZ: -- the details because they did
21 do the root cause analysis and the corrective action
22 for that.

23 JUDGE WARDWELL: Okay. And what was the
24 root cause analysis results indicate and the
25 corrective action for this, CBR? Mr. Teahon?

1 MR. TEAHON: Sir, as I indicated yesterday,
2 our injection wells have bleeder valves on them and in
3 the early days, we had spring loaded valves. And we
4 had a piece of material get stuck in that valve and
5 cause release of injection fluid that impacted the
6 well.

7 JUDGE WARDWELL: You can confirm that?
8 That, that happened? Or was this a hypothesis?

9 MR. TEAHON: No sir, I can confirm that.

10 JUDGE WARDWELL: And it -- by visual
11 inspection, you saw it leaking or you saw the dirt and
12 had to clean it or whatever?

13 MR. TEAHON: Yes, sir. It's part of our
14 report that was submitted.

15 JUDGE WARDWELL: And did this spill just go
16 down, infiltrate through the soils, same as rainwater
17 would? Or did it go through a preferential pathway
18 through that injection well? Do you have any idea
19 based on your field observations?

20 MR. TEAHON: It would have had to have
21 infiltrated through the soil. Our wells are sealed
22 with the cement that Mr. Beins indicated, plus there's
23 a bentonite seal on the surface.

24 JUDGE WARDWELL: But some of those seals do
25 weather pretty fast, don't they? And deteriorate? Or

1 is that not your experience?

2 MR. TEAHON: It's not our experience.
3 We're there every two weeks looking at the wells and
4 if we see any indication that there's an issue there,
5 we try to correct it.

6 JUDGE WARDWELL: Okay. Thank you. In NRC
7 EA, Exhibit 010, Page 79, for horizontal excursions,
8 you state that corrective action for the perimeter
9 ring wells primarily consisted of adjusted flows in
10 the nearest production units to capture any outward
11 flow. These corrective actions proved adequate in
12 controlling the excursions in a timely for nine
13 perimeter wells. For the other four wells, a
14 corrective action proved less effective. For three
15 wells, CBR attributed the cause for the excursion
16 status to mine unit geometrics. And you reference NRC
17 2014.

18 For the fourth well, CBR attributed the
19 inadequacy of the corrective actions to differences in
20 completion intervals of the perimeter well and the
21 nearest production wells. And again, referencing NRC
22 2014. None of these excursions have impacted the
23 surrounding groundwater quality. First of all, for --
24 well, I guess it's NRC's testimony, so I'll ask them.
25 What does mine unit geometrics mean in regards to

1 being the cause for these excursions?

2 DR. STRIZ: If we could pull up the map of
3 the mine units, it would be easier for me to explain.

4 JUDGE WARDWELL: The one with the radius of
5 influence on them? I think that's --

6 DR. STRIZ: No, no, no. It's the actual
7 location of the mine units. Or I can just explain it.
8 And I don't remember which exhibit it was, but we've
9 seen the map of the mine units. The way that the CBR
10 began was with Mine Unit 1, which is a very small mine
11 unit. It's about 9.3 acres. And then Mine Units 2,
12 3, 4, and 5 surround this mine unit. So when they
13 finished restoration of Mine Unit 1, they converted
14 those three wells -- after they met the groundwater
15 quality standards, they converted three of the wells
16 that were used for the restoration confirmation into
17 excursion monitoring wells for the surrounding units
18 to protect Mine Unit 1 because it had been restored.
19 And those -- it's a difficult pattern to control
20 because you have all these active mine units around it
21 and you have a very small mine unit. So they had more
22 excursions into that unit. That was the basis of the
23 geometry.

24 JUDGE WARDWELL: Thank you.

25 CHAIR GIBSON: If any witnesses need to

1 happen to run to the restroom while -- as long as
2 they're not being examined by one of the judges, it's
3 fine. I understand that some of you all need to go
4 more frequently than we take breaks. So, okay. Very
5 well.

6 JUDGE WARDWELL: I'm currently on a long
7 section, so just let me know whenever you want to take
8 a break. No time is better than the other, so it
9 doesn't really -- yes, okay, 10:00 would be good.
10 Yes. And do you agree with the testimony of Crow
11 Butte that these have all been corrected and pulled
12 off of excursion status?

13 DR. STRIZ: Yes.

14 JUDGE WARDWELL: NRC?

15 DR. STRIZ: Yes.

16 JUDGE WARDWELL: Thank you. And speaking
17 of that, if you do need an exhibit or if anyone does,
18 let me know. I just don't -- I remember seeing that
19 mine -- I don't think we've pulled it up here in the
20 last two days. I know I've seen it, but there's no
21 way I'd be able to find it for you and we don't need
22 it right now.

23 DR. STRIZ: Thank you.

24 JUDGE WARDWELL: But if you really
25 absolutely do need it, don't hesitate. We'll take the

1 time to get the darned thing. But this one, I don't
2 think need it. I've got the basic --

3 DR. STRIZ: Okay.

4 JUDGE WARDWELL: -- picture under it. That
5 makes some sense. NRC testimony in their -- not
6 testimony, in their statements in the Environmental
7 Assessment, Page 79, for vertical excursions, you
8 state that CBR attributed the excursion events for
9 wells in the overlying shallow aquifer to natural
10 fluctuations in the water quality for the following
11 reasons. One, CBR has stated that the wells with
12 excursions are located in Mine Units 6 and 8, which
13 are in close proximity to the headwaters, including
14 groundwater seeps for English Creek. And, two, CBR
15 has stated that groundwater in the overlying aquifer
16 is under the influence of surface water. And, three,
17 CBR has presented data that correlate a rise in the
18 groundwater levels with increased excursion parameter
19 concentrations. And you reference NRC 2014. NRC, do
20 you remember what NRC 2014 is? And is it an exhibit
21 in this proceeding?

22 DR. STRIZ: Yes. It's the SER.

23 JUDGE WARDWELL: Okay.

24 DR. STRIZ: And it's Exhibit --

25 JUDGE WARDWELL: 009, I believe?

1 DR. STRIZ: -- 009.

2 JUDGE WARDWELL: Okay. Great. For all
3 excursion status events in the shallow aquifers, the
4 events generally terminate within 90 days without
5 corrective actions, which is consistent with a process
6 for events not attributed to operations. And you also
7 reference, see also NRC009, which is the SER, on Page
8 125. This is all your testimony. If you feel it's
9 more appropriate, I'll ask Crow Butte for the details
10 of what went on, but if not I'll --

11 DR. STRIZ: No, I'm --

12 JUDGE WARDWELL: -- continue to proceed --

13 DR. STRIZ: I'm fine.

14 JUDGE WARDWELL: Okay, great. When were
15 these vertical excursions first detected? And how
16 long has there been work done trying to reach a
17 conclusion on these?

18 DR. STRIZ: I need to get to another table.
19 Oh, it's in the other folder. Oops. I've done quite
20 a lengthy analysis of these excursions. The first
21 excursion in an overlying unit in Mine Unit 6 was
22 detected 3/6/2000 and was attributed to natural
23 fluctuation of shallow groundwater quality. They have
24 continued --

25 JUDGE WARDWELL: Can I interrupt you right

1 there? Because I have -- one of the things I remember
2 one of the things that I forgot to mention in regards
3 to that. Why wasn't this natural fluctuations impact
4 on water quality detected when they did background
5 sampling of these wells? And I assume they did as
6 soon as they put them in place?

7 DR. STRIZ: That's one of the reason we're
8 requiring them to measure uranium is that I went back
9 and looked at the background water quality in the
10 wells in Mine Unit 6 in the upperlying aquifer and
11 could not detect natural fluctuations. So I could not
12 verify that this was accurate. That this was a basis
13 for this.

14 JUDGE WARDWELL: So --

15 DR. STRIZ: I could --

16 JUDGE WARDWELL: -- this is still just a
17 hypothesis then? There's no -- because there's no
18 information that was gained from -- the background
19 water quality did not show these fluctuations with --

20 DR. STRIZ: No, it did not.

21 JUDGE WARDWELL: -- groundwater?

22 DR. STRIZ: No, it did not. And it formed
23 the basis for requesting the extra monitoring. As
24 I've described, we need a very substantial basis to
25 request --

1 JUDGE WARDWELL: I think I will turn to
2 Crow Butte right now to get a comment just on this one
3 issue. The fact that background didn't show this,
4 doesn't that kind of diminish the weight that might be
5 placed on this particular excuse for why these
6 excursion parameters were detected?

7 MR. TEAHON: No, sir. These wells were
8 baseline sampled in a dry year. Had they been
9 baseline sampled in a wet year, our excursion
10 monitoring parameters would have been different.
11 There's a strong downward hydraulic gradient in that
12 area. These are close to the English Creek drainage
13 system. And we see when we get a wet year, the same
14 set of wells that are close to English Creek, those
15 excursion parameters go up.

16 And we're talking chlorides that are
17 moving from an order of 30 to 40 parts per million.
18 If that were mining solution, it would be 100 times
19 that, it'd be 400 parts per million. As soon as the
20 groundwater level drops and it dries out, those wells
21 go off excursion status. And we've seen that cycle
22 over the past several years on Mine Units 6 and 8.

23 JUDGE WARDWELL: One of your other
24 hypotheses that relate to this mention about being
25 close to the seeps in English Creek, is it?

1 MR. TEAHON: It's at the headwaters of
2 English Creek. The upper end, the shallow part of
3 English Creek starts right along Mine Units 6 and 8.

4 JUDGE WARDWELL: And it doesn't say
5 anything about the seeps from that? Yes, including
6 groundwater seeps, I thought.

7 MR. TEAHON: Yes. It's a very shallow
8 water table in that area.

9 JUDGE WARDWELL: NRC, have you ever
10 required seeps to be monitored? And if not, why not?

11 DR. STRIZ: No, we haven't required seeps
12 to be monitored. The requirement for monitoring of
13 surface water is, the guidance is for perennial
14 streams. And ephemeral streams and seeps are not
15 typically monitored. And even though these streams
16 are ephemeral at the Crow Butte site, they have been
17 willing to monitor them. So it's not one of our
18 guidance requirements to monitor seeps --

19 JUDGE WARDWELL: But, still, that's just
20 guidance. You can --

21 DR. STRIZ: That's --

22 JUDGE WARDWELL: You can --

23 DR. STRIZ: That's true.

24 JUDGE WARDWELL: -- deviate from that
25 guidance and say, well, we've got some seeps here in

1 some of these. It seems like that would be even of
2 more interest, especially considering they're
3 ephemeral anyhow. Might as well get the seeps while
4 they're there to see what they're like.

5 DR. STRIZ: Once again, we request what we
6 feel is necessary. We could have added --

7 JUDGE WARDWELL: Why --

8 DR. STRIZ: -- it if we --

9 JUDGE WARDWELL: Why did you decide the
10 seeps weren't necessary and that the stream itself
11 wasn't necessary? I think if I was going to have a
12 preference, I'd go to the root cause being the seeps
13 before I got to the stream.

14 DR. STRIZ: The guidance is for surface
15 water that's perennial and that's what we go by.

16 JUDGE WARDWELL: Seep isn't surface water?

17 DR. STRIZ: It does become surface water in
18 a drainage, yes.

19 JUDGE WARDWELL: Thank you. Now I'll see,
20 make sure I've got -- I've got to weave my way back.
21 I think we're back to you in regards to -- yes. And
22 how long has this been addressed, was the next part,
23 have we been working on this?

24 DR. STRIZ: They continue to date. We
25 still have excursions in Mine Units 6 and 8 with

1 precipitation events.

2 JUDGE WARDWELL: So do you disagree with
3 Crow Butte in their statement that -- or is this the
4 only -- is there only one well left on excursion
5 status in this --

6 DR. STRIZ: Well as --

7 JUDGE WARDWELL: -- in your activities with
8 them?

9 DR. STRIZ: As he described, they have one
10 well that has shown that it is below the UCLs and if
11 they get a confirmatory sampling, that well will go
12 off excursion status.

13 JUDGE WARDWELL: And the others have been
14 off excursion status --

15 DR. STRIZ: They are off.

16 JUDGE WARDWELL: -- even though you're
17 still pursuing and trying to find out more
18 definitively the root cause of these problems?

19 DR. STRIZ: It's not that we disagree with
20 them. We want verification by adding uranium that
21 this is not due to spills in the area or production
22 fluids. And we're using the uranium as a
23 characterization tool. And if it's detected, then we
24 will ask them to do more characterization.

25 JUDGE WARDWELL: Okay. Thank you. You do

1 -- whenever I see a qualifier, I get a little excited
2 and within this testimony, NRC, you say the events
3 generally terminate within 90 days. What do you mean
4 by that? And what's the difference, what's the
5 variation?

6 DR. STRIZ: They have varied anywhere from
7 20 days to 402 in Mine Unit 6.

8 JUDGE WARDWELL: So really the generally 90
9 doesn't really mean much. It just varies --

10 DR. STRIZ: Well, the majority of them by
11 far are below 60 days.

12 JUDGE WARDWELL: And how many, just
13 glancing at that, approximately how many did not
14 terminate in 90 days or go longer than that?

15 DR. STRIZ: One, two, three, four.

16 JUDGE WARDWELL: Okay. Thank you. Four
17 out of how -- what was the total number again?

18 DR. STRIZ: We are up to -- I haven't added
19 the most recent excursions, but it's -- I'm sorry, I
20 had that in my summary table. Fifteen as of January
21 2013. And I haven't added the most recent ones.

22 JUDGE WARDWELL: Okay. Thank you.

23 DR. STRIZ: Fifteen -- and there's many in
24 the same well.

25 JUDGE WARDWELL: Okay.

1 DR. STRIZ: So that doesn't --

2 JUDGE WARDWELL: Thank you.

3 DR. STRIZ: -- account for that.

4 JUDGE WARDWELL: NRC testimony, 001, Page
5 114 to 115, Answer 14.8, you testified that excursions
6 in the overlying aquifer were not found to be related
7 to vertical excursions from the production zone. For
8 NRC, does not this state that the use of these
9 indicator parameters are not effective in detecting
10 vertical excursions, making the overburden wells
11 ineffective and basically somewhat useless in regards
12 to detecting vertical excursions if, in fact, you have
13 these other --

14 DR. STRIZ: The reason that it's not from
15 the -- the reason that they're not detecting from the
16 production zone is because they're not coming from the
17 production zone from our analysis. The excursion
18 indicators are still adequate for detecting excursions
19 from the production zone.

20 JUDGE WARDWELL: Yet, you see the
21 variations in the same indicator parameters that
22 you're using to attribute to excursions. And if
23 there's other activities going on that will affect
24 those excursion indicator parameters that aren't
25 related to excursions, doesn't that diminish the

1 effect of them as indicator parameters for excursions?

2 DR. STRIZ: I would disagree.

3 JUDGE WARDWELL: Did I just really -- okay.

4 Fair enough.

5 DR. STRIZ: No, I would disagree. I think
6 they're very effective excursion indicators of
7 production fluids. We may have -- if there's been a
8 spill, that's a production fluid. And they would be
9 indicating it. Correct? As --

10 JUDGE WARDWELL: Well, yes. But you have
11 others that you're saying isn't related to coming from
12 the production zone for other reasons besides the
13 spills, correct?

14 DR. STRIZ: In my analysis in the SER, I
15 distinctly say that I think that it's possible these
16 could be coming from spills and that's why I requested
17 that the license condition be added for uranium.

18 JUDGE WARDWELL: Okay.

19 DR. STRIZ: Because there have been several
20 spills and it makes sense that if the water level
21 rises, it could be going up into the vadose zone, re-
22 dissolving a spill, and carrying those fluids back
23 down. So they are sufficient for indicating
24 production fluids.

25 JUDGE WARDWELL: So we're really back to

1 where we were before that you're still investigating
2 this actively and then that will dictate decisions for
3 future mining units and the activities associated with
4 it such that you may change the excursions parameters.
5 Probably not, but fine, it's still an open issue based
6 on this particular situation. Is that a fair
7 assessment?

8 DR. STRIZ: No, I think that the excursion
9 indicators are sufficient for detecting excursions.
10 This is a case where our analyses show that additional
11 information was required to attempt to characterize
12 the source or to verify whether Crow Butte is correct.

13 JUDGE WARDWELL: Okay.

14 DR. STRIZ: I do not see that we would add
15 uranium as an excursion indicator. They've functioned
16 very well over more than 20 years of operations.

17 JUDGE WARDWELL: Thank you, Doctor. Sure.
18 We will turn it over to --

19 CHAIR GIBSON: We'll stand in recess.
20 Instead of 10, 15 minutes, I've got to run up and get
21 some Claritin or something. I've got some kind of
22 allergy going here.

23 (Whereupon, the above-entitled matter went
24 off the record at 9:53 a.m. and resumed at 9:58 a.m.)

25 CHAIR GIBSON: Excuse me, can we go on the

1 record here for just a second? It appears that one of
2 our witnesses has got a family emergency, Mr.
3 Lancaster, and needs to be excused. Counsel, will all
4 of his testimony be able to be covered through another
5 witness?

6 MS. SIMON: Yes, your honor.

7 CHAIR GIBSON: Okay, very well. If there's
8 no objection, then we'll let Mr. Lancaster be excused
9 and I'll be right back as soon as I can get something
10 for my allergies.

11 (Whereupon, the above-entitled matter went
12 off the record at 9:59 a.m. and resumed at 10:14 a.m.)

13 JUDGE WARDWELL: Okay. Back to, I think we
14 were talking somewhat about this excursion stuff, but
15 back to the testing for uranium in the Mine Units 6
16 and 8. How many wells does that apply to about?

17 DR. STRIZ: I apologize.

18 JUDGE WARDWELL: No problem.

19 DR. STRIZ: I have a lot of information.
20 Mine Unit 6 has 28 overlying wells.

21 JUDGE WARDWELL: Okay.

22 DR. STRIZ: Mine Unit 8 has 29 overlying
23 wells. So it applies to all of those.

24 JUDGE WARDWELL: Okay. Thank you. Okay.

25 All right. We've covered lots of the questions I've

1 had just in our dialogue here. That's what's taking
2 me time to go through this.

3 DR. STRIZ: I would like to make one
4 correction to the EA, your honor.

5 JUDGE WARDWELL: Okay.

6 DR. STRIZ: It has an error in that it says
7 natural uranium and radium-226. That is incorrect.
8 We are only requesting that they monitor natural
9 uranium by license condition.

10 JUDGE WARDWELL: Okay. Thank you. And you
11 said that's a request? What did you say right at the
12 very end of that?

13 DR. STRIZ: Require them.

14 JUDGE WARDWELL: You do require, you don't
15 request them?

16 DR. STRIZ: It's not required. That's an
17 error.

18 JUDGE WARDWELL: Okay.

19 DR. STRIZ: The license condition only
20 requires uranium.

21 JUDGE WARDWELL: Right. But it is a
22 license condition that requires it --

23 DR. STRIZ: Yes, it is.

24 JUDGE WARDWELL: -- it's not just a request
25 --

1 DR. STRIZ: It's a license condition.

2 JUDGE WARDWELL: -- that they are agreeing
3 to?

4 DR. STRIZ: No, it's not. It's a license
5 condition.

6 JUDGE WARDWELL: In, yes, CBR License
7 Renewal Application, Page 5-30 states that the
8 vertical excursions into the overlying Brule Aquifer
9 are another possible pathway for contaminants to reach
10 the White River. Such events are unlikely because CBR
11 has plugged and abandoned all exploratory drill holes
12 at the CBR facility and because the wells are subject
13 to MIT. Could you explain MIT and what's involved
14 with that?

15 MR. TEAHON: MIT is the abbreviation for
16 Mechanical Integrity Testing. And we have a Class III
17 UIC requirement that those wells be tested every five
18 years. The well or the packer is set down above the
19 screens and one at the top and then it's pressurized
20 up to 120 percent of the operating parameters.

21 JUDGE WARDWELL: And then just tested that
22 it can hold that pressure?

23 MR. TEAHON: Right. To make sure that the
24 well has maintained its integrity. Any time we work
25 the well over, we have a rig on the well, we're also

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1 required to do a follow-up MIT to make sure that the
2 well integrity is still good.

3 JUDGE WARDWELL: Okay. Thank you.
4 Intervenors Exhibit 046, Page 5, Kreamer states that
5 site monitoring has a potential to provide information
6 that does not accurately reflect levels in spatial
7 orientation of any potential pollutant release,
8 synergistic effects of multiple contaminants, and does
9 not provide early warning of contaminant migration.
10 NRC, would you like to comment on that position of Dr.
11 Kreamer?

12 DR. STRIZ: As we stated in our testimony,
13 we disagree with that. We think that the monitoring
14 network is sufficient to detect excursions using the
15 three indicators.

16 JUDGE WARDWELL: Okay. Thank you. In
17 NRC's EA, Page 79 to 81, staff discusses the
18 excursions to date identified as a result of Crow
19 Butte's excursion monitoring program and finds that
20 based on the analysis of groundwater quality impacts
21 from excursions in the prior license period and the
22 continued requirements for excursion monitoring to
23 detect and take corrective action to eliminate the
24 excursion, the NRC staff concludes that the long-term
25 impacts on groundwater from excursions would be small.

1 And I guess with the ongoing investigation, I guess it
2 surprises me a little that you would say it's small.
3 At best, wouldn't you just say it's unknown until you
4 can resolve that issue with 6 and 8?

5 DR. STRIZ: Based on their history, we have
6 determined that the impacts are small. And we
7 continue to investigate this, but until we have
8 information to indicate otherwise, we cannot make a
9 determination. And even if there are these
10 excursions, it's likely that the impact would be small
11 based on that they will have to take corrective action
12 and they will have to restore all of them to baseline
13 conditions per their license condition.

14 JUDGE WARDWELL: Okay. Thank you. Moving
15 on to Contention C, the NRC staff's characterization
16 that the impact of surface waters from an accident is
17 minimal since there are no nearby surface water
18 features does not accurately address the potential for
19 environmental harm to the White River, i.e., White
20 River alluvium is a potential pathway for
21 contamination from accidents at the CBR facility and
22 that potential impacts to the White River were not
23 adequately addressed in the License Renewal
24 Application or the EA. Intervenors testimony, 003,
25 Page 3, in Dr. LaGarry's 2008 opinion he alleges that

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1 the White River alluvium can receive contaminants from
2 waters transmitted through the Chamberlain Pass (Basal
3 Chadron Formation) where it's exposed at the land
4 surface.

5 NRC testimony, Exhibit 001, Page 21,
6 Answer C.5 states that aquifer connection is not
7 possible because, one, the Basal Chadron sandstone
8 does not outcrop anywhere near the license area or the
9 proposed NTEA, North Trend Expansion Area. This is --
10 never mind, strike those last two, well, you don't
11 have to strike them, they are in there, but I don't
12 have any questions on them. We've already covered
13 that. Okay, we've talked about that. Ms. White Plume
14 isn't here today? Or is she?

15 MR. BALLANCO: She is, your honor.

16 JUDGE WARDWELL: What's that?

17 MR. BALLANCO: She is here.

18 JUDGE WARDWELL: Great. Oh, yes. I do
19 have a question for you if you wouldn't mind coming
20 up. Good morning.

21 MS. WHITE PLUME: Good morning.

22 JUDGE WARDWELL: In your testimony, 021,
23 you state that our Tribal members used to be able to
24 make use of the White River. Fishing in it, watering
25 horses and cattle, and for crop irrigation. Now, most

1 people are leery of it due to contamination and low
2 flow. Do you know if the White River flowing on the
3 Reservation has been tested and what the test results
4 show?

5 MS. WHITE PLUME: I know it's been tested
6 and illegal MCLs for uranium and arsenic and other
7 contaminants have been revealed. But I don't have the
8 test results.

9 JUDGE WARDWELL: Okay. That's fine.
10 That's enough. Is there any indication that these
11 contaminants are coming from the Crow Butte facility?

12 MS. WHITE PLUME: Through our spiritual
13 teachings, that's what we know.

14 JUDGE WARDWELL: Say again now?

15 MS. WHITE PLUME: Through our spiritual
16 teachings, that's what we know, because we have a
17 relationship with this ancestral territory and waters.

18 JUDGE WARDWELL: Okay. Thank you. So
19 because of these tests, it is not merely a perception
20 issue in regards to the White River, but you actually
21 have data to show that these radionuclides and other
22 contaminants are detected in the river water, is that
23 --

24 MS. WHITE PLUME: Yes.

25 JUDGE WARDWELL: -- correct? Is that river

1 flowing all year long in the Reservation area? Or is
2 it like it's been reported here that, I think Dr.
3 LaGarry characterizes it comes in the spring and then
4 it's gone?

5 MS. WHITE PLUME: Yes.

6 JUDGE WARDWELL: It just comes in the
7 spring? It's only flowing during the spring time?

8 MS. WHITE PLUME: Well, it comes and goes
9 depending on rain and snow melt and --

10 JUDGE WARDWELL: Okay.

11 MS. WHITE PLUME: -- all of that.

12 JUDGE WARDWELL: Okay. Great. Yes.
13 Thanks. That's all I have on Contention C. Do any of
14 you people have questions on C? I forgot to mention
15 that. How about A?

16 JUDGE HAJEK: No.

17 JUDGE WARDWELL: And keep in mind, in case
18 there are any newcomers to our experience that we're
19 having here these last few days, we did cover a lot of
20 background on hydrogeology that applied to all the
21 Contentions. And so the individual questions I have
22 -- the specific questions I have for the individual
23 Contentions are not many because we basically covered
24 most of the issues that we're dealing with. And
25 that's also why it takes me a few minutes to weed out

1 the repetitive ones.

2 CHAIR GIBSON: While you're in the process
3 of weeding out repetitive ones, Judge Wardwell, I just
4 wanted to make note of one thing that I would like to
5 try to do. I hope it will not be an inconvenience for
6 any of the witnesses. What I would like to do is when
7 we've finished with Contentions A, C, D, F, and 14,
8 initially, we're going to be getting into Contentions
9 6, 9, and 12. There may be some of these witnesses
10 who don't have anything to say about Contentions 6, 9,
11 and 12. If it would be possible to get them to stick
12 around a little bit, what we would like to do is get
13 through 6, 9, and 12 and then come back to the
14 questions that we have that you all proposed to us.
15 We may have some additional questions to ask of them
16 at that time.

17 Frankly, we've not had a chance to digest
18 them and to ask those questions. It'll take us a
19 little bit of time to do that. So I apologize to any
20 witnesses if that's an inconvenience, but we need to
21 get through it in this way. So if you could try to
22 make whatever plans you need to make for the rest of
23 the day, we will -- it'll be just today. We won't be
24 getting into this tomorrow. But I just meant, you
25 won't be dismissed for the bulk of our hearing. Okay?

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1 Thank you.

2 JUDGE WARDWELL: Okay. Moving on to
3 Contention F, we have no other questions on Contention
4 D. They were all repetitive, what we've already
5 covered. Contention F, failure to include recent
6 research, basically claimed that staff's EA failed to
7 consider the results of recent research related to the
8 use of the outdated manuals for water quality sampling
9 and testing and not adopting recent changes into the
10 regional and local geology, especially as it relates
11 to the formation and naming of the Basal Chadron
12 Formation.

13 And Crow Butte's testimony, in 001, Page
14 30, A62 states the there is no requirement that an
15 applicant consider the research or opinions of any
16 particular expert in preparing an application. And I
17 guess I would address this to anyone from the
18 Intervenors who wish to address this, is that, is
19 there any requirement that staff use the most
20 sophisticated model or any other particular level of
21 complexity when evaluating relative impacts from an
22 agency action in a NEPA related document that you are
23 aware of?

24 DR. LAGARRY: I'll begin, your honor.

25 JUDGE WARDWELL: Okay.

1 DR. LAGARRY: And I'm speaking as a
2 scientist and not a business person or a regulator.
3 But it's standard scientific practice to demonstrate
4 due diligence in your scholarship by using the latest
5 research and ideas. Paradigms can shift in short
6 time. Often because the holders of an earlier
7 paradigm retire, become inactive, and then their
8 students carry on with new ideas and new approaches.
9 So within the span of a decade, major changes can
10 happen in how things like sedimentary deposits and
11 faults and fractures and all these things can occur
12 and manifest.

13 And keeping up with the recent research,
14 in my view as a scientist, is incumbent on an
15 operation like Crow Butte because how these concepts
16 change can directly influence how they approach their
17 extraction and restoration of deposits and how they're
18 treated. In addition, some of these fields are
19 advancing quickly with technology. And so technology
20 reveals new things. Right?

21 And so, I mean, I get warm fuzzies from
22 this hearing because we're finally using Chamberlain
23 Pass Formation, the proper name of these rocks.
24 However, that was seven years in the making. The
25 revised concepts were introduced in 1994 and then

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1 extended into Nebraska in 1998, a full decade before
2 the 2008 hearings. And here we are seven years on, 17
3 years from that. In the career of a scientist, entire
4 ways of viewing the world can completely be
5 revolutionized in 17 years, right? So this is a
6 function of due diligence and trust that if the
7 scientific community is going to trust the scholarship
8 and the integrity of a science based operation,
9 whether it be a business, an agency, or another
10 scientist, that's a fundamental thing that has to be
11 there. And with that, I'll pass it on to my
12 colleagues.

13 JUDGE WARDWELL: Thank you, Dr. LaGarry.

14 MR. WIREMAN: Mike Wireman here. I'll add
15 to that as a scientist and as a long-time employee of
16 the USEPA, it is very important to use new
17 understandings. We have learned a tremendous amount
18 about, for instance, the fate and transport of
19 contaminants in the subsurface over the last 15 years.
20 That science has evolved tremendously. It didn't even
21 exist, frankly, before the late 1980s, early 1990s.

22 So I've always been of the mind that you
23 have to bring to any problem, any issue, the latest
24 understandings in terms of just the science and the
25 first principle understandings of these processes as

1 well as any new understanding of the site, of the
2 place that you're looking at. It's really important
3 because Dr. LaGarry is right, science moves down the
4 road. There are new understandings. We learn all the
5 time. So it's critical, I think, to use the most
6 recent research, most recent understandings, and apply
7 them to the problems at hand.

8 MS. MCLEAN: Continuing on that thought,
9 I'd like to say that we have come miles in testing for
10 the true toxicity of environmental impacts and
11 environmental chemicals. We're not using the
12 technology that's been developed a long time ago and
13 not requiring that. One is speciation of the
14 inorganic -- of the heavy metals, which is huge
15 because each one of those different species has a
16 different, if you look in the MSDS or the Merck
17 manual, they have a different toxicity, they target
18 different tissues and organs in the body, and they
19 have different consequences in the body. So that --
20 and the same thing with the organified heavy metals as
21 well. That we know that quickly accumulate up the
22 food chain and bioaccumulation, of which I submitted
23 slides and testimony to that.

24 So we can't really properly evaluate and
25 the scientific community has been waiting to be able

1 to see some testing made public about -- to be able to
2 properly evaluate the true toxicity of these
3 environmental chemicals in the environment that have
4 escaped in waste from everything. Every sort of
5 industry, not just mining. And so I know as I've
6 called around to talk to different laboratories that
7 speciation, some speciation is being done on a
8 haphazard basis for selenium and, sometimes, arsenic,
9 but none of this is published. And none of this is
10 forced to be published or required to be published so
11 that we can evaluate the true toxicity of this stuff.

12 And I understand from what the laboratory
13 bench chemists tell me when I try and get results from
14 different mining operations, they told me, frankly,
15 that the numbers, and the numbers are so
16 characteristically bad that the mining companies
17 choose not to reveal them. So these things need to be
18 made public. They need to be utilized with -- for the
19 scientific community to properly evaluate and for you
20 guys and the EPA to properly evaluate the true
21 toxicity of the chemical forms that we're looking at.

22 JUDGE WARDWELL: Thank you very much. Do
23 you have something new to add to this?

24 DR. KREAMER: I do. Very pertinent to --
25 specific. As far as redox conditions and how they

1 change radioactive movement. Even in this last year,
2 March, the DOE came out and saw some very unexpected
3 things as far as how things are sequestered and how
4 they move. Which would be pertinent to transport
5 here. And in the modeling that was done, the
6 restoration based modeling, it was based on Gelhar and
7 Wilson, 1974. They also reference Zheng, et al and
8 his work in '91 and '92. Since that time Zheng, et
9 al's work on MT3D has been updated since the early
10 '90s, 1998 and later work, it's not referenced in the
11 LRA. And I guess there are things in procedures that
12 older modeling techniques have been used.

13 JUDGE WARDWELL: Thank you. In NRC001 at
14 59, Answer F-9, as noted in Section 2.9.1 of the
15 License Renewal Application, the preoperational
16 baseline groundwater quality data were initially
17 provided in the 1987 License Application for the Crow
18 Butte facility. And that's referencing the License
19 Renewal Application, 001, at 2-275. And it appears
20 that the License Renewal Application refers to earlier
21 versions of the EPA documents that were used at the
22 time those original baseline measurements were taken.
23 And the references to them were apparently provided
24 for historic context. So I guess I'll go to the
25 staff, is it your understanding that the updated

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1 manuals have been used since their adoption for water
2 sampling?

3 MR. BACK: Yes, your honor. Staff traced
4 that back to the original application and found a
5 reference to it. It's currently not referenced in
6 their current LRA. It's just included in the
7 reference list.

8 JUDGE WARDWELL: Thank you. Were the older
9 publications only used for the preoperational baseline
10 water quality sampling then?

11 MR. BACK: Yes. It is my understanding,
12 your honor.

13 JUDGE WARDWELL: Okay. Thank you.

14 DR. STRIZ: Your honor?

15 JUDGE WARDWELL: Yes.

16 DR. STRIZ: May I add something with
17 respect to the latest research?

18 JUDGE WARDWELL: You may because I wasn't
19 thinking of something yet.

20 DR. STRIZ: Okay. Thank you. I was hoping
21 I could catch you at that moment. Staff would like to
22 revise their position on acceptance of the Chamberlain
23 Pass Formation designation. And the reason for this
24 is that the groundwater modeling report done by USGS
25 in 2014 uses references up and through 2014. They do

1 not, however, include the body of work that was done
2 by LaGarry and Terry in redesignating the Chamberlain
3 Pass Formation. We have serious concerns that USGS
4 has not adopted the Chamberlain Pass Formation
5 nomenclature for Nebraska. They have adopted it only
6 for the Badlands.

7 So they identified Chamberlain Pass in the
8 Badlands, but USGS does not use this terminology in
9 any of their recent publications. I have published
10 three articles, three reports with USGS in recent
11 years. And I understand that they have a very
12 rigorous internal and external peer review process.
13 They would not exclude a body of work unless they had
14 a specific reason. As Dr. LaGarry opened in his
15 statement, he said the Chamberlain Pass Formation
16 nomenclature had been accepted by the State of
17 Nebraska. However, he did not say it had been
18 accepted by the USGS. So we'd like to caveat our
19 response that we will accept the Chamberlain Pass
20 Formation designation once USGS has indicated that
21 they have accepted it.

22 CHAIR GIBSON: Without getting too far
23 afield here, I think it's important to recognize that
24 this issue is something that we're going to be
25 addressing in our separate day of hearing that you all

1 will propose to us on Friday.

2 DR. STRIZ: Thank you.

3 JUDGE WARDWELL: Moving on, I think, to my
4 last Contention that you get to hear me lead the
5 babbling. It may be impossible to stop me from
6 babbling a little bit on the other Contentions, but I
7 won't be taking the lead on it. And in Contention 14,
8 the Final EA violates the National Environmental
9 Policy Act in its failure to provide an analysis of
10 the impacts on the project from earthquakes,
11 especially as it concerns secondary porosity and
12 adequate confinement. And seismology is discussed in
13 Section 3.4.3, Pages 28 to 29 of the EA. And in that,
14 it concludes that, quote, the CBR facility is located
15 in the stable interior of the United States and in
16 Seismic Zone One, which is a zone of low seismic
17 hazard. And they reference NRC010 at 28.

18 It also discusses several historic
19 earthquakes in Nebraska, including several within 100
20 miles of the facility and provides Modified Mercalli
21 index intensities at the locations near the epicenter
22 for those earthquakes. And, again, referencing NRC010
23 at 28 to 29. Two recent earthquakes identified by the
24 Intervenors that occurred in South Dakota in November
25 2011 were located approximately 25 miles north-

1 northwest of the CBR facility, referencing NRC066 at
2 2, but was felt at Crawford, Nebraska, referencing NRC
3 Exhibit 001, Pages 107 and 108, in regards to Answer
4 14.3. The magnitudes of those earthquakes as reported
5 by the United States Geologic Survey were 3.3 and 4.0,
6 correspond to a Modified Mercalli index values of 3
7 and 4. And that's also citing NRC067 at 1. My
8 question to staff is, were those two earthquakes
9 included in your EA database?

10 MR. CAO: Yes.

11 JUDGE WARDWELL: So you did evaluate those
12 two recent earthquakes in your Environmental
13 Assessment?

14 MR. CAO: No, no, no. Not in the EA, but
15 in our testimony.

16 JUDGE WARDWELL: No, I didn't ask -- I
17 asked in the EA, were they evaluated?

18 MR. CAO: They didn't.

19 JUDGE WARDWELL: They were not? Thank you.
20 NRC001, Page 108, Answer 14.3, you state that adding
21 those earthquakes to the description in Section 3.4.3
22 of the EA would not change the accuracy of the
23 description in terms of the typical seismic activity
24 and level of seismic hazard because they fall within
25 the range of earthquakes identified in Table 3-8 of

1 the Environmental Assessment. And that's referencing
2 NRC010 at 28. That analysis that you presented in
3 your testimony on Page 108 that I just quoted was not
4 presented in your EA either, is that correct?

5 MR. CAO: Yes.

6 JUDGE WARDWELL: And when was your EA
7 published?

8 CHAIR GIBSON: Just a minute, did you say
9 yes?

10 MR. CAO: I said yes.

11 CHAIR GIBSON: Okay, great. Okay, thank
12 you. I just wanted to be sure we picked it up for the
13 court reporter. Thank you.

14 JUDGE WARDWELL: What was the publication
15 date for the EA? Just to refresh my memory.

16 MR. GOODMAN: Nathan Goodman. October
17 2014, your honor.

18 JUDGE WARDWELL: Okay. Thank you. Why
19 doesn't it make sense to not include those two
20 earthquakes that occurred in 2011 in your EA?

21 MR. CAO: I would say that omission of
22 those two earthquakes with -- it's less perfect for
23 the EA to omit those two events. But because this
24 area is generally in the Seismic Zone Zero and the
25 Seismic Zone One, it's a low seismic area. It's a big

1 area. It's from South Dakota all the way -- so what
2 I'm saying is they are the same area. So if you,
3 let's say, sample half of the area or two-thirds of
4 the area, you get the same evaluation. How strong the
5 ground shaking will be in your evaluated area.

6 JUDGE WARDWELL: And that's fine. But all
7 that discussion could have been put in the EA, could
8 it not have?

9 MR. CAO: Yes.

10 JUDGE WARDWELL: Thank you. Back to your
11 testimony again, Exhibit 001, Page 108, 14.3, staff
12 states for these reasons, the discussion in the EA is
13 adequate for the purposes of describing the
14 environment in terms of seismic activity despite the
15 omission of these two earthquakes. I guess I'll turn
16 to the Intervenor, whoever would like to respond to
17 this, and just say, why doesn't the information in the
18 EA combined with the staff's testimony in Answer 14.3
19 resolve this portion of Contention 14?

20 DR. KREAMER: Sorry, your honor. We were
21 discussing radons.

22 JUDGE WARDWELL: You were fooling around?

23 DR. KREAMER: We were, your honor.

24 JUDGE WARDWELL: You weren't paying
25 attention, were you?

1 DR. KREAMER: We were not paying attention.

2 JUDGE WARDWELL: It's kind of like when an
3 eraser comes flying across this and it lands on your
4 desk.

5 DR. KREAMER: Could you please throw one?

6 JUDGE WARDWELL: We were talking about the
7 earthquakes and NRC has looked at these subsequent to
8 the publication of the EA and has created arguments
9 saying how they're similar to the other ones and that
10 it really wouldn't affect the ultimate conclusions
11 reached on their assessment. And I asked, but doesn't
12 it make sense to make it worthy of inclusion in the
13 EA? And then from there I went on and quoted staff as
14 saying for these reasons, the discussion in the EA is
15 adequate for the purposes of describing the effective
16 environment in terms of seismic activity despite the
17 omission of these two earthquakes.

18 And my question to you is, why doesn't the
19 information in the EA combined with what the staff has
20 just said in response to this issue in their Answer
21 14.3 resolve this issue associated with -- the
22 omission of these two earthquakes was brought up in
23 part of the Contention 14? Let me rephrase that,
24 because it got a little confusing the way I had to
25 word it. Does not the discussion in the EA and the --

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1 as amplified by what has now been stated in Answer
2 14.3, basically evaluate these two earthquakes that
3 were initially omitted?

4 DR. KREAMER: It would be helpful to have
5 the information in the EA and not just anecdotally.
6 I'm not an expert in earthquakes. It's more fractured
7 flow that would result from earthquakes. And so
8 without evaluating -- I did not evaluate that myself.

9 JUDGE WARDWELL: Well, yes. We're not at
10 the point of now looking at those earthquakes in
11 regards to fractures. It's just the mere inclusion of
12 those two earthquakes or exclusion from the EA and now
13 --

14 DR. KREAMER: The exclusion of that and
15 some of the other anecdotal information on water level
16 changes in the Brule and things we've discussed this
17 morning, yes. It would be great for us to be able to
18 independently analyze that information, your honor.
19 And, again, apologies.

20 JUDGE WARDWELL: Would anyone else from the
21 Intervenors like to comment on that question?

22 DR. LAGARRY: Your honor, it's -- when
23 things aren't included in something like an
24 environmental assessment, it's difficult for us to
25 evaluate whether that sort of thing is on the minds of

1 the people drafting the report, the people
2 contributing to the report. And as any seismologist
3 who works in California on the San Andreas Fault will
4 tell you, this is tricky, unpredictable business and
5 it needs careful consideration. So as part of the due
6 diligence, we need to see and be reassured that
7 everything is considered and due diligence is
8 processed.

9 JUDGE WARDWELL: Thank you, Dr. LaGarry.

10 MS. WHITE FACE: It's not just the two big
11 earthquakes, 3 and 4 are not that big. But still
12 they're bigger than usual. But we have a lot of
13 little ones here. And if I -- just as these guys, if
14 I would have known this was coming up, the information
15 is available at the South Dakota School of Mines about
16 all these little tiny earthquakes that are here every
17 day. My concern is that these pipes are in the ground
18 and these little tiny earthquakes will keep affecting
19 them.

20 JUDGE WARDWELL: Thank you. In NRC's
21 testimony, Page 108, Answer 14.4, you state that 3.4.3
22 of the EA discusses historic earthquakes in Nebraska,
23 but does not discuss earthquakes that occurred in
24 neighboring states, such as southern South Dakota and
25 eastern Wyoming. My question to staff is, given the

1 close proximity to Wyoming and South Dakota, why
2 wouldn't you consider all earthquakes within a given
3 radius from the mining activity and not just limit it
4 to Nebraska?

5 MR. CAO: That's what exactly we have done
6 in the testimony. But it's not in the EA.

7 JUDGE WARDWELL: And I believe that
8 testimony is NRC001, Pages 108 to 109, Answer 14.4,
9 you go on to state that adding additional information
10 on historic earthquakes within, for example, 100 miles
11 of the CBR facility, regardless of which state the
12 earthquake occurred in, would not affect the accuracy
13 of the EA's description of typical seismic activity
14 and level of seismic hazard. But is that not correct
15 that none of those statements and considerations were
16 presented in the EA?

17 MR. CAO: Yes.

18 JUDGE WARDWELL: And doesn't common sense,
19 again, say that you would include earthquakes from
20 surrounding states from a facility rather than limit
21 yourself to one state because most earthquakes have
22 never taken any courses in seismology have they? They
23 don't know anything about borders?

24 MR. CAO: I agree with you with that. But
25 here we are try to say is missing those events --

1 because serving our purpose to evaluate the
2 environment impact, the important question we have to
3 answer is what's going to happen? How serious it's
4 going to happen? But less likely we are interested to
5 say, how often it's going to happen? If the seismic
6 hazard is very low, it could be very frequent, but
7 doesn't have any consequences.

8 JUDGE WARDWELL: But including those
9 earthquakes a set radius away from the facility would
10 make more sense than limiting it to strictly a
11 geographic boundary of a given state that the facility
12 is located in, wouldn't it?

13 MR. CAO: That's correct.

14 JUDGE WARDWELL: Thank you. And by the
15 way, you can very politely ask me to stop being such
16 a wiseguy too, I have no problems with that. I accept
17 that.

18 MR. CAO: Thank you.

19 JUDGE WARDWELL: As long as you -- NRC001,
20 Page 109, A14.4, staff illustrates the insensitivity
21 of including earthquakes from the other states by
22 compiling a table based on data from NUREG 2115 and
23 USGS Earthquake Catalogs that list historic
24 earthquakes within 100 miles of the Crow Butte
25 facility and a histogram of their magnitudes as

1 presented in NRC Exhibit 066 at Pages 1 through 3, NRC
2 Exhibit 068, and NRC Exhibit 069. And noting that
3 these data show that the vast majority of earthquakes
4 within 100 miles of the CBR facility have magnitudes
5 of less than 4, corresponding to a Modified Mercalli
6 index value of 3 at the epicenters, referencing NRC066
7 at 1-3 and NRC067 at 1.

8 In illustrating that the earthquakes in
9 this area are very consistent in depth and nearly all
10 occurring at five kilometers, that's three miles,
11 below the surface. And that's referencing NRC066 at
12 1-2. As a result, there's no significant difference
13 in the characteristics of earthquakes discussed in the
14 EA and other historical earthquakes that have occurred
15 outside of Nebraska in South Dakota or eastern
16 Wyoming. And, again, I'll ask you again and just say
17 I gather from your previous testimony that you would
18 agree that it makes sense to have this information in
19 and you've done this evaluation for it and I'll turn
20 to the Intervenors and say, do you have the same
21 comments that you did with the exclusion of those new
22 earthquakes as you would for the exclusion associated
23 with the other states?

24 DR. LAGARRY: Your honor, the earthquakes
25 are, as I mentioned earlier, a tricky business. And

1 which earthquake from which state of which magnitude
2 on which day, it's difficult to tell if any one of
3 those particular earthquakes will have an impact on
4 what was a closed fault or fracture and then open it.
5 So, in my view, all earthquakes at all times of all
6 magnitudes should be discussed and evaluated.

7 JUDGE WARDWELL: Thank you. Let's now turn
8 to the effects of the earthquakes on secondary
9 porosity, hydraulic conductivity, and flow patterns.
10 The Intervenor, as Dr. LaGarry in his 013 Exhibit,
11 Page 2 to 3, states that based on numerous small
12 earthquakes, the area is tectonically active to this
13 day, quoting McMillan and others in 206. And while
14 these earthquakes are relatively mild and won't
15 significantly damage surface infrastructure, however,
16 even small earthquakes are commonly creating, closing,
17 and redistributing the secondary porosity of the
18 region's rocks and hanging the flow pathways of the
19 region's groundwater.

20 CBR testimony, 045, Page 6, Answer 18
21 counters that while acknowledging the potential for
22 small earthquakes to occur periodically, the area is
23 one of the most tectonically stable in the United
24 States, referencing their testimony at Paragraph 56,
25 at Answer 56. And there is no indication that the

1 small and infrequent earthquakes that may occur would
2 adversely impact Crow Butte's operations. And agrees
3 with staff's testimony on seismic hazards that was
4 presented in their testimony 001 at Answer 14.2 and
5 14.8. I will turn to Dr. LaGarry or anyone else from
6 the Intervenors and just ask if you have any physical
7 evidence showing a change in the flow patterns due to
8 earthquakes and how would anyone go about trying to
9 determine that?

10 DR. LAGARRY: All right. Your honor, in
11 2007, it's been documented that the town, and I
12 documented this in my testimony, my written testimony,
13 that Chadron Creek, which supplies Chadron, Nebraska
14 -- formerly supplied Chadron, Nebraska's ground water,
15 the water supply disappeared abruptly one day. And
16 this caused some concern. Fortunately, Chadron had a
17 secondary water supply from up on the tablelands
18 through a center pivot.

19 JUDGE WARDWELL: Excuse me to interrupt.
20 What was the first water supply that went dead?

21 DR. LAGARRY: A creek called Chadron Creek.

22 JUDGE WARDWELL: Okay. Thank you.

23 DR. LAGARRY: It's fed from a spring at the
24 base of the High Plains Aquifer and flows north and
25 Chadron drew its municipal water from there. With

1 some investigation from Chadron State College faculty
2 and students, they found that Chadron Creek flowed
3 from its headwaters and the springs about two miles
4 out onto the plains and then disappeared into a crack
5 in the rock. This had never happened in Chadron's
6 history. This was the first time, to my knowledge,
7 that the opening of a previous closed joint or fault
8 in the local bedrock had resulted in the disappearance
9 of an entire town's water supply into the subsurface.

10 This event was in fact the motivating
11 influence for my being involved in these hearings.
12 That happened in 2007. The initial 2008 hearing
13 happened shortly after that, that I participated in.
14 We had a community town hall meeting to discuss the
15 issue and the future impacts on the groundwater. And
16 it was the consensus of all the participants and the
17 residents of Chadron that were there that this issue
18 of groundwater disappearing and moving through opening
19 and closing faults and fractures in the rock was a
20 serious issue and had to be addressed further. And
21 that event demonstrated clearly to me that these
22 faults and fractures do flex, they do open up. There
23 may be -- the exact cause of that event is still under
24 investigation. However, the seismic activity in the
25 area is one of the contenders for the cause of that

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1 event happening. It requires serious consideration in
2 my view.

3 JUDGE WARDWELL: Do you have any
4 information that would indicate any changes during
5 that same time period or any other time period where
6 these smaller earthquakes in 2011 that have changed
7 the flow patterns in the license area of Crow Butte?

8 DR. LAGARRY: No, your honor. For events
9 such as that, you either have to be directly affected,
10 it would have to be reported by somebody who lost
11 their water supply or potentially gained a new water
12 supply. Or to have a trained observer on that spot at
13 that time as that was happening. And this is a vast
14 area. In my view, such an event could take place
15 after a minor earthquake that may or not be felt
16 onsite and a fissure open up and then until it's seen
17 first-hand, on the spot, it would continue unknown.

18 In my 2008 opinion, I advocated locating
19 and specifically monitoring faults and joints and
20 things to start gathering some data on events that
21 happen so that if somebody would happen to be
22 monitoring a fault or a fracture, and an earthquake
23 took place, then they could measure first-hand what
24 happened to that and start gathering data. Or if
25 water started being issued through such a crack, they

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1 would be on hand to observe and measure it. But in my
2 written testimony in which I showed Diffendal's
3 lineaments, I also show lineaments mapped by Maher and
4 Balmat. These things are extremely numerous and,
5 while I admit that it would be a Herculean task and
6 perhaps an impossible one to monitor and measure and
7 observe every crack, it might be worth doing in the
8 vicinity of a license area.

9 JUDGE WARDWELL: Thank you.

10 MR. WIREMAN: Your honor, may I --

11 JUDGE WARDWELL: I think I'm all set with
12 the information I need. Thank you. Crow Butte, how
13 would seismically induced changes in any connectivity
14 between the aquifers through the fractures be
15 discovered at your facility?

16 MR. TEAHON: We would notice those changes
17 in our production wells and injection wells. We have
18 flow meters on those. If there were any changes,
19 those would alarm and we'd know that right away.

20 JUDGE WARDWELL: And how would the
21 potential for additional groundwater impacts be
22 assessed in the event that seismic activity created
23 communication pathway between the mining unit and the
24 other aquifers?

25 MR. TEAHON: Could you repeat that? I

1 don't fully understand.

2 JUDGE WARDWELL: Yes. How would the
3 potential for additional groundwater impacts now, the
4 water quality impacts, be assessed in the event that
5 seismic activity created communication pathways
6 between the mine unit and the other aquifers?

7 MR. TEAHON: We have the baseline water
8 quality parameters, so we would know that in going
9 back and doing the restoration and then the changes in
10 the baseline parameters.

11 JUDGE WARDWELL: And would it not also
12 change what the parameters are that have occurred
13 since then if -- whatever you were measuring?

14 MR. TEAHON: It could. But it would also
15 change the water levels too.

16 JUDGE WARDWELL: Right. And that's what --
17 the first question was water levels, the second one
18 was water quality. And so that's -- thank you for
19 that clarification. NRC testimony, 001, Page 110,
20 Answer 4.6, you state that the relationship between
21 porosity and permeability is dependent upon
22 characteristics of the rock matrix, including, but not
23 only, the porosity, but also the size of the voids and
24 the extent to which they're interconnected. The
25 relationship between porosity and permeability is not

1 directly proportional. I guess I would ask NRC,
2 whoever wants to comment on this, is this statement
3 true that the relationship between porosity and
4 permeability is not directly proportional true for all
5 deposits?

6 DR. STRIZ: There have been attempts to
7 correlate the relationship in some and it may
8 correlate in some. But as was discussed earlier,
9 there's 14 orders of magnitude in permeability and
10 only three in porosity. Very difficult to develop a
11 correlation.

12 JUDGE WARDWELL: Just in regards to your
13 statement about this porosity and permeability
14 relationship, would not the permeability of any given
15 one deposit composed of one material, such as the clay
16 deposit of the upper Chadron, have a direct
17 relationship with porosity should it change due to
18 variations in overburden stress?

19 DR. STRIZ: Not necessarily. Because it
20 has to do with the interconnectivity of the pores.

21 JUDGE WARDWELL: But if you --

22 DR. STRIZ: And those pathways are very
23 hard to determine unless you're doing core studies.

24 JUDGE WARDWELL: But if you took a sample
25 of that clay material, not the clay stone itself, that

1 is -- would not that be somewhat compressible --

2 DR. STRIZ: Yes, it would --

3 JUDGE WARDWELL: -- material?

4 DR. STRIZ: -- be compressible. Clays have
5 very high porosity --

6 JUDGE WARDWELL: And --

7 DR. STRIZ: -- very low permeability.

8 JUDGE WARDWELL: And as it -- and that clay
9 material, if you reduced the porosity by putting
10 additional stress on it, would you not see a direct
11 difference in the hydraulic connectivity?

12 DR. STRIZ: I don't know.

13 JUDGE WARDWELL: Okay. Thank you.

14 DR. STRIZ: Your honor, may I add something
15 to the discussion about the Chadron Creek
16 disappearance?

17 JUDGE WARDWELL: Yes, you may.

18 DR. STRIZ: There was an extreme drought in
19 northwestern Nebraska through 2007 that could account
20 for the disappearance of this stream.

21 JUDGE WARDWELL: Do you know if it's come
22 back since then?

23 DR. STRIZ: I haven't evaluated that, but
24 there --

25 JUDGE WARDWELL: Dr. LaGarry --

1 DR. STRIZ: -- was a very extreme drought.

2 JUDGE WARDWELL: -- has the stream
3 reappeared out from the crack of the rock?

4 DR. LAGARRY: It has reappeared from
5 another crack farther downstream. The field crews
6 from Chadron State College, including myself, Dr. Mike
7 Leite, the professor there, and about 15 students
8 first-hand directly observed the water disappearing
9 into the crack in the rock.

10 JUDGE WARDWELL: Thank you. NRC's
11 testimony, 001, Pages 110 to 117, Answer 14.6 to
12 14.11, staff provides detailed discussion disputing
13 Intervenors' claim that earthquake effects on flow
14 patterns on the site by addressing a number of
15 different issues. I won't bother quoting here. But
16 it's in the testimony between 14.6 and 14.11. My only
17 question I have for staff is, has any of that
18 testimony been included in the EA?

19 MR. GOODMAN: Your honor, Nathan Goodman.
20 I don't believe so.

21 JUDGE WARDWELL: Okay. Thank you. I am
22 saddened and chagrined to say that I have finished my
23 portion of this.

24 CHAIR GIBSON: Do you have anything further
25 on Contention A, C, D, or F, Judge Hajek? Okay. This

1 is what we'll do. We're going to take a ten minute
2 recess. I don't know if there's 6, 9, 12 witnesses
3 here, if there is, they need to come forward. Those
4 of you who were on A, C, D, F, and 14 and aren't on 6,
5 9, and 12 can go sit or take a break. We're going to
6 try to get those questions drafted so we can get those
7 out and get you all out of here. In the interim
8 though, we're going to take a ten minute recess as
9 soon as we finish with the restroom. Thank you.

10 (Whereupon, the above-entitled matter went
11 off the record at 11:06 a.m. and resumed at 11:19
12 a.m.)

13 CHAIR GIBSON: Yes, Mr. Reid?

14 MR. REID: At this point, can we excuse
15 Charmaine White Face? Are we done with her? So we
16 can let her go home?

17 CHAIR GIBSON: Hold on just one second.
18 Okay. Why don't we do this? Could you come up Ms.
19 White Face? I believe we actually -- there was one
20 question we wanted to ask you, ma'am, and then you can
21 be excused because I believe that takes care of
22 everything we've got in terms of proposed questions.
23 Just one follow-up.

24 MR. REID: Thank you.

25 JUDGE WARDWELL: Yes. Thanks for coming

1 back. I just want to clarify. I'm pretty sure the
2 transcript will show that you did talk about this
3 yesterday, but I want to make sure because it's too
4 late if we go home and I don't have that. Is it your
5 opinion that there is evidence of contamination of the
6 underground sources of drinking water on the Pine
7 Ridge Indian Reservation from uranium mining activity
8 at the Crow Butte site? And, if so, what's the
9 scientific basis for your opinion?

10 MS. WHITE FACE: Again, yes, I did say this
11 in my testimony. Yes, I do believe there is a basis.
12 It's the excursions that have gone past the Chadron
13 and the Brule and into the Arikaree. I'm positive
14 this has happened. There are -- the testimony just
15 before about numerous -- how many earthquakes there
16 are here and the faults and everything. That also --
17 I didn't testify to that yesterday. But the other
18 part is where it really shows to me is the isotopic
19 ratio of U-234 to 238. That is the strongest
20 indicator to me.

21 It was mentioned this morning that NRC is
22 requiring now Crow Butte to consider uranium in their
23 monitoring wells. I would consider -- since they're
24 going to consider uranium, why don't they consider the
25 isotope ratio? Because it's the isotope ratio that

1 will show that it's mining. And it's the isotope
2 ratio of all these five deep wells at Pine Ridge that
3 show me that mining has influenced the drinking water
4 at Pine Ridge. And I looked around, where is there
5 another mine, uranium mine, active uranium mine close
6 by to Pine Ridge? And with a potentiometric surface
7 of the Arikaree Aquifer pointing back to Crow Butte,
8 that's what led me to believe that. I hope that NRC
9 would require the isotope ratio for any monitoring of
10 any excursion because then they will see that it is
11 not just naturally occurring uranium.

12 JUDGE WARDWELL: Okay. Thank you, Ms.
13 White Face. Just hang on here a minute because I'm
14 going to ask some clarifying stuff from both you
15 people and the NRC. So don't move just yet. The rest
16 of the Intervenor's witnesses, I only am interested in
17 your comments in regards to the isotope ratio. And if
18 you have no comments in regards to that, that's fine.
19 But limit your response to only that.

20 MR. WIREMAN: In terms of the uranium
21 isotopes, the specifically uranium isotopes?

22 JUDGE WARDWELL: Yes.

23 MR. WIREMAN: We know that the uranium-234

24 --

25 JUDGE WARDWELL: Specifically in regards to

1 Ms. White Face's testimony that, that ratio is
2 indicative of impacts from the Crow Butte mining.

3 MR. WIREMAN: Well --

4 JUDGE WARDWELL: And if you don't have any,
5 that's fine.

6 MR. WIREMAN: I have an opinion as to the
7 ratio. As to whether or not -- how it might apply to
8 what's going on in Pine Ridge, I do not have an
9 opinion. But the ratio, my understanding and we've
10 done this a number of times, that ratio changes once
11 you disturb the rock. And so it is an indication that
12 rock has been disturbed. And mining is one form of
13 disturbance.

14 JUDGE WARDWELL: Why -- the only thing that
15 strikes me funny with that statement is that the
16 industry goes through quite a bit of effort trying to
17 extract the usable uranium through all kinds of
18 processes to enrich the uranium. You seem to indicate
19 that really all we have to do is disturb it. All we
20 have to do is grind it up and roll it around in a
21 cement mixer and, bingo, we've got what we need.

22 MR. WIREMAN: I mean disturbance of the
23 rock in terms of mining or excavating rock. Once
24 that's done, that ratio can change. The ratio is a
25 stable ratio with no disturbance of the rock. Once

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1 you disturb the rock, then that ratio changes. And we
2 use that as an indication of disturbance.

3 JUDGE WARDWELL: Thank you. Crow Butte,
4 does that ratio change, do you observe in your mining
5 and in the process of developing the yellowcake
6 between what might be there in the groundwater and
7 then what you see when you start your enrichment, your
8 conversion to yellowcake?

9 MR. TEAHON: We've never done that
10 sampling, sir.

11 JUDGE WARDWELL: Okay. And NRC, do you
12 have any response to what Ms. White Face says?

13 MR. FUHRMANN: Well, yes, sir.

14 JUDGE WARDWELL: Make sure you speak in --
15 I can't hear you very well, so I'm sure others --

16 MR. FUHRMANN: Okay. In OST001, Ms. White
17 Face's testimony, the claim was made that the activity
18 ratios in the groundwater from the wells observed on
19 the Reservation indicated disturbance. But those
20 activity ratios for those wells are 1.78, 1.9, and
21 2.06. And these are activity ratios in groundwater
22 that are very natural. The typical range is quoted in
23 NRC082, it's a paper by Rhodes. Those ratios are
24 between 1 and 3 typically, it can go up to 10. But
25 between 1 and 3 is much more typical.

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1 In INT006, which is the 1982 baseline
2 report by Spalding, in the appendix tables, there are
3 a number of analyses that show a number of things.
4 But they also show the U-234, U-238 ratios taken
5 around 1982. In the Arikaree, these ratios all are
6 around 2, plus -- well, yes, 2, plus or minus maybe
7 0.2 or 0.3. In the Brule, it's similar. It's a
8 little bit lower. So those ratios are of activity
9 ratios are very typical.

10 JUDGE WARDWELL: Okay.

11 MR. FUHRMANN: So they, in my opinion, they
12 show no sign of any disturbance.

13 JUDGE WARDWELL: Okay. Thank you very
14 much.

15 MR. LEWIS: Your honor, may I comment on
16 that issue?

17 JUDGE WARDWELL: No, I think I'm all set.
18 I think I got the information I need. Thank you, Ms.
19 White Face for being here and for participating in
20 this hearing. We appreciate your testimony. And
21 along those lines, now that I've finished up, again
22 what I said yesterday still holds. The reason we were
23 able to get through this on schedule is because of the
24 quality of your responses. They were crisp, they were
25 to the point, in the vast majority of the times. And

1 I want to let you know how much I appreciate it
2 because it made my life so much easier. It really
3 did. You're great witnesses. Thank you.

4 CHAIR GIBSON: Right before we get started
5 here on 6, 9, and 12, I just have one request for you,
6 Ms. Simon.

7 MS. SIMON: Yes, sir.

8 CHAIR GIBSON: There was a number of, I
9 guess, guidance documents and regulatory guides that
10 have been discussed in the hearing so far. And I was
11 wondering if you could provide citations to us in your
12 conclusions of law, once you've had a chance to review
13 the transcript, explaining if and when these guidance
14 documents or regulatory guides have been reviewed or
15 commented upon by the Commissioner. Either in the
16 context of an adjudicatory proceeding or otherwise.

17 MS. SIMON: Okay, your honor.

18 CHAIR GIBSON: Thank you, Ms. Simon. Very
19 well. Okay. I believe Judge Hajek has some questions
20 about 6, 9, and 12.

21 JUDGE HAJEK: Thank you, Judge Gibson. I'd
22 like to begin first by thanking all of the witnesses
23 for their candid and complete responses to Judge
24 Wardwell's questions. And also I'd like to thank
25 Judge Wardwell for having such an extensive set of

1 questions because he really has made my job, I think,
2 a lot easier. He's covered a lot of questions that I
3 really had planned to cover. And I jumped in a few
4 times to try to get a little bit of clarification.
5 But at this point in time, I guess I'm done.

6 CHAIR GIBSON: Don't go overboard yet.
7 He's going to get --

8 JUDGE HAJEK: Don't go overboard?

9 CHAIR GIBSON: -- a big head if you keep
10 talking --

11 JUDGE HAJEK: Okay.

12 CHAIR GIBSON: -- that way about him.

13 JUDGE HAJEK: So we're here to discuss
14 Contention 6 first and then Contention 9 and then
15 we'll discuss Contention 12, which has two topics
16 within it. When I began looking at these various
17 Contentions, I pretty much began to think that
18 Contention 6 and Contention 9 were extremely close.
19 Certainly Contention 9 depends upon what's going on in
20 Contention 6. But I've kept them separate, 6 and 9.

21 So we'll start on Number 6 first where, in
22 terms of what the Board admitted, the Final EA
23 violates NEPA in concluding that the short-term
24 impacts from consumptive groundwater use during
25 aquifer restoration are moderate. Okay. And I'll

1 start with the staff because it seems this Contention
2 speaks directly to the characterization of consumptive
3 groundwater use. And there are so many terms and
4 repetitions of these terms as they're used. And so I
5 would like to start first with getting a better feel
6 for the terms small, moderate, and large and how they
7 are defined.

8 So, Contention 4 titled -- I'm sorry, the
9 Environment Assessment titled Environmental Impacts is
10 really where I think this begins. So Mr. Deucher, if
11 you could display NUREG 1748, Page 4-14 for us, I'd
12 appreciate that. I want to read from here because
13 this is actually referenced by the staff in the EA.
14 A standard of significance has been established by NRC
15 for assessing environmental impacts and with the
16 Standards of the Council on Environmental Quality's
17 regulations as a basis, each impact should be assigned
18 one of the following three significance levels. And
19 moving on a little bit. Moderate is environmental
20 effects are sufficient to alter noticeably, but not to
21 destabilize important attributes of the resource. So,
22 NRC staff, did I read that correctly? Is that what it
23 says?

24 MR. BACK: Yes, your honor.

25 JUDGE HAJEK: So diving into that

1 definition a bit. In doing so, we're concerned only
2 now with consumptive use. And only with its effects
3 on the Basal Chadron Aquifer. So, Mr. Back, are you
4 taking the lead for --

5 MR. BACK: Yes, your honor.

6 JUDGE HAJEK: -- for the staff on this
7 Contention? Okay. Would you agree that there are
8 important attributes to the Basal Chadron Aquifer,
9 which is the resource being consumed during operation
10 and restoration?

11 MR. BACK: Yes, your honor.

12 JUDGE HAJEK: Yet, the EA does not detail
13 the important attributes that were considered to
14 determine the moderate classification, is that
15 correct?

16 MR. BACK: I don't necessarily agree with
17 that, your honor. We discuss in the EA the aquifer
18 use, how it's currently being used for livestock
19 primarily, and it's being used for water supply.

20 JUDGE HAJEK: So specifically can you list
21 for us the important attributes then in a listing that
22 you took into consideration when making the
23 determination of moderate? And then we can pursue
24 those as we go through these questions.

25 MR. BACK: Yes, your honor. The list

1 involved water quality, water quantity, and potential
2 impacts to surface water sources. And those were the
3 primary impacts that we considered.

4 JUDGE HAJEK: So water quality --

5 MR. BACK: Quantity --

6 JUDGE HAJEK: -- water quantity, and
7 surface impacts?

8 MR. BACK: Well, those were -- for the
9 criteria, it was water quantity and water quality.

10 JUDGE HAJEK: Okay. What about uses for
11 that water?

12 MR. BACK: Absolutely, your honor. We
13 discussed that in the EA, how that use for water --
14 it's classified as a poor quality water and it's
15 primarily used for livestock.

16 JUDGE HAJEK: So the water in the Basal
17 Chadron Aquifer is classified as a function of the
18 area, the horizontal geographical area where it's
19 located in different ways, is that correct? Relative
20 to its quality, mostly, is that right?

21 MR. BACK: The Basal Chadron is poor
22 quality throughout the entire aquifer. If that
23 answers your question.

24 JUDGE HAJEK: It is used for agricultural
25 purposes though.

1 MR. BACK: These well yields are very
2 small. On the order -- I've seen numbers like 10 to
3 20 gallons a minute for single wells. So that's way
4 they'll -- they're typically used to feed a pond for
5 livestock to drink out of the pond. And so it's not
6 like what you're thinking of, pivot irrigation, maybe,
7 system. That's not from the Basal Chadron.

8 JUDGE HAJEK: Okay. Thank you. Mr.
9 Wireman, on Page 6 of your testimony, INT047,
10 referencing the LRA on Page 3-20, that being CBR011,
11 on Page 320, which I found in the PDF is Page 371, you
12 state, water levels in the city of Crawford could
13 potentially be impacted by approximately 20 feet by
14 consumptive withdrawal of water from the Basal
15 Chadron. Is that correct?

16 MR. WIREMAN: To the extent that there are
17 wells in the Basal Chadron in the vicinity of
18 Crawford. Those wells' potentiometric surface could
19 be affected, yes.

20 JUDGE HAJEK: But is water used for any
21 purpose in the city of Crawford?

22 MR. WIREMAN: The city of Crawford's public
23 water supply comes from infiltration galleries in the
24 alluvium and not from the Basal Chadron. But domestic
25 wells or stock wells in the vicinity of Crawford would

1 be affected.

2 JUDGE HAJEK: Okay. And, Mr. Back, the EA
3 suggests an impact already of as much as 30 to 50
4 feet, is that correct?

5 MR. BACK: Yes, your honor. Along those
6 lines. I don't have that number memorized. But, yes,
7 sir, along those lines.

8 JUDGE HAJEK: Thank you. And Mr. Wireman,
9 I infer that the people of Crawford then, from what
10 you've just said, are not directly impacted --

11 MR. WIREMAN: Not the public water supply.

12 JUDGE HAJEK: -- relative to the public
13 water supply?

14 MR. WIREMAN: Right.

15 JUDGE HAJEK: Right. Mr. Teahon, you or
16 Crow Butte had testified that there are a number of
17 wells that are monitored in the Crawford area. Is
18 that correct?

19 MR. TEAHON: Yes, sir. The wells that are
20 within one kilometer of the active mine unit.

21 JUDGE HAJEK: And, I'm going to come back
22 to the definition of an active mine unit, but are you
23 referring, when you make that statement, are you
24 referring to a mine that is actually in operation? Or
25 are you referring to the perimeter of the permit area?

1 MR. TEAHON: No, sir. We're referring to
2 the furthestmost mining well. Which is in Mine Unit 10
3 and it's one kilometer from that point that we're
4 required to do quarterly water sampling of the private
5 wells.

6 JUDGE HAJEK: And how many private wells
7 are you currently monitoring?

8 MR. TEAHON: Nineteen and of those, one of
9 them is in the Basal Chadron sands.

10 JUDGE HAJEK: And these are all private
11 wells that are providing water for livestock purposes,
12 is that correct?

13 MR. TEAHON: Domestic use and livestock.

14 JUDGE HAJEK: Domestic use and livestock?
15 How do you define domestic use?

16 MR. TEAHON: Household use.

17 JUDGE HAJEK: So it's being --

18 MR. TEAHON: Human consumption.

19 JUDGE HAJEK: Human consumption? I had
20 understood that the Basal Chadron that close to the
21 ore field was not qualified for human consumption.

22 MR. TEAHON: The Basal Chadron sand well
23 that we monitor sits between our monitor well ring and
24 our mine unit. And that -- the water quality in that
25 well meets the MCLs for drinking water.

1 JUDGE HAJEK: Is that on site? Within the
2 license area? Or is that outside the license area?

3 MR. TEAHON: It's outside the license area.

4 JUDGE HAJEK: Thank you. So according --
5 I'm sorry. Dr. LaGarry, would you agree with Mr.
6 Back's statement that access to water from an aquifer
7 is an important attribute of the aquifer?

8 DR. LAGARRY: Could you please repeat the
9 question?

10 JUDGE HAJEK: Would you agree with the
11 staff's statement that access to water from an aquifer
12 is an important attribute or is it not an important
13 attribute?

14 DR. LAGARRY: It's an extremely important
15 attribute.

16 JUDGE HAJEK: In what manner?

17 DR. LAGARRY: This is a water starved
18 region experiencing cycles of drought. There are some
19 scientific estimates that we haven't seen the worst of
20 the recent cycle of drought. So water supplies here
21 are limited and they basically control every function
22 of society and human endeavor in the region.

23 JUDGE HAJEK: So according to the EA, a
24 moderate impact on the Basal Chadron Aquifer from
25 restoration activities could noticeably change the

1 water level, for example, but not destabilize it, I'm
2 not sure what the word destabilize means here, so I
3 would like some definition of that, or inhibit it's
4 availability to users. Moderate impact, would that --
5 that inhibits its availability to users, would you
6 consider that moderate or beyond moderate?

7 DR. LAGARRY: It depends on how many of
8 your cows drink the water and how much you depend on
9 the water economically. For the landowners whose cows
10 drink that water, whether it be quality or quantity,
11 if the cows can no longer drink the water, it can
12 provide an economic hardship to those people who
13 formerly used it. If the quality is impacted, it
14 could either poison the cattle or transmit
15 bioaccumulated radionuclides up the food chain. So I
16 would argue that for those people who rely upon the
17 water and live close by, that the impact would be
18 greater than moderate.

19 JUDGE HAJEK: Thank you. I'd like to get
20 a handle also on the meaning of consumptive water use.
21 You have something to add to that, Mr. Back?

22 MR. BACK: Yes, your honor. Consumptive
23 water use is the amount of the water that's withdrawn
24 from the Basal Chadron by the mining company in
25 operations but not returned.

1 JUDGE HAJEK: So, Intervenors claim on Page
2 108 of their Joint Position Statement that the
3 conclusion in the EA that groundwater consumption
4 during restoration being moderate is based arbitrarily
5 on a conclusion that, first, the aquifer should remain
6 saturated. I've noticed a couple of times that there
7 seems to be a concern about the aquifer being
8 saturated. We had a bit of discussion on that
9 yesterday. I'd like to follow up on that briefly.
10 But also that water levels would eventually recover.
11 And the Intervenors state further that it's not
12 sufficiently supported by evidence in the record. So
13 let me turn to Dr. Kreamer, first, on that. Do you
14 support that claim of the Intervenors in their Joint
15 Position Statement on Contention 6?

16 DR. KREAMER: Yes, I do.

17 JUDGE HAJEK: And, Mr. Wireman, do you also
18 support that statement?

19 MR. WIREMAN: Yes, I do.

20 JUDGE HAJEK: Why did I not think that --
21 or why would I have not thought that's what you would
22 have answered?

23 MR. WIREMAN: Well, I can explain if you'd
24 like.

25 JUDGE HAJEK: Go ahead.

1 MR. WIREMAN: Lowering of the
2 potentiometric surface in the aquifer where people use
3 it will also reduce the yield of their well. These
4 are relatively small yields. Though I'll tell you, a
5 20 gallon a minute well where I live is an amazing
6 well. My well gets 7 gallons a minute and I'm happy
7 as a clam about it. So reducing the yield of a well
8 by lowering the potentiometric surface increases the
9 cost of pumping water out of the ground. If they
10 relied on a flowing well, and that potentiometric
11 surface goes below the ground, they now have to pump.
12 So that's a hardship.

13 JUDGE HAJEK: Mr. Back, these wells that
14 you described as being used for pond fill, are these
15 wells, are these ponds, is the pumping, is it
16 mechanical pumping by wind or is it electrical
17 pumping? What kind of pumping is done here?

18 MR. BACK: Your honor, it's my
19 understanding that it's mechanical pumping.

20 JUDGE HAJEK: So it's done with windmills
21 that I see as I drive along the side of the road or
22 along -- all the way from Denver up to here, is that
23 correct?

24 MR. BACK: That is my understanding.

25 JUDGE HAJEK: So when the potentiometric

1 surface is lowered, do these wells need to be modified
2 and do they need to be dug deeper by their owners in
3 order to continue to fill the livestock ponds?

4 MR. BACK: Keep in mind, your honor, that
5 the wells would already be down to the Basal Chadron.
6 And the Basal Chadron is fairly thin and typically if
7 you're trying to maximize your production, you would
8 fully penetrate that system and a driller would know
9 that, that's the best way to get the most water out.
10 And so, right now, the pump might be able to sit maybe
11 20 feet below ground surface or 30 feet below grounds
12 surface. But if that potentiometric surface is
13 lowered, that's the height that the water level will
14 rise in the well, if that's lowered and the pump isn't
15 sitting down near the screen, you would have to lower
16 the pump with the potentiometric surface to be below
17 it.

18 JUDGE HAJEK: I'm not sure I understood
19 your response. So let me read it back to you --

20 MR. BACK: Sure.

21 JUDGE HAJEK: -- as to what I heard. I
22 thought I heard you say that the well itself would
23 already have been dug to the bottom of the Chamberlain
24 Pass Formation. And I'll -- let me just take the
25 liberty of commenting on the use of the term

1 Chamberlain Pass, and Dr. Striz, I appreciate your
2 comments earlier this morning on that. But if I look
3 in the Crow Butte LRA, and I'm going to take a look at
4 a specific figure later, I notice that they label it
5 as the Chamberlain Pass Formation, and so I'll use
6 their terminology, if I may, that's in the LRA. So as
7 I understood you, Mr. Back, you stated that the wells
8 already would have been dug and probably cased or some
9 professional manner into the Chamberlain Pass
10 Formation. Is that correct?

11 MR. BACK: Yes, your honor. That's how the
12 --

13 JUDGE HAJEK: And then the pump itself
14 would only be lowered to as low a level as could
15 possibly -- as high a level as would be appropriate
16 for the current level of the potentiometric surface of
17 the water. Is that correct?

18 MR. BACK: Yes, your honor. With a safety
19 factor because they would want to include there are
20 times of maybe getting less water. It's not that
21 impacted by rainfall since we don't really have much
22 recharge. So it would probably be fairly stable. But
23 in times of drought, they'd want to pump the water
24 more, so they'd probably lower it down lower than --
25 to provide them some safety.

1 JUDGE HAJEK: So it's an interesting
2 comment that you make by rainfall. Because rainfall
3 doesn't -- I mean, aren't we talking about the amount
4 of water in the Chamberlain Pass Formation? And that
5 amount of water is that going to be impacted in a
6 timely way by rainfall?

7 MR. BACK: Your honor, if there's a
8 drought, they'll need to pump more water to fill the
9 ponds if there's less rain. And so --

10 JUDGE HAJEK: So the consumptive use of
11 water from the Chamberlain Pass is affected not only
12 by the mine's use, but it's also going to be affected
13 by the use of water by the private citizens around the
14 outside of the licensed area, is that correct?

15 MR. BACK: Yes, your honor.

16 JUDGE HAJEK: Okay. Thank you. Now the
17 other comment that was made, that was discussed
18 yesterday involved saturation. And the EA, I believe
19 on Page 83, which is the Red Page 96, has a conclusion
20 that groundwater consumption during restoration is
21 moderate. The aquifer should remain saturated. Is
22 that -- and I believe I've seen that in at least two
23 different places, which I infer to mean that you are
24 concerned about, that is the NRC, the Commission is
25 concerned about the ability of the aquifer to remain

1 saturated as potentially having a negative impact on
2 the aquifer. Can you describe what you mean by that?

3 MR. BACK: Yes, your honor. Consistent
4 with my testimony yesterday, that the way I stepped
5 through this was, NUREG 1748, as you've outlined here,
6 provides the definition of small, moderate, and large.
7 The approach that we've taken, that staff has taken
8 has been to look at the consumptive water use rates
9 that have been provided by Crow Butte and we've done
10 our own analysis, projected whether those draw downs,
11 the available draw downs based on those consumptive
12 use rates would drop the potentiometric surface down
13 below the top of the Basal Chadron.

14 Now, we know that if the Basal Chadron
15 remains saturated, we will not destabilize the
16 resource. Because what that means is that water will
17 be coming in from the sides as it's pumped at a rate
18 that exceeds what's actually being pumped. So the
19 system remains stable. Now, when we move from a
20 confined system to an unconfined system, now the
21 water's coming out of storage. And so you get -- for
22 every foot of draw down that you have, you can pump a
23 lot more water out of that Basal Chadron.

24 JUDGE HAJEK: Every foot, are you speaking
25 about a foot within the Basal Chadron?

1 MR. BACK: A foot of drawn down within the
2 Basal Chadron.

3 JUDGE HAJEK: Within the Basal --

4 MR. BACK: Just like we had the
5 potentiometric surface --

6 JUDGE HAJEK: Yes.

7 MR. BACK: -- drop. As long as that
8 aquifer is confined, as it drops a foot, the
9 potentiometric surface drops one foot, that water's
10 actually derived from the expansion of water and the
11 compression of the matrix, of the rock matrix. So
12 it's not a lot of water that you can pull out for
13 every foot of draw down. And, so, but once we get
14 down to the unconfined system -- say they were to draw
15 it all the way down to the -- and it's no longer
16 confined, now it's unconfined. Well, now the water's
17 going to be derived from the free draining of the
18 pores, the actual matrix itself. So the effect is, is
19 that you can get a lot more water out of the well when
20 it's unconfined. But the impact is far smaller with
21 that amount of water that you pull out.

22 JUDGE HAJEK: I don't understand why you
23 can get more water out after you have penetrated the
24 upper surface of the formation itself. Can you
25 explain that to me?

1 MR. BACK: Sure. The water, when you --
2 any system that's unconfined that when you're pumping
3 it, the water's actually derived from the pores
4 itself. So if I were to have a swimming pool and fill
5 it with sand and look at that volume of water, that's
6 what I could pump out. Okay? Now, if I were to seal
7 up that swimming pool and really pressurize it, I
8 might only be able to get ten percent of what's in the
9 pool in addition because I've pressurized it. Now,
10 when I tap that pressure and I start letting that
11 water out, I'm going to see that head dropping fairly
12 quickly and I'm only going to be getting out small
13 amounts of water until I get the head all the way down
14 to the gravel to where then I start pulling water from
15 the aquifer matrix itself.

16 So it's a question of how much water can
17 go into storage from the compression of the matrix
18 itself, which is small, and the expansion of water,
19 since water's fairly incompressible. You don't get
20 much water out of those processes. So they're not --
21 even at all their pumping rates we've projected,
22 they'd never get close to where they're going to start
23 getting into the unconfined system behavior.

24 JUDGE HAJEK: Okay. And we'll coming back
25 to the maximum pumping rate question. But as I

1 recall, Mr. Wireman, I think you agreed that it was in
2 the best interest of Crow Butte, of the applicant, to
3 not pull so much water out that the aquifer becomes
4 desaturated. Is that correct?

5 MR. WIREMAN: He's correct in his
6 explanation that as long as the potentiometric surface
7 remains above the top of the Basal Chadron --

8 JUDGE HAJEK: Yes.

9 MR. WIREMAN: -- the amount of water that
10 you can pump out per foot of decline is less than the
11 amount that you can pump out per foot of decline once
12 the potentiometric surface has gone below the top of
13 the Chadron. Because as long as it's above, you're
14 not pulling water out of the aquifer itself. The
15 water yielded to the well comes from expansion of
16 water and compression. That's true. But the
17 definition of what is destabilizing, in my opinion, is
18 a somewhat arbitrary definition. Their view is that,
19 that's --

20 JUDGE HAJEK: Their view, who are they?

21 MR. BACK: NRC's view in this -- as you've
22 put on the screen here, their definitions of small,
23 moderate, and high. They define destabilization as
24 drawing water out of storage in the aquifer, once that
25 head comes all the way down. That's an arbitrary

1 definition. I mean, it is. It's just you have to
2 have something to have small, medium, and large. One
3 could also argue that it's destabilized if people
4 don't have as readily access to the water, if they
5 have to pump more, if they have to pay more, if their
6 flowing well stops. So I'm not arguing with what
7 they've done. They have a system and they have a
8 scale. But I would just say it's an arbitrary
9 definition.

10 JUDGE HAJEK: Mr. Back, on destabilization
11 and what Mr. Wireman said, is maintaining
12 stabilization then, is that an NRC important
13 attribute?

14 MR. BACK: I mean, based on everything the
15 NUREGs say, yes. I mean, if you go to a -- if you
16 destabilize, it's an important issue.

17 JUDGE HAJEK: So if it's an important
18 issue, then within your license conditions, why would
19 you not have a license condition that requires the
20 applicant to maintain a -- let's see, do I want to use
21 the word minimum or maximum? To maintain a minimum
22 head above the formation?

23 MR. BACK: Your honor, there is a license
24 condition for how many well-fields can be in operation
25 and restoration at the same time. And that

1 effectively does what you're asking.

2 DR. STRIZ: May I add --

3 JUDGE HAJEK: You're relying -- let Dr.

4 Striz --

5 DR. STRIZ: May I add something, your

6 honor?

7 JUDGE HAJEK: Yes. But please speak into

8 the mic. I --

9 DR. STRIZ: I apologize. License

10 conditions are only put in place for safety issues.

11 They are not designed to evaluate, to address

12 environmental impacts unless there's a specific Act

13 that we can point to such as Historical Preservation

14 Act. The license conditions are related to safety.

15 Therefore, we do not have a limitation on draw down in

16 the aquifer because we do not consider it a safety

17 issue. However, there's a caveat to that. If they

18 drop the water level below the top of the Basal

19 Chadron and they go into unconfined aquifer

20 conditions, they raise a safety issue that would have

21 to be reevaluated and we would have to address it.

22 And I can tell you what that safety issue is. It's --

23 JUDGE HAJEK: That was my next question.

24 DR. STRIZ: The safety issue is that if

25 they drop the water level, they lose the ability

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1 maintain oxygen in solution. They cannot maintain
2 their dissolved oxygen in solution. The dissolved
3 oxygen comes out of solution and creates a two-phase
4 flow system. Their infrastructure is not designed to
5 handle a two-phase flow system. Their pumps are not
6 designed to handle gas, it causes cavitation. Their
7 lines are not designed to handle a free-phase flow of
8 oxygen throughout the system. Their meters cannot
9 meter two-phase flow. Their pressure cannot be
10 measured with two-phase flow. So if they did drop the
11 water level below the top of the Basal Chadron, we
12 would have a safety issue that would have to be
13 addressed. That's why it's also in their interests
14 not to do it.

15 JUDGE HAJEK: So if lowering the water, the
16 piezometric surface or the overall surface, then below
17 the top of the Formation causes removal of oxygen and
18 a two-phase issue that is going to affect pumping, and
19 you say that's a safety issue at that point in time,
20 then that goes back to my question of why do you not
21 have a license condition to assure that, that
22 particular safety issue does not occur?

23 DR. STRIZ: Because we do not believe that
24 it will occur with the limitations that they already
25 have on their pumping rates and what they have

1 represented to us will be their pumping rates.
2 They're nowhere near dropping those water levels below
3 the top of the Basal Chadron.

4 JUDGE HAJEK: So their pumping rates are
5 insufficient to lower the water level to that point?

6 DR. STRIZ: Correct.

7 JUDGE HAJEK: Okay. And I have questions
8 on that, but for CBR, but I'll come back to that in
9 just a moment. Okay. Mr. Deucher, can you please
10 display Figure 2.6-10 from the LRA? Okay. We had
11 this up yesterday I believe, or the day -- and as well
12 as Monday. Mr. Teahon, this figure shows well logs
13 starting at the north, and I think I asked this
14 question, but let me follow up to make sure I fully
15 understand. Where are the well-fields in this drawing
16 for the current project area?

17 MR. TEAHON: As I pointed out yesterday,
18 clear to the far right-hand side is the start of the
19 mine unit. About, I can't see the number there, it
20 looks like 111.

21 JUDGE HAJEK: That was the smudge at the
22 top?

23 MR. TEAHON: That smudge at the top, sir.

24 JUDGE HAJEK: Okay.

25 MR. TEAHON: That's the very north end of

1 the mine unit. And this cross-section only penetrates
2 in a short distance into the License Renewal Area.

3 JUDGE HAJEK: So do you have another figure
4 that shows the License Renewal Area, the Current Study
5 Area or CSA as I believe you're referring to it on
6 here?

7 MR. TEAHON: If you were to look at cross-
8 section northwest to southeast, it goes through the
9 entire license area.

10 JUDGE HAJEK: Which figure is this?

11 MR. TEAHON: Well, if you look on Figure
12 2.6-3, it'll show you the transect and then the cross-
13 sections associated with that.

14 JUDGE HAJEK: Okay. So what --

15 CHAIR GIBSON: Mr. Teahon, is this the
16 figure to which you were referring?

17 MR. TEAHON: Yes, sir.

18 CHAIR GIBSON: Okay.

19 MR. TEAHON: So if you see on the upper
20 corner there, the Area of Review by the town of
21 Crawford, where it says NW and that transect line that
22 goes through to southeast. So northwest to southeast.

23 JUDGE HAJEK: I see that. What are the
24 numbers, the meaning of the numbers? Cross-section
25 512.000, 506, 500? What do they refer to?

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1 MR. BEINS: Your honor, Wade Beins with
2 Crow Butte. I moved back a table. The numbers that
3 are on that particular figure represent the Nebraska
4 State plane coordinates of those particular cross-
5 sections. We just picked a cross-section that was
6 roughly across a cross-section that has a northing of
7 either 512,000, I can't read the others off the screen
8 here, 494,000. It's just indicating a particular
9 coordinate however.

10 JUDGE HAJEK: Do you have a drawing then
11 related to this that shows us the potentiometric
12 surface relative to the level of the formation? Or
13 the -- I believe most of your drawings generally show
14 feet above sea level, is that correct?

15 MR. BEINS: That's correct.

16 JUDGE HAJEK: Okay. So I'm looking for a
17 drawing then or a figure that enables me to evaluate
18 the potentiometric surface relative to the top of the
19 formation.

20 MR. BACK: Your honor?

21 JUDGE HAJEK: If I go back to the figure
22 that I asked originally for Mr. Deucher to post, 2.6-
23 10, when I had read the material, I had thought that
24 more of the mine area was included here. And so when
25 I look at this to try to confirm the numbers in the

1 LRA and that are referenced in the EA as to how much
2 water height is available, I found it very -- well, I
3 found that I was totally unable using this particular
4 drawing to do that. Because I got much -- I only got
5 maybe 200 feet of total distance. And so, where does
6 the 300 to 500 feet -- what is the reference for the
7 300 to 500 feet? And I'm hoping you're pulling this
8 out of an exhibit that --

9 MR. TEAHON: Yes. It's in Exhibit CBR011.
10 And it's, I don't know what the PDF number is, but the
11 potentiometric surfaces of the Basal Chadron sands are
12 in Figure 2.7-4b. And also in 2.7-4c and 2.7-4d.

13 JUDGE HAJEK: Okay. So these -- I found
14 this on, Mr. Deucher, PDF 232, 2.7-4 Alpha. And, Mr.
15 Teahon, what is the meaning of these numbers on here
16 please?

17 CHAIR GIBSON: First of all, is that the
18 figure to which you are referring?

19 MR. TEAHON: No.

20 CHAIR GIBSON: Okay.

21 JUDGE HAJEK: Okay.

22 CHAIR GIBSON: Before we get into a figure
23 we don't want to talk about, let's make sure we know
24 the --

25 MR. TEAHON: The --

1 CHAIR GIBSON: -- one that we do want to
2 talk about.

3 MR. TEAHON: Go to the next one, 4b.

4 JUDGE HAJEK: 4b?

5 MR. TEAHON: There's a potentiometric
6 surface.

7 JUDGE HAJEK: Okay. And, Mr. Deucher, can
8 you blow this up so that we can read it? And let's
9 move on down a little bit on this figure. So if I
10 describe the lower right-hand corner of the figure
11 there, it shows the license area, of course. And if
12 we go to the rectangular section at the bottom right,
13 that rises, I see a number 20 on the blow-up of this
14 figure. That's a good spot. So go to the left a
15 little bit then and let's say, we're at 4.1, 4.2r,
16 it's roughly 3,700 feet above sea level, is that
17 correct?

18 MR. TEAHON: Yes, sir.

19 JUDGE HAJEK: Okay. Now, take me if you
20 can to a similar figure that shows the level of the
21 top of the formation at this location.

22 MR. TEAHON: That will take me some time to
23 find, sir.

24 CHAIR GIBSON: Do you want to try to do
25 that at lunch?

1 MR. TEAHON: We can do that.

2 CHAIR GIBSON: Would that be best?

3 JUDGE HAJEK: Okay. Yes.

4 CHAIR GIBSON: Rather than --

5 JUDGE HAJEK: That's fine.

6 CHAIR GIBSON: Rather than get bogged down
7 in a search for the holy grail here, let's just --
8 okay. Thank you.

9 JUDGE HAJEK: Yes. I would like for you to
10 --

11 CHAIR GIBSON: Hold on a minute. Mr. Smith
12 may have found something.

13 MR. SMITH: Well, I think Figure 2.7-7,
14 which is page 249.

15 CHAIR GIBSON: On the -- 249 on the PDF?

16 MR. SMITH: Correct.

17 JUDGE HAJEK: Is that the figure?

18 MR. SMITH: That's the figure that I was
19 referring to. I see it has an elevation in there and
20 it shows the formation.

21 JUDGE HAJEK: I see the Basal Chadron
22 Formation referenced at the bottom. Do you agree with
23 Mr. Smith on this, Mr. Teahon? Is this what we need
24 to show the available potentiometric depth?

25 MR. TEAHON: Yes. The potentiometric

1 surface is shown at the top.

2 JUDGE HAJEK: Okay.

3 MR. TEAHON: And the depth of the Basal
4 Chadron sands are shown at the bottom.

5 JUDGE HAJEK: So I'm having a hard time
6 understanding these numbers because on the previous
7 drawing that had been put up, the color drawing, I
8 thought -- or that had all the levels on it, I thought
9 I was looking at 3,700 feet on that. And here I see
10 5,600 or 5,200 feet. These are distances from some --
11 these are horizontal distances that I'm reading, is
12 that correct? I see this -- okay. So I have a 3,600
13 foot elevation on the far right-hand side as a
14 reference and then a vertical scale of 100 feet from
15 that. So I've got to basically measure and convert my
16 feet.

17 But I don't -- so in the scale at the
18 bottom left of this figure, it looks, at least on the
19 screen I have here, that I've got 100 feet is about
20 one inch on there. And if I translate that over, I
21 only see -- going up to a horizontal line an
22 approximate piezometric surface of the Chadron Base,
23 but I get then -- I guess I can get three inches at
24 least from that on down. And three inches, it looks
25 like maybe one, two, about three inches. So this is

1 showing 300 feet to me. Is that correct? And I only
2 -- I don't see that going to 500 feet. So where did
3 that number come from?

4 MR. TEAHON: The 500 feet is what? I don't
5 understand where you're getting the 500 feet.

6 JUDGE HAJEK: But we -- Mr. Back, you might
7 help here.

8 MR. BACK: You need to go to the
9 potentiometric surface and take that surface and
10 subtract those two numbers to get the depth. So that
11 -- to get the height --

12 JUDGE HAJEK: I'm trying to do that off
13 this drawing.

14 MR. BACK: No. You are taking the steps
15 that the staff took. He is -- this is exactly what we
16 did to look to check their numbers.

17 JUDGE HAJEK: Okay.

18 MR. BACK: And so you don't -- you get the
19 potentiometric surface that we were looking at three
20 figures ago. You look at the depth to the top of the
21 Basal Chadron. And the difference is the height above
22 the Basal Chadron that the potentiometric surface --

23 JUDGE HAJEK: See, that I understand.

24 MR. BACK: Okay.

25 JUDGE HAJEK: But looking at this drawing,

1 I'm unable to get those numbers.

2 MR. BACK: You are correct, your honor.
3 That is -- these are the steps that I took or that the
4 staff took to do what you are trying to do now.

5 CHAIR GIBSON: Did the staff summarize
6 those somewhere?

7 MR. BACK: No, your honor. No.

8 CHAIR GIBSON: So you did it, but you
9 didn't summarize it so we can't really see your work.
10 Is that a fair statement?

11 MR. BACK: Yes, your honor. But there are
12 many things we check on the applicant that we don't
13 summarize. We would summarize it if there was a
14 serious issue with it.

15 CHAIR GIBSON: Okay. So you basically
16 looked at it, said it's not a serious problem, and you
17 just skipped over it and you didn't memorialize what
18 you'd done?

19 MR. BACK: No, your honor.

20 CHAIR GIBSON: Okay. Very well. So
21 essentially to -- I just want to be sure. So if Judge
22 Hajek or Judge Wardwell, I would not do it by the way,
23 wanted to try to calculate this, they would need to go
24 through the steps that you do where you took the
25 little legend down here and you compared it up here on

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1 the graph and then you subtracted the numbers and then
2 you could get the potentiometric surface. Is that a
3 fair statement?

4 MR. BACK: Yes, your honor. And we did it,
5 since the Basal Chadron dips from north to south, we
6 did it over several different cross-sections just to
7 confirm that we were in -- that they were in the
8 proper range, the proper average.

9 CHAIR GIBSON: Okay.

10 JUDGE HAJEK: So I can see on this drawing
11 rather clearly, I think I can find 300 feet. I can't
12 come close to finding 500 feet.

13 MR. BACK: No, your honor. You need to go
14 to the potentiometric surface that's in the figure
15 that we were looking at and subtract those two --

16 JUDGE HAJEK: What figure were you looking
17 at?

18 MR. BACK: We had it pulled up earlier,
19 which is the potentiometric surface of the Basal
20 Chadron, the water level. What the -- exactly.
21 That's exactly what you need to be looking at.

22 JUDGE HAJEK: Okay. So I saw 3,700 feet,
23 I believe I read off that figure. And then you're
24 telling me that I should be able to find 3,200 feet at
25 the surface, at the top level of the formation here.

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1 Is that right?

2 MR. BACK: Something like that. There's an
3 average across the well-field. And so, because the
4 Basal Chadron goes from a depth, I think it's 250 feet
5 in the north down to 800 feet in the south, I mean, it
6 depends on where things are. But it's basically an
7 average.

8 JUDGE HAJEK: But I thought, Mr. Beins, I
9 thought you had indicated that this was from the north
10 all the way to the south. Is that you or was that Mr.
11 Teahon that --

12 MR. BEINS: That is not this particular
13 cross-section, your honor.

14 MR. BACK: This is an east-west cross-
15 section that bisects the mines as you go through.

16 JUDGE HAJEK: So this is just not what I
17 asked for then. I asked for one that goes all the way
18 from the north to the south. Do you have that?

19 MR. BEINS: I'm not sure that it has been
20 scanned, your honor. We can get that at noon.

21 MR. SMITH: It's the one figure above. The
22 page before, 248, west-southwest.

23 JUDGE HAJEK: Okay. So this is the entire
24 length of the mine unit then? Or the site? On Page
25 --

1 MR. BEINS: I believe it is --

2 MR. SMITH: Page 246 shows where this
3 cross-section is located. It's two pages above this.

4 JUDGE HAJEK: Okay. So in this large
5 ellipse here then that cross-section is what is on
6 Page 248, PDF 248. Is that what I'm being told? So
7 it goes beyond the licensed area?

8 MR. BEINS: Yes, your honor, it does. From
9 the point where you see the NW, the northwest
10 abbreviation at the upper left-hand corner of the
11 figure there at the top of the ellipse.

12 JUDGE HAJEK: Okay.

13 MR. BEINS: That line that heads
14 southeasterly down towards the lower right-hand corner
15 of the figure, where you see the abbreviation SE. So
16 that particular cross-section just has a few logs
17 along that trend.

18 JUDGE HAJEK: Okay. Let's go back to that
19 two pages later then, please. I'm trying to get to
20 the 500 number, 500 foot.

21 MR. BEINS: Could we zoom in please?

22 JUDGE HAJEK: Okay. So the northeast would
23 be the left-hand side, is that correct? And the
24 right-hand side of this would be the southeast?

25 MR. BEINS: The left-hand side would be the

1 northwest --

2 JUDGE HAJEK: Northwest?

3 MR. BEINS: -- part of the cross-section.
4 The right-hand side is the southeast portion.

5 JUDGE HAJEK: Okay. And I have a line that
6 shows me the piezometric surface of the Basal Chadron.
7 And there's no elevation on that. And this, perhaps
8 this is blown up too large to see the scale. There is
9 no scale on here. But I see 3,600 feet. So if I
10 assume that it, perhaps it's a good assumption maybe
11 not, I can see I would guess that the pretty much
12 absolute straight line is at 3,700 feet across the
13 entire mine, is that correct? Or the licensed area?
14 For -- now I see the three -- the far right, there's
15 a line through the middle that says 3,600. Is that
16 correct?

17 MR. BEINS: Yes, your honor.

18 JUDGE HAJEK: Okay. So then above that,
19 there is a line that has an arrow pointing to it,
20 approximate piezometric surface of the Basal Chadron.
21 And so that would be the 3,700 foot level, is that
22 correct?

23 MR. BEINS: Approximately. It's not going
24 to be exactly 3,700 foot probably.

25 JUDGE HAJEK: Okay. It narrows a little

1 bit at the left. But, so I'm looking at -- let's just
2 look at the middle of the drawing. So on the monitor
3 here, that distance or actual distance on the monitor
4 here shows, I would guess, let's say about an inch,
5 one inch. And then if I would measure down below that
6 3,600 foot line, that's really pretty much the
7 greatest depth of the formation down there. And it
8 looks like about double that distance. So that would
9 be 600 feet, is that correct? About at that location?

10 MR. BEINS: If that scale that you're
11 applying to it is correct, sir.

12 JUDGE HAJEK: Okay. Am I close enough to
13 have confirmation that --

14 MR. BEINS: Yes.

15 JUDGE HAJEK: -- we have 500 feet
16 available? But it's only in this one location?

17 MR. BEINS: Yes, your honor.

18 JUDGE HAJEK: Okay. So then the -- where
19 the water drawn down occurs is going to be quite
20 spatially dependent on whether or not we desaturate
21 the aquifer depending on how much consumptive water
22 use there might be. Is that correct?

23 MR. LEWIS: Yes, your honor. The saturated
24 thickness, or the potentiometric head, as shown in the
25 map basically increases in the southern portion of the

1 site. So as you looked at the cross-sections in the
2 southern portion of the area, you have got a greater
3 thickness of available head.

4 JUDGE HAJEK: So it's not a straight line
5 as shown on this drawing, Mr. Lewis?

6 MR. LEWIS: The potentiometric surface on
7 this drawing is not absolutely straight. But it's a
8 sloping surface. But it does thin to the north and
9 thicken towards the south.

10 JUDGE HAJEK: Mr. Back, is this one of the
11 drawings that you might have used to make your --

12 MR. BACK: No, your honor. Without a
13 scale, I did not use this drawing. In fact, I assume
14 that, that potentiometric surface was pre-pumping. If
15 you look at their original application, I believe
16 that, that 500 number, it's my opinion that, that came
17 from pre-pumping conditions. My calculations show
18 that the actual potentiometric surface ranged from 200
19 -- let's see, I have those numbers. Closer to 300
20 feet, 300 to 400 feet across the mine. That's what my
21 calculations were based on.

22 JUDGE HAJEK: Okay. So your calculations
23 that are, as Judge Gibson asked, that have not really
24 been documented in the EA by a table or a drawing,
25 would be 300 to 400 feet --

1 MR. BACK: Yes, your honor.

2 JUDGE HAJEK: -- on average, is that
3 correct?

4 MR. BACK: Yes, your honor.

5 JUDGE HAJEK: And so the statement that 47
6 feet is approximately ten percent based on the 300 to
7 500 feet might be a non-conservative estimate?

8 MR. BACK: It may be, your honor. It may
9 be. So it was depending on where you are in the mine
10 field. But there might be places. I did not check
11 every point. There may be places to where it's 500
12 feet. I concentrated on where I thought the minimum
13 areas would be. So I did not check every point in the
14 mine field.

15 JUDGE HAJEK: But the EA uses 300 to 500
16 feet, is that correct?

17 MR. BACK: I believe so, 300 to 500.

18 JUDGE HAJEK: And so the statement in the
19 EA would be non-conservative?

20 MR. BACK: Not --

21 JUDGE HAJEK: Relative to what --

22 MR. BACK: -- necessarily.

23 JUDGE HAJEK: -- you just testified here?

24 MR. BACK: Not necessarily, your honor.
25 Because the license application is closer to -- I

1 believe they reference 500 feet. So my overall
2 calculations were taking that whole range.

3 DR. STRIZ: Your honor, may I add
4 something? Just the draw down is not constant across
5 the license area. It varies also. So you have to
6 take that into account. I mean, these are all
7 averages.

8 JUDGE HAJEK: I understand.

9 DR. STRIZ: Okay.

10 JUDGE HAJEK: And we're going to look at
11 that draw down or draw down calculation here in a
12 little while. Okay. So let me summarize a little bit
13 here of what I think where we are. And then we'll
14 take a break for lunch. Okay? My understanding of
15 what we've looked at right here really shows that the
16 available -- actually two things. One is I think that
17 from looking at the drawings and also, Mr. Back, from
18 what you've said in terms of what your estimates have
19 been, the maximum available draw down head is probably
20 closer to 400 feet rather than 500 feet stated in the
21 EA. And I understand the EA gives a range, 300 to 500
22 feet. I understand it varies across the well-field
23 here. And I understand that the 500 foot level then,
24 or the 500 foot is taken from the LRA. Is that
25 correct? Do you have a reference for that?

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1 MR. BACK: Yes, your honor. I would have
2 to go back to look at it.

3 JUDGE HAJEK: So when we come in -- Crow
4 Butte, do you have the specific reference available
5 for the 500 foot?

6 MR. TEAHON: No, sir. We'd have to look it
7 up.

8 JUDGE HAJEK: Okay. So when we come back
9 from lunch -- how long do you want to take, Judge
10 Gibson?

11 CHAIR GIBSON: How about if we just take
12 until 1:30? Not yet.

13 JUDGE HAJEK: Not yet? Okay.

14 CHAIR GIBSON: Keep finishing.

15 JUDGE HAJEK: Okay. So when we come back
16 from lunch, we'll have a confirmation of where the 500
17 foot number came from. And, Mr. Back, if you have the
18 ability to analyze your 400 foot number a little more
19 carefully, that's what I'm understanding really to
20 have from the staff at this point is more of a 300 to
21 400 foot number. So that -- what I'm looking for is
22 a number I can use for the consideration of total
23 pumping ability, Dr. Striz. And the available draw
24 down before we desaturate the aquifer. Which I have
25 a new understanding for that is or it could be a

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1 safety issue. Not necessarily an environmental issue,
2 but an unidentified, in terms of the SER or the EA,
3 safety issue that perhaps there should be
4 consideration of a license condition to protect
5 against. Okay?

6 CHAIR GIBSON: Okay. Very well. Let me
7 just add one more thing here before we take our recess
8 for lunch. And that is, just doing a little bit of
9 looking at the modeling information that Ms. Simon
10 provided on our part, not mine, I might add, that's a
11 collective our, I just would like to get some
12 confirmation maybe when we go back on the record at
13 lunch that the people who received it are able to use
14 and read the model inputs. I just want to be sure
15 that's the case because I don't want us to end up
16 where you think you gave everything they needed and
17 they didn't get everything they needed.

18 I just want to make sure because I know
19 how models can be. Taking the depositions of a few
20 modeling experts in the past, I've learned that
21 sometimes you've got to get a lot of stuff in order to
22 read someone else's model. So I would like to get
23 some confirmation of that after we come back from
24 lunch. Okay. Very well. Thank you. We will stand
25 in recess for one hour, back at 1:30.

1 (Whereupon, the above-entitled matter went
2 off the record at 12:29 p.m. and resumed at 1:33 p.m.)

3 CHAIR GIBSON: Okay. Are we ready to go
4 back on the record? Would you all please be seated?

5 Just a housekeeping item before we get
6 back into our questions on Contention 6. I would
7 appreciate it if you all would -- we're going to hold
8 the Board exhibits that we listed as being -- all of
9 them as being non-public just for right now. I just
10 want to make sure that there's not anything in there.
11 Those are the pump tests, the USGS study, the Souders
12 report, the Terry report, the oval that was drawn on
13 the Pine Ridge Reservation; I hope that's not going to
14 be copyrighted, and the NRC model.

15 I just want to make sure that there's not
16 anything that we could run into a problem with either
17 disclosing any proprietary information or disclosing
18 any copyrighted information on the web. So if you all
19 would just look at that. We're going to hold them as
20 non-public for right now and then we'll release them
21 once I get that from you. If you all would just let
22 us know that maybe at the end of the day today, that
23 would be great, or next break or something. Okay?

24 I doubt there is. There might be
25 something copyrighted though on some of these papers,

1 these scholarly articles. So if you'd just look at
2 that and let us know, we'd appreciate it. I know Ms.
3 Simon's trying to find out -- is going to -- we're
4 going to keep that one private no matter what until
5 she gets it cleared through the NRC in ADAMS. Okay?

6 If there's nothing else, Judge Hajek?

7 DR. KREAMER: Your Honor, you did ask me
8 to --

9 CHAIR GIBSON: Oh, oh. I did. Oh, thank
10 you. Thank you, Dr. Kreamer. I was telling my clerks
11 here the three best things about getting older, you
12 get to make new friends every day, you get to hide
13 your own Easter eggs -- and I can't remember what the
14 third one is.

15 (Laughter)

16 CHAIR GIBSON: Yes. Go ahead. Go ahead.

17 DR. KREAMER: Your Honor, you're not Rick
18 Perry, are you, for the third one?

19 (Laughter)

20 CHAIR GIBSON: Okay. So, go right ahead.
21 I'm sorry. You were going to tell us about the inputs
22 and whether you were having any difficulty. That's
23 all.

24 DR. KREAMER: Yes, I did look through the
25 information on the model that was sent. This is not

1 the restoration model. This is the model that looked
2 at the White River Fault. I looked at all 3,947 pages
3 that were sent. These are in code that would be
4 unintelligible to even most modelers, although I'm
5 familiar with the code and I went through it. I have
6 looked and I already have arrived at shortcomings of
7 the model.

8 And although I know you have not looked at
9 it, it does not meet the criterion that Judge Wardwell
10 said when he said there's probably nice printouts with
11 summary information that is easily digestible. And
12 also there's no justification for the selection of
13 boundary conditions in heads and that sort of thing.
14 There are heads chosen, but if you had to do a
15 detective game, you'd have to say, well, why did they
16 choose that head? What's an average of --

17 CHAIR GIBSON: Okay. Those sorts of
18 issues are things that we'll address on the additional
19 day of the hearing, but this is what I would like you
20 to do since you do see some problems reviewing the
21 data. This is what I would like you to do. I would
22 like for you to perhaps have a visit with -- your
23 counsel can be involved, but visit with Dr. Striz
24 perhaps and see if there's a way that we can put that
25 in a condition that you can view it so that you can

1 see all that. Is that fair enough?

2 DR. KREAMER: Yes, I think --

3 CHAIR GIBSON: You may find deficiencies
4 in it. That's not a problem.

5 DR. KREAMER: I understand.

6 CHAIR GIBSON: It's just more a matter of
7 whether you can see what they've done, because if you
8 can't see what you've done, then you can't critique
9 the model. And in fact, the only reason I know that
10 is because I've deposed a whole lot of air dispersion
11 modelers in my life and I know what that's like.
12 Okay?

13 DR. KREAMER: And then you know that
14 making the model, it's quicker than reviewing someone
15 else's model.

16 CHAIR GIBSON: Yes, yes. So let's just
17 hold off on your critique of it. I just want to see
18 if we can figure out a way for you to see it.

19 DR. KREAMER: One point of clarification:
20 When we discuss it, do you want to move toward some
21 sort of document that would also be reviewable by Your
22 Honors and your staff?

23 CHAIR GIBSON: Of course I would, but
24 that's a lawyer problem that can be easily solved.
25 What can't be solved is whether you can see what you

1 need to see. Okay?

2 DR. KREAMER: Yes, Your Honor.

3 CHAIR GIBSON: And that goes the same
4 thing for you, Mr. Smith, for your folks if they need
5 to see it and they can't. Okay? So I want to make
6 sure that they can see what the staff's done here. So
7 with that, I'm sure if you all will just talk, you all
8 can figure out a way for us to understand what you
9 need and we can deal with it accordingly with your
10 lawyers and not having us involved. Okay? When we
11 need to get involved, we will be.

12 Okay. Okay, Dr. Hajek. Mr. Hajek. Judge
13 Hajek.

14 JUDGE HAJEK: I have no idea who I am.

15 (Laughter)

16 JUDGE HAJEK: Okay. So before we left the
17 last item we were covering was a question about the
18 300 to 500 feet, is that correct?

19 MR. BACK: Yes, Your Honor.

20 JUDGE HAJEK: And have you come up with a
21 resolution on that number?

22 MR. BACK: In a way, Your Honor.

23 JUDGE HAJEK: Okay. Please --

24 (Simultaneous speaking)

25 MR. BACK: All right. The EA references

1 the SER for the 300 to 500 feet. So you had also
2 asked that I kind of back-check the calculations that
3 I did, and so I thought I would -- and that's how I
4 spent my time rather than searching the license
5 application for the 3 to 500 feet.

6 JUDGE HAJEK: Okay. So let me interrupt
7 you very briefly, because I want to hear your number
8 and then I want to move on. So the EA references the
9 SER --

10 MR. BACK: Yes, Your Honor.

11 JUDGE HAJEK: -- and the SER references
12 the LRA. Is that correct?

13 MR. BACK: The SER actually says the
14 applicant reported a thickness, and I didn't look at
15 the reference because there was some discussion to it,
16 but I'm assuming that's where it's coming from.

17 JUDGE HAJEK: I'm going to guess without
18 looking that in that paragraph in the SER it probably
19 includes a reference it is something like CBR, 2007
20 Alpha.

21 MR. BACK: Quite honestly, I knew I was
22 going to be hurried to do the calculation, so I just
23 saw that that was what was reported. And so I quit
24 reading and went back.

25 JUDGE HAJEK: Go ahead and let's -- what

1 have you got?

2 MR. BACK: So the bottom line is is to get
3 that -- the check that was done on the sat pre-mining
4 conditions, saturated thickness was done with using
5 those cross-sections and the potentiometric surface
6 that was done of the Basal Chadron before any pumping
7 was performed. That surface and the cross-sections
8 are in the license application and that's what was
9 used to come up with that 3 to 500 and an average of
10 400.

11 JUDGE HAJEK: Okay. So when you say that
12 the figures you used were in the license
13 application --

14 MR. BACK: Yes, Your Honor.

15 JUDGE HAJEK: -- those are currently on
16 the record. The number that you just confirmed is --
17 you did confirm all the way to 500 using the
18 applicant's figures?

19 MR. BACK: Yes, Your Honor.

20 JUDGE HAJEK: Do you have two specific
21 numbers you can numerically name for us?

22 MR. BACK: Figure 2.7.4a and figure 2.7-6.

23 JUDGE HAJEK: 2.7-4a and 2.7-6?

24 MR. BACK: Yes, Your Honor.

25 CHAIR GIBSON: Okay. Thank you.

1 CBR, do you agree with what Mr. Back has
2 said?

3 MR. TEAHON: Yes, sir. We didn't find the
4 specific 300 to 500-foot reference. The only thing we
5 found that referenced 500 feet was the thickness, the
6 maximum thickness.

7 JUDGE HAJEK: Maximum thickness. So what
8 you're saying and from what I understand is that may
9 be to the bottom rather than the top? Is that what
10 you meant?

11 MR. TEAHON: Yes, sir.

12 JUDGE HAJEK: Okay. Thank you.

13 Intervenors, do you agree with these
14 numbers? Are you okay with those?

15 DR. KREAMER: The numbers are sort of
16 vague and we agree as far as they're certain about it,
17 which is about our level of certainty as well.

18 JUDGE HAJEK: Okay. Thank you.

19 Okay. Let me move on, if I may. Dr.
20 Kreamer, the staff's witnesses also testified in NRC-
21 001-R, or not -R, on page 87 to 88 that 47 feet is the
22 drawdown since the beginning of -- or since pre-
23 operations, pre-mining days until today, and that's
24 about 10 percent of this height now that we have of
25 let's say 300 to 500 feet. But from what Mr. Teahon

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1 said I think it's perhaps less than that is what I'm
2 surmising from this. And the SER says about the same
3 thing, but let's go with the 10 percent value.

4 So have you looked at both the SER and the
5 EA and seen the 10 percent estimate?

6 DR. KREAMER: Yes, Your Honor.

7 JUDGE HAJEK: Okay. Do you agree with
8 that estimate?

9 DR. KREAMER: I don't think it's relevant,
10 because the Brule is drawn down about that much over
11 that same time period and the connection with the
12 Brule would probably mean de-watering wouldn't be a
13 problem. If there was a big drawdown, you might have
14 a safety issue with subsidence, Your Honor.

15 JUDGE HAJEK: Thank you. Mr. Back, the 47
16 feet, is that a linear change since the beginning of
17 mining operations, or what kind of a curve do we have
18 there?

19 MR. BACK: Hypothetically it would be
20 somewhat linear as the well pump, but since they
21 started off pumping at different rates -- because they
22 started off in production and then they went to
23 restoration. And so in our Exhibit NRC-059 there's
24 actually a curve, a drawdown curve that shows how that
25 would have been projected, that they did this work

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1 before they actually started mining and it shows what
2 they anticipated. The staff went back and had them
3 check those values against what they actually got in
4 2009.

5 JUDGE HAJEK: So this is NRC-059. Do you
6 have a page number?

7 MR. BACK: There's only a few pages there,
8 so it's toward -- there are a number of graphs, but
9 the whole RAI is probably five pages.

10 JUDGE HAJEK: Okay. Thank you.

11 CBR, do you agree with the data in the
12 calculation in NRC-059? Are you familiar with that?

13 MR. TEAHON: We have no reason to not --
14 dispute it.

15 JUDGE HAJEK: Okay. Mr. Back, the EA at
16 pages 82 to 83; and I'm going to paraphrase just a
17 little bit, notes that during restoration flow can
18 exceed 1,000 gallons per minute. I think the actual
19 number is 1,200 perhaps, or as high as 1,200.

20 MR. BACK: We have a capacity of 1,150,
21 sir.

22 JUDGE HAJEK: Eleven hundred and fifty?
23 Okay. And that's due to improvements in capacities of
24 the RO and IX systems. On page 82 the EA states
25 during the sweep phase groundwater is not re-injected

1 into the production aquifer and all withdrawals are
2 considered consumptive, is that correct?

3 MR. BACK: Yes, Your Honor.

4 JUDGE HAJEK: But then on page 88 of NRC-
5 001 staff states a consumptive use rate of greater
6 than 900 gpm is not considered realistic. So, how do
7 I relate the 1,150 gallons per minute capability with
8 a consumptive use rate of 900 gpm as not being
9 realistic?

10 MR. BACK: Your Honor, consistent with
11 CBR's testimony yesterday the highest consumptive use
12 rate that they anticipate is 240 gallons. Keep in
13 mind those numbers that you were just citing, much of
14 that water is re-injected back into the aquifer and
15 doesn't contribute to consumptive use.

16 JUDGE HAJEK: Okay. CBR, would you follow
17 up on that? My understanding is during the sweep
18 phase no water is re-injected. All of it goes to
19 where, the two deep disposal wells?

20 MR. TEAHON: Sir, the 1,150 is the RO
21 circuit, reverse osmosis circuit, and 80 percent of
22 that is re-injected. The bleed-off, that is about 20
23 percent. What you're talking about is just pulling
24 fresh water from the perimeter across the mine unit
25 and disposing of all of that water. That's a

1 groundwater sweep. That wouldn't go through
2 treatment.

3 JUDGE HAJEK: I do understand that. What
4 I don't understand relative to what you just said was
5 that the groundwater sweep phase draws from the
6 perimeter. I thought it drew from more centrally so
7 that the water from the perimeter comes in to add
8 basically, quote/unquote -- and I think some place you
9 say that -- "baseline water."

10 MR. TEAHON: If you had just a square area
11 and you were going to clean that up with sweep alone,
12 you would go up gradient and pull water across your
13 mine zone, fresh water across it. Our sweep basically
14 is a well field bleed along the edge of the mine unit
15 where we can pull fresh water in. And we don't do a
16 complete disposal clear across the mine unit, a sweep.
17 We have other things going on in the mine unit at the
18 same time that we're doing sweep along the edge.
19 We're also doing treatment.

20 JUDGE HAJEK: So sweep and treatment
21 occurs at the same time? I did not understand that.

22 MR. TEAHON: Well, we're not completely
23 sweeping the whole mine unit from north to south, say,
24 of fresh water. As we treat across the mine unit we
25 have to maintain an inward hydraulic gradient.

1 JUDGE HAJEK: That's correct. I
2 understand.

3 MR. TEAHON: So with that well field bleed
4 we're pulling fresh water in from the edge. We're not
5 re-injecting out there. We're re-injecting the water
6 back into the patterns that we're cleaning.

7 JUDGE HAJEK: Sort of what I thought I
8 understood, but I -- well, it is what I understood,
9 but that you would be drawing fresh water in from
10 outside the mine unit or from all edges all the way
11 around and then sweeping by taking water out of the --

12 (Simultaneous speaking)

13 MR. TEAHON: It wouldn't be from all the
14 way around because we have adjacent mine units to them
15 as we expanded out, so it's just along the sides.

16 JUDGE HAJEK: It's along the side away
17 from --

18 MR. TEAHON: Production or adjacent --

19 JUDGE HAJEK: -- a production mine unit
20 or --

21 MR. TEAHON: Yes, sir.

22 JUDGE HAJEK: Okay. I understand. And
23 what is the capacity then of your pumping systems for
24 the sweep phase? I'm getting 200 gallons per minute,
25 or 20 percent of 1,150, is what I understood you to

1 say, that might be going or that might be exposed of
2 during mining that's taking place in a different mine
3 through the IX and RO circuits, is that correct?
4 Twenty percent there?

5 MR. TEAHON: No, the production side is a
6 half to one-and-a-half percent bleed. So if we're
7 pumping 5,000 gallons a minute on the production
8 side --

9 JUDGE HAJEK: Yes.

10 MR. TEAHON: -- we're getting somewhere
11 around 25 to 50 gallons a minute of bleed.

12 JUDGE HAJEK: Okay.

13 MR. TEAHON: That's the half to one-and-a-
14 half percent. It usually runs around a half to a
15 percent.

16 JUDGE HAJEK: Yes. All right.

17 MR. TEAHON: So that's on the production
18 side.

19 JUDGE HAJEK: Okay.

20 MR. TEAHON: On the restoration side is
21 we're doing RO treatment. We get 80 -- for every 100
22 gallons that comes in, we get about a 20 percent waste
23 stream coming off of that. So the 1,150 gallons, if
24 you calculate that out, that's 230 gallons of what we
25 call brine, salt that goes to disposal along with

1 anything from the production side.

2 JUDGE HAJEK: Okay. So I have two-hundred
3 and --

4 MR. TEAHON: Thirty maximum if we were --

5 JUDGE HAJEK: -- thirty max.

6 MR. TEAHON: -- at full capacity at 1,150
7 gallons a minute of RO.

8 JUDGE HAJEK: Okay. So that's from
9 restoration, is that correct?

10 MR. TEAHON: That's from the restoration
11 circuit.

12 JUDGE HAJEK: Okay. You have a number of
13 mines in restoration at once, is that correct?

14 MR. TEAHON: Yes, sir, we have five mines
15 in restoration right now.

16 JUDGE HAJEK: Okay. And so 230 gallons
17 plus 25 gallons from a production mine?

18 MR. TEAHON: From the other five mine
19 units.

20 JUDGE HAJEK: The other five --

21 MR. TEAHON: So, we have five mine units
22 in restoration, five mine units in production. One
23 min unit has been restored.

24 JUDGE HAJEK: Okay. And then if you have
25 a mine under restoration undergoing sweep at the same

1 time as you have another mine or two undergoing
2 treatment, what is the total waste flow rate at that
3 point?

4 MR. TEAHON: We don't do total sweep. We
5 don't do that.

6 JUDGE HAJEK: What is --

7 MR. TEAHON: It's combined with the RO
8 from the inflow along the perimeter of the mine unit.
9 Because that mine unit is in restoration a portion of
10 that is going to be having fresh water swept into it
11 from the outside, and that's going to go through the
12 RO circuit, is going to be part of the RO circuit.

13 JUDGE HAJEK: So sweep water is also
14 treated, is that what I understand you to say then?

15 MR. TEAHON: Yes, the way we do it it
16 would be.

17 JUDGE HAJEK: The way you do it? Is that
18 codified in a procedure that the NRC has reviewed and
19 approved?

20 MR. TEAHON: Well, the way we define sweep
21 it would be if we were to do the full -- we have four
22 phases of restoration that we could do. We could do
23 transfer. We could take the lixiviant that currently
24 exists in the mine unit and transfer -- forward it to
25 an adjacent mine unit that we're going to start

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1 production in. We've started all of our mine units.
2 We don't do any transfer. Okay? Groundwater sweep is
3 a total sweep across the mine unit of fresh water as
4 defined in our restoration plan. And then we have
5 treatment, which is IX and RO. So what we do when a
6 mine unit goes into restoration, that sweeping along
7 the edge is included in our treatment process.

8 JUDGE HAJEK: Okay. And what is your
9 total capacity then that would send water into the
10 waste system? How many gallons per minute total?

11 MR. TEAHON: Eleven hundred and fifty of
12 RO.

13 JUDGE HAJEK: Oh, 1,150 would be treated?
14 I thought I understood you to say that perhaps 20
15 percent of that would go into waste.

16 MR. PAVLICK: The maximum waste from the
17 restoration circuit is that 230 gpm, the 20 percent
18 of --

19 JUDGE HAJEK: And so, that's even during
20 sweep?

21 MR. PAVLICK: Yes, the sweep water is
22 going to commingle with other restoration water. So,
23 let's say for instance in Mine Unit X we're doing
24 sweep and we're bringing water in from the sides,
25 fresh water in from the sides of the mine unit. We're

1 not re-injecting, so that we've got a cone of
2 depression there. So that water is coming to the
3 restoration plant mixed with other restoration waters
4 from other mine units, treated through that RO
5 circuit. So the capacity limitation for all of that
6 restoration water including the sweep water that we're
7 bringing in from Mine Unit X plus Mine Unit Y that's
8 in another phase of restoration -- the total capacity
9 there is 1,150 gallons a minute. And the waste
10 generated from that is 230.

11 JUDGE HAJEK: So the total consumptive use
12 during this phase, or these phases is 230 gallons plus
13 25 gallons, is that correct?

14 MR. PAVLICK: That's correct.

15 JUDGE HAJEK: Okay.

16 MR. PAVLICK: But the capacity of the
17 equipment at the plant right now and the -- that
18 assumption with production flow that generates the 25
19 gpm from that stream, you've got it right.

20 JUDGE HAJEK: Okay. And the 25 gpm in
21 general would go to the ponds?

22 MR. PAVLICK: No, all of that water,
23 whether it be RO brine or bleed generally will go to
24 the deep well.

25 JUDGE HAJEK: The deep well?

1 MR. PAVLICK: Deep wells.

2 JUDGE HAJEK: Okay. Thank you.

3 Intervenors?

4 MR. WIREMAN: We understand this and the
5 only comment I want to make, this is a normal sort of
6 operational scheme for this sort of mine. I'm a
7 little nervous about only the partial sweep as part of
8 the restoration, but that's a slightly different
9 issue.

10 JUDGE HAJEK: Okay. So your total
11 capacity -- you know what, I'll come back to that in
12 just a moment.

13 So the EA on page 4, Mr. Back --

14 MR. BACK: Yes.

15 JUDGE HAJEK: -- because this is one of
16 the things I'm a little bit confused about, you spent
17 a lot of time describing restoration, so staff must be
18 concerned about restoration. Is that a fair
19 statement?

20 MR. BACK: Yes, Your Honor.

21 JUDGE HAJEK: Okay. It's really pretty
22 well detailed, but the EA on page 4, which is your red
23 page 17, states CBR is capable of processing in excess
24 of 9,000 gallons per minute, but this does not include
25 restoration flow, which you state there is covered

1 under another permit. So have I read that correctly?

2 MR. BACK: Yes, Your Honor.

3 JUDGE HAJEK: And then License Condition
4 10.6 covers groundwater restoration. In 10.13 it also
5 excludes restoration flow. So what's the other
6 permit?

7 MR. BACK: Your Honor, let me defer to Dr.
8 Striz since she --

9 JUDGE HAJEK: Okay. Dr. Striz, what's the
10 other permit?

11 DR. STRIZ: I do not know.

12 JUDGE HAJEK: So the staff doesn't know.
13 So, CBR, what's the other permit?

14 MR. TEAHON: We have a Class III UIC
15 permit with the Nebraska Department of Environmental
16 Quality that has a flow limitation, maximum flow
17 limitation of 11,000 gallons per minute, and of that
18 only 9,660 gallons per minute can be used for
19 production. The flow limits of the license condition
20 from the NRC is 9,000 gallons a minute production, no
21 limit on restoration. So I don't know of any other
22 constraints that we're under.

23 JUDGE HAJEK: Those are the same numbers
24 I have. Thank you for confirming those.

25 Okay. So you're talking about the NDEQ

1 Class III permit, which is Exhibit CBR-017, is that
2 correct?

3 MR. TEAHON: Yes, sir.

4 JUDGE HAJEK: Okay. Thank you. And the
5 numbers that you just quoted for me are table 2.2?

6 MR. TEAHON: We're checking, sir.

7 JUDGE HAJEK: Thank you.

8 MR. TEAHON: Yes, sir, 2.2.

9 JUDGE HAJEK: Okay. Thank you. Mr.
10 Deucher, can you please display the EA, NRC-10, page
11 6, table 2-1?

12 I have a couple of questions about this
13 table, Mr. Back, before I ask Mr. Teahon my question
14 here. The EA in this table shows six units in
15 production, four units in restoration, one unit
16 restored, but I thought yesterday you had said that
17 only five units were allowed to be in production at
18 any one time and only five units in restoration. Can
19 you explain the difference?

20 MR. BACK: The table is in error,
21 specific.

22 JUDGE HAJEK: The table is in error?
23 Okay.

24 All right. Mr. Teahon, would you update
25 the table for us? And I'd like you to do it in --

1 MR. TEAHON: I can do it right now, sir.

2 JUDGE HAJEK: I would like you to do it --

3 (Simultaneous speaking)

4 MR. TEAHON: In 2013 when Mine Unit 11 was
5 put in --

6 JUDGE HAJEK: I'm sorry. Wait a minute.
7 Let me ask my question.

8 MR. TEAHON: Okay.

9 JUDGE HAJEK: Okay? Because I'd like you
10 to do it in one mine unit at a time. Okay? So what
11 I'd like to know is -- I'd like you to really fill in
12 a couple more columns for me. That's what I'm really
13 looking for here. So recognizing the four steps of
14 restoration being groundwater transfer, groundwater
15 sweep, groundwater treatment and well field
16 circulation, okay, and also stabilization monitoring,
17 which is after you're finished there, I'd like to go
18 through each mine unit one at a time. Can we do that?

19 MR. TEAHON: Yes, sir.

20 JUDGE HAJEK: Okay. And then we'll have
21 the total numbers and everything and that will correct
22 whatever the error is in this table right here.

23 MR. TEAHON: Okay.

24 JUDGE HAJEK: Okay. So Mine Unit 1, if I
25 look at this table, it says groundwater restored;

1 reclamation under way. That's not in the five kind of
2 steps, actually four steps plus one, right?

3 MR. TEAHON: This is the status of the
4 mine in 2007 when we submitted the application.

5 JUDGE HAJEK: Okay.

6 MR. TEAHON: Okay? Mine Unit 1 has been
7 restored and the wells have been plugged, abandoned
8 and plugged, and all of the surface features have been
9 removed.

10 JUDGE HAJEK: So this is now ready for the
11 pronghorn sheep or whatever?

12 MR. TEAHON: Well, it sits in the center
13 of the area, so it's the center of the doughnut -- is
14 the geometry issue.

15 JUDGE HAJEK: Okay.

16 MR. TEAHON: So that one has been
17 restored. Has not been decommissioned. We won't
18 decommission the site until all the mine units are
19 restored. But restored and reclaimed. We've removed
20 all the surface features and planted it back to grass.

21 JUDGE HAJEK: Okay. Mine Unit 2?

22 MR. TEAHON: Stabilization, sir.

23 JUDGE HAJEK: So all four of the
24 restoration steps have been completed and this is in
25 stabilization monitoring. How long has it been in

1 stabilization monitoring?

2 MR. TEAHON: Going on two years.

3 JUDGE HAJEK: Two years?

4 MR. TEAHON: Along with Mine Unit 3. They
5 were put into stability monitoring at the same time.

6 JUDGE HAJEK: Okay. Let's take them still
7 one at a time. It's been in stabilization monitoring
8 for two years?

9 MR. TEAHON: Yes, sir.

10 JUDGE HAJEK: Okay. And I'm not recalling
11 exactly where these requirements are, and I hope you
12 can help me. There are two stabilization periods that
13 I am familiar with. One of them says -- and,
14 Intervenors, you had a comment that a stabilization
15 period of only six months was significantly too short,
16 is that correct?

17 MR. WIREMAN: It is correct, and part of
18 the new Sub-part 192 rule deals with that issue.

19 JUDGE HAJEK: The Sub-part 192 rule says?

20 MR. WIREMAN: It extends the stabilization
21 period far beyond six months.

22 JUDGE HAJEK: Can you be more specific
23 with that?

24 MR. WIREMAN: I believe it's three years,
25 but I'd have to go back and read the rule.

1 JUDGE HAJEK: Okay.

2 MS. SIMON: Your Honor, excuse me. Marcia
3 Simon. I just want to note that that rule is not a
4 final rule yet, so it has no legal effect yet.

5 JUDGE HAJEK: Okay. One-ninety-two is not
6 a final rule. Okay. Maybe I should ask -- I'm not
7 sure -- Okay. All right. I was going to ask Dr.
8 Striz. The license -- and Mr. Teahon. So you can
9 confirm each other. I believe the license has a
10 requirement, is that correct, or a license condition?

11 DR. STRIZ: That is correct. It's --

12 JUDGE HAJEK: Go ahead and read it.

13 DR. STRIZ: It's License Condition 10.6,
14 Restoration Stability Monitoring. "The licensee shall
15 conduct sampling of all constituents of concern on a
16 quarter year basis during restoration stability
17 monitoring. The sampling shall include the specified
18 ore zone aquifer wells. The applicant shall continue
19 the stability monitoring until the data show the most
20 recent four consecutive quarters indicate no
21 statistically significant increasing trend for all
22 constituents of concern which would lead to an
23 exceedance above of the respective Criterion 5(B)(5)
24 standard."

25 JUDGE HAJEK: Thank you. Now, recall

1 before I go on here, we're talking about consumptive
2 water use here, and Contention 9 deals with the
3 constituents that need to be monitored and the
4 baseline meeting of those levels. So I don't want to
5 talk about that. I'm going to pull a Wardwell on here
6 you. But you are now how many years into
7 stabilization?

8 MR. TEAHON: We have -- so our Class III
9 license has a minimum of six months. So the NDEQ
10 requires us to collect a minimum of six monthly
11 samples, consecutive monthly samples and then analyze
12 those for stability. At the meantime in the mine
13 units there's nothing going on. All -- everything's
14 shut down. And the NRC requirement is just as Dr.
15 Striz had articulated, 12 consecutive months. Or four
16 consecutive quarters. My mistake. Four consecutive
17 quarters of stability monitoring.

18 JUDGE HAJEK: That's not what I understood
19 her to read. I understood her to read that you -- I
20 do understand nothing's happening down in the mine.
21 What I understood her to have read and my reading of
22 the License Condition 10.6 -- is that what you said?

23 DR. STRIZ: 10.6.

24 JUDGE HAJEK: 10.6 -- is that you need to
25 take samples once every three months and you must get

1 four quarters of consecutive samples without an
2 increase in any parameter, constituent parameter in
3 excess of the limits.

4 MR. TEAHON: Yes, sir, that's correct.

5 JUDGE HAJEK: Okay.

6 MR. TEAHON: And we run those through the
7 Pro UCL program to show that that parameter is within
8 90 percent confidence of being stabilized, 95 percent.

9 JUDGE HAJEK: And Mine Unit 2 has been in
10 stabilization monitoring for how long?

11 MR. TEAHON: Two years.

12 JUDGE HAJEK: Two years? Why?

13 MR. TEAHON: At the end of the six --
14 well, we -- at the end of the one-year four
15 consecutive quarter period for the NRC, the NDEQ
16 requested that we do some additional sampling for four
17 of the analytes, five of analytes; I don't recall
18 exactly off the top of my head, that hadn't shown
19 stability over that time.

20 JUDGE HAJEK: Okay. So you have met the
21 NRC requirement of four consecutive quarters of not
22 having measured in exceedance in accord with the NRC
23 10 CFR 40, Appendix A, table 5C, I believe, is that
24 correct?

25 MR. TEAHON: We are of the understanding

1 we have. We're in the process of writing those
2 reports and submitting them. Due to the timeliness of
3 this hearing, we've -- I'm the one writing the report,
4 so I've been delayed in doing that. But we have all
5 the lab data.

6 JUDGE HAJEK: Appreciate your priority in
7 being here. Thank you.

8 MR. TEAHON: We have all of the samples
9 collected.

10 JUDGE HAJEK: Okay.

11 MR. TEAHON: And all we have to do is
12 submit the final report.

13 JUDGE HAJEK: Okay. But you're continuing
14 to do stabilization monitoring as a result of a
15 commitment to NDEQ?

16 MR. TEAHON: No, we had collected the last
17 of those samples based on the follow-up that we did
18 for them last fall.

19 JUDGE HAJEK: So Mine Unit 2 is two years
20 into stabilization monitoring, but you're done? Is
21 that what you're really saying?

22 MR. TEAHON: Yes, sir. We've collected
23 all the samples in both Mine Units 2 and 3, and we'll
24 be submitting those reports together because we want
25 to remove them at the same time because it breaks the

1 well field in two separate units.

2 JUDGE HAJEK: Okay. Mine Unit 3 is in
3 stabilization monitoring?

4 MR. TEAHON: Yes, sir, it's done. The
5 samples have been collected and we're writing the
6 report.

7 JUDGE HAJEK: How long has that been in --

8 MR. TEAHON: Two years.

9 JUDGE HAJEK: That also for two years?

10 MR. TEAHON: Yes, sir.

11 JUDGE HAJEK: Okay. Mine Unit 4?

12 MR. TEAHON: Mine Unit 4 is in RO
13 treatment.

14 JUDGE HAJEK: Okay. So here I have a
15 little further confusion then. So it's undergone
16 sweep and now you're in RO treatment? Beyond sweep
17 or --

18 MR. TEAHON: Well, we don't' -- sweep's
19 part of the RO treatment. It's included. That water
20 is included with the RO treatment.

21 JUDGE HAJEK: I see. Mr. Lewis, can you
22 clarify that a bit for me? I've lost my reference
23 here. CBR-041, is that the Whorley report that has
24 the spreadsheet at the end of it on the last page?

25 MR. LEWIS: I'm sorry. I'll have to

1 refresh my memory of 041. I've written a couple
2 reports.

3 JUDGE HAJEK: Yes, just hold on. I'll get
4 the exact one here.

5 JUDGE WARDWELL: Our librarian has come to
6 the rescue again.

7 MR. LEWIS: Yes, this would be the model-
8 based restoration plan.

9 JUDGE HAJEK: The model-based restoration?

10 MR. LEWIS: Yes, sir.

11 JUDGE HAJEK: Okay. So relative to the
12 model-based restoration plan, then can you just help
13 us out here and tell us where Mine Unit 4 is then,
14 because I notice in that plan sweep is not included.

15 MR. LEWIS: That's correct. This plan was
16 written for the treatment phase. How many pore
17 volumes would be necessary or predicted in order to
18 bring the mine unit to its restoration goals by RO
19 treatment. The sweep phase had either already been
20 completed for most of the mine units before I was
21 involved or it wasn't included in the modeling because
22 it hadn't affected the concentration averages
23 significantly enough to warrant its inclusion.

24 JUDGE HAJEK: Okay. Thank you. All
25 right. Back to Mr. Teahon. Mine Unit 5?

1 MR. TEAHON: RO, sir.

2 JUDGE HAJEK: RO? And Mine Unit 6?

3 MR. TEAHON: Currently Mine Unit 6 is
4 being -- it's in restoration phase, but we're not
5 doing any treatment in that mine unit currently.
6 We're putting the infrastructure in so that we can
7 bring those wells into the RO building itself. So
8 what we have on are two wells to maintain our inward
9 hydraulic gradient. And once the infrastructure is
10 put in, that mine unit will then go back into RO
11 treatment.

12 JUDGE HAJEK: And the infrastructure that
13 you're talking about, what is involved with that
14 infrastructure?

15 MR. TEAHON: Putting the pipeline in from
16 the mine unit back to the restoration building itself.

17 JUDGE HAJEK: Okay. When you say the
18 "restoration building," is that a different building
19 from the central --

20 MR. TEAHON: Yes, it's separate from the
21 production building.

22 JUDGE HAJEK: It is separate from the
23 production building? Is this a larger diameter or
24 capacity pipe then than you would have for --

25 MR. TEAHON: Production?

1 JUDGE HAJEK: -- mining purposes --

2 (Simultaneous speaking)

3 MR. TEAHON: No, it's the same.

4 JUDGE HAJEK: The same? Okay. Mine Unit
5 7?

6 MR. TEAHON: It's in production.

7 JUDGE HAJEK: It's in production? Okay.
8 So the one error is -- okay. I'll come back to say
9 that, to respond there. Okay. Mine Unit 7 is in
10 production?

11 MR. TEAHON: Yes, sir.

12 JUDGE HAJEK: Mine Unit 8?

13 MR. TEAHON: Production.

14 JUDGE HAJEK: Production? And when you
15 say "production," are these full production, or do you
16 have partial productions? I mean, is there a -- I
17 guess I'm kind of thinking nuclear power plants. You
18 know, you get it to the end of a fuel cycle and you
19 start tapering at the end. Do you do that with mine
20 units, or is it either all or nothing?

21 MR. PAVLICK: Your Honor, it's similar, so
22 in a given well house within a mine unit there's --
23 well, not to confuse this, because in a given mine
24 unit let's say there's 150 production wells scattered
25 around that area. When we first start that mine unit

1 there may be 90-plus percent of those wells in
2 service. Over time as the ore body is depleted and we
3 reach a lower limit of economics basically where it
4 doesn't make sense to run that well, we'll shut it
5 off. And so, over time there's a lessening of the
6 number of pumps and the flow from that mine unit.

7 JUDGE HAJEK: And then when you shut off,
8 you shut down the entire seven well ring, is that
9 correct?

10 MR. PAVLICK: Not necessarily, because
11 it's adjacent to another production well. So some of
12 those are dual-service injectors.

13 JUDGE HAJEK: I understand. Okay. Oh,
14 well, can you give me then a percentage of production
15 on let's say Mine Unit 7 and Mine Unit 8?

16 MR. PAVLICK: This is off the top of my
17 head, but Mine Unit 7 might be roughly 50 percent.
18 Mine Unit 8, probably 60 to 70 percent.

19 JUDGE HAJEK: Okay. Mine Unit 9?

20 MR. PAVLICK: It's in production and
21 probably 90 percent.

22 JUDGE HAJEK: Mine Unit 10?

23 MR. PAVLICK: It's in production and 90-
24 plus percent.

25 JUDGE HAJEK: And Mine Unit 11, the

1 newest?

2 MR. PAVLICK: In production and 90-plus
3 percent.

4 JUDGE HAJEK: Thank you. So we have a
5 good table here. We know where we're headed on that.

6 Mr. Back, going back to the staff's
7 statement in the EA on page 83, that extension of the
8 restoration periods, and greater than expected
9 consumptive use rates significantly increase the
10 drawdown, but the Basal Chadron aquifer should still
11 remain saturated. So I don't quite follow the
12 connection between operations and restoration that
13 leads here to your moderate conclusion. Is it
14 strictly a function of your conclusion that -- and you
15 use the word "should" remain saturated.

16 MR. BACK: Your Honor, based on the way
17 that the aquifer has behaved to date, at the existing
18 pumping rates the applicant could pump approximately
19 900 gallons a minute as consumptive use and the
20 aquifer would still remain saturated.

21 JUDGE HAJEK: Nine hundred gallons per
22 minute. My understanding is that was a staff
23 calculation?

24 MR. BACK: That's exactly right. Based on
25 existing pumping rates and drawdowns.

1 JUDGE HAJEK: Crow Butte, you have a much
2 lower number now from what I understood this
3 afternoon. Is that correct?

4 MR. PAVLICK: That's correct.

5 JUDGE HAJEK: What is your maximum waste
6 capacity then, for pumping, pumping capacity into
7 waste?

8 MR. PAVLICK: Yes. So the deep well
9 system composed of two deep wells is roughly 250
10 gallons a minute. And then you've got --

11 JUDGE HAJEK: Two wells or one well?

12 MR. PAVLICK: Two wells.

13 JUDGE HAJEK: Two wells?

14 MR. PAVLICK: Yes.

15 JUDGE HAJEK: So each well has a capacity
16 of only 125?

17 MR. PAVLICK: No, as the testimony
18 yesterday said, No. 1 deep well can take 200-plus
19 gallons per minute under vacuum. No. 2 deep well is
20 limited to around 35 gallons a minute.

21 JUDGE HAJEK: Well, that's quite a
22 difference.

23 MR. PAVLICK: Yes, sir.

24 JUDGE HAJEK: Okay.

25 MR. PAVLICK: But to finish that up, so

1 the deep well capacity is as I just stated, plus the
2 evaporation pond capacity. Really when you average
3 that out on an annual basis, it's around 15 gallons a
4 minute.

5 JUDGE HAJEK: From all the ponds?

6 MR. PAVLICK: Yes, that's all the ponds.
7 So that's taking into account seasonal evaporation and
8 trying to hold the pond level say steady on an annual
9 basis.

10 JUDGE HAJEK: So I understand the seasonal
11 variation to an extent, but that's a summer time or is
12 that an average over 12 months that you're giving me?

13 MR. PAVLICK: So the 15 gallons a minute
14 would be averaged over 12 months.

15 JUDGE HAJEK: Okay. Give me the two deep
16 well numbers again, please? No. 1 was?

17 MR. PAVLICK: No. 1 was 200 to 250 gallons
18 a minute. And that's based on whether we use a
19 downhole pump to pressurize, or a surface pump to
20 pressurize that flow. And then deep well 2, 35
21 gallons a minute. And that runs at 300 psi surface
22 injection pressure.

23 JUDGE HAJEK: Okay. And then you said the
24 evaporation rate in the pond was 15 gallons per
25 minute, is that correct? You have a --

1 MR. PAVLICK: Discharge into the ponds is
2 15 gallons a minute. Evaporation rate is very
3 seasonal around here. And so, on average my eight
4 years' experience watching those ponds, it averages
5 out to 15 gallons a minute on an annual basis.

6 JUDGE HAJEK: And you have sprays at the
7 ponds, is that correct?

8 MR. PAVLICK: That's correct. We use
9 sprays to assist with evaporation. We also dye the
10 ponds blue, that darker color, just to get a little
11 bit radiant heat in the water to promote evaporation.

12 JUDGE HAJEK: Okay. And in the ponds you
13 try to maintain a water level at about, what, 10 foot
14 of depth from what I recall yesterday? Is that --

15 MR. PAVLICK: So the ponds are 15-foot
16 deep. We're constrained to no higher than 12 foot
17 maximum height and we try to maintain the levels as
18 low as we possibly can without uncovering the sludge
19 that we talked about yesterday.

20 JUDGE HAJEK: Okay. Thank you. Okay. I
21 think I've covered this a little bit, Mr. Back. I had
22 the question about is there a regulatory or a license
23 limit on potentiometric level, and I believe the
24 answer is no. And I believe, my interpretation is
25 that you have an operational concern to maintain a

1 potentiometric level so that you do not run into
2 pumping issues in your mines. Is that correct? Do
3 you monitor that level for the purpose of protecting
4 your pumps, or any other reasons?

5 MR. PAVLICK: Do we monitor the
6 potentiometric surface level?

7 JUDGE HAJEK: That's correct, yes, in the
8 active mine unit, or in all the mine units.

9 MR. PAVLICK: So we monitor it with our
10 monitoring well system every two weeks. So we monitor
11 that level.

12 JUDGE HAJEK: Typically what is it at
13 today? Really interested in the delta above the mine
14 surface?

15 MR. TEAHON: We'll let Mr. Lewis -- they
16 just did a map that shows current conditions.

17 MR. LEWIS: Your Honor, you had given us
18 a task over lunch time to identify the available head,
19 and we had used an existing base map and then plotted
20 the current -- and when I say "current," these are as
21 of October 26th of --

22 (Simultaneous speaking)

23 JUDGE HAJEK: Is this in an existing
24 exhibit, or is this new?

25 MR. LEWIS: I'm sorry. It's in August of

1 this year.

2 JUDGE HAJEK: I'm sorry?

3 MR. LEWIS: August of this year. This
4 is --

5 JUDGE HAJEK: Is it in an exhibit that you
6 have already submitted?

7 MR. LEWIS: No, this would be a new
8 exhibit.

9 CHAIR GIBSON: Would it be possible, Mr.
10 Smith, to get that marked so we'll know what witness
11 is referring to?

12 MR. SMITH: Yes, of course.

13 CHAIR GIBSON: What was your last exhibit
14 number? We can just add that to it.

15 MR. SMITH: This would be CBR-062.

16 CHAIR GIBSON: We'll just make this CBR-
17 062. Okay?

18 (Whereupon, the above-referred to
19 document was marked as CBR Exhibit No.
20 063 for identification.)

21 PARTICIPANT: Sixty-three.

22 CHAIR GIBSON: Or, 63. They said 63, Mr.
23 Smith.

24 MR. SMITH: Okay. I have no reason to
25 doubt them.

1 CHAIR GIBSON: There you go. Sixty-three.
2 CBR, you're referring now to CBR-063. Is that
3 correct, Mr. Lewis?

4 MR. LEWIS: Yes, sir.

5 CHAIR GIBSON: Very well. Okay. You'll
6 get copies out for everybody, Mr. Smith?

7 MR. SMITH: (No audible response)

8 CHAIR GIBSON: Thank you so much.

9 JUDGE HAJEK: Looks like we're almost good
10 to go on that.

11 CHAIR GIBSON: Just wait until he gets --
12 (Simultaneous speaking)

13 JUDGE HAJEK: Yes, I'll wait until --
14 we'll wait.

15 (Pause)

16 JUDGE HAJEK: Okay. Does everyone have a
17 copy of this exhibit?

18 (No audible response)

19 JUDGE HAJEK: Okay. Go ahead, Mr. Lewis
20 explain what you have here.

21 MR. LEWIS: Well, basically what this
22 exhibit will demonstrate, we went and we plotted a
23 number of existing well locations from going north in
24 the northern portion of the mine all the way to the
25 southern-most part of the mine. It looks like nine

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1 locations. And from that information it looks to me
2 as though the available head currently, or recently,
3 varies from about 435 feet in the southwestern portion
4 of the mine to approximately 150 feet in the northern
5 portion of the mine.

6 JUDGE HAJEK: Okay. I see those numbers.
7 Four hundred and thirty-five, which is CM7-13.

8 MR. LEWIS: Correct.

9 JUDGE HAJEK: Is that correct? And 147
10 feet, which is well CM10-15?

11 MR. LEWIS: Correct.

12 JUDGE HAJEK: And the CM7, is that like
13 Mine 7? Is that what that means, or does that have no
14 relationship?

15 MR. TEAHON: Yes, sir, that's Chadron
16 monitor well, Mine Unit 7.

17 JUDGE HAJEK: Okay. So this is not an
18 actual well that's being used for production purposes.
19 This is one of the wells for monitoring that's in the
20 300-foot radius?

21 MR. TEAHON: Yes, that's the monitor well
22 ring around the entire mine site.

23 JUDGE HAJEK: Okay. Thank you. And then
24 this is CBR Exhibit --

25 CHAIR GIBSON: It's going to be CBR-062.

1 Mr. Smith was correct. There was no CBR-062. This
2 CBR-062.

3 JUDGE HAJEK: Oh, okay.

4 CHAIR GIBSON: Yes.

5 JUDGE HAJEK: CBR-062.

6 CHAIR GIBSON: Correct.

7 JUDGE HAJEK: And it is Crow Butte
8 Resources' figure 2.7-4D, Delta, as annotated. Okay.

9 MR. TEAHON: With October 2015 water
10 levels. Or, August 2015. I'm a month ahead or two.

11 JUDGE HAJEK: Okay.

12 CHAIR GIBSON: Yes, this is very current.

13 MR. TEAHON: Yes, sir.

14 CHAIR GIBSON: Okay?

15 JUDGE HAJEK: Okay. Thank you very much.
16 Okay. Intervenors, do you have any questions relative
17 to this latest exhibit?

18 PARTICIPANT: Concerns.

19 JUDGE HAJEK: Concerns. Excuse me.

20 MR. WIREMAN: First of all, we appreciate
21 seeing this. We haven't seen this data in this form
22 and it's helpful. I would just note to Your Honor
23 that 147 feet of head in the north is the lowest
24 amount of head I've seen to date in this mine. And I
25 assume that's a pumping level head because Unit 10 is

1 in production. So I'd just point out that 147 feet is
2 not --

3 (Simultaneous speaking)

4 JUDGE HAJEK: Let me go back to CBR. And
5 can you respond to that, because Mr. Wireman said he
6 thinks this might be a pumping level head, but this is
7 a monitoring well where you're not pumping. So how do
8 you respond?

9 MR. TEAHON: We are in production in Mine
10 Unit 10, so this is the effects of the well field
11 bleed and the water level at that monitoring well ring
12 as a result of production within that mine unit.

13 JUDGE HAJEK: Okay. So this represents
14 the drawdown --

15 MR. TEAHON: The current operating flows.

16 JUDGE HAJEK: -- conditions?

17 MR. TEAHON: Yes, sir.

18 JUDGE HAJEK: And what is the radius of
19 influence of that drawdown here? Is that a reasonable
20 term for me to use, or not? So you're pumping all
21 this water out of this mine unit, but the drawdown in
22 the aquifer extends beyond exactly where you're --

23 (Simultaneous speaking)

24 MR. TEAHON: So how far does the cone of
25 depression go out past the monitor well ring?

1 JUDGE HAJEK: That's correct.

2 MR. TEAHON: I will defer to the
3 hydrogeologist.

4 MR. LEWIS: Your Honor, I can speak some
5 to that having utilized the flow model for the site.
6 I have some experience with that. I would estimate
7 the radius of influence to be about a mile-and-a-half.
8 About a mile-and-a-half radius to --

9 JUDGE HAJEK: A mile-and-a-half radius?

10 MR. LEWIS: Yes.

11 JUDGE HAJEK: Okay.

12 MR. LEWIS: It does vary somewhat across
13 the mine, but that's an average.

14 JUDGE HAJEK: And that's going to vary.
15 So the radius -- let me pursue that a moment. Where
16 is the center of the radius?

17 MR. LEWIS: Well, because the mine is
18 elongate and pumping is taking place either for
19 restoration or for production pretty much throughout
20 that area, the cone of depression is also elongated,
21 kind of cigar-shaped. And when I say "mile-and-a-
22 half," from any of the major axes of that kind of
23 ellipse would be the radius of influence.

24 JUDGE HAJEK: Okay. Thank you.

25 DR. KREAMER: Your Honor?

1 JUDGE HAJEK: Yes?

2 DR. KREAMER: Dave Kreamer.

3 CHAIR GIBSON: Just a minute, Dr. Kreamer.
4 I'll let you address that to Judge Hajek in just a
5 Second. Apparently they came in to work on the air-
6 conditioner at noon and apparently they turned it off
7 when they did. We've turned it back on, but if you
8 all are like me, you're starting to burn up. So
9 please feel free to remove your jackets and get
10 comfortable. I'd like to maintain as much decorum as
11 we can here, but it is blazing hot.

12 So, yes, Judge Hajek, you and Dr. Kreamer
13 need to deal with something here.

14 DR. KREAMER: Judge, you asked for
15 questions, if we had any questions, and I do have a
16 question. From 1982 to --

17 JUDGE HAJEK: I'm not allowed to ask you
18 if you have questions. You may express a concern. I
19 was corrected on the use of my language.

20 DR. KREAMER: I'm sorry?

21 JUDGE HAJEK: Express your concern,
22 please.

23 DR. KREAMER: Oh, it's more than a
24 concern. It's a question followed up from the
25 information we've just been given. The high pumping

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1 rate was in Mine Units 1 and 2 from 1982 to 2008.
2 There was a commensurate drop in the Brule above it of
3 about 40 feet drop in the Brule's elevation. The
4 pumping was not in area Mine Unit 10 or 11 appreciably
5 because one of them had just started up and the other
6 hadn't in 2008.

7 My question is with this new data in the
8 Basal Chadron/Chamberlain Pass we're seeing more
9 pumping and lowered rates in the northwest. Is there
10 a commensurate drop in the Brule as there was from
11 1982 to 2008 in the Brule formation in Mine Areas 1?
12 In other words, are we seeing an identical response in
13 the Brule that we saw in that long period of time, the
14 drop in Mine Area 1?

15 JUDGE HAJEK: Okay. Let us talk a moment
16 up here before I go further there.

17 (Pause)

18 JUDGE HAJEK: Okay. That question, Dr.
19 Kreamer -- I appreciate that question, that comment.
20 It's a -- our little conference here. That is a
21 hydrogeology and aquifer interaction question and
22 issue. And so, we're not going to respond to it
23 currently, but we'll address it either later after
24 we're done with Contention 6 or at a different time.

25 DR. KREAMER: Can I mention it's also a

1 safety issue and a wildlife habitat issue in the
2 springs above? So there is a -- as far as
3 stabilization and your definitions here there might be
4 a consideration for subsidence in the de-watering of
5 the Brule and also diminishment of spring flow and the
6 effect on habitat and the wells, the privately-owned
7 wells in the area.

8 JUDGE HAJEK: Appreciate that comment.
9 Thank you very much.

10 MR. SMITH: Excuse me, Judge. This is
11 Tyson Smith for Crow Butte. Dr. Kreamer has mentioned
12 a few times this supposed drop in Brule water levels,
13 and we have not yet had a chance to respond to that.
14 And I appreciate if you'd like for us to wait until
15 later to do so. We can do so then, but we would like
16 at some point the opportunity to respond.

17 CHAIR GIBSON: I think, Judge Wardwell,
18 would you just address that, Mr. Smith's comment?

19 JUDGE WARDWELL: At this time?

20 CHAIR GIBSON: No, no, no. Judge Wardwell
21 will certainly address that at the right moment. We
22 need to finish with Contention 6, Mr. Smith. But
23 thank you for reminding us that you want to get that
24 addressed.

25 JUDGE HAJEK: I'm just going through my

1 notes here. I had a number of questions on modeling
2 that I was going to pursue, but I think that was
3 pretty well covered yesterday. And so I'm not going
4 to pursue these. I just need to move on down. And
5 that's the reason I'm sitting here staring at my
6 notes. I can get back to you in just a moment.

7 Okay. Irrespective of modeling, I want to
8 pursue pore volume concerns. So there seem to be
9 conflicting statements on pore volume, actual and
10 projected uses. And I think this comes somewhat from
11 the modeling and such.

12 Mr. Back, staff references the LRA,
13 Section 6.1.4.2 in NRC-001, page 87.

14 MR. BACK: I'm going to defer to Dr. Striz
15 on the pore volume.

16 JUDGE HAJEK: Okay. So here the staff
17 reports that CBR has stated that 9 pore volumes were
18 required for a complete restoration of Mine Unit 1 and
19 11 will be required for each of the remaining mine
20 units. Is that correct?

21 DR. STRIZ: Yes, that is correct.

22 JUDGE HAJEK: Okay. Is this the reference
23 for the staff's conclusion in the EA, NRC-010, page
24 83?

25 DR. STRIZ: Yes.

1 JUDGE HAJEK: And here you state that at
2 least 11 pore volumes --

3 DR. STRIZ: Yes.

4 JUDGE HAJEK: -- of groundwater will be
5 required for restoration. And I believe that should
6 really say for restoration of each mine --

7 DR. STRIZ: Correct.

8 JUDGE HAJEK: -- rather than a general
9 statement.

10 DR. STRIZ: Each mine unit.

11 JUDGE HAJEK: Okay. Of each mine. Dr.
12 Striz, the staff in the same paragraph references a
13 water balance performed that I interpret to have been
14 included in Section 5.7.9.4 of the SER.

15 DR. STRIZ: I believe so.

16 JUDGE HAJEK: I don't find it there.

17 DR. STRIZ: Oh, okay.

18 JUDGE HAJEK: I did a search in the SER of
19 the section number, I did a search for the term "pore
20 volume," and I did a search for variations of the
21 words "water balance," and I found nothing. Can you
22 help me with -- what did I miss?

23 MR. BACK: Your Honor, there's a table in
24 the SER; and I have to find the table, that the Safety
25 Group does not call this a water balance, but

1 basically what's provided is the water volumes that
2 are going into the deep water disposal and the water
3 volumes that are going into the evaporation ponds.
4 And so, that's the data that was used to back out what
5 the previous consumptive use values looked like. So,
6 let me just find that table.

7 JUDGE HAJEK: Thank you.

8 DR. STRIZ: Pore volumes are not
9 equivalent to the consumptive use --

10 JUDGE HAJEK: Can't hear you.

11 DR. STRIZ: The pore volumes are not
12 equivalent to the consumptive use rate. They're
13 different terms.

14 JUDGE HAJEK: That I understand.

15 DR. STRIZ: The pore volumes are the
16 amount that have to be treated.

17 JUDGE HAJEK: Okay. Now, Dr. Striz --

18 DR. STRIZ: Yes?

19 JUDGE HAJEK: -- and, Mr. Back, or staff,
20 Intervenor's joint position statement states more than
21 36 pore volumes were required for Mine Unit 1
22 referencing INT-3 at page 3. Are you familiar with
23 this document?

24 DR. STRIZ: Yes.

25 JUDGE HAJEK: And was INT-050 or similar

1 documents used in determining your EA projection of
2 more than 11 only, more than 11 pore volumes, and thus
3 the EA conclusion that the consumptive use during
4 aquifer restoration may be moderate?

5 DR. STRIZ: The number of pore volumes
6 estimate was based on the historical performance of
7 the mine and the use of the model-based restoration
8 plan numbers, and their representations to us. That
9 was the information that was used to come to that
10 estimate in the SER.

11 JUDGE HAJEK: So I believe I heard you say
12 you really used two pieces of data. One is historical
13 information on the number of pore volumes that were
14 required. And what I understood from Mr. Teahon a
15 little bit ago is that Mine Unit No. 1 has had a
16 complete -- it's been restored. The land above it is
17 in reclamation at the present time, is that correct?

18 MR. TEAHON: It has been reclaimed.

19 JUDGE HAJEK: It has been reclaimed. Mine
20 Units 2 and 3 are -- essentially they're in
21 stabilization at this point in time. And so my
22 understanding of stabilization is that we are no
23 longer using pore volume for that purpose. If the
24 stabilization fails over within the four-quarter
25 period, there might be additional local treatment. By

1 local treatment, I mean not the entire mine unit. Is
2 that correct?

3 MR. TEAHON: There's potentially spot
4 treatment.

5 JUDGE HAJEK: Spot treatment? Okay. So
6 those are three data points. Did you have all three
7 of those data points available?

8 DR. STRIZ: I wasn't aware of the spot
9 treatment that was being conducted, but once again, we
10 still stand by the estimate of approximately 11 pore
11 volumes for future restorations.

12 JUDGE HAJEK: Okay. What I'm looking for
13 when I ask the question though with data points there
14 is a report on Mine Unit 1 where NRC has approved the
15 restoration of that mine, is that correct?

16 DR. STRIZ: That is correct.

17 JUDGE HAJEK: Okay. And then there are
18 other reports that I'm not aware of NRC having
19 approved at this point, but --

20 DR. STRIZ: That's correct. We have not
21 seen them.

22 JUDGE HAJEK: -- do we have drafts? Do
23 you have drafts?

24 DR. STRIZ: We don't have any restoration
25 points -- reports from Mine Units 2 and 3.

1 JUDGE HAJEK: So your estimate of pore
2 volume for future restoration is based upon only one
3 real actual data point, and that's from Mine Unit 1,
4 and then projections from the 4 -- the 11 or the 10
5 additional mines based upon --

6 DR. STRIZ: Their model-based restoration
7 plan.

8 JUDGE HAJEK: Okay.

9 DR. STRIZ: And our estimates of what we
10 think it will take to restore it based on those two
11 points.

12 JUDGE HAJEK: I keep hearing a lot of our
13 estimates, we did a back-of-the-envelope calculation.
14 I don't hear a lot of -- I come from the power plant
15 side of this industry. I'm sorry. We can't deal with
16 data of that -- I don't even call that data. Those
17 kinds of analyses. I'm looking for real hard number
18 -- I'd like to have a real hard number average.

19 And so, right now let me go back to Mr.
20 Lewis here. In your projections or in the other
21 reports that are on the record, reports on Mine Unit
22 2 and Mine Unit 3, how many pore volumes were used for
23 each one of those two mines?

24 MR. LEWIS: Total pore volumes to restore
25 them from the time restoration began, sir?

1 JUDGE HAJEK: That's correct.

2 MR. TEAHON: I don't have the exact
3 numbers, but somewhere in the 30 to 40 range.

4 JUDGE HAJEK: For each of the two mine
5 units?

6 MR. TEAHON: Yes, sir.

7 JUDGE HAJEK: Okay. So now I have three
8 values that are actual values. I've got a 36 and a 30
9 and 30. Is that correct?

10 MR. TEAHON: Yes, sir. This was before we
11 was started the model-based restoration, and Mr. Lewis
12 can explain how that has dramatically changed in the
13 way we operate and the way we restore.

14 JUDGE HAJEK: Okay. Let me go back to Dr.
15 Striz. Do you have the -- we just heard the report of
16 30 pore volumes for Mine Unit 2, 34 for pore volumes
17 for Mine Unit 3. Do you have those numbers or --

18 DR. STRIZ: Yes. Yes, I do.

19 JUDGE HAJEK: -- you had those in the
20 past --

21 DR. STRIZ: Yes, I do. I have those
22 numbers.

23 JUDGE HAJEK: -- before today? Okay. Do
24 you consider those in coming up with your average of
25 less than -- or less than 11, more than 11?

1 DR. STRIZ: In part, but as has been
2 described they have a model-based restoration plan
3 that they have put forward as their restoration plan,
4 which we have approved, which says it will take four
5 to six pore volumes. And based on the experience of
6 the site, we increased that to 11 --

7 JUDGE HAJEK: Eleven.

8 DR. STRIZ: -- in concert with them to be
9 conservative.

10 JUDGE HAJEK: Okay. So I recall, Mr.
11 Lewis, seeing the four to six numbers in your report,
12 and I don't have the exhibit numbers here in front of
13 me. You may know what they are. I believe they're
14 CBR --

15 MR. LEWIS: Zero-forty-one I believe was
16 the model-based restoration plan.

17 JUDGE HAJEK: Zero-forty-one --

18 MR. LEWIS: Yes.

19 JUDGE HAJEK: -- is the model-based
20 restoration plan. And I believe it --

21 MR. LEWIS: There was also a report
22 describing the performance of restoration of Mine
23 Units 2 and 3 specifically using the model-based
24 restoration plan and how that improved the efficiency
25 of the restoration.

1 JUDGE HAJEK: Okay.

2 MR. LEWIS: And that's CBR No. 38.

3 JUDGE HAJEK: Oh-forty-eight?

4 MR. LEWIS: Oh-thirty-eight.

5 JUDGE HAJEK: Thirty-eight? Okay. And
6 that's -- I do recall that number. Okay.

7 All right. So, Dr. Striz, the average
8 that is reported in the EA is more than 11 where more
9 than 11 in your interpretation is 12, or 20?

10 DR. STRIZ: Our interpretation would be --
11 I really don't know how to answer question. Based on
12 the model-based restoration plan and the historic
13 performance we have agreed to 11 pore volumes, which
14 is conservative --

15 (Simultaneous speaking)

16 JUDGE HAJEK: I'm sorry. Wait a minute.
17 I couldn't quite hear what you said. Based on the
18 model-based restoration plan we have --

19 DR. STRIZ: We have determined that to be
20 conservative we will be around 11 pore volumes. That
21 is our estimate. And Your Honor should be aware that
22 the pore volumes are a value that are used for the
23 surety and that they can adjust those pore volumes as
24 the surety is reviewed every year. And we don't truly
25 have a limit on their ability to use more pore

1 volumes, so they can come back to us and say, well, we
2 thought it was going to be 11, but it's going to be 12
3 and we can adjust the surety to account for that. So
4 that's how pore volumes are used to be practical.

5 JUDGE HAJEK: Okay. So when you use the
6 term "surety," you're --

7 DR. STRIZ: Talking about the bond.

8 JUDGE HAJEK: How many dollars do they
9 have to put into the bank? Is that --

10 DR. STRIZ: The bond, if they default, for
11 a third-party plus a contingency to restore the well
12 fields.

13 JUDGE HAJEK: Okay. Let me turn to the
14 Intervenors and ask your reaction to that calculation,
15 let's say.

16 MR. WIREMAN: We have not been able to get
17 any information as to why for Mine Units 1, 2 and 3 it
18 took more than 30 pore volumes to restore those mine
19 units to the applicable standards. And I understand
20 the model-based restoration system indicates that they
21 can do better and be more efficient: 4, 6, 11. But
22 from our side we really would like to know why it took
23 so many pore volumes in the first three, because we're
24 concerned that maybe the heterogeneities had something
25 to do with that. But we don't know because there's

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1 never been an explanation in any of the documents as
2 to why it took so many. That's our concern.

3 JUDGE HAJEK: Okay. Any other concerns?

4 (No audible response)

5 JUDGE HAJEK: Let me just roll back up
6 here a moment. Okay. Mr. Lewis, your projections of
7 -- and I'm going to go back to the last page again
8 that I mentioned earlier. It's a spreadsheet in CBR-
9 041, which shows basically that in any one of the
10 three stages of restoration that you considered in
11 that MBRP report there might be as many as three mines
12 at the same time in each of the phases, is that
13 correct?

14 MR. LEWIS: It depends on the available RO
15 capacity. Within a single mine there's a number of
16 well houses --

17 JUDGE HAJEK: Yes.

18 MR. LEWIS: -- and normally the
19 restoration would proceed by well house. If the
20 available RO capacity was sufficient, which it was for
21 these smaller mine units, then you could treat the
22 whole mine unit in a single phase. So it would still
23 proceed sequentially and you wouldn't be operating
24 three mines consecutively, mine units consecutively at
25 the same time. They would proceed one after the

1 other.

2 JUDGE HAJEK: Your spreadsheet shows that
3 -- it does show that each one might be in different
4 stages, but as I recall there could be -- in parallel
5 operation there could be three mine units perhaps in
6 the same stage at the same time.

7 MR. LEWIS: In the model-based restoration
8 we had four phases, or five. I'm sorry. There was a
9 total of seven -- a total of eight phases. And we
10 broke that down into either -- restoration of Phase 1
11 was Mine Unit 2. Phase 2 and 3 was Mine Unit 3.
12 Phase 4 was Mine Unit 4, the eastern half. Phase 5
13 was Mine Unit 4, western half. Phase 6 was Mine Unit
14 5, eastern portion. Phase 7 was Mine Unit 5, western
15 portion. And Phase 8 was Mine Unit 5, northern
16 portion. So depending again upon the available RO
17 capacity we were either able to simulate a single
18 phase as the whole mine unit, or in some cases we had
19 to break it down in the larger mine units to be half
20 of the mine unit or a number of --

21 JUDGE HAJEK: I recall that.

22 MR. LEWIS: -- well houses.

23 JUDGE HAJEK: Okay. Thank you. Okay. I
24 have one more question. The first phase is, or step;
25 I'm not sure is the best word to use there, is

1 groundwater transfer, where you take water from a new
2 mine and move into water from an old mine, or is it
3 the other way around?

4 MR. TEAHON: The mine unit that's going
5 into restoration that's been in production, we would
6 transfer that lixiviant that's there forward into the
7 next mine unit. But we've started all of our mine
8 units so that that phase will not be used.

9 JUDGE HAJEK: That's what I wondered
10 about. Okay. But I understand that, you understand
11 that, but I don't see that really explained in the LRA
12 and I don't recall in the EA -- when you explain the
13 four steps of restoration, there's no discussion of
14 the fact that that is unavailable as part of the
15 restoration plan. Is that correct?

16 MR. BANK: I believe so, Your Honor.

17 JUDGE HAJEK: Okay. I have --

18 MR. TEAHON: Sir, when we submitted the
19 license renewal application in 2007, Mine Unit 11
20 hadn't been put into production, and so there was a
21 potential to transfer water from 9 into 11. So over
22 the course of the license renewal that condition has
23 changed.

24 JUDGE HAJEK: Yes, I understand. Okay.
25 Thank you. Okay. I'll give the Intervenors one

1 chance to express any additional water use concerns
2 here.

3 MR. WIREMAN: Again, I just will reiterate
4 we're somewhat puzzled by 30-some pore volumes
5 necessary and a model saying 4 to 6. We just don't
6 really understand that difference and what they've
7 learned with the model-based system that leads to that
8 conclusion. That has not been described or explained
9 in any of the documents.

10 JUDGE HAJEK: Thank you. Okay. I have no
11 further questions on Contention 6, so we'll take a --

12 CHAIR GIBSON: We'll take a 10-minute
13 recess. If there's any additional questions that you
14 all feel we should add on Contention 6, why don't you
15 go ahead and put those together? I believe Judge
16 Wardwell may have some questions on hydrogeology that
17 were raised over the last few days, and then we'll get
18 to those questions on 6, and then we'll move to 9.

19 Very well. We stand in recess for 10
20 minutes after we go to the restroom.

21 (Whereupon, the above-entitled matter went
22 off the record at 2:57 p.m. and resumed at 3:11 p.m.)

23 CHAIR GIBSON: Okay. We are back on the
24 record. I believe we got a couple of questions on
25 Contention 6, so we'll get that done, and then we'll

1 move to the questions that Judge Wardwell and the
2 Board decided we would ask among the things that have
3 been passed up over the last few days that don't
4 relate to the extra day we're going to have. Okay?
5 There you go.

6 JUDGE HAJEK: Okay. Thank you for doing
7 that. I thought you had -- I was thanking Mr. Beins'
8 for having put down Mr. Pavlick's sign in front of
9 him. I thought we had a transformation, like I saw on
10 a magic show.

11 Okay. So, Mr. Wireman, you asked rather
12 pointedly about never having received an explanation
13 for why we were using 36/30/30 pore volumes for
14 restoration, and all of a sudden we're looking at 3 or
15 4 or 5, or an average projection of about 11. So, for
16 Crow Butte, Mr. Teahon or Mr. Pavlick, who I don't see
17 there; he's hiding in the back, can you address that
18 question at a high level and also a brief level the
19 reasons for the higher numbers of pore volumes for
20 Mine Units 1 through 3 and explain why numbers like
21 that are not even closely expected to continue for the
22 remaining mine units?

23 MR. PAVLICK: Yes, Your Honor. Regarding
24 Mine Units 2 and 3 and the number of pore volumes it's
25 taken to restore them, several circumstances there

1 that lead to those numbers. First was equipment
2 capacity, basically reverse osmosis capacity in the
3 restoration plan as these two mine units entered
4 restoration. So, under capacity for -- of equipment
5 to deal with the adequate restoration of those mine
6 units, what that does -- when you don't have enough
7 restoration capacity in the form of RO equipment, we
8 tended to use our ion exchange equipment, which we did
9 have enough capacity of to basically do the work. So
10 in effect we were removing uranium through IX, not
11 doing enough of the removal, the additional removal
12 done through reverse osmosis to adequately address the
13 cleanup of the mine unit. We fixed that with some
14 equipment upgrades in 2008, adding restoration -- or
15 RO capacity.

16 Additionally, at the time we tended to --

17 JUDGE HAJEK: Okay. Let me just stop you.

18 MR. PAVLICK: Yes, sir.

19 JUDGE HAJEK: Okay. Remember high
20 level/brief. And let me interject also I believe you
21 said you added the equipment in 2008. I think I can
22 use the word, you clearly informed the Commission of
23 that and they made a comment; and I'm not recalling,
24 it's either in the EA or the SER, that Crow Butte had
25 increased capacity in order to increase the

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1 restoration flow. Is that correct?

2 MR. PAVLICK: Yes, Your Honor.

3 JUDGE HAJEK: Okay. Thank you for a very
4 brief response. Okay. Go ahead, Mr. Pavlick.

5 MR. PAVLICK: And I'll be brief.

6 JUDGE HAJEK: And stay brief.

7 MR. PAVLICK: We addressed the capacity
8 issue.

9 The second issue was the -- at the time we
10 over-treated the water, so basically produced better
11 water quality in the goals for each, in the
12 restoration goals for each well, having not learned at
13 that point that over-treatment was detrimental, I
14 guess, to the volume of water needed to restore the
15 mine unit.

16 And thirdly, the geometry of the mine
17 units is difficult to restore because they're bounded
18 on three sides by active mine units. In that case we
19 had to build a perm fence, or a permeate fence to --
20 as a guard wall, so to speak, to not infiltrate the
21 restoration mine unit with production water adjacent
22 to it.

23 JUDGE HAJEK: And so now as I understand,
24 going forward relative to the MBRP, the MBRP corrects
25 for those, the error of overuse. I think may even

1 have seen that in one of the exhibits. And the other
2 part of it is that you essentially extend the length
3 of time perhaps that it really takes to totally
4 restore a mine. Is that -- using the MBRP, but
5 resulting in a lower use of total water volume to
6 accomplish it. I just need a yes or a no.

7 MR. BANK: Yes.

8 JUDGE HAJEK: Okay. Thank you.

9 MR. PAVLICK: It's much more efficient.

10 CHAIR GIBSON: When he said "model-based
11 restoration program," that's the same as MBRP, is that
12 right?

13 MR. LEWIS: Yes, sir.

14 CHAIR GIBSON: Okay. Thank you.

15 JUDGE HAJEK: Okay. So I have one more
16 question for Crow Butte, and this was submitted. And
17 I apologize to the writer. I hope I don't trip all
18 the way through this. I'm having a little difficulty
19 reading it.

20 So, Crow Butte, since the license allows
21 9,000 gallons per minute, isn't the current maximum
22 amount of waste you'd expect from production to be 135
23 gallons per minute as opposed to the 25 gallons per
24 minute and 50 gallons per minute numbers referenced by
25 you?

1 MR. TEAHON: Although we have the license
2 capability of doing 9,000 gallons a minute, we've had
3 two license amendments to increase that flow over the
4 years. So when we increased it to 9,000 gallons a
5 minute, we wanted to make sure we wouldn't have to go
6 back and do it again. In reality, our flows are
7 around 5,000 gallons a minute.

8 JUDGE HAJEK: Okay. Thank you. Okay.
9 Pass that down.

10 CHAIR GIBSON: Judge Wardwell, would you
11 please lead us in our next adventure here?

12 JUDGE WARDWELL: This will be for anyone
13 who wishes for Crow Butte. How much drawdown in the
14 Brule occurs during operations and do you see any
15 difference with the restoration?

16 MR. TEAHON: We see seasonal fluctuations
17 in our baseline -- in our SM, shallow monitor wells
18 that are in the Brule formation. We'll see seasonal
19 variations of several feet, but we have not seen the
20 40-foot declines that's been mentioned by the
21 Intervenors.

22 JUDGE WARDWELL: I will turn to the
23 Intervenors and ask them, where in the evidence you
24 submitted or the exhibits presented at this proceeding
25 did your reference for the drawdown in the Brule come

1 from?

2 DR. KREAMER: We analyzed a side-by-side
3 comparison of the 1982 Brule --

4 JUDGE WARDWELL: Is this your analysis?

5 DR. KREAMER: No, no. This is -- the
6 analysis was from LRA.

7 JUDGE WARDWELL: Okay.

8 DR. KREAMER: That's 27 -- excuse me, 2-7
9 -- excuse me, 2.7-3A. That's the 1982 water levels in
10 the Brule and the LRA 2.7-3B, which is the 2008 levels
11 in the Brule. We did a side-by-side comparison of
12 those. And we can bring them up and I can show you
13 the exact points where we --

14 JUDGE WARDWELL: No need to do that. I
15 think we remember those. Those were the plan views
16 that we -- figures that we looked at --

17 DR. KREAMER: And --

18 JUDGE WARDWELL: -- some time in the past
19 year. I forgot how long we've been here, but --

20 DR. KREAMER: That's correct. And if we
21 bring them up side by side, I can point out the exact
22 spots where the 40-foot-plus was down, which is in the
23 main pumping area near Mine Unit Area 1. As you go a
24 little bit to the south/southeast, it's less. It's
25 about 15-foot drawdown as you get close to the mine,

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1 just -- the mine operation that just opened up and
2 hadn't started pumping. Likewise, as you go to the
3 northwest, actually water levels haven't varied there
4 over long term much at all. But the impact of the
5 pumping historically manifests itself in the Brule.
6 And it's pretty dramatic if you do it side by side and
7 you look at the actual numbers.

8 JUDGE WARDWELL: Is there a reason you
9 didn't present that in your testimony?

10 DR. KREAMER: Well, when you said had I
11 looked at 27 -- 2.7-3A and 2.7-3B, I didn't really
12 understand what you were talking about. And I went
13 back to refresh myself yesterday and --

14 JUDGE WARDWELL: No, I don't mean in your
15 testimony here, but in your pre-file testimony, or
16 certainly in your pre-file reply.

17 DR. KREAMER: We've talked about vertical
18 migration and connection throughout. And in the
19 testimony here --

20 JUDGE WARDWELL: My question is there a
21 reason why you didn't present those calculations in
22 your reply?

23 DR. KREAMER: I didn't know it was going
24 to be a linchpin of one of the arguments of staff that
25 there was no vertical --

1 JUDGE WARDWELL: Okay.

2 DR. KREAMER: -- connection between the
3 Brule and the underlying --

4 JUDGE WARDWELL: Thank you.

5 DR. KREAMER: -- Chamberlain Pass.

6 JUDGE WARDWELL: Thank you. Crow Butte,
7 would not the comparison of those potentiometric
8 levels that are shown on those two figures -- or I
9 think there's a series of figures over a number of
10 years of the water levels in the Brule -- be an
11 indication of the drawdown in the Brule?

12 MR. TEAHON: Yes, it should be, sir.

13 JUDGE WARDWELL: And you don't believe
14 they're at the magnitude that the Intervenor's have
15 postulated?

16 MR. TEAHON: Our shallow monitor wells,
17 when we do the baseline sampling on them, we get a
18 water level in the well. It's measured every two
19 weeks. It's put on a graph. We watch those trends
20 for movement. As in Mine Unit 6 and 8, we know when
21 the groundwater level starts coming up in those areas
22 we're going to have the potential for excursion, so we
23 watch those water levels every two weeks when we
24 measure those wells. So like I said, we haven't seen
25 in recent years those kind of declines.

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1 JUDGE WARDWELL: Are those graphs
2 available in any of the exhibits presented in this
3 proceeding?

4 MR. TEAHON: We can make them available
5 for each one.

6 JUDGE WARDWELL: But now they aren't?

7 DR. KREAMER: They're not. It would be
8 203 wells and take a point in time. Over a month's
9 period you'd have all 203 wells sampled. And they
10 give the water level of all of those sites.

11 JUDGE WARDWELL: Do you see my eyes
12 crossing as you mention that?

13 (Laughter)

14 JUDGE WARDWELL: What are those exhibit
15 numbers again, Dr. Kreamer?

16 DR. KREAMER: Hold on one moment.

17 JUDGE WARDWELL: And I'd like to pull
18 those up.

19 DR. KREAMER: That's 2.7-3A in the LRA --

20 JUDGE WARDWELL: And the page number?

21 DR. KREAMER: -- and 2.7-3B.

22 JUDGE WARDWELL: And the page number?

23 DR. KREAMER: I'm sorry, I don't have that
24 page number.

25 CHAIR GIBSON: Mr. Smith, could you give

1 us the page number there?

2 MR. SMITH: Sure. It looks like it's page
3 224 of the PDF.

4 JUDGE WARDWELL: And this is a license
5 renewal application?

6 MR. SMITH: I'm sorry. Correct. This is
7 CBR-011.

8 JUDGE WARDWELL: There we go.

9 MR. SMITH: 2.7-3B is page 224.

10 JUDGE WARDWELL: We got it.

11 CHAIR GIBSON: Thank you.

12 JUDGE WARDWELL: Dr. Kreamer, would you
13 like to point out a couple of the largest variations
14 that you saw on this --

15 (Simultaneous speaking)

16 DR. KREAMER: I would be happy to. It
17 probably -- if we could put side by side so we could
18 refer to the same place without having to jump back
19 and forth, that --

20 JUDGE WARDWELL: I assume you take the
21 same place. You only have to point it out. You only
22 have to point --

23 (Simultaneous speaking)

24 DR. KREAMER: Well, it's -- okay. It's --
25 how do I point it out? There's --

1 JUDGE WARDWELL: Where's --

2 DR. KREAMER: -- a red line down the --

3 JUDGE WARDWELL: Wait, wait, wait, wait,
4 wait.

5 CHAIR GIBSON: We could have you create
6 another oval.

7 JUDGE WARDWELL: And I know someone who
8 creates ovals.

9 DR. KREAMER: Would it be possible, Your
10 Honor, to start with 1982 and show what the levels
11 were rather than work backwards? This is -- these --

12 JUDGE WARDWELL: All I need is on one of
13 those pages, whichever page you'd like to do it on.

14 DR. KREAMER: I'd be happy to do it, but
15 I -- if we could do -- well, if we could start with
16 the nineteen eighty -- the other graph, that would be
17 great.

18 JUDGE WARDWELL: Set him up with that and
19 then we want to go back a couple pages from this. But
20 again, I only need it, don't I, on one of those
21 graphs, because then you're going to take the same
22 point for future ones.

23 DR. KREAMER: Sure.

24 JUDGE WARDWELL: Then I'm going to ask
25 Crow Butte --

1 DR. KREAMER: I'm going to point out a
2 specific well on the other --

3 JUDGE WARDWELL: That's fine.

4 DR. KREAMER: -- that has a specific
5 elevation, which I think is more rigorous.

6 JUDGE WARDWELL: All you have to do is
7 mark it so that they can tell a point that you think
8 is the largest. And again, say what you calculate for
9 that point as the largest variation that you see.

10 DR. KREAMER: Okay. Let me change
11 glasses.

12 JUDGE WARDWELL: And there is the Brule
13 2.7-3A, and that is the regional water level from '82
14 to '83, which is pre-mining.

15 DR. KREAMER: And if you could blow that
16 up a little bit so we could actually read it a little
17 bit better, make it bigger.

18 JUDGE WARDWELL: I notice that's outside
19 the license area, but, Crow Butte, would you be able
20 to find a well or find a graph that shows your
21 observations over a period of time close to that
22 location, or would you like some other that --

23 MR. TEAHON: The map, the potentiometric
24 surface map of the Brule is the one that we have based
25 on our water levels in the shallow monitor wells.

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1 These are outside that monitor well ring.

2 JUDGE WARDWELL: Yes. So, but do you have
3 a monitoring well that's close to that sufficiently
4 that you would be comfortable -- could be used for a
5 comparison to the calculations that Dr. Kreamer has
6 made?

7 MR. TEAHON: Within a half mile.

8 JUDGE WARDWELL: Is that vertically or
9 horizontally?

10 MR. TEAHON: Horizontally.

11 JUDGE WARDWELL: And a half mile is how
12 far on this? It's whether you're comfortable. We're
13 going to take this as evidence and what appropriate
14 way we think it has and then also what it shows. And
15 they're saying that there's how many feet of drawdown
16 in the Brule?

17 DR. KREAMER: In the neighborhood of 40.

18 JUDGE WARDWELL: Forty feet. And how
19 long, the 20 years of operation or between --

20 DR. KREAMER: From 1982. And the other
21 map was 2007 to 2008. It's what they quoted yesterday
22 to say I was in error when I thought it was an
23 appreciable -- they said it was not an appreciable
24 distance.

25 JUDGE WARDWELL: Okay. So from '82 to

1 2007 they're claiming -- they calculate 40 feet about
2 of drawdown in the Brule.

3 MR. TEAHON: Yes, we're not comfortable
4 with that without knowing the details of that.

5 DR. KREAMER: I'd be happy to go through
6 it, Your Honor.

7 JUDGE WARDWELL: Well, what I want to see
8 is just what your measurements are. It's --

9 MR. TEAHON: So we're comparing apples to
10 apples.

11 JUDGE WARDWELL: -- so I -- you know,
12 we're the decision makers here on whether that's
13 comfortable or not. We're going to take a look at
14 that next to see roughly, but for now I just want to
15 get the right location before we go into details of
16 comparing it. And I want to know where you will be
17 able to provide us with a plot of the water levels in
18 your Brule aquifer that indicate to you there's very
19 little movement. And then I can talk to Dr. Kreamer
20 in regards to finding a well closer to that that we
21 can use for comparison between that, if you understand
22 what I'm saying; i.e., get a well closer -- get it in
23 the license area near to where the wells you have that
24 are monitoring.

25 MR. LEWIS: Your Honor, I believe we can

1 comply with that request with the understanding that
2 because these are two different data sets -- that is,
3 the pre-mining wells are a different set of wells than
4 the wells that are used to put together the current
5 maps. That well construction is very important with
6 respect to depth of well screen in a system that has
7 a strongly downward gradient as it does now under
8 pumping conditions.

9 So although there could be some comparison
10 made between this data set pre-mining that was off-
11 site domestic wells and other types of wells that have
12 considerable variation in their vertical construction
13 whereas the SM monitoring wells, the shallow
14 monitoring wells used to put together the current
15 water level maps are much more restricted to a
16 specific depth, a specific well screen length. And
17 that depth, given the downward vertical gradients, can
18 give an incorrect perception, not comparing apples and
19 oranges in effect.

20 And so with that understanding, I mean, we
21 certainly can compare --

22 JUDGE WARDWELL: I got some of that
23 understanding, but yet you present this as an exhibit
24 in your license renewal application. This isn't the
25 Intervenor's exhibit. This is your data with your

1 best estimate of what the pre-mining conditions are.
2 We will go to the next diagram and see what that
3 difference is and then go to 2007 and see what that
4 is. And then we'll look at what you provide for a
5 graph once we select the location. And then we will
6 sort that out, like we've got many things to sort out
7 in regards to the dual-battling experts.

8 MR. LEWIS: Understand, Your Honor.

9 JUDGE WARDWELL: That's where we're going
10 with this.

11 Have you had time to determine whether
12 that's an appropriate location to move with, or would
13 you rather suggest some other, just in regards to your
14 availability of data?

15 MR. TEAHON: We can start there, sir.

16 JUDGE WARDWELL: This is as good as any?
17 Great.

18 Joe, I would ask you to go to the next
19 diagram. We're going to circle that same location
20 hopefully. And this is -- we're already jumped up to
21 '08, so I guess we don't have any intermediate. So is
22 this the one you had rather than the '07, Dr. Kreamer?

23 DR. KREAMER: Yes, that's -- I'm sorry,
24 Your Honor. This is the 2007-2008 map. And I have --

25 JUDGE WARDWELL: It is really the 2008-

1 2008 map.

2 DR. KREAMER: Yes. Yes. Yes, Your Honor.

3 JUDGE WARDWELL: Okay.

4 DR. KREAMER: And I might point out that
5 even though we realize that these are different wells,
6 this is the information that we were given solely,
7 first of all. Second of all, both the NRC staff and
8 Crow Butte used this yesterday saying that there was
9 no appreciable difference according to these two
10 figures exactly. They used this as part of their
11 argument yesterday. And it's the only thing we have
12 to look at.

13 So, we -- taking another look, because --

14 JUDGE WARDWELL: I just wanted --

15 DR. KREAMER: Okay.

16 JUDGE WARDWELL: I understand that.

17 DR. KREAMER: I'm sorry. I'm a professor.

18 JUDGE WARDWELL: You were at the --
19 there's our circle. There's our elliptical. How did
20 you get the readings off of this map at that location?

21 DR. KREAMER: Do I have a line function in
22 here, our technical support guy?

23 PARTICIPANT: Yes, you do.

24 DR. KREAMER: Okay.

25 PARTICIPANT: Right there.

1 DR. KREAMER: Great. I had to extrapolate
2 because they are different data sets. Excuse me. I'm
3 changing glasses. And extrapolating the contour line
4 -- and again, the contour lines were drawn all the way
5 across the LRA in the 1983 -- excuse me. I hit that
6 in the wrong spot. Can you erase that for me? Well,
7 that's about as good -- you know, if -- hang on a
8 minute.

9 JUDGE WARDWELL: All you have to say is
10 you extrapolated those lines out to that oval?

11 DR. KREAMER: Yes. Yes, sir, in this
12 fashion here. And so if you -- remember the level in
13 1983 was 3883, I believe. And if you look in the
14 neighborhood now, we're seeing 3835 and 3845. That's
15 in the neighborhood of more than a 40-foot drop in the
16 Brule.

17 JUDGE WARDWELL: Crow Butte, are these the
18 wells you were referring to that you now have data for
19 shown here?

20 MR. TEAHON: Yes, sir.

21 JUDGE WARDWELL: So we don't have to
22 necessarily go out to that location. I wonder if it's
23 better to go back to the previous map and select a
24 location inside or on one of those potentiometric
25 surfaces, see how close it is to that rather than look

1 at that one well that just only -- you're using one
2 well that had only one reading in it as opposed to
3 these that had many. Wouldn't it be more prudent to
4 extrapolate in from the one baseline one and then look
5 at the ones we have available? Would that be all
6 right with you?

7 DR. KREAMER: We did both.

8 JUDGE WARDWELL: Okay.

9 DR. KREAMER: And I guess the reason I
10 started off with this is because it was a discrete
11 value. It was one value. And extrapolating between
12 lines -- we're out in here where we have to get the
13 same position with maps of two different scales, but
14 we can do that as well. And in the pumped region
15 you'll see drawdowns throughout this region if you --
16 let's do that exercise, if you would like. But you'll
17 see drawdowns in the neighborhood of 30 to 40 feet.

18 As you go down to the southwest they go
19 down to about 15 feet. And we can do that exercise,
20 if you would like. And as we're -- up in the
21 north/northwest region up here, there's actually
22 almost no change where there hadn't been pumping.

23 JUDGE WARDWELL: Okay. So we're at 3845.
24 This metric line is heading across the license renewal
25 area, license area, renewal area and heading almost to

1 the edge of the step there that's next to the oval.
2 Let's just take a look at what that looks like on the
3 previous diagram. Go back up two pages, Joe. Up.
4 Yes, there you go.

5 And that shows us somewhere between 2860
6 and 3900. Would there be anything wrong with taking
7 the well that's inside the license renewal area, 25.
8 Can you see that to the -- yes, there, Joe -- and
9 using that value.

10 DR. KREAMER: I suggest, Your Honor, that
11 we take all of them and have a map of what the change
12 is. But I guess I have no objection to us taking any
13 point. And I think you'll still see that in the
14 pumped area we're in the neighborhood of 30, 40-feet
15 drawdown in the Brule. And if you're over to the
16 southeast, you'll be in the neighborhood of about 15
17 foot -- feet.

18 JUDGE WARDWELL: Crow Butte, are the
19 ground contours very similar between these diagrams?

20 MR. BEINS: The surface contours, sir?

21 JUDGE WARDWELL: Well, let's look.

22 MR. BEINS: Yes.

23 JUDGE WARDWELL: I thought you knew.
24 Let's go back to the other side. Two down. Yes, if
25 you just click to the full scale, we'll get there

1 faster and then -- yes, there you go. And then go
2 back in here. Now, let's go back in and see if we can
3 find that point. Yes, okay. Keep going.

4 DR. STRIZ: Your Honor, may I add
5 something?

6 JUDGE WARDWELL: Sure.

7 DR. STRIZ: Crow Butte has been measuring
8 the water levels in the Brule since they installed the
9 monitoring wells for over 25 years. I believe that
10 hydrographs of those water levels would answer this
11 question. And specific locations nearby. And you
12 would be able to see if --

13 (Simultaneous speaking)

14 JUDGE WARDWELL: That's true, but what has
15 been presented here; and I will check this transcript
16 to assure that Dr. Kreamer has represented it
17 correctly, that over the past couple of days they have
18 said that the difference between these potentiometric
19 maps would give an indication of the drawdown in the
20 Brule. And if in fact these maps show 40 feet and the
21 hydrographs show 4 feet, one of the two is in error.
22 And then it's a question of which one do we believe is
23 in error. And without other information we don't
24 know.

25 DR. STRIZ: Well, there's --

1 JUDGE WARDWELL: The hydrographs could be
2 in error.

3 DR. STRIZ: There's 202 wells versus very
4 few wells that were used develop the original
5 contours. And we had this discussion before.

6 JUDGE WARDWELL: But their representation
7 of --

8 DR. STRIZ: Understood.

9 JUDGE WARDWELL: -- what this level --

10 DR. STRIZ: Agree.

11 JUDGE WARDWELL: All those wells show
12 things now at somewhere between 3835 and 3845 for our
13 oval. So I guess we will stick with that oval as the
14 point. And if you can select the well that's -- one
15 or two wells that are close to that to provide us with
16 the hydrographs that would be good. And can you get
17 to 722 and say 717?

18 MR. TEAHON: Sure.

19 JUDGE WARDWELL: Are you comfortable with
20 those two as selected values, or would you like some
21 other value, some other wells?

22 DR. KREAMER: Your Honor, you can pick any
23 value you want. I am interested in what's happening
24 in the northwest now that a new mine unit is open and
25 started to pump. And in the northwest there actually

1 have been very constant water levels. With the new
2 pumping that's just occurred since 2008 there might be
3 a response. And again, my concern is for spring
4 diminishment because of the surface groundwater
5 interactions and artesian wells -- 18 of the 19 off-
6 site wells are in the Brule and the hardship that
7 might come to outside owners because of water
8 quantity. Also, no information was presented on
9 stream discharge or creek discharge.

10 JUDGE WARDWELL: You're starting to get
11 way beyond where we're at. We started off with trying
12 to solve this problem. And I understand your concerns
13 in regards to that.

14 DR. KREAMER: Yes.

15 JUDGE WARDWELL: You pointed this out as
16 the area of the maximum drawdown, did you not?

17 DR. KREAMER: Yes, I did, Your Honor.

18 JUDGE WARDWELL: That's what we're
19 focusing on.

20 DR. KREAMER: Okay.

21 JUDGE WARDWELL: And in response to your
22 suggested questions in this area because of what you
23 find. So now we're investigating what you -- the
24 calculations you have done.

25 DR. KREAMER: I'm sorry. I was talking

1 about the implications of it.

2 JUDGE WARDWELL: I'd like to do one other
3 thing before we leave here. Can we go to the next
4 exhibit? Yes, go up two. Yes. And that's the same
5 one again, Joe? The same oval?

6 And so there we're between 3860 and 3900,
7 are we not, Dr. Kreamer?

8 DR. KREAMER: Yes. And again, I picked
9 that point because it's an explicit number.

10 JUDGE WARDWELL: Okay. And let's go back
11 now one. Oh, and again, I didn't write these down.

12 And so, now we're between 3835 and 3845.
13 And so, even if we ignore possible inaccuracy
14 associated with the baseline conditions, we can see
15 that there's been a bit of drawdown, has there not,
16 just between 2008 and whatever that -- I forgot to
17 label of what that next --

18 MR. TEAHON: The pre-mining map, 1982?

19 JUDGE WARDWELL: No, I know the pre-mining
20 map is the one before. The third one had it somewhere
21 between 390 and 3860. Here in the 2008 it's between
22 about 3835 and 3845. So quite a bit of difference has
23 happened between 2008 and -- Joe, go ahead and flip up
24 again to get to that one just so we do it for
25 completeness. No, I want to go the other way. Thank

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1 you. Zoom in on the date. The legend. Yes. It's
2 2008. It's October. Yes. The other one was March.
3 They were both 2008. One's October and one's March.

4 So I would be interested in the
5 hydrographs for those two wells that we pointed out.
6 In this time frame, really is all we need.

7 MR. TEAHON: Yes, sir, we can get that for
8 you.

9 JUDGE WARDWELL: Great. Thanks.

10 CHAIR GIBSON: We will call this Board
11 Exhibit 8. 8A will be the first one that I believe
12 was March of 2008. And the other one will be, 8B will
13 be the one that was I believe October of 2008.

14 (Whereupon, the above-referred to
15 document was marked as Board Exhibit No.
16 8 for identification.)

17 CHAIR GIBSON: Okay.

18 MR. SMITH: Yes, Your Honor.

19 CHAIR GIBSON: Very well. Now with
20 respect to your output that you're going to be putting
21 something together here, Mr. Smith, I think we'll
22 finally be able to use CBR-063 now. Fair enough?

23 MR. SMITH: Yes, Your Honor.

24 CHAIR GIBSON: Okay. So CBR-063 will be
25 the graph, or whatever the -- the data output of these

1 two wells. Okay?

2 (Whereupon, the above-referred to
3 document was marked as CBR Exhibit No.
4 063 for identification.)

5 JUDGE WARDWELL: Can I add just one other
6 thing? Sorry.

7 CHAIR GIBSON: This one well at these two
8 different times.

9 JUDGE WARDWELL: When did you first start
10 measuring these? How far back do you have the
11 hydrographs available?

12 MR. TEAHON: We'll have to create the
13 hydrographs. We have the water level readings from
14 the date that we started mining in that mine unit, the
15 water levels from that date.

16 JUDGE WARDWELL: So if we have the
17 hydrographs from 2008 and the hydrographs for the
18 basically pre-mining condition, that would serve these
19 three charts, these three figures?

20 MR. TEAHON: Yes, sir, we'd have the -- we
21 have the water level prior to starting the mine unit
22 from when we did the baseline sampling.

23 JUDGE WARDWELL: Okay. Great. Yes.

24 MR. TEAHON: Do you want depth to water?
25 Would that be easier than a hydrograph?

1 JUDGE WARDWELL: What I'd really like it
2 in is elevation of the water.

3 MR. TEAHON: Elevation?

4 JUDGE WARDWELL: The potentiometric
5 surface, yes, which -- as reflected by the elevation
6 of the water level in the well.

7 MR. TEAHON: Yes, sir, we can do the
8 potentiometric surface.

9 JUDGE WARDWELL: Yes, then I don't have to
10 -- when you're comparing that to this chart, I can do
11 it directly and I don't have to do anything more.

12 MR. TEAHON: Okay.

13 JUDGE WARDWELL: Yes. Great. Does that
14 sound appropriate to you, Dr. Kreamer?

15 DR. KREAMER: Yes, it does, Your Honor.
16 Thank you.

17 JUDGE WARDWELL: Thanks. Okay. Anything
18 more on that topic?

19 (No audible response)

20 JUDGE WARDWELL: Now this next question is
21 going to take some time.

22 (Laughter)

23 JUDGE WARDWELL: I'm glad I amuse myself,
24 if no one else. What the hey.

25 Crow Butte, getting back to some of your

1 excursion monitoring and the data from it, what labs
2 do you use for your excursion parameters? Do you do
3 that internally or do you send it out, or do you do a
4 combination of both?

5 MR. TEAHON: We do that internally. We
6 send out the quality assurance/quality controls
7 samples quarterly, as does the NDEQ goes around with
8 us quarterly and collects samples beside -- at the
9 same time that the water samplers are collecting them.
10 They collect the spilt sample and send it in, then
11 cross-check our results.

12 JUDGE WARDWELL: Is your lab qualified, or
13 is it merely just check for QA -- not merely. I mean,
14 just check for QA from NDEQ. And do you go any
15 further with any other lab accreditation, or you don't
16 have the need for it because NDEQ --

17 MR. TEAHON: No, we use --

18 JUDGE WARDWELL: -- monitors your efforts?

19 MR. TEAHON: -- traceable standards to
20 calibrate our machines each day before we run the
21 samples.

22 JUDGE WARDWELL: Okay. And is there any
23 accreditation agency that goes around and accredits
24 labs? And if so, do you have one of those
25 accreditations?

1 MR. TEAHON: Not our lab. We send our --
2 when we need accredited samples, we send them out to
3 a third party.

4 JUDGE WARDWELL: And do your QA/QC samples
5 -- that's sent out to an accredited lab?

6 MR. TEAHON: Yes, they are, sir.

7 JUDGE WARDWELL: Okay. Thank you.

8 JUDGE HAJEK: I have a question on that;
9 I'm sorry, Professor Wardwell, on this.

10 JUDGE WARDWELL: You don't need to be
11 sorry.

12 JUDGE HAJEK: You send your samples out to
13 a third party, but do you not also split samples with
14 NDEQ?

15 MR. TEAHON: Yes, we do, on a quarterly
16 basis.

17 JUDGE HAJEK: Okay. So relative to the
18 question Judge Wardwell asked you on having sample
19 verifications, how many do you split with NDEQ versus
20 how many you actually send out? How does that
21 division of verification work?

22 MR. TEAHON: We -- they collect a Basal
23 Chadron sand sample well, the CM wells and one of the
24 SM wells. They do it on a rotational basis so that
25 over the course of time all of the wells are checked.

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1 We do the same thing. We rotate them around and we
2 send those samples out on a quarterly basis to a third
3 party and a different lab than what the NDEQ sends
4 their sample to.

5 JUDGE HAJEK: Okay. I guess I don't
6 understand what the term "split sample" means.

7 MR. TEAHON: We collect a volume of water
8 and they take half and we take half.

9 JUDGE HAJEK: Okay. So there's train of
10 -- what is it --

11 PARTICIPANT: Chain of custody.

12 JUDGE HAJEK: -- chain of custody on that?

13 MR. TEAHON: Yes, sir.

14 JUDGE HAJEK: Is that correct?

15 MR. TEAHON: Yes, sir.

16 JUDGE HAJEK: They have a person on site
17 who works with you on that --

18 MR. TEAHON: Yes, sir.

19 JUDGE HAJEK: -- to collect the sample?

20 MR. TEAHON: Okay. Thank you.

21 JUDGE WARDWELL: Thank you. Next question
22 I have that's come up, what's the foundation material
23 that you place the bottom liner of the liner for your
24 evaporation ponds on?

25 MR. TEAHON: It's a compacted native soil.

1 JUDGE WARDWELL: Okay. is there any
2 specification for preparation of that in regards to
3 removal of large stones, or I don't know what your
4 native soil looks like without the vegetation, but is
5 there anything you can elaborate more on it? You
6 could turn the mic over. You don't have to -- just
7 introduce yourself so we know that a different speaker
8 has come on, not that we can't recognize the
9 difference in voices.

10 MR. PAVLICK: Doug Pavlick, Crow Butte.
11 So the design of the evaporation ponds was an
12 engineered design. I believe it was reviewed by the
13 NRC at the time of construction. And as far as the
14 soil quality, honestly I can't answer that, but I
15 believe that was in the engineering specs for that
16 design and construction.

17 JUDGE WARDWELL: Okay. So, thank you.
18 That's sufficient.

19 How do you handle any leaks in the bottom
20 liner?

21 MR. TEAHON: We have not had a leak in the
22 bottom liner.

23 JUDGE WARDWELL: How would you know if you
24 did?

25 MR. TEAHON: We have monitor wells around

1 the ponds that would detect that.

2 JUDGE WARDWELL: Thank you. How many
3 total pipe leaks have you found and repaired, roughly
4 if you don't know exactly?

5 MR. TEAHON: Pipe leaks, as -- trunk lines
6 are you talking about?

7 JUDGE WARDWELL: Total pipes.

8 MR. TEAHON: Our total leaks, as I
9 reported yesterday, 358 leaks. That doesn't -- those
10 are surface spills.

11 JUDGE WARDWELL: Right.

12 MR. TEAHON: Is that what we're talking
13 about?

14 JUDGE WARDWELL: No, I'm talking about
15 pipe leaks where you've -- we talked about what
16 happens if a pipe leaks and you say you monitor it by
17 the change in pressure and visual observations and
18 lack of frost in the winter time, yada, yada, yada.
19 How many of those have you had and detected that
20 required repair of the -- that then led to the repair
21 of the pipe and whatever else needed to be done with
22 it?

23 MR. TEAHON: I don't have that off the top
24 of my head, sir. I have that on an Excel spreadsheet
25 and I can get it to you for tomorrow.

1 JUDGE WARDWELL: I don't need it exactly,
2 if you think you're comfortable enough with testifying
3 the ballpark figure. But if not, then why don't you
4 just get us -- then why don't you report to us without
5 another exhibit what that approximate number is?

6 MR. TEAHON: The majority of the leaks
7 that we've had are from bleeder valves. As I
8 explained yesterday, that on the injection wells at
9 one point in time we had spring-loaded valves on
10 there, pop-off valves, if you will, and they'd become
11 plugged with materials. And now we have a
12 mechanically operated open bleeder valve and there
13 have been instances where those have been left open.
14 The well head -- the wind's blown the well head
15 against them and propped them open. And so, just
16 based off of filling out that database, most of those
17 have been from injection water spills.

18 JUDGE WARDWELL: And I'm interested in the
19 pipe itself and the leaks out of the pipes, not out of
20 the well.

21 MR. TEAHON: The fusion -- we've had
22 fusion welds leak, and that number probably less than
23 15.

24 JUDGE WARDWELL: Would you like to add to
25 that?

1 MR. PAVLICK: Yes, Doug Pavlick, Your
2 Honor. On an annual basis; so this is off-the-top-of-
3 my-head experience, we might have two to four pipe
4 leaks as defined by two-inch laterals extending from
5 a well house to a well head, or a trunk line failure.
6 Trunk line failures are very rare. They don't --
7 typically we wouldn't have one -- one per year or
8 anything like that.

9 And the pipeline leaks most typically are
10 when we grade the roads at the mine to -- after a rain
11 storm. A grader hits a line that's close to the
12 surface and it's immediately detected and addressed
13 and repaired and mitigated.

14 JUDGE WARDWELL: Okay. Thank you. And
15 when we were discussing the testing you did on the
16 wells, the MIT testing on the wells, have you had any
17 failures of that, or have you maintained continuity on
18 all the wells that you've abandoned?

19 MR. TEAHON: We get occasional failures,
20 one to two a year average. Of the 900 to 1,000 wells
21 that we test every year, we'll get 1 to 2 failures.

22 JUDGE WARDWELL: And you drill that out
23 and re-grout it and re-abandon it?

24 MR. TEAHON: Well, no, we isolate where
25 it's at and go down and sleeve the well and then

1 retest it to make sure that the integrity is there.

2 JUDGE WARDWELL: Okay. Thank you. In
3 regards to the spray irrigation system that you have
4 in the evaporation ponds, are you required or do you
5 do any sampling from around the ponds to help assure
6 that any renegade spray that may leave the planned
7 area of the evaporation pond doesn't and isn't
8 impacting the soils around the pond and then
9 potentially infiltration into the upper aquifer?

10 MR. TEAHON: We don't during operation.
11 At baseline we'll go around and sample and if there's
12 any contamination there we'll have to clean it up and
13 remove it. But the closest area that we would be
14 doing surface samples on would be the English Creek
15 drainage north of there, approximately a half mile.

16 JUDGE WARDWELL: Okay. Mr. Pavlick, do
17 you have any --

18 MR. PAVLICK: Yes, Your Honor. We do
19 control when we run the spray, so we watch the wind
20 direction and wind speed. And there's protocol to
21 direct the operations to run the sprays in appropriate
22 weather. And they're off during inappropriate
23 weather.

24 JUDGE WARDWELL: Thank you. Dr. Lagarry,
25 just so you don't feel left out, which I know you

1 often do, do you agree with NRC staff's statement that
2 in their testimony that they USGS does not recognize
3 that the Chamberlain Pass formation is part of the
4 Chadron formation in Nebraska?

5 DR. LAGARRY: Your Honor, the United
6 States Geological Survey is not the arbiter of that.
7 They do not function as a gatekeeper for geological --

8 JUDGE WARDWELL: Can I interrupt quickly?

9 DR. LAGARRY: Pardon me?

10 JUDGE WARDWELL: Can I interrupt quickly?

11 DR. LAGARRY: Please.

12 JUDGE WARDWELL: Okay. Do you agree that
13 the USGS has not recognized that change in the
14 nomenclature?

15 DR. LAGARRY: No, sir.

16 JUDGE WARDWELL: You don't agree that they
17 haven't?

18 DR. LAGARRY: I provided to my counsel,
19 who distributed to the other members, that -- two USGS
20 reports where they do recognize the Chamberlain Pass.

21 JUDGE WARDWELL: Okay. And now go ahead
22 with your other --

23 CHAIR GIBSON: Can I just ask one more
24 question? Is this going to be part of the material
25 that we're going to be having in the exhibit that

1 you're going to be providing, Mr. Ballanco, or --

2 MR. BALLANCO: Your Honor --

3 CHAIR GIBSON: -- the studies?

4 MR. BALLANCO: -- I do believe this
5 probably is covered by the supplemental day we're
6 scheduling.

7 CHAIR GIBSON: We'll certainly wait for
8 that. I just wanted to be sure. Okay. Thanks.

9 JUDGE WARDWELL: Do you want to wait for
10 that or just have him finish --

11 (Simultaneous speaking)

12 CHAIR GIBSON: No, no, no. I just wanted
13 to be sure that was part of it. That's all.

14 JUDGE WARDWELL: Yes. Go ahead and finish
15 your comments on the USGS not being the gatekeepers
16 for this type of thing -- I think is where you were
17 leaving off.

18 DR. LAGARRY: That's right, Your Honor.
19 No, the rules for that are published in what's called
20 the North American Stratigraphic Code, which is
21 determined by the North American Commission on
22 Stratigraphic Nomenclature. It's published in the
23 American Association of Petrologists bulletin. The
24 most recent North American stratigraphic code dates
25 from 1983.

1 Article 23 governs the procedure. It has
2 to be published in a peer-reviewed journal. And if it
3 meets the minimum criteria established by the code,
4 then the professional convention is to accept the
5 changes.

6 JUDGE WARDWELL: Thank you. NRC, would
7 you like to comment on why that isn't sufficient
8 credibility to warrant consideration of the change in
9 the name, or at least co-name it at a minimum in
10 regards to any documents that come out where you use
11 both names?

12 DR. STRIZ: First of all, I'd like to
13 recognize that he is correct. The USGS does recognize
14 the Chamberlain Pass from two publications, but only
15 in South Dakota in the Badlands. So I'd like to agree
16 with Dr. Lagarry, but only in South Dakota, not in
17 Nebraska.

18 In addition, I am aware of the North
19 American Stratigraphic Code and there are a couple
20 more articles about whether or not you accept a change
21 in name, because it's a very serious matter. Not only
22 does it have to be published in peer-reviewed
23 literature, which his documents were -- I have
24 contacted the Geological Society of America to ask if
25 the documents were peer-reviewed, and they

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1 corroborated that they were. However, the publication
2 has to be accepted widely and put into use widely, and
3 to this date USGS has not accepted it. And as they
4 are an authority on geology, a federal authority on
5 geology, the fact that they have not accepted it gives
6 me cause for concern.

7 And so I have -- we have stated, NRC, that
8 we would potentially like to consult with USGS and ask
9 them is there a particular reason why this body of
10 literature -- which was peer-reviewed and which Dr.
11 Lagarry has presented to meet the Stratigraphic Code,
12 and they're still not using it.

13 JUDGE WARDWELL: Okay. Thank you. I
14 think that clarifies everything. In that regard, not
15 everything.

16 Intervenors, whoever would like to handle
17 this question, do you agree that Crow Butte is
18 required to maintain an inward gradient within the
19 license area, and do you have any evidence to refute
20 that that inward gradient hasn't been maintained?

21 MR. WIREMAN: Yes, we agree that they are
22 required to maintain an inward gradient, and other
23 than the excursions we have no reason to believe that
24 they have not.

25 JUDGE WARDWELL: Okay. Thank you.

1 MR. WIREMAN: Mr. Wireman.

2 JUDGE WARDWELL: Dr. Lagarry, in regards
3 to the Chamberlain Pass formation and the
4 radionuclides in there -- I think we talked about this
5 before, but I want to ask it again just to fix the
6 point, and then I think I'll ask it maybe a different
7 way than I did before in the last two days. And that
8 is is there ever an instance that you've come upon
9 where those radionuclides are naturally occurring in
10 your estimation as opposed to coming in from the
11 operations at Crow Butte?

12 DR. LAGARRY: Yes, Your Honor. Along the
13 White Clay Fault in southern Oglala Lakota County on
14 the Pine Ridge Reservation there is an instance where
15 geothermal waters are reaching the surface carrying
16 with them dissolved uranium in measurable amounts, up
17 to 90 parts per billion.

18 JUDGE WARDWELL: And refresh my memory on
19 the radionuclides that were detected in the Pine Ridge
20 Reservation by either Ms. White Face or White Plume,
21 I forget which now. What do you conclude about their
22 origins in regards to whether they're natural
23 occurring or related to CBR operations, or unknown and
24 could be either way?

25 DR. LAGARRY: That's a multi-part

1 question. I'll get to all the parts. The first part
2 of the question was which radionuclides. The tribe
3 generally collects gross alpha. Ms. White Plume
4 talked about uranium-234, 238, and thorium. Okay.
5 Those are generally the radionuclides that are of
6 concern in our samples on the reservation.

7 The second part of the question was --
8 you'll have to refresh my memory. What was the second
9 part of your question?

10 JUDGE WARDWELL: Well, I think the heart
11 of my question was do you believe those radionuclides
12 come from the CBR facility? And I think I gave really
13 three options of either yes, they did, no, they're
14 natural occurring, or it could go either way.

15 DR. LAGARRY: It could go either way, Your
16 Honor. I mean, I really don't know. The only ones
17 that we are relatively certain -- I mean, within the
18 knowledge we have at the present time it's likely that
19 the geothermal water at the White Clay Fault is
20 bringing up natural uranium.

21 JUDGE WARDWELL: Thank you, Dr. Lagarry.

22 For either of the three, or all of them
23 for that matter, if you wish to comment, do you agree
24 with Ms. White Face's assertion that the CBR has
25 contaminated water at the reservations on the basis of

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1 the isotope ratios?

2 DR. LAGARRY: I see that as an open
3 question, Your Honor. I really can't say.

4 JUDGE WARDWELL: Thank you.

5 MR. WIREMAN: I really I cannot say
6 either. I have not looked at the date. I'm not
7 familiar with it.

8 JUDGE WARDWELL: Thank you.

9 DR. KREAMER: I have not received the data
10 either, so I --

11 JUDGE WARDWELL: We got a hat trick.
12 Thank you.

13 For Mr. Lewis, in your professional
14 opinion is it plausible that a release of uranium from
15 Crow Butte's operations to the White River alluvian
16 could be detected on the Pine Ridge Reservation within
17 25 years of the release given the distance to the
18 reservation, the effects of dilution and the
19 properties of the uranium? And please briefly explain
20 the basis for your opinion.

21 MR. LEWIS: No, I don't believe that's
22 possible, Your Honor. I don't believe it's possible
23 for a number of reasons. I'll try to be concise.
24 Basically, the only condition hydraulically that would
25 allow that to occur would be a post-mining condition.

1 And by definition, post-mining that water will be
2 restored condition. So any water that would migrate
3 post-restoration would be essentially restored in a
4 decent water quality. Otherwise, you know, we have an
5 inward gradient during mining that would not allow
6 anything to leave the facility until a post-mining
7 condition.

8 Second, the distance involved, given
9 natural rates of flow in the groundwater system, 20
10 feet per year, this type of natural flow in the Basal
11 Chadron -- just given the distances and the timing
12 involved, it's not possible for contaminants to move
13 that distance. Sub-crop into the White Water alluvian
14 has been postulated, whether it be through fractures
15 or not, over a distance of, you know, more than 30
16 miles as the bird flies. And the migration route is
17 not as the bird flies, so it's more than 30 miles.

18 So the processes of dispersion and
19 attenuation and chemical dilution are very important,
20 and we're talking about such distances that by the
21 time these chemical transport that distance it's
22 inconceivable they would be detected. So that's my
23 basis of my opinion.

24 JUDGE WARDWELL: Okay. Thank you.

25 CHAIR GIBSON: And it's about 25 years

1 that you all have been in operation, is that right?

2 MR. TEAHON: Yes, we started commercial
3 production in April of 1991.

4 CHAIR GIBSON: Okay. So not quite 25
5 years? Okay. Thank you.

6 JUDGE WARDWELL: For anyone from Crow
7 Butte, is not the West Ash Creek, another tributary of
8 the White River, present in the mining area?

9 MR. TEAHON: No, West Ash Creek is not
10 present.

11 JUDGE WARDWELL: It's outside the LA?

12 MR. TEAHON: Yes.

13 JUDGE WARDWELL: Okay. Thank you. Did
14 you ever test for either water levels or for water
15 quality within the upper confining unit?

16 MR. TEAHON: The Brule? The upper
17 confining unit being the middle and the upper Chadron?

18 JUDGE WARDWELL: And I understand that in
19 some places the lower Brule will be part of that,
20 depending upon how it's judged. It's usually kind of
21 lumped together as the upper confining unit, that some
22 of the lower Brule will be confined enough. But I
23 think mostly it is talking about setting something in
24 the middle and upper Chadron. And I can't remember.
25 We went through a lot, and that's why I'm asking it

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1 again, to fix this point because I couldn't remember
2 myself.

3 MR. BEINS: Certainly, sir. We did have
4 an observation well for pump test No. 2 with the
5 transducer downhole, I believe numbered UCP 1.

6 JUDGE WARDWELL: Okay. And but no
7 monitoring wells were placed there?

8 MR. BEINS: No monitoring wells to gather
9 water quality, sir.

10 JUDGE WARDWELL: And does your testimony
11 still hold in regards to the fact that the recovery
12 rates for the well in that upper confining unit are so
13 slow they lead some people to misrepresent it as being
14 no water available?

15 MR. BEINS: Yes, sir.

16 JUDGE WARDWELL: Thank you. Thank you,
17 all.

18 CHAIR GIBSON: Okay. This is what I'd
19 like to do: I believe we've completed all our
20 examination of Contentions A, C, D, F, 14 and 6. So
21 we have 9, 12 and 1 left. I'd like to take a 10-
22 minute recess, and we will begin our examination of
23 witnesses with regard to Contention 9. The one thing
24 I would like to add is to the extent that there's any
25 witnesses here who are not going to be talking about

1 6, 9 or 1 -- I mean, 9, 12 or 1, they may be excused
2 at this time. Okay? Thank you very much.

3 (Whereupon, the above-entitled matter went
4 off the record at 4:13 p.m. and resumed at 4:26 p.m.)

5 CHAIR GIBSON: I was pleased to see that
6 Dr. Striz and Dr. Kreamer and their counsel were
7 conferring. I hope that means we're getting close to
8 some kind of a happy resolution.

9 MS. SIMON: Your Honor, yes, Marcia Simon,
10 in these high-level negotiations I think we're going
11 to try to work something out by email tonight and have
12 something definite by tomorrow morning.

13 CHAIR GIBSON: That's great to hear.
14 Thank you so much.

15 Now, just in fairness, is there anything
16 we need to work out with your client, Mr. Smith, so
17 you get whatever the benefit is of they get on the
18 modeling, or --

19 MR. SMITH: Yes, we're happy to monitor
20 their discussions. We don't have a particular
21 interest in that, so we're happy to monitor and we'll
22 receive whatever information they receive.

23 CHAIR GIBSON: Very well.

24 MR. SMITH: But we are not -- we don't
25 have a driving interest in this.

1 CHAIR GIBSON: I just didn't want you to
2 feel left out.

3 MR. SMITH: I do not feel left out. Thank
4 you.

5 CHAIR GIBSON: Good. Good. All right.
6 If there's nothing else, then I believe we'll proceed
7 to Contention 9.

8 JUDGE HAJEK: Okay. We are here to
9 consider questions related to Contention 9 as admitted
10 by the Board in LVP 15-11. Contention 9 is the final
11 EA violates 10 CFR Section 51.10, 51.70 and 51.71, and
12 NEPA in implementing regulations by failing to include
13 the required discussion of groundwater restoration
14 mitigation measures. And I think as I had introduced
15 this earlier when we talked about 6, or discussing --
16 going ahead to discuss 6 and 9, I was relegating this
17 to primarily a discussion of the commitment of
18 restoration values. And so, that's where I would like
19 to begin.

20 Mr. Teahon, the LRA, CBR-011, Section 613,
21 becomes really the primary section of the LRA that
22 we're going to be talking about this afternoon.
23 Beginning on page 6-4, which is PDF 547, details the
24 restoration goals for the individual mine units. Is
25 that correct?

1 MR. TEAHON: One moment, sir.

2 (Pause)

3 MR. TEAHON: Are they tables that show the
4 restoration values for each mine unit?

5 JUDGE HAJEK: That's correct. Yes --

6 (Simultaneous speaking)

7 MR. TEAHON: Yes, I'm familiar with those.

8 JUDGE HAJEK: There are 10 tables, I
9 think.

10 MR. TEAHON: Yes, sir.

11 JUDGE HAJEK: Okay. Mr. Teahon, the first
12 paragraph references the CSA Class III UIC permit. Is
13 this Exhibit CBR-017?

14 MR. TEAHON: (No audible response)

15 JUDGE HAJEK: I thought these were easy
16 questions.

17 MR. TEAHON: Yes, sir.

18 JUDGE HAJEK: Thank you. Mr. Teahon, one
19 page later in the LRA, Section 6.1.3.1, Establishment
20 of Baseline Water Quality, states that before mining
21 begins in a mine unit one baseline restoration well
22 for each four acres is sampled to establish the mine
23 unit baseline water quality, and goes on to specify
24 collection details. Is that correct?

25 MR. TEAHON: Yes, sir.

1 JUDGE HAJEK: Typically how many sample
2 well is this in total?

3 MR. TEAHON: Well, as it says one per acre
4 -- so it's dependent upon --

5 JUDGE HAJEK: It says one per --

6 MR. TEAHON: One per four acre. So it's
7 dependent upon the size of the mine unit.

8 JUDGE HAJEK: Yes.

9 MR. TEAHON: Typically 20 to 25 wells.

10 JUDGE HAJEK: Typically 20 to 25 wells?
11 Thank you. This is consistent with the NDEQ permit,
12 CBR-017, page 10, is that correct?

13 MR. TEAHON: Yes, sir.

14 JUDGE HAJEK: Okay. Thank you. Mr.
15 Deucher, please display CBR-017, page 10 for us.

16 And, Mr. Teahon, please read when he does
17 that Section 2 for us.

18 MR. TEAHON: That is not -- it would be
19 page 11.

20 JUDGE HAJEK: Page 11. Okay. Paragraph
21 2, Establishment of Restoration Parameters.

22 CHAIR GIBSON: That was 11 on the PDF, is
23 that right? Or that 11 on both? Yes, both.

24 JUDGE HAJEK: Okay. Paragraph 2(a), 2
25 Alpha.

1 MR. TEAHON: Yes, sir.

2 JUDGE HAJEK: Would you just read
3 either --

4 (Simultaneous speaking)

5 MR. TEAHON: "Those parameters which have
6 a numeric groundwater standards established in Title
7 118 or other established documents must be restored to
8 the standard value unless the standard is exceeded by
9 the mean of the pre-operational sampling value's,"
10 quotes, "'baseline mean.' The restoration value for
11 parameters whose baseline mean exceeds the standard
12 shall be equal to the mine unit mean plus two standard
13 deviations (see table 2.6)."

14 JUDGE HAJEK: Okay. Mr. Deucher, would
15 you please scroll down to the next page?

16 Okay. So this is table 2.6, and these are
17 the restoration standards from NDEQ. Is that correct?

18 MR. TEAHON: Yes, sir.

19 JUDGE HAJEK: And are these restoration
20 standards that are committed to in the LRA and that
21 are repeated in your table 6.1-1 in CBR-011, the LRA?
22 It's on page 6-6. I don't have a PDF of that
23 reference.

24 MR. TEAHON: Yes, sir.

25 JUDGE HAJEK: Okay. Then the LRA includes

1 table 6.1-2 through 6.1-11 that have two explanations
2 associated with them. At the bottom of page 6-5 and
3 at the top of 6-6 it states these tables provide the
4 baseline average in the range for all restoration
5 parameters as well as the NDEQ standard approved for
6 that mine unit. Is that correct?

7 MR. TEAHON: Yes, sir.

8 JUDGE HAJEK: And on page 6-17, second
9 paragraph up from the bottom it states the MCLs from
10 Title 118 are listed. The restoration standards from
11 the Class III UIC permit are listed, and the Title 118
12 standard at that time of the Notice of Intent was
13 approved by -- or as approved by NDEQ.

14 MR. TEAHON: Yes, sir.

15 JUDGE HAJEK: Okay. Let's take table 6.1-
16 2 on page 6-7.

17 Mr. Deucher, can you pull that up? And I
18 apologize for not having that request in my notes
19 here. Okay. That is what I want. That is correct.

20 Mr. Teahon, please explain the meaning for
21 us of each of the columns to clarify these
22 definitions. So start with the third column from the
23 left, the mine unit number baseline column. Is that
24 the average for all the baseline monitoring wells?

25 MR. TEAHON: Yes, sir.

1 JUDGE HAJEK: And how is the standard
2 deviation calculated when it --

3 (Simultaneous speaking)

4 MR. TEAHON: It's not on that one. N/A.

5 JUDGE HAJEK: It is for some of the
6 substances.

7 MR. TEAHON: It is when it's less -- when
8 there's a value that's greater than the reporting
9 limit. If you go down to chloride, 203.9, the
10 standard deviations based on the values collected in
11 the baseline monitor wells, and listed in this table.

12 JUDGE HAJEK: This is one standard
13 deviation at this point, is that correct?

14 MR. TEAHON: Yes, sir.

15 JUDGE HAJEK: Thank you. And the column
16 on the right is from Title 118?

17 MR. TEAHON: The column -- oh, clear to
18 the right? That's the restoration value. Title 118
19 is a groundwater standard. That's the first column to
20 the right of the parameters. The far right column
21 would be the restoration value if any standard
22 deviations are applied. If the parameter is non-
23 detect, it's baseline value becomes a groundwater
24 restoration standard.

25 JUDGE HAJEK: Say that again, please?

1 MR. TEAHON: If there's a non-detect, as
2 in ammonium, then the restoration goal becomes the
3 Title 118 groundwater restoration value.

4 JUDGE HAJEK: Thank you. Now there are 10
5 tables here each listing the parameters for 27
6 elements or parameters, is that correct?

7 MR. TEAHON: Yes, sir, there should be one
8 for each mine unit.

9 JUDGE HAJEK: Okay. Each of Mine Units 1
10 through 10. I think I understand the requirement here
11 is at the end of the four restoration steps; that is,
12 groundwater transfer, sweep, treatment and well field
13 circulation or recirculation, and before the
14 stabilization monitoring begins the baseline values
15 listed in either column 2, or 5 counting from the
16 left, is to be achieved. Is that correct?

17 MR. TEAHON: Yes, sir.

18 JUDGE HAJEK: And which column is the
19 goal?

20 MR. TEAHON: The one on the right.

21 JUDGE HAJEK: The one on the right? Okay.
22 Thank you.

23 Then if I just scroll down; and we don't
24 have really have to do this to verify it, but we can,
25 I notice the values change from mine to mine. The

1 column 2 values change because the mines are
2 different. Is that correct?

3 MR. TEAHON: Yes, sir.

4 JUDGE HAJEK: Why do the values in column
5 5 change from mine to mine?

6 CHAIR GIBSON: When you say "column 5,"
7 you mean the column on the far right?

8 JUDGE HAJEK: Yes.

9 CHAIR GIBSON: Okay. MU-2 NDEQ
10 Restoration Value.

11 JUDGE HAJEK: On this particular page.

12 CHAIR GIBSON: Right.

13 JUDGE HAJEK: That's right.

14 CHAIR GIBSON: That's what column 5 is.

15 JUDGE HAJEK: Right.

16 MR. TEAHON: Why do those values change?

17 JUDGE HAJEK: From mine to mine?

18 MR. TEAHON: Well, they're based on the
19 groundwater standard, Title 118. If any of the values
20 in Title 118 change when that mine unit's put into
21 restoration -- and an example of that would be
22 uranium. If you look in the early mine units,
23 uranium, the groundwater standard is set at 5.0 parts
24 per million. If you look in Mine Units 9, 10 and 11,
25 you'll see that the groundwater standard for uranium

1 changed to 0.03 parts per million. So at the time
2 that the mine unit's put into restoration, that's the
3 restoration goal at the time. And then we're looking
4 -- I'm looking at Mine Unit 2. The value was five.
5 And the subsequent mine units were -- the value is
6 0.03. It's two standard deviations from the baseline
7 average.

8 JUDGE HAJEK: So what is your commitment
9 here then? Is it to the standards at the time this
10 table was created when the mine unit went into
11 operation initially, or is it the standard that exists
12 when the mine is taken out of operation?

13 MR. TEAHON: These are the restoration
14 values that are approved by NDEQ before we put the
15 mine unit into the operation.

16 JUDGE HAJEK: I think my question was then
17 do they change as a function of the standards at the
18 time -- I understand this is the standard at the time
19 the mine unit went into operation. At the time the
20 mine comes out of operation, which could be 25 years
21 later, or 20 years later --

22 MR. TEAHON: Yes, sir.

23 JUDGE HAJEK: -- will the standard for
24 restoration purposes change to the value that is in
25 the current, most recent copy of NDEQ 118?

1 MR. TEAHON: In our conversation with the
2 NDEQ they have indicated to us that the values that
3 were in effect and that were approved by the Notice of
4 Intent are the values that will be used when that mine
5 unit's restored.

6 JUDGE HAJEK: Thank you for that
7 clarification. Now finally, Mr. Teahon, on this
8 where's the table for Mine Unit 11?

9 MR. TEAHON: Again, Mine Unit 11 was not
10 into production when this application was submitted in
11 2007, and we do have a table like this for Mine Unit
12 11. It's been put in within the last seven years.

13 JUDGE HAJEK: Within the last seven years?
14 Yes, this is 2015. The original RAI came to us; and
15 I'm going to come back to this particular issue, in
16 2007. The staff issued an RAI and then they issued
17 another RAI and -- at least three; I don't know how
18 many total, and you produced a lot of extra material.
19 And you said Mine Unit 11 went in sometime some seven
20 years ago. Is that what I just heard you say?

21 MR. TEAHON: (No audible response)

22 JUDGE HAJEK: So that would be like 2008.
23 And the LRA that we have here, CBR-011, that is, as I
24 understand, the total of the LRA that includes all RAI
25 responses. And I recall looking in the bottom right

1 corner of a lot of pages that apparently the last --
2 it's pretty much been updated to May of 2009.

3 MR. TEAHON: Yes, Mine Unit 11 went into
4 production in 2013.

5 JUDGE HAJEK: 2013? So that's only two
6 years ago. But it went into production before the SER
7 and the EA were produced, is that correct?

8 DR. STRIZ: The SER was published in 2012
9 and then corrections were made to it in 2014.

10 JUDGE HAJEK: '14? So did you include
11 Mine Unit 11 restoration standards?

12 DR. STRIZ: No, they were not provided to
13 us, so they were not included. It was not part of
14 our --

15 JUDGE HAJEK: Were not provided to you?

16 DR. STRIZ: They were not part of the
17 RAIs, and so we didn't get this table.

18 JUDGE HAJEK: Okay.

19 MR. TEAHON: Those values are in our SERP
20 process; and the SERPs are submitted annually for
21 annual changes, so the restoration values would be in
22 the SERP that was conducted for this well.

23 JUDGE HAJEK: This well? Okay. Thank
24 you.

25 MR. TEAHON: Or this mine unit.

1 CHAIR GIBSON: I'm just going to ask a
2 quick question, Mr. Teahon. The baseline restoration
3 values for Mine Unit 11, will those be the same as
4 they were for Mine Unit 10?

5 MR. TEAHON: No.

6 CHAIR GIBSON: There weren't any changes,
7 were there?

8 MR. TEAHON: Well, the change would be the
9 restoration goal for uranium is no longer five. It's
10 0.03. So it would be -- two standard deviations from
11 the mine unit average would become the restoration
12 goal for 11.

13 CHAIR GIBSON: And when did that go into
14 effect?

15 MR. TEAHON: I'd have to look in the
16 permit. I don't know the exact date, but it's listed
17 in our UIC permit.

18 CHAIR GIBSON: Well, I'm just trying to
19 figure out if the numbers are going to be the same for
20 10 and 11. That's all. Not for 1 and 11, but for 10
21 and -- you've already got 10 in here, right?

22 MR. TEAHON: They will be similar for 9,
23 10 and 11.

24 CHAIR GIBSON: Okay. Including uranium?

25 MR. TEAHON: Yes.

1 CHAIR GIBSON: Okay. Very well. Thank
2 you.

3 JUDGE HAJEK: Mr. Deucher, you can roll
4 down here to maybe Mine Unit 10. There it is. So the
5 goal here, at least on your uranium, is 0.03. The
6 restoration value is .108.

7 MR. TEAHON: Yes, sir.

8 JUDGE HAJEK: Okay. Any questions on
9 that, anybody?

10 (No audible response)

11 JUDGE HAJEK: Okay. All right. Staff,
12 the SER, NRC-009, on page 138, states the sampling
13 approach and the number of samples provided to
14 establish the values -- and I'm projecting her a
15 little bit -- to establish the baseline values in
16 table 6.1, 2 through 11, which is what we have up
17 here, has not had sufficient rigor is the statement.
18 Is that correct?

19 DR. STRIZ: I'm trying to find -- where on
20 page 138?

21 JUDGE HAJEK: This is on page 138, which
22 is your red page 156.

23 DR. STRIZ: Section 6.1.3.2?

24 JUDGE HAJEK: There it is. Mr. Deucher as
25 it up on the display. Okay.

1 DR. STRIZ: Yes. Yes, I see it now.
2 Thank you.

3 CHAIR GIBSON: The page being displayed is
4 the subject about which Judge Hajek just asked you.

5 DR. STRIZ: Okay. Thank you. Can you
6 repeat the question, please? Could you repeat the
7 question, please, now that I have it in front of me?

8 JUDGE HAJEK: I'm sorry. I cannot hear
9 you.

10 DR. STRIZ: Oh, could you repeat the
11 question, please, now that I have the text in front of
12 me?

13 JUDGE HAJEK: Sure. The question was on
14 this page 138, or red --

15 DR. STRIZ: Yes.

16 JUDGE HAJEK: -- 156, states the sampling
17 approach and number of samples provided to establish
18 the values, to establish the baseline values in tables
19 6.1, 2 through 11 of the LRA has not had sufficient
20 rigor. Is that a correct statement?

21 DR. STRIZ: Yes, that was our conclusion.

22 JUDGE HAJEK: That was your conclusion?
23 And the staff then says also on this page that a
24 license condition will be imposed to ensure baseline
25 conditions are determined as required in 10 CFR 40,

1 Appendix A, Criterion 5 Bravo 5 and that this
2 condition is presented in SER Section 614. And I
3 think that means paragraph 2. Is that correct?

4 DR. STRIZ: Yes.

5 JUDGE HAJEK: Good. So, Dr. Striz, does
6 the proposed method then correspond to the license
7 SUA-1534, Condition 11.3, on page 11 of NRC-012, which
8 is the license?

9 DR. STRIZ: Yes.

10 JUDGE HAJEK: And does this license
11 condition correspond to the statement in the EA, NRC-
12 010, Section 4.6.2.3, on pages 81 and 82, which is red
13 94 and 95, that the purpose -- and this a quote, I
14 think, "The purpose of aquifer restoration is to
15 return groundwater quality in the production zone to
16 compliance with the groundwater protection standards
17 in 10 CFR Part 40, Appendix A, Criterion 5(B)(5)?"

18 DR. STRIZ: Correct.

19 JUDGE HAJEK: And for mines already in
20 operation, understanding that data cannot be
21 regathered, does this license condition require that
22 the license goals already documented in these tables
23 that we just scrolled through be revised?

24 DR. STRIZ: Those are not our restoration
25 standards, Your Honor. Those are NDEQ's restoration

1 standards. We do not apply their restoration
2 standards. We require restoration to the baseline
3 water quality under Criterion 5(B)(5). And that is
4 what the license condition states.

5 JUDGE HAJEK: Okay. That is what the NRC
6 license condition states?

7 DR. STRIZ: Yes, correct.

8 JUDGE HAJEK: I just want to make sure
9 that --

10 DR. STRIZ: Absolutely.

11 JUDGE HAJEK: -- we're referring to the
12 NRC license here.

13 Dr. Kreamer, your testimony in INT-069,
14 page 6, is that excluding uranium from the monitoring
15 program profoundly inhibits discovery of rebound
16 effects. And I am understanding the meaning of this
17 to be that if uranium is not monitored post-
18 restoration during the -- what we now have as a multi-
19 year, I believe, or eventually to be multi-year, but
20 at least a four-quarter monitoring period -- inhibits
21 the discovery of rebound effects. Have I interpreted
22 your testimony correctly?

23 DR. KREAMER: I believe you have, yes.

24 JUDGE HAJEK: Okay. Dr. Kreamer, I note
25 in the LRA, CBR-011, page 6-4 -- Mr. Deucher, can you

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1 bring that up? It's in the same range. It's going to
2 be PDF 548. That's CBR, or Crow Butte Resources,
3 commits to return the groundwater to the restoration
4 values set by NDEQ in the Class III permit that we've
5 already discussed. Are you familiar with that permit?

6 DR. KREAMER: Yes. Yes. Not every
7 detail, but I'm familiar with it, yes, Your Honor.

8 JUDGE HAJEK: This is Exhibit CBR-017, is
9 that correct, the permit?

10 (No audible response)

11 JUDGE HAJEK: Okay. Mr. Wireman, you
12 raised the issue in your testimony on page 8; this is
13 INT-047, on page 8, that the NDEQ Title 118 MCLs and
14 the NRC 10 CFR 40, Appendix A MCLs are inconsistent.
15 Is that correct?

16 MR. WIREMAN: As I understand the NDEQ
17 118, they are drinking water MCLs that are EPA MCLs.

18 JUDGE HAJEK: Are they the same as the
19 MCLs in 10 CFR 40, Appendix A?

20 MR. WIREMAN: Yes.

21 JUDGE HAJEK: So they're not inconsistent?
22 Your testimony, as I read it, said they are
23 inconsistent.

24 MR. WIREMAN: I would have to review that,
25 but as far as I know the MCLs in NDEQ 118 are in fact

1 the MCLs in Part 40, Appendix A.

2 JUDGE HAJEK: Would you speak closer to
3 the --

4 MR. WIREMAN: I'm sorry. As far as I know
5 the NDEQ 118 standards are the MCLs and the same as in
6 Part 40, Appendix A. So I would have to find my
7 statement on page 8. And I'm looking here.

8 JUDGE HAJEK: Okay. Further, Mr. Wireman,
9 I believe in that same testimony you state that Crow
10 Butte Resources as committed to the NRC limits. Is
11 that correct?

12 MR. WIREMAN: I did state that, and I was
13 referring to the future, not the earlier mine units
14 that are under restoration. As I understood this,
15 Your Honor --

16 CHAIR GIBSON: You may need to speak just
17 a little closer to that microphone.

18 MR. WIREMAN: Yes, as I understood this,
19 Your Honor, the -- Nebraska -- what was called a
20 secondary standard in the past, which are the Nebraska
21 Class of Use standards, were acceptable restoration
22 standards for the earlier mine units. And that's the
23 issue I was raising in my testimony, because those
24 Class of Use standards often are way, way higher than
25 the MCLs in NDEQ 118 or the EPA MCLs in Appendix A.

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1 And as I understand further, NRC has now
2 decided that those secondary standards, Class of Use
3 standards, are not compatible with Appendix A.

4 JUDGE HAJEK: Okay. I think what I
5 understood you to say is that the two sets of
6 standards are different and that Crow Butte has
7 committed to the 10 CFR 40, Appendix A MCLs, and that
8 -- I missed the third part.

9 MR. WIREMAN: My understanding is that
10 they have committed to that for the future, but the
11 earlier mine units that were restored, these standards
12 that were used in -- for some parameters were the
13 Class of Use standards established by the NDEQ, which
14 are not consistent with MCLs in Appendix A or
15 consistent with NDEQ 118.

16 JUDGE HAJEK: Okay. So I think what
17 you're hitting on is the real point of this entire
18 contention, as I understand.

19 MR. WIREMAN: Absolutely it is the point
20 of this contention.

21 JUDGE HAJEK: Okay. So are you saying
22 that your understanding is that the earlier mine units
23 are not required to meet the 10 CFR 40, Appendix A
24 standards?

25 MR. WIREMAN: I'll give you an example.

1 For Mine Unit 10 in the table you just showed just a
2 few moments ago the NDEQ 118 standard, or the MCL from
3 EPA, would be 5.0 milligrams per liter. The baseline
4 value established by Crow Butte was 87.3 milligrams
5 per liter. The standard deviation was 161.0. The
6 restoration standard is 409. And so, I'm at a real
7 loss there. I assume, maybe incorrectly, that the
8 restoration standard is a secondary standard
9 established by the State of Nebraska.

10 JUDGE HAJEK: Okay. And we're going to
11 come back to that secondary.

12 Crow Butte, do you have a response to --

13 MR. TEAHON: That's their Class of Use
14 standard. That's how they apply the two standard
15 deviations. They recognize the fact that this is an
16 exempt aquifer. It meets the requirements of that,
17 that the drinking water in its pristine state is not
18 of drinking water quality prior to mining and
19 therefore they grant a Class of Use in the restoration
20 standards.

21 CHAIR GIBSON: Just one second. Just for
22 clarification, Mr. Teahon, you said "they." Are you
23 referring to the NDEQ?

24 MR. TEAHON: Yes.

25 CHAIR GIBSON: Okay.

1 MR. WIREMAN: The Nebraska Department of
2 Environmental Quality.

3 CHAIR GIBSON: Great. Thank you.

4 JUDGE HAJEK: Okay. Thank you. Mr.
5 Wireman, then in your rebuttal testimony, I think it
6 is INT-070, on page 3, you state ACLs have been
7 approved for too many parameters.

8 MR. WIREMAN: That's a personal
9 professional opinion. It's -- ACLs have been granted
10 for some mine units for some parameters. The way I
11 understand that process is that the company must do a
12 best practicable effort to meet the applicable
13 standard, which would be in those -- in the earlier
14 days, either the secondary Class of Use standard or an
15 MCL. And if they could not meet those after best
16 practical effort, then they could apply for an
17 alternative concentration limit, which could be
18 approved by NDEQ.

19 JUDGE HAJEK: NRC, do you have any comment
20 on secondary goals and ACLs at this point?

21 DR. STRIZ: Yes, I do. First let me make
22 sure that it's very clear that the class -- Criterion
23 5(B)(5) standards are background, or MCLs, whichever
24 is higher, and an alternate concentration limit. And
25 that is a license condition in the license and it

1 applies to all mine units that are in restoration or
2 stability now. Mine Units 2 through 11 will have to
3 meet those restoration standards. Very clear about
4 that.

5 Now, as far as Mine Unit 1 goes, it is
6 true --

7 JUDGE HAJEK: I'm sorry. As far --

8 DR. STRIZ: Mine Unit 1.

9 JUDGE HAJEK: Yes.

10 DR. STRIZ: The restoration of Mine Unit
11 1 was -- at the time there was an allowance for a
12 secondary restoration goal of Class of Use. And for
13 some of the constituents, only four, Mine Unit 1 was
14 approved on Class of Use. Since that time the
15 Commission has issued RIS-09005; and I don't have the
16 exhibit number in front of me, I apologize -- 061,
17 which states that that secondary restoration goal is
18 inconsistent with the groundwater protection standards
19 in 10 CFR Part 40, Criterion 5(B)(5), Appendix A,
20 Criterion 5(B)(5), and that all future mine units will
21 be required to meet the Class -- the Criterion 5(B)(5)
22 standards.

23 CHAIR GIBSON: Just quickly, all future
24 mining --

25 DR. STRIZ: All -- it -- the --

1 CHAIR GIBSON: -- does that mean that
2 applies to 2 through 11?

3 DR. STRIZ: Yes.

4 CHAIR GIBSON: Oh, okay. Great. I just
5 wanted to be sure. When you said "future," I thought
6 it meant something is going to happen in the future.

7 DR. STRIZ: Well, I have to be very clear
8 because it's got some grandfather language in it that
9 explains why it applies to them. It says that under
10 the existing requirements in Appendix A of 10 CFR Part
11 40 the staff will apply the Criterion 5(B) standards
12 in evaluating all ISR groundwater restoration plans
13 currently under review or submitted in the future. So
14 it applied to the groundwater restoration plans. As
15 you are aware, they submitted the model-based
16 restoration plan, which was approved through that
17 approval. Mine Units 2 and 3 fell under that
18 umbrella, and all the others are under it. So all of
19 them have to meet the Criterion 5(B)(5) standards.

20 Now, I have an additional comment. I
21 believe it was Dr. Kremer who was saying that we have
22 approved ACLs. We have never approved an ACL. The
23 ACL process for approval requires an amendment. They
24 have to propose the ACLs. They have to meet the
25 criteria in 5(B)(6) for the evaluation. There has to

1 be an public hearing because it's an amendment. We
2 have not -- never gone through this process. What has
3 been allowed in the past was that the secondary goal
4 of Class of Use was approved for Mine Unit 1. That
5 was not considered an ACL at the time.

6 JUDGE HAJEK: Thank you. So what you say
7 is not an ACL may be what you're saying was an ACL, is
8 that correct?

9 DR. KREAMER: I did not say that.

10 CHAIR GIBSON: No, I think it was Mr.
11 Wireman.

12 DR. KREAMER: David Kreamer. I didn't ask
13 that.

14 CHAIR GIBSON: I think so.

15 MR. WIREMAN: I said it, yes. Yes, I said
16 it.

17 CHAIR GIBSON: I just want to make sure
18 we're not getting caught up on nomenclature. That's
19 all.

20 MR. WIREMAN: Yes, Mr. Wireman here. Let
21 me clarify my understanding of this.

22 CHAIR GIBSON: Yes.

23 MR. WIREMAN: I did not -- my
24 understanding is that NDEQ approved ACLs in the past,
25 not NRC. That's number one.

1 CHAIR GIBSON: Okay.

2 MR. WIREMAN: Secondly, I am happy to hear
3 that the Appendix A standards will apply to 2 through
4 11, but I look at the table that was just shown here
5 for Mine Unit 10 --

6 CHAIR GIBSON: Right.

7 MR. WIREMAN: -- and it has a restoration
8 standard of 409 for radium. That is not in Appendix
9 40 -- or --

10 CHAIR GIBSON: And I think we've already
11 established that the derivation from that was NDEQ.
12 They put it in their application. This predated this
13 license condition to which he's referring.

14 MR. WIREMAN: That's true, but I read what
15 was in the LRA.

16 CHAIR GIBSON: Certainly.

17 MR. WIREMAN: Yes.

18 CHAIR GIBSON: As you were entitled to.

19 MR. WIREMAN: Yes.

20 CHAIR GIBSON: We finally got some
21 clarification.

22 MR. WIREMAN: Yes.

23 CHAIR GIBSON: No, I just want to be sure
24 we're not talking past each other.

25 MR. WIREMAN: Yes, as I understand; one

1 more point, I do understand that ACLs were not
2 approved by NRC. They were approved by -- to the
3 extent they were approved, it was NDEQ. And I believe
4 again under the new rule 192, if and when it's
5 finalized, that ACLs cannot be approved unilaterally
6 by the state, but would have to be approved by NRC.
7 That's my understanding.

8 CHAIR GIBSON: Okay. Very well.

9 JUDGE HAJEK: Thank you. Okay. So, staff
10 and CBR, I'm still a bit confused by what it is that
11 CBR has committed for restoration. So let me pursue
12 this through a few questions.

13 So, Mr. Teahon, is the cited NDEQ permit
14 here indeed CBR-017? Just to confirm that.

15 MR. TEAHON: What was that again?

16 JUDGE HAJEK: The NDEQ permit that we've
17 been discussing, is that indeed CBR-017?

18 MR. TEAHON: Yes, sir.

19 JUDGE HAJEK: Okay. Then, Mr. Deucher, if
20 you can bring it up again, let's look first at page 1.
21 Okay. Just to make sure, just to establish what this
22 is, Mr. Teahon, this is your permit for your plant as
23 stated at the top of this page, is that right?

24 MR. TEAHON: Yes, sir.

25 JUDGE HAJEK: Okay. And then -- so the

1 title -- let's see, the title of this is your permit.
2 We've got this. Now, on page 2 of the permit -- roll
3 on down near the bottom. That's good. No, back up.
4 Okay. That's it. Right there, Joe.

5 Okay. So here at the bottom it says -- if
6 you can tell me, please, what's the date this permit
7 became effective?

8 MR. TEAHON: I'll have to look that up,
9 sir.

10 JUDGE HAJEK: We have it on the --

11 MR. TEAHON: I don't have it off the top
12 of my head.

13 JUDGE HAJEK: It's on screen right there,
14 I think.

15 MR. TEAHON: Oh, I was looking for the
16 signature. April 23rd, 1990. My mistake.

17 JUDGE HAJEK: That's all right. No,
18 that's okay. Now, this is your exhibit CBR-017.

19 MR. TEAHON: Yes, sir.

20 JUDGE HAJEK: Okay. But this copy is not
21 signed, so can you confirm for us that indeed this
22 permit was signed and did go into effect on April
23 23rd, 1990?

24 MR. TEAHON: Yes, sir, I can get you a
25 scanned copy of the original.

1 JUDGE HAJEK: Well, I don't need a scanned
2 copy at this point. I'll believe you if you affirm --
3 you know how you -- I affirm --

4 MR. TEAHON: Yes, sir.

5 JUDGE HAJEK: -- that this is indeed your
6 permit, this was indeed signed --

7 MR. TEAHON: Yes, sir.

8 JUDGE HAJEK: -- and it currently is in
9 force, has been in force since sometime around April
10 of 1990.

11 MR. TEAHON: Well, it's been revised since
12 then. As you can see in the table, if you go to table
13 -- page 12, table 2.6 was revised. A modification was
14 revised of this original, revised that table in 2007.
15 So there's been modifications made to this since 1990.

16 JUDGE HAJEK: Okay. And what you have
17 given us in CBR-017 is the most recent version with
18 all of the modifications that have been placed here,
19 is that --

20 (Simultaneous speaking)

21 MR. TEAHON: To my knowledge, yes.

22 JUDGE HAJEK: Okay. Thank you. Now, I'm
23 inferring from the --

24 CHAIR GIBSON: Just with one
25 quantification. Except insofar as Mine Unit 11. You

1 do have a page for that, but it wasn't in this
2 exhibit, correct?

3 MR. TEAHON: No, sir, that was put into
4 restoration after the submittal.

5 CHAIR GIBSON: Okay.

6 MR. TEAHON: Or put into production after
7 the submittal.

8 CHAIR GIBSON: Right. Right. Okay.

9 JUDGE HAJEK: That table is relative to
10 the LRA, I think.

11 Okay. Mr. Teahon, I'm inferring from the
12 detail in CBR-011, the LRA, Section 6.1.3, starting on
13 page 6-4, which is PDF-548 -- Mr. Deucher, can you
14 bring that back for us, please -- that different
15 standards exist for different agencies. Is that
16 correct?

17 MR. TEAHON: What was the page number
18 again, sir?

19 JUDGE HAJEK: It is page No. 6-4. It's
20 548. And there's a good image of it. Oh, 547.

21 MR. TEAHON: And the question again?

22 JUDGE HAJEK: Is that different standards
23 exist for different agencies.

24 MR. TEAHON: Yes, sir, we are under dual-
25 jurisdiction.

1 JUDGE HAJEK: Thank you. Now, the NDEQ
2 permit, do you refer to those standards as secondary
3 restoration values?

4 MR. TEAHON: That's what they refer to
5 them as.

6 JUDGE HAJEK: They being?

7 MR. TEAHON: The NDEQ.

8 JUDGE HAJEK: The NDEQ?

9 MR. TEAHON: Their Class of Use values.

10 JUDGE HAJEK: Okay. And then in this
11 section that's displayed here of the LRA, and notice
12 at the bottom right this is dated May 7th, 2009. So,
13 this particular page is in response to an RAI,
14 apparently. It's been incorporated.

15 MR. TEAHON: Yes, sir.

16 JUDGE HAJEK: Is that correct?

17 MR. TEAHON: Yes, sir.

18 JUDGE HAJEK: Okay. All right. You go on
19 in this same section and you describe the U.S. EPA
20 groundwater protection standards issued under the
21 authority of the Uranium Mill Tailings Radiation
22 Control Act. I believe you referred to that
23 yesterday, Mr. Wireman, as being required to be
24 followed by NRC licensed, ISL licensees, is that
25 correct?

1 MR. TEAHON: (No audible response)

2 JUDGE WARDWELL: Okay. It may be on the
3 next page, 548, then.

4 MR. TEAHON: And the question was? I
5 thought you were speaking to someone else. Sorry.

6 JUDGE HAJEK: That's okay.

7 JUDGE WARDWELL: Why don't you scroll to
8 the next page, Joe?

9 JUDGE HAJEK: Yes.

10 JUDGE WARDWELL: There you go. That's it.

11 JUDGE HAJEK: That's it. Okay. So you're
12 explaining in this top paragraph that the EPA
13 groundwater protection standard issued under the
14 authority of the Uranium Mill Tailings Radiation
15 Control Act as being required to be followed by NRC
16 ISL licensees.

17 MR. TEAHON: Yes, sir, that was in a
18 response to an RAI that they request that we put that
19 in the application.

20 JUDGE HAJEK: Okay. Thank you. And then
21 I think in here you conclude the regulatory path by
22 stating these standards are listed in Criterion
23 5(B)(5) of 10 CFR 40, Appendix A.

24 MR. TEAHON: Yes, sir.

25 JUDGE HAJEK: Okay. And then you provide

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1 three alternatives for restoration. The first
2 alternative here is the Commission approved background
3 concentration of constituents in the groundwater.

4 MR. TEAHON: Yes, sir.

5 JUDGE HAJEK: If I misread these, please
6 jump in. The second one, values given in your -- and
7 this is table 6.1-1 in the -- if the constituent in
8 the table and the background level is below the value
9 as listed.

10 MR. TEAHON: Yes, sir.

11 JUDGE HAJEK: And thirdly, alternate
12 control limits established by the Commission.

13 MR. TEAHON: Yes, sir.

14 JUDGE HAJEK: This is in your LRA.

15 MR. TEAHON: Yes, sir.

16 JUDGE HAJEK: And these actually are
17 stated in 10 CFR 40, Appendix A, Criterion 5(B) that
18 you referenced above. Is that correct?

19 MR. TEAHON: Yes, sir.

20 JUDGE HAJEK: Dr. Striz, I thought I heard
21 you say earlier the Commission does not issue ACLs.

22 DR. STRIZ: No, they do. The Criterion
23 5(B)(5) has a definite process for ACL -- accepting
24 and approving ACLs. It just has not been done in the
25 past. We have never granted an ACL. We allow the

1 secondary goal. But we didn't go through the ACL
2 amendment process for Mine Unit 1. We allowed that
3 secondary goal of Class of Use. But now everyone will
4 have to go through -- all the mine units will have to
5 go through the ACL amendment if they --

6 JUDGE HAJEK: Every one of the remaining
7 10 mine units?

8 DR. STRIZ: Excuse me?

9 JUDGE HAJEK: Every single one of the 10
10 remaining mine units?

11 DR. STRIZ: Correct.

12 JUDGE HAJEK: For --

13 DR. STRIZ: If they apply for an ACL,
14 they'll have to go through an ACL amendment process.

15 JUDGE HAJEK: Okay. And those ACLs would
16 only apply to the constituents listed in Appendix A,
17 Criterion 5(B). And there's a table there, table 5C,
18 maximum values for groundwater protection.

19 DR. STRIZ: No, it applies to all
20 hazardous constituents of concern which are covered
21 under Criterion 13. So that's all the --

22 JUDGE HAJEK: I'm sorry. The door slammed
23 in the back and I couldn't hear you.

24 DR. STRIZ: It applies to all constituents
25 of -- hazardous constituents of concern which are

1 identified in Criterion 13, which lists all the
2 constituents that are typically measured at
3 restoration. So anything that's not included in that
4 table that would be of concern.

5 JUDGE HAJEK: That would include
6 everything perhaps that's in the NDEQ 118 in general?

7 DR. STRIZ: I need to check the license.
8 I believe that the actual ones that are listed within
9 the license.

10 JUDGE HAJEK: So that would be Mr.
11 Teahon's table 6.1-1?

12 DR. STRIZ: This is listed in License
13 Condition 11.3(C). Ammonia, arsenic, barium, cadmium,
14 calcium, chloride, copper, fluoride, iron, lead,
15 magnesium, manganese, mercury, molybdenum, nickel,
16 nitrate, pH potassium, radium-226, selenium, sodium
17 sulfate, total carbonate, total dissolved solids,
18 uranium, vanadium, and zinc.

19 JUDGE HAJEK: Quite a list. And that is
20 -- tell me the license condition is 11 --

21 DR. STRIZ: 11.3(C).

22 JUDGE HAJEK: And that also was Criterion
23 13?

24 DR. STRIZ: Well, some of those are
25 included in Criterion 13, so it's not just limited to

1 table 5C is the point I'm trying to make. There's
2 many constituents that we require. Definitely the
3 ones in Criterion 13, but here in this license
4 condition we've added additional ones.

5 JUDGE HAJEK: Okay. Is uranium in that
6 list?

7 DR. STRIZ: Yes, it is.

8 JUDGE HAJEK: Okay. Thank you.

9 DR. STRIZ: Of course.

10 JUDGE HAJEK: Okay. Then I believe that
11 in this -- what we had up there from the license just
12 a few moment ago, Mr. Teahon, it references the NRC
13 rulemaking that would resolve differences between
14 dual-standards emphasizing that the UMTRCA standards
15 would govern.

16 MR. TEAHON: Yes, sir, and as stated in
17 the three conditions there, if we can't meet the
18 goals, we'll apply for an ACL.

19 JUDGE HAJEK: And you would apply to?

20 MR. TEAHON: On the constituents that are
21 not back to the baseline average.

22 JUDGE HAJEK: And you would apply to NRC?

23 MR. TEAHON: Yes, sir.

24 JUDGE HAJEK: Is that correct? Thank you.

25 Okay. Finally, on this section in this last paragraph

1 where I just read, NRC is currently developing
2 rulemaking in an effort to eliminate dual-
3 jurisdiction. Such new rulemaking could affect
4 groundwater restoration.

5 And it's the next sentence that I have a
6 question about. CBR is requesting in this
7 application; so this was back in 2009, that the NRC
8 amend the current License Condition 10.3 to reflect
9 these groundwater quality standards. Is that correct?

10 MR. TEAHON: Yes, we did, sir.

11 JUDGE HAJEK: Yes, we did?

12 MR. TEAHON: Yes, in this application.

13 JUDGE HAJEK: In this application?

14 MR. TEAHON: And we did not get that
15 request as stated.

16 JUDGE HAJEK: Thank you. And but that --
17 so, Dr. Striz --

18 DR. STRIZ: Yes?

19 JUDGE HAJEK: -- help me understand. So
20 in this application they requested that you provide --
21 that NRC provide a new license condition that would
22 specifically state that the requirements of 10 CFR 40,
23 Appendix A be met. And NRC put a license condition in
24 that you said was 11.3 Bravo. But that's different
25 from what they had requested, is that correct?

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1 DR. STRIZ: I don't see the difference.
2 And aside from that, the license condition stands that
3 they have to meet 10 CFR Part 40, Appendix A,
4 Criterion 5(B)(5).

5 JUDGE HAJEK: So are they the same then,
6 as she has indicated, Mr. Teahon?

7 MR. TEAHON: Are they the same as NDEQ's
8 requirements?

9 JUDGE HAJEK: No, they're not the same as
10 NDEQ.

11 MR. TEAHON: No.

12 JUDGE HAJEK: But are they now the same as
13 you --

14 MR. TEAHON: Based on our history with
15 Mine Unit 1 where we restored to the Class of Use
16 based on what we're currently required to do now, no,
17 they are not the same.

18 JUDGE HAJEK: Are they the same as in the
19 UMTRCA limits at this point in time, or are we still
20 waiting for those to --

21 MR. TEAHON: Are the values that we're
22 restoring to now?

23 JUDGE HAJEK: Yes.

24 MR. TEAHON: We will meet the Class of Use
25 standards and then we'll apply for an ACL for the ones

1 that don't meet Criterion 5(B)(5).

2 JUDGE HAJEK: Okay. Thank you.

3 Okay. Mr. Deucher, would you please
4 display NRC-010, page 82, red 95 at the top so that we
5 can read it?

6 And, staff, I don't know who wants to
7 answer this. There are three concentration limits
8 referenced in this paragraph. The second refers to
9 table 5C. I think I can understand that. I need help
10 with the other two, though. First, the paragraph
11 states at the beginning -- and let's just read it.
12 "The purpose of aquifer restoration is to return the
13 groundwater quality in the production zone to
14 compliance with the groundwater protection standards
15 in 10 CFR 40, Appendix A, Criterion 5(B)(5). Is that
16 okay?

17 DR. STRIZ: Yes.

18 JUDGE HAJEK: Okay. And the rest is
19 essentially a quote from Criterion 5(B)(5), is that
20 correct?

21 DR. STRIZ: Yes.

22 JUDGE HAJEK: Was that a yes?

23 DR. STRIZ: Yes.

24 JUDGE HAJEK: Thank you. So I find items
25 1 and 3 sufficiently clear -- I do not find items 1

1 and 3 sufficiently clear. So, can you do two things
2 for me here for each of them? First, explain for me
3 in 25 words or less what each one of these means, 1
4 and 3.

5 Let's take the first condition. What are
6 the Commission-approved background concentrations and
7 where are they found?

8 DR. STRIZ: They're from the background
9 water quality that they measured at the mine units,
10 the average of that, which was --

11 JUDGE HAJEK: So that's the tables -- I
12 don't remember the numbers.

13 DR. STRIZ: Yes, it's their background
14 values in those tables.

15 JUDGE HAJEK: Those 10 tables --

16 DR. STRIZ: Yes.

17 JUDGE HAJEK: -- that we looked at?

18 CHAIR GIBSON: This would have been I
19 believe the third column in those tables that had
20 the --

21 DR. STRIZ: It was the -- was it the
22 first --

23 CHAIR GIBSON: Or maybe the second.

24 DR. STRIZ: The second column.

25 CHAIR GIBSON: Was it the second?

1 DR. STRIZ: Second column.

2 CHAIR GIBSON: Second column? Okay. Very
3 well.

4 JUDGE HAJEK: So when this says the
5 Commission approved background concentrations, then
6 you refer to those in the LRA. And so, license has
7 been issued. Those are actually Commission --

8 DR. STRIZ: Correct.

9 JUDGE HAJEK: -- or approved?

10 DR. STRIZ: Correct.

11 JUDGE HAJEK: Is that correct? Okay. For
12 the third condition what are the Commission-
13 established ACLs and how are they established?

14 DR. STRIZ: That's covered under Criterion
15 5(B)(6), and that is in our testimony. "Alternate
16 concentration limits that present no significant
17 hazard may be proposed by the licensee for Commission
18 consideration. Licensees must provide the basis for
19 any proposed limits including consideration of
20 practicable corrective actions that limits or as low
21 as reasonable achievable and information on the
22 factors the Commission must consider.

23 "The Commission will establish a site-
24 specific alternate concentration limit for a hazardous
25 constituent as provided in paragraph 5(B)5 of this

1 criterion if it finds that the proposed limit is as
2 low as reasonably achievable after considering
3 practical corrective actions and that the constituent
4 will not pose a substantial present or potential
5 hazard to human health or the environment as long as
6 the alternate concentration limit is not exceeded."

7 And then it goes on to list the factors
8 that must be considered in the amendment application
9 for the Commission to make this decision.

10 JUDGE HAJEK: And would you repeat for me,
11 please, what is the reference in there? You said it
12 was 5 -- or --

13 DR. STRIZ: 5(B)(6).

14 JUDGE HAJEK: 5(B)(6). Thank you. So,
15 these are issued, or these are effectively -- or that
16 paragraph is in effect at this particular time.

17 DR. STRIZ: Yes, it is.

18 JUDGE HAJEK: Is that correct? Okay. So
19 what I'd like to do, if we -- well, I think we can
20 really do this without looking at tables side by side.
21 The values in the NDEQ restoration standards detailed
22 in table 2.6 of CBR-017, we have that before us. And
23 those in Appendix A standards, have they been included
24 in Exhibit -- the Appendix A --

25 DR. STRIZ: They're part of the CBR --

1 JUDGE HAJEK: -- 5C?

2 DR. STRIZ: I'm sorry. I didn't
3 understand the question.

4 JUDGE HAJEK: Has table 10 CFR 40,
5 Appendix A, Criterion 5(B)(5), table 5C -- is that in
6 an exhibit already?

7 MS. SIMON: Your Honor, Marcia Simon for
8 the staff. Typically the regulations aren't usually
9 included as exhibits. The Board can take judicial --
10 official notice of those.

11 JUDGE HAJEK: Thank you. So we can
12 discuss them more clearly among everyone here, can we
13 introduce Board Exhibit -- I don't know what number
14 we're up to -- titled, "5C Maximum Values for
15 Groundwater Protection?" And I have copies of that
16 that we can pass around. Okay. And this is a two-
17 page exhibit all on one sheet of paper. The first
18 page identifies -- it provides the identification of
19 what this is, Appendix A in the bottom right corner.
20 And table 5C is on the back side of that.

21 CHAIR GIBSON: And just for identification
22 purposes we will mark this as Board Exhibit 9.

23 (Whereupon, the above-referred to
24 document was marked as Board Exhibit No.
25 9 for identification.)

1 JUDGE HAJEK: Okay. Mr. Teahon, which
2 standards are more restrictive here, the NDEQ
3 standards or the 10 CFR 40, Appendix A standards that
4 we just distributed?

5 MR. TEAHON: Depends upon the constituent,
6 but some are more stringent, some are not. Lead, for
7 example, is 0.05. The DEQ is 0.015. As -- in mine
8 units after the 2007 that became 0.015 due to the
9 maximum contamination level set by the EPA. So
10 currently this is listed at 5, but in -- if you look
11 in Mine Units 9 and 10, it would be 0.015.

12 JUDGE HAJEK: Okay. Thank you. Do you
13 agree, Dr. Striz?

14 DR. STRIZ: Yes.

15 JUDGE HAJEK: Okay. And did the staff
16 amend the license? I think I have the answer, but let
17 me ask Dr. Striz. Did the staff amend the license in
18 accordance with the request stated in the LRA?

19 DR. STRIZ: The -- I'm not confident of
20 what the request is in the LRA. We stated in the
21 license that they have to meet the Criterion 5(B)(5)
22 criteria.

23 JUDGE HAJEK: Yes, I think what I'm after
24 is did the staff amend the license to include that
25 particular requirement that was requested that a

1 commitment to the 5C maximum values for groundwater
2 protection in Appendix A? Before the new license was
3 issued was there an amendment?

4 DR. STRIZ: No.

5 JUDGE HAJEK: No?

6 DR. STRIZ: There was no amendment.

7 JUDGE HAJEK: Okay. Thank you. Okay.

8 Dr. Striz, if single conditions for a constituent are
9 changed in a license by amendment after an LRA has
10 been submitted, does that preclude the change having
11 to be addressed in the final environmental assessment
12 document?

13 DR. STRIZ: Can -- could you rephrase that
14 or --

15 JUDGE HAJEK: Yes, let me --

16 DR. STRIZ: I want to make sure I answer
17 this --

18 JUDGE HAJEK: Okay. Let me phrase it a
19 little bit differently. I do not see or did not see;
20 and did I miss this, in the EA any discussion of this
21 particular condition being implemented?

22 DR. STRIZ: I believe it's in the EA, so
23 I'll let someone try and track it down for me and we
24 can move on.

25 MS. SIMON: Your Honor, I believe it's in

1 the section that we went over earlier. I don't
2 remember the page number.

3 JUDGE HAJEK: Can't hear you, Ms. Simon.

4 MS. SIMON: The section where you were
5 asking about on a page of the EA what is meant by the
6 alternate concentration limit, I think the Commission
7 establishes it -- PDF page 95. I think it's page 82
8 of the EA. That's where the EA discusses that the
9 licensee would have to meet the three criteria that
10 are in 5(B)(5).

11 DR. STRIZ: At the top of page 82.

12 JUDGE HAJEK: I'm sorry. Top of --

13 DR. STRIZ: It's at the top of page 82.

14 JUDGE HAJEK: And this 82 is red or black?

15 DR. STRIZ: Black.

16 MS. SIMON: It's the black ink.

17 JUDGE HAJEK: Page 82? Okay. There it
18 is. Okay. "The purpose of aquifer restoration is to
19 return the ground" -- it's what we read earlier.
20 That's correct. Okay. Thank you. I did see that
21 before.

22 All right. Now, Mr. Teahon, here's my
23 confusion a little bit. I have three total tables all
24 of which are different. I have in the LRA table 6.1-1
25 on page 6-6 that seems to have been committed to in

1 item B on page 6-5, the page before that. I have
2 table 2.6 in the NDEQ permit on page 12 that we've
3 been talking about. And then I have table 5C from 10
4 CFR 40, Appendix A. And it seems as though I also
5 have an additional requirement that I was not aware
6 of, and that is License Condition 11.3(B).

7 And my question is relative to all of
8 these various sets of constituents what is it that, or
9 which is it, or how does Crow Butte determine what
10 they committed to meet on restoration of a mine unit?

11 MR. TEAHON: Prior to issuing this license
12 in November of 2014 we were committed to restoring, as
13 we did Mine Unit 1, back to the DEQ, NDEQ Class of
14 Use. Since the issuance of this license, now we're
15 required to restore to a different standard than what
16 we have in the past. So if needed; and I emphasize if
17 needed, we will apply for an ACL on the constituents
18 that we can't restore back to the requirements of 5C.

19 JUDGE HAJEK: Okay. 5C and the License
20 Condition 11.3(B)?

21 MR. TEAHON: Yes, sir.

22 JUDGE HAJEK: Is that correct? And, Mr.
23 Wireman, that set of requirements includes uranium
24 relative to what your testimony was that uranium was
25 not included.

1 MR. WIREMAN: I don't see uranium in --
2 oh, it is. Okay. Excluding radon and uranium. In
3 table 5C there's gross alpha. And then it says
4 "excluding radon and uranium."

5 JUDGE HAJEK: Oh, I agree with you.

6 It's --

7 MR. WIREMAN: So, I don't see --

8 (Simultaneous speaking)

9 JUDGE HAJEK: -- table 5C.

10 MR. WIREMAN: Yes, it's not here.

11 JUDGE HAJEK: But relative to -- I need
12 NRC-012, Mr. Deucher. And on NRC-012 we need
13 Condition -- what page is that on? Do you have that
14 in front of you, Ms. Striz, or Dr. Striz?

15 DR. STRIZ: That is NRC -- I'm sorry.

16 MS. SIMON: Your Honor, it's on page PDF
17 11, if you're looking for License Condition 11.3.

18 DR. STRIZ: The license condition for
19 restoration standards is in 10.6.

20 JUDGE HAJEK: Okay. This is --

21 DR. STRIZ: 11.3 had to do with what they
22 had to restore to those standards. 10.6 is the actual
23 requirement to meet those standards.

24 JUDGE HAJEK: Okay. So, 10.6 is on red
25 page 8, or PDF page 8. And I'm looking at this here.

1 I don't see the list of constituents that you read
2 earlier. It was quite a long list.

3 DR. STRIZ: Yes, it was a long list.

4 JUDGE HAJEK: So why am I not seeing it?

5 DR. STRIZ: It's true, they're not there.

6 JUDGE HAJEK: So what were you reading
7 from when you read that list? You just read it a few
8 minutes ago.

9 DR. STRIZ: Excuse me?

10 PARTICIPANT: The other license condition
11 that you read for the record. That's --

12 DR. STRIZ: Right. Right. So, I think
13 that those --

14 PARTICIPANT: (Off microphone).

15 DR. STRIZ: Right. Right. No, I
16 understand. 11.3(C). Those were the things that had
17 to be required at background to be measured. And the
18 restoration standards do say hazardous constituents,
19 which would be those that would be covered under
20 Criterion 13. So the remainder -- yes, you're
21 correct.

22 JUDGE HAJEK: Okay. I really was unable
23 to hear what you just said.

24 DR. STRIZ: I said you're correct. I
25 don't see that those were included in the 5(B)(5)

1 standard, but they're expected to be returned to
2 background. And that would be something that we would
3 have to correct.

4 JUDGE HAJEK: Okay. What action is
5 required for you to correct that?

6 DR. STRIZ: It would take an amendment to
7 the license.

8 JUDGE HAJEK: Pardon?

9 DR. STRIZ: It would take an amendment to
10 the license to correct that.

11 JUDGE HAJEK: So you're saying that NRC
12 did not put these constituents in the license in error
13 and now it's upon the licensee to go through the
14 process of submitting an amendment request to get them
15 in?

16 MS. MONTEITH: Your Honor, if I may.
17 Emily Monteith for the NRC staff. I believe 10.6
18 references the requirements in 5(B)(5). 5(B)(5) in
19 turn references 5(B)(6), which sets the standards for
20 the request for an ACL. The list of hazardous
21 constituents that would be subject to that I think is
22 a matter of regulatory interpretation. We may want to
23 speak with the staff before we are able to answer that
24 question.

25 (Pause)

1 MS. MONTEITH: Your Honor, Ms. Striz was
2 reading initially from Criterion 5(B)(6), which sets
3 the process for request for an ACL. And if I may read
4 that again, I think the pertinent part is: "The
5 Commission will establish a site-specific alternative
6 concentration limit for a hazardous constituent as
7 provided in paragraph (5)(B)(5) of this criterion."
8 And then it goes into the requirements for setting
9 that ACL.

10 Hazardous constituent is defined in
11 Criterion 13 of Appendix A to part 40. And that is
12 the long list of constituents that she was reading.
13 So that seems to be incorporated by reference into
14 Criterion 5(B)(5) and Criterion 5(B)(6) in License
15 Condition 10.6.

16 JUDGE HAJEK: So --

17 CHAIR GIBSON: Just a minute. We'll let
18 you speak, Tyson, in just a minute.

19 JUDGE HAJEK: So, Mr. Teahon, is that part
20 of your commitment then of --

21 CHAIR GIBSON: Hold on a minute. I think
22 Tyson wanted to respond. Mr. Smith wanted to respond
23 to the point she was just making, I think.

24 MR. SMITH: I would just say I agree with
25 Ms. Monteith that the standard in 5(B) -- well, that

1 uranium is a hazardous constituent and that would be
2 covered by this restoration standard in Condition
3 10.6.

4 CHAIR GIBSON: And therefore there won't
5 need to be any specific --

6 MR. SMITH: A change would not be
7 necessary to the license.

8 CHAIR GIBSON: -- revision for monitoring
9 uranium, is that correct, and limiting --

10 MR. SMITH: Right.

11 CHAIR GIBSON: -- it in this situation?

12 MR. SMITH: For restoring uranium.

13 CHAIR GIBSON: Okay. Thank you.

14 JUDGE HAJEK: Okay. Mr. Wireman, your
15 intention was that uranium was not included among
16 those constituents that were required to be monitored
17 back to baseline conditions, is that correct?

18 MR. WIREMAN: Yes.

19 JUDGE HAJEK: But it sounds like because
20 in Criterion -- was that 13?

21 MS. MONTEITH: I'm sorry?

22 JUDGE HAJEK: Is that Criterion 13? Is
23 that --

24 MS. MONTEITH: Criterion 13 lists the
25 hazardous -- I'm sorry. Yes, Criterion 13 was

1 hazardous constituents.

2 DR. STRIZ: Yes, I misunderstood your
3 question. All of the hazardous constituents are
4 listed there.

5 JUDGE HAJEK: So the constituents that are
6 listed there essentially include all the constituents
7 that previously were listed, and still are, in the
8 NDEQ 118 standard?

9 DR. STRIZ: Not all of them, no.

10 JUDGE HAJEK: And the one element or
11 constituent that is in question here is uranium, and
12 that one is?

13 DR. STRIZ: It's definitely listed, yes.

14 JUDGE HAJEK: Okay. All right. So just
15 to conclude this discussion of Contention 9, Mr.
16 Teahon. So your commitment is to restore the mines in
17 accordance with 10 CFR 50, Appendix A, 5(B)(5) that
18 includes by reference Criterion 13. Did I say that
19 correctly, Dr. Striz?

20 DR. STRIZ: Yes.

21 JUDGE HAJEK: Okay. Is that correct, Mr.
22 Teahon?

23 MR. TEAHON: Yes, sir.

24 JUDGE HAJEK: Okay. And, Mr. Smith, do
25 you agree with that as well?

1 (Laughter)

2 MR. SMITH: Yes, I --

3 JUDGE HAJEK: Okay.

4 MR. SMITH: Yes. I mean, you said Part
5 50. It would be Part 40, but other than that
6 correction, yes.

7 JUDGE HAJEK: I meant Part 40. Thank you
8 for correcting me. Part 40. Okay. So my final
9 question and where I was trying to get to was to
10 determine what is the commitment that the plant has
11 made. And as I understand now it is to meet the
12 standards in 10 CFR 40, Appendix A, Criterion 5(B)(5)
13 that includes by reference Criterion 13. And that
14 does include uranium as well as -- I'm just going to
15 stop there. Some other constituents. Probably that
16 include most of those that were in 118 in the past.

17 MR. TEAHON: Yes, sir, we will restore to
18 the most restrictive of the two requirements and if
19 necessary would apply for an ACL.

20 JUDGE HAJEK: Thank you. And I am done.

21 CHAIR GIBSON: I have a question.

22 JUDGE WARDWELL: Oh, okay. Judge Gibson
23 has a question.

24 CHAIR GIBSON: All right. I just a
25 question for Dr. Striz.

1 DR. STRIZ: Yes.

2 CHAIR GIBSON: I want to make sure I
3 understood. You said that what the staff did for Mine
4 Unit 1 would today require a license amendment. Is
5 that correct?

6 DR. STRIZ: Yes, it would for some of the
7 constituents that were above background.

8 CHAIR GIBSON: Do you know when the
9 approval was for the restoration for Unit 1?

10 DR. STRIZ: 2003.

11 CHAIR GIBSON: 2003? Okay. Very well.
12 Thank you.

13 DR. STRIZ: Thank you.

14 CHAIR GIBSON: This is what we're going to
15 do: I think we can take a five-minute recess. I
16 can't imagine there being any more questions about
17 this, but you all may have some about Contention 9.
18 And if you do, let us know. If you don't, let us know
19 and we will recess until tomorrow at 8:30.

20 Stand in recess for five minutes.

21 (Whereupon, the above-entitled matter went
22 off the record at 5:42 p.m. and resumed at 5:50 p.m.)

23 CHAIR GIBSON: All right. Let's see if we
24 can't finish up Contention 9.

25 JUDGE HAJEK: We have a number of

1 questions. All of the questions that have been
2 submitted will go into the record, okay, whether I ask
3 the questions at this point in time or not.

4 But one of the questions I would like to
5 ask, and this is to the staff. Okay. As I read what
6 we have here, for Crow Butte to justify requesting an
7 ACL they need to first have done a best practicable
8 effort. What is meant by that and how do you evaluate
9 that?

10 MS. MONTEITH: Your Honor, I believe that
11 is calling for a legal conclusion. That's an
12 interpretation of the regulations and there is no past
13 staff practice in the approval of an ACL to provide
14 them with that information.

15 CHAIR GIBSON: Is there anything wrong
16 with Dr. Striz explaining what is involved in a
17 technical analysis of those words? I mean, somebody's
18 got to review data that comes in. That's a filter
19 through which they've got to evaluate the data.

20 MS. MONTEITH: Your Honor, we'll just
21 register that as an objection to the question for the
22 record and then she may proceed to answer it.

23 CHAIR GIBSON: Okay. Thank you.
24 Objection is noted.

25 JUDGE HAJEK: Okay. Dr. Striz, would you

1 please follow up on that then? And be sure --

2 DR. STRIZ: What we look for, what we
3 would look for, since we haven't had an ACL amendment,
4 is that we would look for that they had applied every
5 technique available to them under their restoration
6 plan, that they had used the techniques that they had
7 offered: the groundwater transfer, the groundwater
8 sweep, the groundwater treatment and reductant
9 addition, that they had made every effort possible to
10 reach those goals. We would look for asymptotic
11 behavior in the constituents to demonstrate that they
12 had made a continuous effort to try to lower those
13 values.

14 And so, we actually look at that now.
15 When meeting background have they gotten the
16 constituent down and asymptotic and no future effort
17 has moved it. It's become stable at some asymptote.
18 So we would look at that in terms of best practical
19 action.

20 JUDGE HAJEK: Thank you. And let me ask
21 a related question to Mr. Teahon. At what point do
22 you request ACLs in the restoration effort? I
23 understand what Dr. Striz said. They're going to look
24 to make sure that you have applied all four of your
25 steps that are in the restoration plan and then you're

1 going to start monitoring. And Mr. Lewis earlier --
2 there he is -- said that a lot of your efficiencies in
3 terms of pore volumes, which may or may not -- I'm
4 sorry, in terms of pore volume use might extend or
5 shorten or reduce the number of pore volumes used.
6 But at what point would you be requesting ACLs?

7 MR. TEAHON: We do the same thing with the
8 model that Mr. Lewis has developed. We look for that
9 asymptotic relationship for the parameters. And once
10 we meet that, we move on and start restoring the next
11 pattern. So as we go across the mine unit and we
12 reach those values and process those pore volumes,
13 once we get one in stability monitoring, if they don't
14 meet the restoration standard at that point, then we
15 would go through the steps if necessary to request an
16 ACL. You can add enough permeate; it's basically
17 distilled water, that they can -- it becomes kind of
18 counterproductive. You start liberating things that
19 you don't see there that are absorbed. So it's a
20 catch-22 and it's the issues we have to resolve when
21 requesting final restoration.

22 JUDGE HAJEK: Okay. So you're going to go
23 through the four steps. You're going to go into
24 stabilization monitoring or stability monitoring. And
25 at that point if you have not -- really at the

1 beginning of that period, stability monitoring. If
2 you have not met the limits, then you're going to
3 probably apply rather quickly for an ACL, is that
4 correct?

5 MR. TEAHON: Yes, we wouldn't process 30
6 or 40 pore volumes again. We know that's not -- it's
7 not cost-effective for one thing and it doesn't solve
8 anything. So it's inefficient.

9 JUDGE HAJEK: Thank you.

10 CHAIR GIBSON: All right. So with that --

11 MR. REID: Excuse me.

12 CHAIR GIBSON: Yes?

13 MR. REID: This is Andrew Reid from the --

14 CHAIR GIBSON: Yes.

15 MR. REID: -- tribe.

16 CHAIR GIBSON: Yes, Mr. Reid.

17 MR. REID: I handed in a question
18 yesterday that I hadn't heard brought up and I didn't
19 know whether or not you had decided not to ask it on
20 an issue.

21 CHAIR GIBSON: There's a lot of questions
22 that have been submitted that we may not ask --

23 MR. REID: Okay.

24 CHAIR GIBSON: -- or we may defer asking
25 until a subsequent time such as in the days hearing

1 that we will have on hydrogeology subsequently.

2 MR. REID: This one dealt with post-
3 closure monitoring and I don't know if that one got
4 overlooked or not.

5 CHAIR GIBSON: I don't believe --

6 MR. REID: Because I thought now was the
7 appropriate time to deal with it, but if not, then
8 that's fine.

9 JUDGE WARDWELL: We reviewed all the
10 questions and those we felt were repetitive or did not
11 provide any assistance for us in our decision we
12 decided not to ask. We asked only those that we
13 thought would add to our decision making process or to
14 complete the record.

15 MR. REID: All right. Thank you.

16 CHAIR GIBSON: And just to give you a
17 complete answer, Mr. Reid, we reviewed all the
18 testimony. There are some holes that we found, and
19 those are basically the questions we've asked. You
20 all think you have seen some other holes, but it
21 didn't really -- may not have gone into the issues
22 that we needed to get addressed in order to reach an
23 initial decision.

24 MR. REID: Thank you.

25 CHAIR GIBSON: Okay? Okay. Now with

1 that, there's nothing else. I think the only homework
2 we have tonight -- you all don't have to be working on
3 any questions, so maybe you can get a better night's
4 sleep. Don't have to be trying to figure out how to
5 work the model or anything. But hopefully you all
6 will be able to work out your issues on the model and
7 you have some good news to report to us tomorrow.

8 The only homework that I'm aware of is
9 that you all will need to be sure and let us know the
10 extent to which any of the information that is in
11 these Board exhibits is proprietary or has some kind
12 of copyright issue or something, because we don't want
13 to be putting that on the web if there's going to
14 cause any injury to anybody, or concern.

15 Also, if there are any witnesses here who
16 are not going to talk about Contention 1 or Contention
17 12, they may be dismissed and don't need to return.

18 We'll be starting at 8:30 in the morning.

19 I believe Mr. Smith has something. Yes,
20 sir?

21 MR. SMITH: I do. Yes, Your Honor. Crow
22 Butte did have another homework assignment related to
23 water levels in a couple of wells. And so, we will be
24 developing that --

25 (Simultaneous speaking)

1 CHAIR GIBSON: Yes, you did. And thank
2 you. I forgot about that. You did have that
3 homework. Thank you. See, it's something getting
4 older.

5 Okay. So anyway, with that, if there's
6 nothing else, we will recess until 8:30 in the
7 morning. Hope you have a good evening. Thank you.

8 (Whereupon, the above-entitled matter went
9 off the record at 5:59 p.m.)

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