

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED
BY THE OIL CONSERVATION DIVISION FOR
THE PURPOSE OF CONSIDERING:

APPLICATION OF ROSETTA RESOURCES CASE NOS. 14265,
OPERATING, LP, FOR APPROVAL OF A 14266
SALTWATER DISPOSAL WELL, SAN JAUN COUNTY,
NEW MEXICO; APPLICATION OF ROSETTA
RESOURCES OPERATING, LP, FOR APPROVAL OF
A SALTWATER DISPOSAL WELL, SAN JUAN COUNTY,
NEW MEXICO

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID K. BROOKS, Legal Examiner
RICHARD EZEANYIM, Technical Examiner
TERRY G. WARNELL, Technical Examiner

February 19, 2009

Santa Fe, New Mexico

This matter came on for hearing before the New
Mexico Oil Conservation Division, DAVID K. BROOKS, Legal
Examiner, RICHARD EZEANYIM, Technical Examiner, and TERRY
G. WARNELL, Technical Examiner, on Thursday, February 19,
2009, at the New Mexico Energy, Minerals and Natural
Resources Department, 1220 South Saint Francis Drive,
Room 102, Santa Fe, New Mexico.

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1 MR. BROOKS: At this time we will call
2 Case Number 14265, application of Rosetta Resources
3 Operating LP for approval of a saltwater disposal well,
4 San Juan County, New Mexico, and Case Number 14266,
5 application of Rosetta Resources Operating LP for
6 approval of a saltwater disposal well, San Juan County,

7 MR. BRUCE: Mr. Examiner, Jim Bruce of
8 Santa Fe representing the applicant. I have three
9 witnesses.

10 MR. BROOKS: I believe your witness will
11 be appearing by telephone?

12 MS. ALTOMARE: He will. And I would
13 object to purported three witnesses, because there was
14 only disclosed that there was going to be two witnesses
15 and, actually, only one was named, so --

16 MR. BRUCE: Mr. Examiner, in the telephone
17 conference yesterday, I mentioned both -- the two
18 witnesses, Chad McGehee and Chris Sutton.

19 MS. ALTOMARE: He only identified that one
20 of them was going to be testified. The pre-hearing
21 statement notes that two witnesses will be appearing
22 today, one of them was identified by name.

23 MR. BROOKS: And the witness, Cory
24 Mitchell, was the land witness that was identified --
25 there was a blank line -- maybe I have the wrong document

1 here.

2 MS. ALTOMARE: I believe Mr. Wood was
3 identified by him.

4 MR. BROOKS: I'm sorry. I have the wrong
5 file here.

6 MS. ALTOMARE: We'll need some time to
7 make arrangements to get Mr. Hayden on the phone.

8 MR. BROOKS: You identified Brian Wood,
9 regulatory consultant and a blank as geologist. Is one
10 of your witnesses this morning a geologist?

11 MR. BRUCE: One is a geologist.

12 MR. BROOKS: His name is?

13 MR. BRUCE: Chris Sutton.

14 THE BROOKS: Who is the other one?

15 MR. BRUCE: Chad McGehee.

16 MR. BROOKS: What is his expertise?

17 MR. BRUCE: He is an engineer.

18 MR. BROOKS: What would be the
19 justification for allowing you to present an engineering
20 witness when you didn't designate one in your pre-hearing
21 statement?

22 MR. BRUCE: Well, I believe either witness
23 could probably handle the -- Mr. Examiner, as you well
24 know, these pre-hearing statements are filed -- I didn't
25 meet with the clients until yesterday. I wasn't certain

1 who was going to testify. It's not going to add to the
2 time to testify, because they're using the same exhibit
3 group.

4 MR. BROOKS: Well, I agree with you that
5 the witness is named. But I would agree that the witness
6 is named doesn't add anything since we normally don't
7 take depositions of witnesses, so it would be very
8 difficult to say that the opposition would be prejudiced
9 by not knowing the geologist's name when they would not
10 probably have had an opportunity to take his deposition
11 anyway. But it does concern me that you're asking to
12 present an engineering witness when you didn't tell
13 anyone, at least not before yesterday, that you were
14 going to do so.

15 So I will sustain the objection to the
16 engineering testimony. If it becomes necessary for
17 rebuttal, we'll take that up at the time, but I will
18 overrule the objection to the geologist's testimony. The
19 two witnesses whose testimony is to be received may stand
20 and be sworn please. State your name, please.

21 MR. WOOD: My name is Brian Wood.

22 MR. BROOKS: Excuse me. Where is the
23 other one? Okay. And your name is?

24 MR. SUTTON: Chris Sutton.

25 MR. BROOKS: Please swear these two

1 witnesses.

2 [Witnesses sworn]

3 MR. BROOKS: Okay. Now, Ms. Altomare, do
4 you want to have Mr. Hayden listen to the testimony of
5 the applicant's witnesses?

6 MS. ALTOMARE: I do. I don't think it's
7 necessary to have him on the line for the opening
8 statement by Mr. Bruce, however, I do want him on the
9 line for testimony of the applicant's witnesses.

10 MR. BROOKS: Okay. We will then go ahead
11 with opening statements if there are opening statements.
12 Do you want to make an opening statement, Mr. Bruce?

13 MR. BRUCE: Just very briefly, Mr.
14 Examiner. There are two saltwater disposal wells,
15 existing wells. Rosetta seeks to add an additional zone
16 in each well. We believe we have evidence that these
17 zones are not fresh water and that injection should be
18 allowed. The Division asserts otherwise. I'd rather let
19 the witnesses testify.

20 MR. BROOKS: Ms. Altomare, do you want to
21 the make an opening statement?

22 MS. ALTOMARE: I'm going to withhold and
23 wait.

24 MR. BROOKS: Reserve until the beginning
25 of your case.

1 I'm not good at dialing these remote phones.

2 MS. ALTOMARE: I think since we only have
3 to get one person on the line, it should be like using a
4 normal phone by speaker.

5 MR. BROOKS: I think we need to get him on
6 the phone.

7 MS. ALTOMARE: Steve, this is Mikal. We
8 are in hearing. We're going to leave the line open.
9 We're going to start calling witnesses for the applicant,
10 so you can observe.

11 MR. HAYDEN: I can put you on speaker and
12 close the door and listen.

13 MS. ALTOMARE: That would be fabulous.
14 Let us know if you aren't able to hear for some reason.

15 MR. HAYDEN. You're fine. I'm on speaker
16 now.

17 MR. BROOKS: Mr. Hayden, David Brooks,
18 hearing examiner. We need to get you sworn now at this
19 time, so if you'll please stand and raise your right hand
20 and state your name for the record.

21 MR. HAYDEN: Steven Hayden.

22 MR. BROOKS: Please swear Mr. Hayden.

23 [Witness sworn]

24 MR. BROOKS: Mr. Bruce, you may proceed to
25 call your witnesses.

1 MR. BRUCE: I call Mr. Wood to the stand.

2 MR. BROOKS: It would probably help if you
3 sit in the chair closest to the microphone.

4 Mr. Hayden, let us know if you cannot hear Mr.
5 Wood.

6 MR. HAYDEN: Okay. I'm hearing you fine.

7 MR. BROOKS: Proceed.

8 BRIAN WOOD

9 Having been first duly sworn, testified as follows:

10 DIRECT EXAMINATION

11 BY MR. BRUCE:

12 Q. Would you please state your name and city of
13 residence for the record?

14 A. My name is Brian Wood. I live in Santa Fe,
15 New Mexico.

16 Q. And what is your occupation?

17 A. I'm president of Permits West.

18 Q. And what type of work does Permits West do?

19 A. Provide environmental and regulatory services.

20 Q. What is your relationship to Rosetta in this
21 case?

22 A. I prepared the C-108 application packages for
23 the Number 11 well and the Number 36 well.

24 Q. Did you do that together with personnel from
25 Rosetta to put the data together for these packets?

1 A. Yes, I did.

2 Q. Let's move on to your first exhibit, Rosetta
3 Exhibit 1. What is is that?

4 A. This is the cover sheet, Form C-108 for the
5 the Tsah Tah SWD Number 11 well.

6 MR. BROOKS: Excuse me. Mr. Bruce, Do you
7 anticipate asking expert testimony from this witness?

8 MR. BRUCE: I do not believe it is expert
9 testimony, as such, Mr. Examiner. It's fact testimony.

10 MR. BROOKS: Very good. You may proceed
11 with factual testimony, but if we get into expert
12 testimony, then we need his credentials on the record.

13 Q. (By Mr. Bruce) Again, this is for Section 11
14 well, Mr. Wood; is that correct?

15 A. Yes. Exhibit 1 is Number 11 well.

16 Q. First of all, going through page 4, this well
17 has already been drilled, as we discussed; correct?

18 A. That's correct.

19 Q. And page 4 reflects data that you've been
20 provided by Rosetta regarding this well?

21 A. Yes. That's correct.

22 Q. And, basically, the front page of this exhibit
23 lists some SWE orders, administrative SWE orders. What
24 was originally done with these wells by Rosetta or on
25 your behalf by Rosetta?

1 A. I prepared the original C-108 seeking approval
2 to dispose of water into the Point Lookout and Menefee
3 formations.

4 Q. What is requested in this case?

5 A. Rosetta is seeking to add a third zone, the
6 Cliff House zone.

7 Q. And is the well data listed -- the well
8 location, well data, et cetera, listed on the next
9 several pages?

10 A. Yes.

11 Q. And was that data obtained in association with
12 your work from Rosetta?

13 A. From Rosetta and, also, state files.

14 Q. If you turn -- on the bottom right-hand side
15 of each page, the pages are numbers just for ease of
16 reference. If you turn to page 9, what type of -- what
17 are the injection rates, et cetera?

18 A. We were requesting an injection rate of 2000
19 barrels of water per day, and a maximum injection rate of
20 3,000 barrels water per day, an anticipated average
21 injection pressure would be 450 psi. Our maximum
22 injection pressure would be 508 psi.

23 Q. That maximum rate would comply with the .2 psi
24 per foot of depth, a regulation of the Division?

25 A. Yes.

1 MR. BROOKS: What was the maximum
2 pressure?

3 THE WITNESS: 508 psi.

4 Q. (By Mr. Brooks) Are there any Mesa Verde
5 wells within a mile of the proposed well?

6 A. That, I have to check. There are no wells
7 within a half mile radius area of review that penetrate
8 the Mesa Verde or the Cliff House.

9 Q. That is what I was asking. Does this
10 application contain the other data that is necessary in a
11 Form C-108?

12 A. Yes.

13 Q. The last several pages, starting with pages
14 17, et cetera, what are they?

15 A. These are water analyses that were collected
16 from various zones. Page 17 represents an analysis in
17 the Cliff House formation. Then page 18, these are
18 analyses that were collected from the Tsah Tah 2 Number
19 4. This is Fruitland coal gas water that was analyzed
20 here, that we were proposing to dispose of into the Cliff
21 House. Similarly, page 19 is Fruitland coal gas produced
22 water. Page 20 is Fruitland coal gas produced water.
23 Page 21 is a fresh water well that's approximately 800
24 feet deep, which is within the area of review.

25 Q. And does this Form C-108 contain all the

1 information normally included in an application for
2 injection submitted to the Division?

3 A. Yes. The only exception is the notice was
4 provided by counsel versus myself.

5 Q. And let's go back to the notice. If you would
6 refer to, again, using the lower right-hand corner pages.
7 If you turn to page 8. Now, you said there were no wells
8 penetrating these zones within the one-half mile area of
9 review. However, in Item V you list that all of the
10 leases and their operators are within that one-half mile
11 of review?

12 A. Correct. And that's regardless of depth.

13 Q. And that's regardless of depth. Does page 15
14 reflect the leasehold, those same leaseholds and what
15 acreage they cover?

16 A. Yes. That is correct.

17 Q. And so even though there are no wells in the
18 area of review penetrating the injection zone, notice was
19 given to all of the offset lessees?

20 A. You would have to answer that question because
21 I did not provide the notice in this case.

22 Q. The second matter is, is this federal surface
23 where this Number 11 well is located?

24 A. Yes, it is.

25 MR. BRUCE: Mr. Examiner, if you'd move to

1 Exhibit 3, Exhibit 3 is the notice given -- my Affidavit
2 of Notice given to the offset lessees. And you'll notice
3 that this application was also sent to the Bureau of Land
4 Management, which is the surface administrative agency.
5 And all of the offsets received actual notice.

6 Q. (By Mr. Bruce) Mr. Wood, let's move to
7 Exhibit 2. What is that?

8 A. This is the C-108 application I prepared for
9 the Tsah Tah SWD Number 36 well, which is on state
10 surface, state minerals.

11 Q. And, again, was this well originally approved
12 administratively as an injection zone?

13 A. Yes. It was approved for the Menefee and the
14 Point Lookout.

15 Q. What is sought in this particular case?

16 A. Rosetta would seek approval to add a third
17 zone, specifically the Cliff House.

18 Q. Without spending too much time, basically, is
19 this exhibit package similar to Exhibit 1?

20 A. Yes.

21 Q. Are similar injection rates and pressures
22 sought for this?

23 A. Yes, similar.

24 Q. And, again, Rosetta would comply with the .2
25 psi per foot of depth injection pressure limitation?

1 A. That is correct.

2 Q. And in accordance with Division regulations,
3 are water samples included at the end of this exhibit
4 packet?

5 A. Yes, sir.

6 Q. And, basically, the same thing as the prior
7 exhibit?

8 A. That is correct.

9 Q. If you turn to pages -- are there any wells
10 within the half-mile area of review penetrating the
11 injection zone?

12 A. There are none.

13 Q. And does Exhibit 15 show all leases within a
14 half mile -- I mean page 15 -- show all leases within a
15 half mile of the injection well?

16 A. Yes, they do.

17 Q. And on page 8, are all of the lessees of the
18 state and federal leases listed on page 8?

19 A. Correct.

20 Q. And, again, the surface management agency is
21 the commissioner of public lands?

22 A. Correct.

23 MR. BRUCE: Mr. Examiner, Exhibit 4 is the
24 Affidavit of Notice with respect to this application, and
25 all of the offset lessees were notified. They were given

1 notice and received actual notice of this application,
2 including the commissioner of public lands.

3 Q. (By Mr. Bruce) Were Exhibits 1 and 2 prepared
4 by you?

5 A. Yes, they were.

6 MR. BRUCE: Mr. Examiner, I move the
7 admission of Exhibits 1 through 4.

8 MS. ALTOMARE: No objection.

9 MR. BROOKS: Exhibits 1 through 4 are
10 admitted.

11 (Exhibits 1 through 4 were admitted.)

12 MR. BRUCE: I have no further questions
13 for this witness.

14 MR. BROOKS: Cross-examination?

15 MS. ALTOMARE: Yes. Thank you.

16 CROSS-EXAMINATION

17 BY MS. ALTOMARE:

18 Q. Some of these questions may be better directed
19 to the geology expert, so if that's the case, please let
20 me know. Sometimes I'm not real clear where the lines of
21 delineation are between witnesses, so go ahead and just
22 call me on it if that's the case.

23 You indicated that a lot of the information in
24 the packets was based on data provided by Rosetta. That
25 includes the sampling that was done on the Tsah Tah? Am

1 I saying that --

2 A. Yes.

3 Q. -- Number 11, which is the basis for claiming
4 that the Cliff House does not contain protectable waters;
5 is that right?

6 A. That is correct, that the water analyses were
7 provided by Rosetta.

8 Q. What was the TDS value of that sample that
9 Rosetta is relying on?

10 A. The TDS in the Cliff House zone as taken from
11 the Tsah Tah SDW 11 was 16,443 parts per million.

12 Q. What was the value of the second sample that
13 was taken during the swabbing that was done on the Tsah
14 Tah Number 11?

15 A. I don't have that information.

16 Q. You were only provided with one of the two
17 samples that was taken?

18 A. Correct.

19 Q. Is that routine that you're only given certain
20 information to be used in the permitting process and then
21 told to write up the permits from the information that
22 you're provided with?

23 A. I asked them for water analyses, and they
24 provided what they gave me.

25 Q. Mr. Bruce referenced that the second packet of

1 materials, the C-108 that was done for the Number 36 was,
2 basically, the same as was used for the Number 11; is
3 that right?

4 A. The main similarity is that we got the
5 identical water analyses in each application package as
6 far as wells in the vicinity, surface ownership, mineral
7 ownership, that differs as, of course, does the well.

8 Q. That's actually what I was getting at. It is
9 exactly the same water analysis; is that right?

10 A. That's correct.

11 Q. So Rosetta is relying on the water analysis
12 for the Tsah Tah Number 11 to base its request for
13 injection on the Number 36, permission to inject in the
14 Number 36, even though the sample was taken on the Number
15 11?

16 A. Yes. That's the closest water analysis we're
17 aware of from the Cliff House zone.

18 Q. And the Number 36 is approximately 2.2 miles
19 or so away from the Number 11; is that right?

20 A. Let me just look at a map, please. I would
21 say yes, at least two miles. No more than three.

22 Q. Are you familiar with the Coleman Oil & Gas
23 Juniper Number 1 Saltwater Disposal Well in that area?

24 A. Yes.

25 Q. Are you aware that that particular well at

1 virtually the same depth had salinities vastly different
2 for the Cliff House formation?

3 A. I'm not aware of the actual difference.

4 Q. And would you agree with me that the Juniper
5 Saltwater Disposal Well is roughly 2.2 miles, also, from
6 the Tsah Tah Number 36?

7 A. I think it would be further.

8 Q. Well, we can get into that later through the
9 Division witness. Is it unusual for an applicant to
10 use -- to rely solely on water testing done from one well
11 and ask permission to inject into another well when
12 there's disparity in measurements like that?

13 A. I don't think it's unusual.

14 Q. Okay. Do you recall assisting Rosetta in
15 applying for a saltwater disposal well called Tsah Tah
16 Number 1 in 2007?

17 A. Yes.

18 Q. Do you recall that they were granted
19 permission to drill that well in July of 2007?

20 A. Yes.

21 Q. Are you aware of whether or not they ever
22 completed that well?

23 A. That well has not been drilled.

24 Q. They were granted permission to inject into
25 the Menefee for that well; isn't that right?

1 A. I would have to check my file, but that sounds
2 correct.

3 Q. Is that in roughly the same area as three
4 other two wells, the Tsah Tah Number 11 and Tsah Tah
5 Number 36?

6 A. All three wells are in the same township.

7 Q. So they would be disposing of Fruitland water
8 produced by the Rosetta wells? That was the purpose of
9 applying for the Tsah Tah Number 1 Saltwater Disposal
10 Well, as well? That was the purpose of trying to get
11 permission for that well?

12 A. That is correct.

13 Q. So you have no information as to why that well
14 was never drilled?

15 A. I do not.

16 MS. ALTOMARE: I think that the rest of my
17 questions relate more to the geology of the area, so I
18 will go ahead and hold off on that and go ahead and pass
19 the witness.

20 MR. BROOKS: Okay. I don't think I have
21 any questions. Do you, Mr. Ezeanyim?

22 MR. EZEANYIM: Mr. Wood, let me ask this
23 question. When we started this hearing, your counsel
24 says that you are a fact witness. So the thing you're
25 presenting here are facts supplied by your client, or do

1 you do the work?

2 THE WITNESS: I did the work incorporating
3 facts supplied by my client, as well as reviewing BLM
4 records and reviewing state records.

5 MR. EZEANYIM: Which of these statements
6 you made here are facts supplied by your client? Which
7 one of them -- like, for example, you said there are no
8 wells in the area of review. And we are talking about
9 two wells here, Number 11 and Number 36; right? Okay.
10 Are you saying that both wells don't have any wells
11 within the area of review? I think, according to
12 testimony here, it's about two and a half miles away, the
13 two wells. So are you saying where you drilled that
14 half-mile area of review for both wells, there are no
15 area of review wells within them?

16 THE WITNESS: What I'm saying is within
17 the half-mile radius area of review --

18 MR. EZEANYIM: Of which one?

19 THE WITNESS: -- for the Number 11 well,
20 there is one Fruitland coal gas well and there is one
21 fresh water well. Neither of those two wells penetrate
22 the Cliff House.

23 MR. EZEANYIM: The shallow end?

24 THE WITNESS: That's correct.

25 MR. EZEANYIM: Now, on the 36, what

1 happens?

2 THE WITNESS: On the Number 36, there are
3 four wells within the half-mile radius area of review.
4 All four wells are Fruitland coal gas wells. None of
5 those four wells penetrate the Cliff House.

6 MR. EZEANYIM: Could you answer a geology
7 question, or do we wait for -- or an engineering
8 question? I mean since you are their --

9 THE WITNESS: Well, raise the question and
10 I'll see if I feel qualified to answer it.

11 MR. EZEANYIM: Well, because I'm very
12 confused here why you want to go to the Cliff House.
13 First of all, what have you been given -- the two wells
14 were approved under some conditions of approval on those
15 two wells, Number 11 and Number 36, and some of the
16 conditions given to your client is that they have to
17 perform some porosity and injection logs, sample
18 analysis, temperature surveys, submit volume logs. Have
19 you done that, or has your client done that? Who do I
20 ask this question to see if this data was collected?

21 THE WITNESS: I would suggest you ask the
22 next witness, Mr. Sutton.

23 MR. EZEANYIM: That's why I'm asking these
24 things, because there are a whole bunch of questions I
25 want to ask to see what is going on here. So that's why

1 I want to know who do I ask the question. Do I ask the
2 consultant or the geologist or the engineer? I don't
3 know. In that case, I may have to defer my questions for
4 now.

5 THE WITNESS: Yes.

6 MR. EZEANYIM: That's all I have.

7 MR. BRUCE: Just one follow-up question to
8 verify.

9 REDIRECT EXAMINATION

10 BY MR. BRUCE:

11 Q. Mr. Wood, you also personally reviewed the OCD
12 files to check wells in the area?

13 A. Yes. That's correct.

14 Q. And you've been doing this for quite some
15 time. And besides taking the data from your client, you
16 review the data and make your own independent judgment
17 when you're preparing the Form C-108?

18 A. That is correct.

19 MR. BRUCE: Thank you.

20 MR. BROOKS: Anything further?

21 MR. EZEANYIM: Nothing further.

22 MR. BROOKS: Very good. The witness may
23 stand down.

24 MR. BRUCE: Mr. Examiner, the next
25 witness -- although we have hard exhibits, we do have a

1 PowerPoint presentation, and I'd like a little time to
2 get that.

3 MR. BROOKS: Okay. We'll take a 10-minute
4 recess.

5 (A recess was taken.)

6 MR. BROOKS: At this time we will go back
7 on the record in Cases Nos. 14265 and 14266, which are
8 consolidated for purposes of hearing.

9 Mr. Bruce, you may proceed.

10 CHRIS SUTTON

11 Having been first duly sworn, testified as follows:

12 DIRECT EXAMINATION

13 BY MR. BRUCE:

14 Q. Would you please state your name and city of
15 residence for the record?

16 A. My name is Chris Sutton. I live in Frederick,
17 Colorado.

18 Q. Who do you work for and in what capacity?

19 A. Rosetta Resources as a geologist.

20 Q. Have you previously testified before the
21 Division?

22 A. No, sir.

23 Q. Could you please summarize your educational and
24 employment background for the examiner.

25 A. My employment in the oil and gas business

1 began in 1998. In the summer of 1998, I took a job as an
2 intern at Forest Oil in the geology department. That
3 internship continued on as I was going to school at
4 Colorado School of Mines. I eventually graduated from
5 there with a degree in geological engineering in 2002.
6 That's the same year that I took a full-time geology
7 position at Forest Oil Corporation where I worked
8 offshore Gulf of Mexico properties for them in
9 development geology, as well as exploration.

10 In August of 2005, I took a geologist
11 position at Rosetta Resources. I've been doing
12 development geology in California and in the San Juan
13 Basin and, also, petrophysical analysis in those two
14 areas.

15 Q. Does your area of responsibility at Rosetta
16 include this portion of the San Juan Basin?

17 A. Yes, sir.

18 Q. Are you familiar with the geologic matters
19 involved in this application?

20 A. Yes, sir.

21 MR. BRUCE: Mr. Examiner, as I said, it's
22 a PowerPoint presentation. Just to be safe, I had the
23 the witness print out copies of what is on the PowerPoint
24 presentation and, in addition, here are two disks with
25 the PowerPoint presentation.

1 MR. BROOKS: That's probably a good idea
2 considering how many times PowerPoint presentations fail.

3 MR. BRUCE: That's what I told the
4 witnesses last night. As I said, Ms. Altomare and Mr.
5 Hayden do have copies of the PowerPoint presentation
6 which was emailed to them last night.

7 MR. BROOKS: Very good. Are you
8 submitting the witness?

9 MR. BRUCE: I am submitting the witness as
10 an expert petroleum geologist.

11 MR. BROOKS: Any objection?

12 MS. ALTOMARE: As an expert petroleum
13 geologist? No objection.

14 MR. BROOKS: So qualified.

15 Q. (By Mr. Bruce) Mr. Sutton, I believe you
16 expressed an interest in pointing out certain things on
17 the map?

18 A. Yes. It would be wonderful if I could stand.

19 Q. Why don't you go over there and one of our
20 other persons can flip through the slides. One thing to
21 be important when you're discussing the exhibits and
22 pointing things out, be sure not say, "here," or,
23 "there." Be precise with respect to what you're pointing
24 out on the exhibit.

25 MR. BROOKS: Okay. You may go up to the

1 exhibit. And would you please take the telephone with
2 you and put in on the table close to where you'll be
3 standing.

4 THE WITNESS: Of course.

5 Q. (By Mr. Bruce) Let's start with the first
6 slide, Mr. Sutton. What does that reflect?

7 A. So the presentation there -- it's a short
8 presentation with several slides. The first portion just
9 shows basin overview where the two wells in question are,
10 and we'll discuss the regional geology and then move on
11 to the actual water test.

12 So on the first slide, again, we're
13 requesting approval to inject into the La Ventana Tongue
14 of the Cliff House member of the Mesa Verde formation.
15 The colored outlines, the distance surrounding the basin
16 on the map show the outcrop of the surface of those
17 different members of the Mesa Verde. In green you'll see
18 the outcrop of Point Lookout, which is the lowest-most
19 member. Moving up, in brown, it's the Menefee outcrop,
20 and Cliff House is shown in blue. It's important to note
21 that within the Cliff House, there are several different
22 packages, the La Ventana being one of them.

23 And then the structure contours that you see
24 here are actually on the Huerfanito Bentonite bed, which
25 is above the Mesa Verde formation. But it's an

1 originally correlateable marker, and those contours are
2 on here just to show the regional dip into the basin.
3 The yellow lease lines that you see are Rosetta's
4 operated acreage, including some state leases. The two
5 wells in question are circled in red. They are the Tsah
6 Tah SWD 11 and SWD 36.

7 As far as overview, we currently have 40 wells
8 producing from the Fruitland formation coal. Those wells
9 combined make 3,500 barrels of water per day. We have
10 two wells that are injecting around 2,500 barrels
11 combined into the Menefee and Point Lookout, which are
12 the two lowest-most members. So you can see that we are
13 injecting less than we're producing. We're currently
14 trucking around 1,000 barrels a day, sometimes more, to
15 two different facilities, both which are around 50 miles
16 each way at a significant cost, and it's also a safety
17 concern with that much trucking.

18 Q. The reason you're here today seeking to add
19 the extra zone is to develop additional injection
20 capacity?

21 A. Yes.

22 Q. What does this slide reflect?

23 A. The second slide shows stratigraphic section
24 going across the basin. This is the map in the upper
25 left portion of the slide that shows where cross section

1 goes across. It goes from southwest to northeast. What
2 you want to key in on is the Mesa Verde. It's right in
3 the middle here. It shows the Point Lookout, the
4 sandstone at the bottom. I forgot to mention, this well
5 drawn on here is the approximate location of each well.
6 So these are the geologic formations that you see in this
7 well.

8 The bottom of the Mesa Verde is the Point
9 Lookout Sandstone. That is the lowest-most member that
10 we are currently injecting into. Then there's the
11 Menefee formation further up. We're also injecting into
12 that. The Cliff House is composed of several different
13 packages. The La Ventana is the most massive, porous and
14 permeable of those zones, and it is above the Menefee
15 formation. It's also shown on here is the Fruitland
16 formation where we're producing coal gas as well as
17 substantial water.

18 Q. Are the Point Lookout -- in your opinion,
19 based on the data you've seen, are all these, the Cliff
20 House, Menefee and Point Lookout, high salinity?

21 A. Yes. They are brackish, but certainly well
22 above the cutoffs of 10,000 parts per million. It's also
23 important -- let me point out just some rough depths.

24 MR. EZEANYIM: Just repeat for me -- you
25 just asked the last question.

1 MR. BRUCE: I said are these high salinity
2 zones, water with high salinity.

3 MR. EZEANYIM: Which zones are you talking
4 about?

5 MR. BRUCE: The Cliff House, Menefee and
6 Point Lookout.

7 THE WITNESS: Yes. All three of them are
8 high salinity, greater than 10,000 parts per million.

9 MR. EZEANYIM: And you have your analysis
10 to prove that?

11 THE WITNESS: Yes. As far as depth, the
12 Fruitland formation coal we're producing around 1,700
13 feet below surface. The Mesa Verde formation begins
14 around 2,500 feet and extends down to the Mancos shale,
15 which is around 4,500 feet.

16 MR. EZEANYIM: I'm interested in the water
17 in the La Ventana member of the Cliff House. What was
18 the native water in the La Ventana member of the Cliff
19 House?

20 THE WITNESS: I didn't understand the
21 question.

22 MR. EZEANYIM: You said the water salinity
23 in the Cliff House?

24 THE WITNESS: Yes.

25 MR. EZEANYIM: La Ventana --

1 THE WITNESS: La Ventana member of the
2 Cliff House, we do have a sample there that is greater
3 than 10,000 parts per million. We'll go into the detail
4 of that.

5 MR. EZEANYIM: Is there any sample that is
6 lower?

7 THE WITNESS: We do not have a sample
8 that's lower.

9 MR. EZEANYIM: When you said, "I have some
10 lower" --

11 THE WITNESS: Previously she indicated
12 that Coleman Oil & Gas may have a different sample. We
13 don't have that sample. I can't speak to that at all.
14 But we have a sample in the La Ventana that's greater
15 than 10,000.

16 MR. EZEANYIM: Okay.

17 Q. (By Mr. Bruce) Go ahead, Mr. Sutton.

18 A. So this is a map, Slide Number 3, that's
19 zoomed in. It's to show the regional nature of the La
20 Ventana Tongue of the Cliff House. The blue outline you
21 see, you may remember from the previous slide of the map,
22 that is the Cliff House outcrop. So within that Cliff
23 House member, there's the La Ventana Tongue. The
24 contours that are shown on here, icopach contours, are
25 thickness contours of that tongue. You see in the --

1 also, on here is the Chacra Line just for reference.

2 So in the northeast portion here, there's a
3 thickness of zero feet. It thickens as it heads to the
4 southwest to -- its thickest portion is around 600 feet,
5 and then it thins heading further to the southwest, where
6 it outcrops. The two wells in question are also shown
7 here and some of the thickest part of the La Ventana
8 Tongue.

9 Q. Anything further on that slide?

10 A. No.

11 Q. What is that slide?

12 A. Slide Number 4 shows a zoom-in. This is a
13 topography map of the area, specifically Rosetta's wells.
14 The two wells shown here with blue triangles are
15 saltwater disposal wells. This is the SWD 11. This is
16 the SWD 36. The purple radius surrounding those are the
17 half-mile radius. As Mr. Wood discussed previously,
18 there aren't any wells within either of those to radiuses
19 that penetrate the Mesa Verde formation.

20 Q. The next slide, what do those reflect?

21 A. This is a cross section showing the logs on
22 both of those wells. On the left is SWD 11, and on the
23 right is SWD 36. On here are correlations between those
24 packages. One curve to pay particular attention to on
25 SWD 11 is the green curve. That's a gamma ray curve that

1 you can read, basically, sands and shales with. To the
2 right would be shale. To the left would be a sand. So
3 you see -- heading down into the La Ventana, you're going
4 from shale into sand, sand being on the left. You can
5 see that the La Ventana is a fairly clean mass of sand
6 going on down to the Menefee and the Point Lookout.

7 Again, we're currently injecting -- in both of
8 these wells, we're currently injecting into the Point
9 Lookout and the Menefee. That's shown in the red
10 perforation intervals in the center of each log track.
11 Above that are the proposed perforated intervals for the
12 La Ventana.

13 Also something to note on the cross section
14 are three water samples -- locations of those three water
15 samples taken in SWD 11. Those are shown in blue. The
16 Point Lookout is at the bottom with around 22,953 parts
17 per million. The Menefee, further up, is 25,149 parts
18 per million, and the La Ventana at the top at 16,443
19 parts per million, which, again, is above the 10,000
20 parts per million cutoff.

21 Q. What is the next slide?

22 A. Three slides will show a well bore diagram on
23 the left. So this is a representation of what the well
24 bore looked like at the time of those tests. On the
25 right is the actual water test of those samples. The

1 first sample was taken on March 15, 2007. The well had
2 casing run. Three intervals were perforated at just
3 one-foot intervals at two shots a foot. The first Point
4 Lookout was perforated at 4181. The Menefee was
5 perforated at 3645, and the La Ventana was perforated at
6 2469.

7 After perforating, they ran in with tubing,
8 set retrievable bridge plug and a packer to isolate each
9 individual perf. So on the 14th, the day before the
10 actual test was taken, they isolated the Point Lookout
11 and swabbed a total of -- between the two days, they
12 swabbed a total of 18 barrels out of that package. I
13 need to grab some notes.

14 Engineering calculations show that the volume
15 within the tubing, the volume of bore hole fluid in the
16 tubing and in this isolated interval would be 18.7
17 barrels. Between the swabbing that was done on March
18 14th and March 15th, we recovered a total of 18 barrels,
19 so little less than what was calculated in the well bore
20 at the time, but still -- the samples that were taken on
21 the last two swabbing runs would far be dominated by
22 formation fluids. We're confident that, on this test,
23 formation fluid was taken. That sample was sent to Key
24 Pressure Pumping Services for water analysis. That
25 analysis was completed on March 17th. It showed total

1 resolved solids 22,953.

2 Q. Again, that's the Point Lookout?

3 A. It is. Yes. At the bottom of the water
4 analysis, you'll see a stiff plot. It's just a
5 representation of cations and anions that compose the
6 Total Dissolved Solids. You can see it's dominated by
7 potassium, sodium and chlorides as shown on the stiff
8 plot. That's the lowest-most interval that we're
9 currently injecting into.

10 Again on March 15th, after taking the Point
11 Lookout sample, they moved both the retrievable bridge
12 plug and the packer up to isolate the Menefee perms,
13 again swabbed. This time they swabbed a total of 25
14 barrels of fluids, taking samples on the last three runs.
15 That calculated tubing and isolated volume around the
16 perforations for this interval, that volume was 16 and a
17 half barrels. We recovered a total of 25 barrels in
18 those swabbing runs and, again, samples were taken on the
19 last three runs.

20 Two days later, Key Pressure Pumping Services
21 submitted the analysis for that sample. It showed 25,149
22 parts per million. The Stiff plot at the bottom shows
23 similar composition, although the concentration is a
24 little bit different.

25 Q. There is similar water quality in both the

1 Point Lookout and the Menefee; is that right?

2 A. True.

3 Q. Next slide.

4 A. This last slide shows the last sample that was
5 taken in the La Ventana Tongue of the Cliff House.

6 Again, retrieveable bridge plug was set and the packer
7 was set to isolate the La Ventana perforated interval.

8 It was swabbed. The bore hole volume is calculated to be
9 13 barrels, and through swabbing, we recovered 18
10 barrels. Samples were taken on the last two runs.

11 Key analysis two days later shows that that
12 sample is 16,443 parts per million. The Stiff plot
13 shows, although it is lesser concentration, the same
14 cations and anions existed as the previous two. I really
15 want to point out on this that the bore hole volume is 18
16 barrels of water -- I'm sorry. I said that wrong. The
17 capacity was 13 barrels of water, and we swabbed a total
18 of 18. So we're fairly confident that we are getting
19 formation fluid when swabbing and that the samples taken
20 were formation fluid.

21 Q. All of these samples were taken during the
22 same time frame; correct?

23 A. Yes. All three samples were taken on the same
24 day.

25 Q. In your opinion, are these three samples

1 accurate?

2 A. Absolutely.

3 Q. What is the next slide?

4 A. The last slide shows an excerpt from EPA
5 definitions, which define source of drinking water at,
6 importantly, fewer than 10,000 parts per million. So
7 because all three of these samples, most importantly, the
8 La Ventana, is greater than 10,000 parts per million. It
9 should not be protected and we should be able to inject
10 into it.

11 Q. If Rosetta cannot get additional injection
12 capacity, what will be the result?

13 A. Due to budget constraints, we cannot drill
14 another injection well, and if we do not have additional
15 capacity, we cannot continue to truck 1,000 barrels a
16 day at the exorbitant cost that it is. We'll be forced
17 to shutting wells.

18 Q. One last exhibit which isn't on the
19 PowerPoint, I'm looking at Rosetta Exhibit 6. I don't
20 really want you to go into it, but what is contained in
21 this packet?

22 A. Those are the actual drilling completion
23 reports. Those are summarized in the previous slides and
24 also in the well bore diagrams. But those are the actual
25 reports.

1 Q. These are the actual reports, and then there
2 is one more slide. Is the data from this final slide a
3 summary of what is contained in Exhibit 6?

4 A. It is. It's just really the exact same data
5 that's contained in Exhibit 6 but just summarized. Those
6 are the operations. On the left is drilling, and on the
7 right is the completion and swabbing runs and water
8 samples that were taken, which we've already discussed
9 those in the previous slides. This was just a summary in
10 case we needed it.

11 Q. Just a couple more questions. Is the -- the
12 water that you are currently injecting into these wells,
13 what formation -- or what pool does it come from?

14 A. The Fruitland formation. It's a coal that
15 we're producing.

16 Q. Is the injection water compatible with the
17 water in the injection zone?

18 A. Yes, it is.

19 MR. EZEANYIM: What is that estimate?
20 What is that division of water?

21 THE WITNESS: In terms of parts per
22 million, it's around 30,000 parts per million. But it's
23 compatible in that we don't have scaling problems or any
24 evidence that -- although it's higher salinity, it
25 shouldn't be any problem with injecting.

1 MR. EZEANYIM: The minimum TDS is about
2 30,000 on those?

3 THE WITNESS: Yes. That's from the three
4 samples that we've taken from three different wells,
5 around 30,000.

6 Q. (By Mr. Bruce) Was Exhibit 5 prepared by you
7 or under your supervision, the PowerPoint?

8 A. Yes. Myself and Chad McGehee, the engineer.

9 Q. Is Exhibit 6 simply a compilation of data from
10 Rosetta's records regarding the drilling, et cetera?

11 A. Yes, from our files.

12 Q. In your opinion, is the granting of these two
13 applications in the interest of conservation and the
14 prevention of waste?

15 A. Yes.

16 MR. BRUCE: Mr. Examiner, I move the
17 admission of Exhibits 5 and 6.

18 MS. ALTOMARE: No objection.

19 MR. BROOKS: Five and 6 are admitted.

20 (Exhibits 5 and 6 were admitted.)

21 MR. BRUCE: Pass the witness.

22 MR. BROOKS: Okay. Cross-examination?

23 CROSS-EXAMINATION

24 BY MS. ALTOMARE:

25 Q. Mr. Sutton, you provided testimony regarding

1 the sample that was done on all three, the Menefee, Point
2 Lookout and the Cliff House, but I'm most interested in
3 the Cliff House value of -- I think 16,443 was
4 ultimately --

5 A. I believe that's correct.

6 Q. What was the value of the other sample that
7 was taken from that depth?

8 A. There were two samples taken on those last two
9 swabbing runs, but we only have analysis on one of them.
10 The common practice for Key is if both samples are
11 similar, they'll just give us the one. If they're
12 largely different values, generally, they'll let us know.

13 Q. How do you define similar versus largely
14 different?

15 A. Certainly if -- I don't know Key's exact
16 practices.

17 Q. Did you check the consistency of the value
18 that Key came up with for this sample against the data
19 that came up on the logs for the Tsah Tah Number 11?

20 A. Yes.

21 Q. What values did you come up with for the
22 calculations for the log data?

23 A. What type of log data are you referring to?

24 Q. The open-hole log data that was run prior to
25 the running of the casing.

1 A. We did, along with a senior petrophysicist at
2 Rosetta, we did calculate just based on the resistivity
3 values of the electric log, what the TDS would be --
4 total resolved solids would be throughout the Mesa Verde
5 formation. If you take just the resistivity values, it
6 would be far less -- in the Cliff House formation, it
7 would be far less TDS than the actual sample.

8 However, when you take the resistivity curve,
9 that is not measuring just resistivity. That's measuring
10 formation resistivity. Formation resistivity can be
11 affected by many things, including the water. It can be
12 affected by minerology, it can be affected by gas
13 content.

14 My opinion, my professional opinion, is that
15 the resistivity is dominated -- in the upper part of the
16 Cliff House, it's dominated by gas saturation being high,
17 giving a higher resistivity. That's also validated by
18 the actual water sample of hard data showing 16,443 parts
19 per million.

20 Q. So you acknowledge that there was an
21 inconsistency between the resistivity calculation data,
22 the log data and the salinity data that Key came up with?

23 A. Yes. If you ignore actual hard data and only
24 look at resistivity calculations, which are affected by
25 many things, including water samples.

1 MR. BROOKS: Excuse me. You said in your
2 opinion, the resistivity results were dominated by --

3 THE WITNESS: Most likely, gas saturation.
4 High gas saturation would also give you high resistivity.

5 Q. (By Ms. Altomare) Are you aware that just
6 over two miles away from these particular wells, the EPA
7 had previously done some investigation and concluded that
8 the salinity was protectable in the Cliff House
9 formation?

10 A. Can I ask what location?

11 Q. The Juniper Saltwater Disposal Well Number 1
12 operated by Coleman.

13 A. I was aware that EPA requested them to take a
14 sample, and I'm also aware that it's less than 10,000
15 parts per million, but that sample is highly
16 questionable. How it was taken is far less accurate than
17 what we've done with the swabbing runs.

18 Q. But given that there was inconsistent values
19 between your sample, the resistivity logs and the EPA's
20 prior findings, you didn't find reason to question
21 injecting 30 plus thousand TDS water into this zone?

22 A. I believe the Coleman sample is not
23 representative of formation fluid due to how it was
24 taken. I think it was bad data. I'm not in the practice
25 of trying to use bad data.

1 Q. But you didn't think it justified maybe taking
2 a second sample in one or both of these wells given the
3 inconsistent findings that were occurring out there?

4 A. We're confident that we got formation fluid as
5 shown with engineering calculations. No.

6 Q. Why wasn't a sample taken in the Tsah Tah 36
7 specifically to justify the request to inject in the Tsah
8 Tah 36?

9 A. We believe that the salinity should not change
10 drastically across the field. So between the SWD 11 and
11 SWD 36, representative sample could be taken in SWD 11
12 and that was done.

13 Q. Even though it is, again, about 2.2 miles away
14 from Tsah Tah 11, just as the Juniper Saltwater Disposal
15 Number 1 is 2.2 miles away?

16 A. Yes. And I dispute the findings of the
17 Coleman Juniper water analysis.

18 Q. I think you described the Cliff House, La
19 Ventana Tongue as being a very porous formation?

20 A. Yes.

21 Q. Would you say that it takes water on a vacuum?
22 I think I've heard that phrase used.

23 A. I've heard others say that, as well. I'm not
24 really qualified to answer that.

25 Q. When those particular wells were completed,

1 they drilled through the Fruitland formation; is that
2 right?

3 A. Yes.

4 Q. So there would have been some add mixture of
5 formation waters, drilling fluids, whatnot mixed into the
6 sand that they were drilling through in completing those
7 wells?

8 A. Very minimal.

9 Q. What kind of drilling mud was used in
10 completing those wells?

11 A. Fresh water was used as the base for the mud,
12 based on the resistivity -- on the electric log, the
13 resistivity of the mud is shown on there. That
14 resistivity when plotted shows a TDS of around 5,500,
15 which is far fresher. If anything, that would -- if
16 there is any effect by that fresh mud, it would have
17 affected our analysis to the fresher side, not the more
18 saline side.

19 Q. But, in fact, don't the induction log results
20 reflect that the formation, the Cliff House formation
21 into which you were drilling, was actually less saline
22 than the drilling fluids that you were completing the
23 well with?

24 A. No, it does not. Not less saline, no.

25 Q. Were you involved in the process of the

1 application for the Tsah Tah Number 1 Saltwater Disposal
2 Well in June of 2007?

3 A. Can you repeat the question?

4 Q. The Tsah Tah Saltwater Disposal Number 1
5 application in June 2007, were you involved in that
6 application?

7 A. Not in the original application.

8 Q. But you were aware that Rosetta was applying
9 for another saltwater disposal well in this area?

10 A. Yes.

11 Q. Why wasn't that well ever drilled?

12 A. Budget constraints.

13 Q. In June of 2007, do you recall what the price
14 of oil per barrel was?

15 A. I don't.

16 Q. But between -- over the last year, I think we
17 can safely say that the price of oil had a bit of a boom.
18 Is that fair assessment?

19 A. Sure. We're not producing oil out of these
20 wells. It's natural gas.

21 Q. Well, the price of oil, price of gas -- the
22 industry had a bit of a boom over the last year?

23 A. Oh, it's at a high, absolutely.

24 Q. During the course of the last year, even
25 though there might be budget constraints now, do you have

1 any knowledge of why, during the course of the last year,
2 Rosetta decided not to drill that well?

3 A. There's always a cost -- we're always looking
4 at our cost. Whether natural gas prices are high or low,
5 there's always a trade-off. Also, my guess is that in
6 2007, we do not have near the water production that we do
7 have today. In drilling wells since then, water
8 production has increased since then.

9 Q. At the time of the application, there must
10 have been enough water production to justify at least
11 submitting the application for an additional well?

12 A. It's common practice to submit applications
13 ahead of time, even though you may not necessarily want
14 to drill. It gives you the leeway.

15 Q. That permission has now lapsed. In any event,
16 Rosetta has decided not to drill that well?

17 A. I believe -- yes.

18 Q. Again, approval was granted for that for
19 injection into the Menefee, which is undisputed saline
20 water?

21 A. Yes.

22 Q. You said there were significant costs involved
23 in the daily trucking of additional water?

24 A. Yes.

25 Q. Can you give us a ball-park figure as to how

1 much Rosetta spends on an annual basis due to its need to
2 truck that additional fluid away?

3 A. On a daily basis, we're trucking 1,000 barrels
4 a day at a cost of \$3.25 a barrel.

5 Q. What is the cost of drilling a new saltwater
6 disposal well?

7 A. Drilling completion costs would be in the
8 neighborhood of a million dollars.

9 Q. So comparably, what's the cost of trucking
10 versus drilling a new saltwater disposal well?

11 A. As a daily operations cost, I don't know when
12 that payout would be. I'd have to get a calculator.
13 Maybe you're aware.

14 Q. The sole basis for your referring to the Cliff
15 House, or the La Ventana Tongue of the Cliff House, as
16 saline sand formation, is the one sample that was tested
17 from the Tsah Tah Number 11 that was drawn in March of
18 2007; is that right?

19 A. In addition to that, it is the same formation
20 as known saline members of that formation deeper. I
21 wouldn't expect --

22 Q. Have you brought the data from that location
23 with you today?

24 A. We just discussed the Menefee and the Point
25 Lookout.

1 Q. But I'm talking about the Cliff House, the La
2 Ventana.

3 A. Yes.

4 Q. The sole basis for your defining the Cliff
5 House member.

6 A. As well as the proximity to the other two
7 known saline packages, the Menefee and the Point Lookout.

8 MS. ALTOMARE: I think that's all the
9 questions I have for this witness.

10 MR. BROOKS: I have one question. You
11 said that you disagreed with the analysis results taken
12 from Coleman's Juniper Number 1?

13 THE WITNESS: Yes, sir.

14 MR. BROOKS: Did you state why you
15 disagreed with it?

16 THE WITNESS: I did not.

17 MR. BROOKS: Please do so.

18 THE WITNESS: Maybe Mr. Hayden is more
19 familiar with the operations. But from my knowledge of
20 the operations, Coleman was injecting Fruitland coal
21 water into the formation. After a substantial period of
22 time injecting water into that formation, they were asked
23 to take a sample. So that sample would not be
24 representative of insitu formation water. It would be
25 far contaminated with whatever they were injecting.

1 MR. BROOKS: If Fruitland coal water in
2 the vicinity is higher salinity, that would make it
3 higher, not lower. Would it not?

4 THE WITNESS: It is in our wells. But
5 from my understanding, Coleman's wells, although close,
6 have a different salinity.

7 MR. BROOKS: That might suggest that 36
8 might have a different salinity from the 11 in the Cliff
9 House, wouldn't it?

10 THE WITNESS: The differences that you may
11 see in Fruitland wouldn't necessarily mean differences in
12 the Cliff House.

13 MR. BROOKS: I would agree with that, but
14 they wouldn't necessarily not mean differences. What is
15 the basis for your conclusion that there are not
16 differences in the Cliff House?

17 THE WITNESS: The continuity and
18 correlateability of the Cliff House package is -- it's
19 very easy to correlate between the two. The Fruitland
20 formation, however, is far more -- especially the coals,
21 are far more discontinuous. They could have drastically
22 different water salinities. Whereas in a continuous
23 package such as the Cliff House, I wouldn't expect a huge
24 salinity change.

25 MR. BROOKS: Okay. Looking at the fourth

1 slide where you have the area map, where is the Coleman
2 well? Is it on that map?

3 THE WITNESS: It is not on the map. I
4 wasn't really prepared to talk about it, but it's further
5 to the south.

6 MR. BROOKS: Where is -- the Number 36 is
7 up here to the north and Number 11 is in between the two?

8 THE WITNESS: Yes, sir

9 MR. BROOKS: Okay. And I gathered from
10 what Ms. Altomare said that the distance to the Juniper
11 well was about the same as the distance between the 11
12 and the 36?

13 THE WITNESS: I'll have to take her word
14 for it.

15 MR. BROOKS: You're not aware?

16 THE WITNESS: No, sir.

17 MR. BROOKS: Thank you.

18 MR. EZEANYIM: Mr. Sutton, I know you're
19 ambitious to get this order amended. I have a couple of
20 questions from your testimony. The first one, you took
21 samples from Number 11. Two samples were taken by Key or
22 you took it and gave it to Key. You got one result. The
23 other results, what happened to the other results? If
24 you're ambitious to get this, you have given me those two
25 results to say where in the Cliff House I got those

1 results from the swab test. You did a swab test number
2 one, swab test number two, you've got to give me those
3 two results to at least prove your case that the two
4 results -- what do I do now with the results I don't
5 have? I don't have these others, no. And, you know,
6 this is disputed.

7 Somebody may take a sample, come up with one
8 result, and then take a sample and come up with different
9 results. So I would have been happier if you gave me two
10 results of that swab number one and swab number two
11 showing that they're very close to the same thing. I
12 would be happier with that.

13 THE WITNESS: I would have been happier,
14 as well. I wasn't on the project at this time, at the
15 time those samples were taken. It is important to note
16 that not just in La Ventana, but also in the Menefee and
17 Point Lookout, several samples were taken and Key only
18 gave us one analysis, which we'd have to conclude is
19 representative of the others. If there was a large
20 difference, they would have noted it.

21 MR. EZEANYIM: Key should have noted that
22 they were similar. I'm not really interested in Point
23 Lookouts and Menefee. I'm interested in Cliff House,
24 especially La Ventana. Now, they took two samples, and
25 that's why you appear today for this hearing. You should

1 have said, "Well, this fourth sample, 17,000, second
2 sample is 16,000." I mean, I would be happier with that.
3 But they give you one and say, "Go and give them that.
4 The other one doesn't have any results." I'm not happy
5 with that. That's one point.

6 The second point is, on Number 36, no sample
7 was taken on the Cliff House.

8 THE WITNESS: No, sir.

9 MR. EZEANYIM: Then you assumed that
10 they're two and a half miles away, and you know that. We
11 don't know it exactly, what is the real concentration in
12 that Cliff House. That Cliff House, everybody is saying
13 that the concentration may be below. So you wanted to
14 prove beyond a reasonable doubt that it's not for your
15 whole case. So you should have taken a sample on 36, two
16 samples, and showed that those two samples had the same,
17 the 10,000 that you are showing us here. So then your
18 testimony, say you assumed that they should be the same,
19 rely on just one swab test on Number 11.

20 THE WITNESS: It's not just assuming.
21 It's from geologic correlation showing a continuous
22 package that looks very similar. I would not expect
23 large salinity changes within that range from my geologic
24 opinion.

25 MR. EZEANYIM: Now, when we approve this,

1 we wanted you to do at least another sample analysis and
2 that's not what you did now. You still haven't convinced
3 me beyond a reasonable doubt that you did it, but you
4 just did two samples of one well and gave me one sample.
5 Again, give me the temperature. They were supposed to do
6 temperature surveys. Give me the temperature of the
7 reservoir and some of the solution resistivity. Because
8 with that, I can come up with some concentration. Did
9 you come up with some temperature surveys? On the 11,
10 what is the temperature of that reservoir and the
11 approximate average resistivity of the solution?

12 THE WITNESS: Talking about the Cliff
13 House, calculations at 2469. The resistivity?

14 MR. EZEANYIM: Yeah. Do you have the
15 resisitivity?

16 THE WITNESS: I do.

17 MR EZEANYIM: What is it?

18 THE WITNESS: It is --

19 MR. EZEANYIM: Give me the average of the
20 solution.

21 THE WITNESS: -- 7.8 at that point, 7.8
22 ohms. Porosity is 24 percent.

23 MR. EZEANYIM: What is the temperature?
24 Do you have an idea?

25 THE WITNESS: I do. Ninety-two degrees.

1 The apparent water resistivity would be .6 ohms at that
2 point. So when you plot .6 ohms and 92 degrees --

3 MR. EZEANYIM: What is that --

4 THE WITNESS: .6.

5 MR. EZEANYIM: The solution is 7.8; right?
6 Resistivity of the formation is --

7 THE WITNESS: The resistivity of the
8 formation is 7.8.

9 MR. EZEANYIM: Okay. Temperature is 92
10 degrees Fahrenheit. Okay.

11 THE WITNESS: That would give a salinity
12 of 8,000 parts per million. But calculating only off the
13 electric log, understanding that you're calculating
14 formation resistivity, not necessarily water resistivity.
15 Those are different.

16 MR. EZEANYIM: I understand that. What
17 would be the factor of the resistivity?

18 THE WITNESS: 13.05. Is that what you're
19 asking about?

20 MR. EZEANYIM: You said you already
21 calculated and the resistivity gives you 8,000?

22 THE WITNESS: Yes, sir.

23 MR. EZEANYIM: What would be the factor
24 affected to be more than 8,000?

25 THE WITNESS: The factors that were

1 affected?

2 MR EZEANYIM: Yeah.

3 THE WITNESS: There are several different
4 factors that would affect formation resistivity. The
5 fluid content, which in this case would be water, that
6 has an effect, the gas saturation has a huge effect. The
7 minerology has a large affect, also. In this case, in my
8 opinion, it's likely high gas saturation, not producible
9 gas, but residual gas, that's increasing the resistivity,
10 that would account for high resistivity, rather than
11 formation water being of low salinity.

12 MR. EZEANYIM: Did you encounter some high
13 gas concentration while you were doing those swab tests
14 on that zone? Did you encounter some high gas
15 concentration?

16 THE WITNESS: Not that I'm aware of.

17 MR. EZEANYIM: But you assumed that it's
18 going to affect the salinity?

19 THE WITNESS: Yes. Not the salinity. The
20 formation resistivity.

21 MR. EZEANYIM: Yes. Did you run porosity
22 logs? And that's where you got the information?

23 THE WITNESS: Yes, sir.

24 MR. EZEANYIM: The porosity is 24 percent?

25 THE WITNESS: Yes, sir.

1 MR. EZEANYIM: And these logs -- okay.
2 We'll get to that later on. The fresh water that is in
3 the area, that fresh water -- what is the fresh water in
4 the area review of those wells?

5 THE WITNESS: Mr. Wood would probably be
6 the one to answer that question. I didn't -- I don't
7 have any work done on fresh water wells in the area. Mr.
8 Wood does. But they're far shallower. None of them are
9 in the Mesa Verde formation.

10 MR. EZEANYIM: How do we get Mr. Wood to
11 answer that question for me?

12 MR. BROOKS: Let's wait until we finish
13 with this witness and then you may recall him.

14 MR. EZEANYIM: Can you tell me exactly why
15 you want to have this -- why you want to add this Cliff
16 House? Tell me exactly why you want to do that.

17 THE WITNESS: We need additional injection
18 capacity, at least 1,000 barrels of water a day, that
19 we're currently trucking. It's at a substantial cost,
20 and because of that cost, we will be forced to shutting
21 wells if we don't get additional injection capacity.

22 MR. EZEANYIM: I know somebody asked you
23 about -- you don't need to shut these wells. You told me
24 you are trucking water.

25 THE WITNESS: Gas prices have come done a

1 lot since then. Although, several months ago it may have
2 been economic to truck that much water. Gas prices are
3 down to the point where it -- we're at the breaking point
4 where we'll be forced to shutting wells rather than lose
5 money.

6 MR. EZEANYIM: And you can't drill another
7 well?

8 THE WITNESS: We don't have the budget
9 money for it.

10 MR. EZEANYIM: You can't do it deeper than
11 the -- you know, drill it deeper into the Mesa Verde
12 formation?

13 THE WITNESS: We're currently injecting
14 into the lowest-most member of the Mesa Verde formation.
15 Drilling deeper, there are additional sands you could
16 inject to that are deeper, but that would also require
17 substantial cost, just like drilling an additional well
18 would. Something that we don't foresee in our budget.

19 MR. EZEANYIM: You continue to talk about
20 budget. Let's talk about the budget now. Let's say you
21 truck 1,000 barrels -- is it 1,000 barrels a day you
22 truck after you -- how much do you produce from your
23 wells a day?

24 THE WITNESS: Water, we're producing --
25 between Fruitland coal producers, 500 barrels of water a

1 day.

2 MR. EZEANYIM: Is that from all the 40
3 wells?

4 THE WITNESS: Yes, sir.

5 MR. EZEANYIM: And how much do you inject?

6 THE WITNESS: Around 2,500 barrels.

7 MR. EZEANYIM: A day?

8 THE WITNESS: There's an additional
9 thousand barrels, sometimes up to 1,200 barrels a day
10 that we have to truck.

11 MR. EZEANYIM: So the rest have to be
12 trucked?

13 THE WITNESS: Yes, sir.

14 MR. EZEANYIM: Do you have an idea how
15 much it costs you to truck all this water?

16 THE WITNESS: Daily, 1,000 barrels a day
17 that we're trucking, that's at a cost of \$3.25 a barrel,
18 so \$3,250 a day, minimum.

19 MR. EZEANYIM: Three thousand what?

20 THE WITNESS: \$3,250 a day at the minimum.

21 MR. EZEANYIM: Okay.

22 THE WITNESS: It's also a safety concern
23 for our company, as well, having that many trucks.

24 MR. EZEANYIM: Because -- why is that?

25 THE WITNESS: It's a lot of trucks on the

1 roads, 50 miles each way.

2 MR. EZEANYIM: There are no producing
3 wells in this area?

4 THE WITNESS: What area are you referring
5 to?

6 MR. EZEANYIM: Outside the area of review,
7 there are no producing wells in the area of injection of
8 this well?

9 THE WITNESS: No, sir, not in the zone of
10 injection. Not close by.

11 MR. EZEANYIM: Can you tell me what your
12 top most perforation is if you are approved for this
13 Cliff House? What is the top most perforation?

14 THE WITNESS: Yes. The top most
15 perforation would be 2,450. The bottom most would be
16 3,197.

17 MR. EZEANYIM: Could you repeat that?

18 THE WITNESS: 2,450 at the top, 3,197.

19 MR. EZEANYIM: I'm talking about both of
20 the wells.

21 THE WITNESS: That's -- the one I just
22 gave you is for the SDW 11.

23 MR. EZEANYIM: Okay. What about the 36?

24 THE WITNESS: The 36, from 2,614 down to
25 3,300.

1 MR. EZEANYIM: But you're currently
2 approved from that well up to 4,350 on that number.
3 You're approved up to -- if I'm not mistaken. No, this
4 one is -- which one is this? How do you call that, Tsah
5 Tah?

6 THE WITNESS: Tsah Tah.

7 MR. EZEANYIM: Number 11, you've been
8 approved to inject from 3,407 to 4,350 on Number 11;
9 right? So what are you going to do with that operation
10 if it goes below -- because you told me you are going to
11 do 2,450 to 3,197.

12 THE WITNESS: Which is approve the perfs.

13 MR. EZEANYIM: Yeah. But you are approves
14 3,197 to 4,350. That's what you have right now. You are
15 approved. And you're talking about 1,056 or something,
16 53.

17 THE WITNESS: I'm not sure I understand
18 your question.

19 MR. EZEANYIM: My question is, now whether
20 you want -- what you want your utmost perforation to be.
21 You said it's 2,450; right?

22 THE WITNESS: Yes.

23 MR. EZEANYIM: Up to 3,107?

24 THE WITNESS: Down to 3,197.

25 MR. EZEANYIM: Currently you perforated

1 from 3,197 to 4,250. That's what you have now?

2 THE WITNESS: Yes, sir. We're currently
3 injecting in this interval down here. In Menefee and
4 Point Lookout, we'd like to inject --

5 MR. EZEANYIM: To be 2,450 to 4,250;
6 right?

7 THE WITNESS: No. It would be the whole
8 interval.

9 MR. EZEANYIM: Yeah.

10 THE WITNESS: Yes, sir.

11 MR. EZEANYIM: The same with the other
12 one. I think the other one is 3,325 to 4,381; right? I
13 just want to -- because there's going to be -- you're
14 asking for 2,500 on all of them. Okay.

15 MR. BROOKS: Mr. Warnell, did you have
16 questions?

17 MR. WARNELL: No questions.

18 MR. BROOKS: Mr. Bruce?

19 MR. BRUCE: Just a couple of follow-up
20 questions, Mr. Examiner.

21 REDIRECT EXAMINATION

22 BY MR. BRUCE:

23 Q. You were questioned about cross flow, Mr.
24 Sutton. When you're drilling the well, there's
25 hydrostatic pressure from the mud. Is that fair?

1 A. Yes, sir.

2 Q. Does that minimize cross flow?

3 A. Absolutely.

4 Q. Then you were talking about the difference
5 between the Mesa Verde and Fruitland coal. Both are
6 pretty much basin-wide zones; correct?

7 A. There's stratigraphic changes basin-wide, but
8 those formation are seen across the basin.

9 Q. But in the Fruitland coal, even though it
10 always seems to be present, isn't that more where zones
11 come and go, from well to well?

12 A. It's far more discontinuous than the Mesa
13 Verde formation.

14 Q. Again, one of reasons why you refer to
15 actual -- in your opinion, is an actual, accurate water
16 sample always better than a log analysis estimate?

17 A. Without a doubt.

18 MR. BRUCE: That's all I have, Mr.
19 Examiner.

20 MR. BROOKS: Ms. Altomare, any recross?

21 MS. ALTOMARE: I don't believe so.

22 MR. BROOKS: Very good. The witness may
23 stand down. I believe Mr. Ezeanyim wanted to recall Mr.
24 Wood?

25 MR. EZEANYIM: Yes.

1 MR. BROOKS: Mr. Wood, if you take the
2 stand again, please.

3 MR. BRUCE: Mr. Examiner, you asked the
4 prior witness about fresh water in the area, and I -- of
5 course Mr. Wood has previously been sworn and he didn't
6 put together the Exhibits 1 and 2, the two C-108s. But
7 I'd just ask him to discuss what the fresh water samples
8 show with respect to the freshness of the water and maybe
9 the depths where that fresh water was found.

10 MR. EZEANYIM: Exactly.

11 MR. WOOD: If you would look at Exhibit 1,
12 page 21, this a water analysis that was collected from
13 what we call the Yazzie 11 well.

14 MR. EZEANYIM: Page 21?

15 MR. WOOD: Page 21 of Exhibit 1. We call
16 this the Yazzie 11 well. The Yazzie family lives within
17 this quarter section, and it's within Section 11. The
18 analysis indicates that the TDS was 280, 280 to zero.
19 This well is approximately a quarter mile northeast of
20 the Tsah Tah SWD Number 11 well. There is no record of
21 it with any government agency.

22 I met with Mr. Yazzie and asked him what his
23 recollection was as far as well depth. He said
24 approximately 800 feet. That is similar to other nearby
25 water wells. There's a mission nearby. There's a

1 rancher by the name of Mr. Blancher that has some water
2 wells. It's all, you know, 800 to 1,000 feet.

3 MR. EZEANYIM: Okay. For Number 11. What
4 of Number 36?

5 MR. WOOD: There were no water wells
6 within a one-mile radius of the Tsah Tah 36 well. I did
7 include the same analysis within the packet as a point of
8 reference. Excuse me. I did not because it's not within
9 a one-mile radius.

10 MR. EZEANYIM: Okay. That's fine.

11 MR. BRUCE: Maybe just one follow-up
12 question.

13 BRIAN WOOD

14 FOLLOW-UP EXAMINATION

15 BY MR. BRUCE:

16 Q. Mr. Wood, generally, would you go to the state
17 engineer records to determine fresh water wells in the
18 area?

19 A. Yes. I check their online database. We had
20 reason to believe that it might have been drilled by a
21 government agency like the Natural Resources Conservation
22 Service. They could not find any known record of the
23 depth, which is why we interviewed Yazzie.

24 Q. So you go out to the site and just look
25 around?

1 A. Correct. Yes.

2 MR. BRUCE: Thank you.

3 MR. EZEANYIM: Thank you

4 MR. BROOKS: You may stand down.

5 MR. BRUCE: That concludes my case.

6 MR. BROOKS: Very good. Ms. Altomare, how

7 long do you estimate your case will take?

8 MS. ALTOMARE: My portion, probably will

9 only take about probably about a half an hour or so, but

10 I would request a recess.

11 MR. BROOKS: How long do you think you

12 need?

13 MS. ALTOMARE: To speak with --

14 MR. BROOKS: -- with your witness?

15 MS. ALTOMARE: I'd like about 20 minutes

16 or so.

17 MR. BROOKS: First, let me ask Mr. Bruce,

18 do your people have transportation plans that --

19 MR. BRUCE: Some people are driving and

20 some people are flying. I don't want this to go late in

21 the afternoon, but I don't think it will.

22 MR. BROOKS: What I'm proposing is to take

23 a lunch recess at this time to give Ms. Altomare plenty

24 of time and accommodate my schedule. Okay. We will

25 stand in recess until 1:15.

1 (A lunch recess was taken.)

2 MR. BROOKS: We will go back on the record
3 in cases numbers 14265 and 14266, consolidated. And I
4 believe, Ms. Altomare, that you are up.

5 MS. ALTOMARE: I think I'm actually going
6 to take -- I guess I'll take the phone over --

7 MR. BROOKS: I think that probably is the
8 best way of -- to take it to counsel table. Okay.

9 MS. ALTOMARE: Briefly, I wanted to do
10 just a little bit of an opening.

11 MR. BROOKS: Okay. You may proceed.

12 MS. ALTOMARE: Essentially, the Division
13 is opposing these applications at this time. There's a
14 well-established set of data based on other operator's
15 applications, EPA investigations and OCD investigation
16 into this area, establishing that there are protectable
17 waters in the Cliff House formations in this region.

18 The sole basis for Rosetta's application
19 contending that the area where they want to inject is
20 saline and not protectable, is a single sample yielding
21 what they claim to be results above 16,000 TDS. Their
22 only explanation for why this is inconsistent with the
23 other data and with the resistivity values coming out of
24 their own data is, basically, that we should believe that
25 value because that is -- because that's one test and,

1 basically, we should believe that test because that's the
2 one they want us to believe.

3 And, essentially, their argument that there
4 are other explanations for the inconsistent data, we find
5 to be insufficient, particularly, because there are ways
6 to support that argument if there is an explanation, an
7 alternate explanation, for the resistivity logs being
8 consistent with that sample data, we would propose that
9 Rosetta should come forward with alternate testing to
10 explain away those inconsistent values.

11 At this point in time, though, basing
12 injection into a zone that is potentially protectable
13 fresh water on a single sample when, to date, we have
14 denied that same potential zone as an injection area for
15 numerous other operators in the area, just doesn't
16 seem -- it doesn't seem like they have provided enough
17 evidence at this point in time.

18 At this time I would call Steve Hayden,
19 District 3 geologist for the Oil Conversation Division as
20 the only witness for the oil Conservation Division.

21 MR. BROOKS: Very good. You may proceed
22 with the examination.

23 MR. HAYDEN: I'd like to start with a
24 little bit of --

25 THE COURT REPORTER: I can't hear him.

1 MS. ALTOMARE: Steve, can you speak up a
2 little bit?

3 MR. HAYDEN: Let me talk about the Mesa
4 Verde stratigraphy, first. But the Mesa Verde is a group
5 that consists of four formations, at the base of which is
6 the Hosta sandstone, followed by the Point Lookout and
7 then the Menefee and then the Cliff House. The La
8 Ventana is a member of the Cliff House. The Cliff House
9 and the Hosta are very much alike in that they were
10 deposited during times of transgression when the sea was
11 moving forward. The Point Lookout was deposited when the
12 shore was moving towards the sea, and they differ in
13 character quite a bit because of that. The Menefee is
14 continental.

15 The La Ventana member of the Cliff House
16 represents a time when the transgression of the sea wave
17 was matched by the input of sediment to the point where
18 the formation degraded and became thicker. This sits on
19 top of the Cliff House. I'll talk about that more later
20 when we get into the logs. But at that point we have a
21 lot of remnants of the Barrier Islands preserved that
22 normally don't preserve in beaches, the foreshore and the
23 intertidal stuff. And the beaches are preserved because
24 the rising sea level buried the -- let them be buried and
25 preserved, and those represent areas where you have much

1 better sorting and rounding of sands, and the sorting
2 makes them more quartz rich. And that sorting also
3 increases the porosity and presumably permeability of
4 the --

5 MR. BROOKS: Excuse me, Mr. Hayden. I
6 believe Mr. Bruce has --

7 MR. BRUCE: Is Mr. Hayden going to be
8 qualified as an expert?

9 MS. ALTOMARE: Oh, I apologize.

10 MR. BROOKS: That is well taken. Mr.
11 Hayden's qualifications should be placed into the record.

12 STEVEN HAYDEN

13 Having been first duly sworn, testified as follows:

14 DIRECT EXAMINATION

15 BY MS. ALTOMARE:

16 Q. Mr. Hayden, have you been previously qualified
17 as an expert in geology for the San Juan Basin before the
18 Division?

19 A. Yes.

20 Q. What is your current position with the Oil
21 Conversation Division?

22 A. District geologist for San Juan Basin for
23 District 3.

24 Q. How long have you held that position?

25 A. Nine years.

1 MS. ALTOMARE: I would move to admit Mr.
2 Hayden as an expert in geology, specifically with regard
3 in this case to the geology of the San Juan Basin.

4 MR. BROOKS: Any objection?

5 MR. BRUCE: No objection.

6 THE WITNESS: I might add that I worked in
7 graduate school on the Mesa Verde, on the sequence
8 stratigraphy of the Mesa Verde, in proving the Hosta
9 sandstone and the Point Lookout and since have worked on
10 the whole thing often.

11 MR. BROOKS: Thank you. Mr. Hayden is so
12 qualified.

13 THE WITNESS: Okay. Anyway, the La
14 Ventana is unique in that it represents preserved beach
15 sands and foreshore sands, the intertidal stuff that
16 normally is washed away by higher energy, either
17 sandstones or stream deposits, that come in and erode
18 them and don't preserve it. This gives the La Ventana
19 better porosity and permeability and better sorting to
20 allow it to be a better aquifer and, also, a better
21 receptacle from the point of view of volume for disposal.
22 I guess that's pretty much what I wanted to say about the
23 stratigraphy. The rest of the Mesa Verde is different in
24 character from the Cliff House.

25 Q. (By Ms. Altomare) Mr. Hayden, we have in

1 front of us, actually, up on the screen right now, is a
2 map of the particular area that we're talking about. Due
3 to the fact that I didn't anticipate it was not going to
4 project very largely, I've gone ahead and made copies for
5 the hearing examiners, as well as opposing counsel, so we
6 can see the salinity numbers that are represented on this
7 map. Can you explain for the hearing examiners what this
8 map shows? I believe you have it in front of you, as
9 well.

10 A. Much like the map that was used in the Rosetta
11 presentation showing the outcrop of the Cliff House also,
12 the numbers in here represent the salinities that were
13 reported at the time this map was drawn. This map is
14 from 1990, I believe, so --

15 Q. So even as far as back as 1990, it was
16 established that the salinities in the Cliff House
17 sandstone area were well below the 10,000 threshold in
18 this area?

19 A. Yeah. Yes, well below that 10,000. We also
20 have some new data that just came in from XTO showing in
21 the area east of Canyon Largo, which is about 10 to 15
22 miles northeast the basin from the Rosetta area. We have
23 some fresh waters in the Cliff House also. That came in
24 last week. Anyway, it's very well established that this
25 is the case here, and we've been dealing with various

1 operators in this area where the La Ventana exists with
2 saltwater disposals and with EPA and the BLM and the
3 Navajo Nation for several years now. You want some
4 history on that, or --

5 Q. Yeah. Let's start out first, though, by
6 talking a little about the location of these specific
7 sites. I have up now the next slide that shows the
8 Juniper and Tsah Tah wells wide view. Is this your
9 understanding of where the two Rosetta wells are located
10 in relation to the Juniper Saltwater Disposal Number 1
11 that we discussed earlier on today?

12 A. Yes.

13 Q. And just for clarification of the record, you
14 were able to hear the testimony that was presented
15 earlier on today by the Rosetta witnesses; is that right?

16 A. Yes, I was.

17 Q. And are you familiar with the Juniper
18 Saltwater Disposal Well Number 1 operated by Coleman Oil
19 & Gas?

20 A. Yes.

21 Q. Are you familiar with its history and the
22 history of the injection intervals that were applied for
23 and later on isolated off with regard to the Juniper?

24 A. Yes, I am.

25 Q. I'm going on now to the next slide, which

1 depicts the Juniper and Tsah Tah wells zoom view with
2 distances. Can you explain for the hearing examiners
3 what is depicted on this map?

4 A. Oh, okay. Yeah. The green marker is the
5 Coleman SWD Number 1. The purple or violet is Rosetta
6 SWD 11, and the blue is the SWD 36. They're pretty much
7 equal distance from one another, just about over two
8 miles.

9 Q. So on this map, the orange line drawn between
10 the Coleman Juniper well and the Rosetta Tsah Tah Number
11 36, it appears to be about 2.21 miles distance?

12 A. The 36 is the long one. That's 4.29,
13 according to the diagram.

14 Q. I'm sorry. I'm reading the wrong -- okay. But
15 Juniper Number 11 and the Coleman --

16 A. Right.

17 Q. -- is the one that's 2.21 miles?

18 A. Right.

19 Q. Then moving on to the next slide, again, on
20 this well, we're looking at only two of the wells. We're
21 looking at Rosetta Tsah Tah Number 11 and the Rosetta
22 Tsah Tah Number 36. And what is the distance that is
23 shown on this map?

24 A. 2.23.

25 Q. So approximately the same distance between the

1 two Rosetta wells as between the Rosetta Number 11 and
2 the Juniper well?

3 A. Yes.

4 Q. Okay. If you would like to talk now a little
5 bit about how the Oil Conservation Division first became
6 involved in the -- or the concerns about the Cliff House
7 formations in this area?

8 A. I first got a phone call from the BLM about
9 five years ago mentioning that Jim Walker, the Region 9
10 EPA engineer was complaining that the Cliff House in this
11 area was fresh. We hadn't paid much attention to that in
12 the past. But it turned out that he was correct
13 according to his calculations which were from the
14 resistivity logs. He estimated that Juniper SWD Number 1
15 was in the 3 to 4,000 range in milligrams per liter of
16 TDS, and he, of course, had -- he was Region 9 EPA, which
17 has primacy on the -- or had primacy on the Navajo
18 reservation. The rest of New Mexico is under Region 6,
19 and they have given primacy to OCD or to the State of New
20 Mexico under their permission to license -- their
21 permission to license approved SWD wells.

22 Q. And as a result of Mr. Walker raising these
23 concerns with regard to the Juniper Saltwater Disposal
24 Number 1, what action was taken by the OCD with regard to
25 that well?

1 A. We asked them to plug that back to just
2 include the Menefee and Point Lookout.

3 Q. To your knowledge, is Coleman injecting into
4 the Cliff House formation at this time?

5 A. No.

6 Q. Are there other operators or other wells in
7 this area that are being limited or prohibited from
8 injecting into the Cliff House?

9 A. Yes, there are. Dugan has four in the area,
10 the Neoprene SWD Number 1 in Section 17 of 25 of 10. The
11 Sanchez O'Brian Number 1 in Section 6 of 24-9. Actually,
12 the other two aren't injecting at this point. Coleman
13 has four. Juniper Number 1 in 16-24-10 that we talked
14 about. They've got the Juniper SWD Number 4 in 17 of 24
15 and 10, the Juniper West Number 1 in 24 of 24-11, and the
16 Cowsaround in Section 16 of 26 and 12. These have all
17 been limited to Menefee and Point Lookout by their SWD
18 orders. Maralex also has one or more in the area --

19 THE COURT REPORTER: I'm sorry. I need
20 you to speak up.

21 MS. ALTOMARE: I'm sorry. Steve, somebody
22 was coughing. Can you repeat that for the court
23 reporter, please?

24 THE WITNESS: All of the wells?

25 MS. ALTOMARE: No, just starting with

1 Maralex.

2 A. Maralex also has one or more in the area,
3 Trading Post SWD wells. I didn't get a chance to look
4 them up over lunch. I didn't get a long enough break.
5 Anyway, they're all limited to exclude the Cliff House at
6 this point, based on EPA requests.

7 Q. (By Ms. Altomare) And that request is based
8 on salinity being less than 10,000 TDS?

9 A. Yes. I have never seen an analysis or am not
10 aware of any analysis that shows dissolved gas in the
11 Cliff House waters. This is the first time I've heard of
12 it in that area.

13 Q. And if it was suspected that any of these
14 salinity measurements or calculations being below 10,000
15 TDS was the result of anything other than a true salinity
16 measure of the water, would you expect one of these other
17 operators to have raised this as an explanation prior to
18 this time?

19 A. Yes, I would. But I would be willing to look
20 at any information that's supplied.

21 Q. Have you seen any data that indicates that the
22 presence of gas or minerals or anything else explains the
23 inconsistent data between the resistivity measurements
24 and the salinity measurements that Rosetta came up with?

25 A. No, I haven't.

1 Q. Have you reviewed the applications for the two
2 Tsah Tah wells submitted in this case?

3 A. Yes.

4 Q. Are you familiar with the current status and
5 history of these two wells?

6 A. Yes.

7 Q. What kind of water or mud systems were these
8 two wells drilled with according to your review of the
9 well files?

10 A. Fresh water.

11 Q. And what's your understanding of the basis for
12 Rosetta's request for being able to inject into the Cliff
13 House formation at this point in time? What are they
14 basing this request on?

15 A. They're basing it on that analysis done by
16 Key.

17 Q. The single sample from Tsah Tah Number 11?

18 A. Yes.

19 Q. Do you have any concerns or issues with regard
20 to the sampling that was done on the Tsah Tah Number 11
21 that they're basing --

22 A. In viewing that it was one sample and it was
23 taken from a very porous and permeable sand after
24 drilling it and cementing it, and there may have been
25 quite a bit of infiltration going on during that process.

1 They were using a low solid, nondispersed mud, basically,
2 although the polymer would protect some of that. I'd
3 like to see more data, because it doesn't agree with the
4 resistivity data, and it, also -- with the resistivity
5 and temperature of the sample that he took and plot that
6 on Halliburton's Gen-5 chart, which I used for
7 resistivity calculations, it shows 10,000 TDS. So I'm
8 not sure what's going on there.

9 Q. Does it concern you that the value that came
10 back for the sample from Tsah Tah Number 11 as noted by
11 Rosetta is not consistent with the historical data for
12 this basin for the Cliff House formation?

13 A. Yes.

14 Q. You had done a review of the logs in this
15 case; is that right?

16 A. Right.

17 Q. I'm now looking at what we marked as OCD
18 Exhibit 1A, which, I believe, you reviewed and put
19 together. It's labeled --

20 A. This is a section from the induction log in
21 the Tsah Tah SWD 11, which includes the top of the -- or
22 includes pretty much all of the Cliff House or the upper
23 Cliff House, anyway. I put two arrows, one marking 2469
24 where they sampled, and I did calculations based on what
25 I read in this log. I took that resistivity reading

1 there to be 10. Mr. Sutton, this morning, said it was
2 7.8. So I'm using a tip, which is the most accurate
3 thing to look at.

4 So I'll accept his 7.8, but I did my
5 calculations which follow using 10 for the near well bore
6 resistivity and 15 for the deep. I'd like to make the
7 point that we were looking at resistivity logs, induction
8 logs. When we see the normal condition for fresh water
9 mud used, the shallow resistivity will be higher than the
10 deep resistivity, because, presumably, the mud is fresher
11 than the formation water. If you note throughout the
12 upper Cliff House here, the resistivity curves either
13 match or they're reversed, with the deep resistivity
14 being higher than the shallow.

15 As an expiration tool, we used that to look
16 for hydrocarbons, which tend to have a higher resistivity
17 than the fresh water muds, which is the point Mr. Sutton
18 made this morning. But in the absence of hydrocarbons,
19 it also indicates fresh water. We use it in the San Juan
20 Basin a lot of times to look for aquifers like the Ojo
21 Alamo, which show the same kind of profile as we see
22 here.

23 Q. So the significance of the mud showing a --

24 A. Absent any indication that there's
25 hydrocarbons present, I take the reverse profile with the

1 deep resistivity being higher to indicate freshness of
2 the formation waters.

3 Q. Is there any indication to you that there are
4 hydrocarbons present in this case?

5 A. Not to my knowledge.

6 Q. Just for the record, can you identify what the
7 green arrow and the red arrow are pointing at in this
8 exhibit?

9 A. The green arrow just represents where the
10 sample that Key ran was taken. The red arrow, I just
11 picked a spot lower down that I suggest probably
12 represents a fair sequence boundary within the La Ventana
13 where you've got greater porosity and permeability, and
14 both resistivities jump there, indicating fresh input,
15 possibly. Or, in the case that there was a lot of gas,
16 I'd expect we would have had some bubbles at the surface
17 at that point.

18 Q. Is there anything else significant on this
19 particular exhibit that you'd like to point out before we
20 move on?

21 A. Mainly, that I used those two as the basis of
22 two calculations I did below.

23 Q. Okay. I'm going to move on to the next slide,
24 which is your worksheet for estimating water quality from
25 electrical well logs. It is labeled OCD Exhibit 1B. Can

1 you explain what this is for the hearing examiners and
2 work through the entries on this worksheet, please?

3 A. Okay. This is a worksheet that I took from a
4 paper by Kent Hoffman, who is a geologist with BLM who
5 based it on Schlumberger data and USGS data. This was
6 published in November of '87 in the San Juan resource
7 area in Durango. This is what BLM uses for their
8 calculations. They supplied it to me, and I've been
9 using it.

10 What it does, it takes the information from
11 the log header and also the readings from the log. If
12 you look -- we took the Rmf from the log which is 1.01
13 ohms per meter at 72.6 degrees. The maximum temperature
14 on the log was 110 Fahrenheit at 4508. Divide that
15 gradient minus 60 by that and you come up with .011
16 degree per foot. Multiplying that to the 2469, I came up
17 with 87.16 degrees Fahrenheit for the temperature in the
18 sample, which doesn't differ much from what Mr. Sutton
19 was talking about this morning.

20 Using that temperature and the Rmf and the
21 Schlumberger Gen-9 chart, I came up with .63 as the Rmf
22 at that temperature. And using the 10 ohms per meter
23 that I had interpreted from that log, I came up with an F
24 value of -- formation value of 15.87. And to get the
25 Rwa, we took the 15 divided by 15.87 to come up with a

1 resistivity of water at that temperature, went through a
2 calculation to do it -- as shown below, to do it at 77
3 degrees Fahrenheit, came up with a 1.096 for resistivity
4 of the water, and I actually used the Halliburton Gen-5
5 chart, which is, essentially, the same thing, but I had
6 cleaner ones, but I didn't make copies of the
7 Schlumberger one, and this is a Halliburton log. To plot
8 that out, I came up with 5,200 milligrams per liter, the
9 plot shown in the next figure, which is the Halliburton
10 chart with that information on it.

11 Q. I'm going to back you up for just a second,
12 Steve. I want to clarify that the data that you're using
13 in these worksheets are pulled from the Rosetta logs; is
14 that right?

15 A. The induction log on the SWD Number 11.

16 Q. And these are the open hole logs that are done
17 before the casing is cemented?

18 A. Right.

19 Q. Why did you choose to use the BLM -- the
20 Halliburton and Schlumberger worksheets that are used by
21 the BLM?

22 A. The easiest way to do it.

23 Q. Are these the standard ways of working these
24 equations?

25 A. It's the standard that's been used in the San

1 Juan Basin, as far as I know.

2 Q. This is the standard that's used in the
3 industry in the San Juan Basin?

4 A. Pretty much. When you have a case of high
5 deep resistivity, it's pretty hard to use SP curve
6 analysis, so usually they go with this, which is based on
7 an Archie equation.

8 Q. Going on to the OCD Exhibit 1C, which is the
9 resistivity-salinity temperature conversions of NaCl
10 Solutions --

11 A. Right. If you look at the vertical, the Y
12 axis, that gives you the resistivity. The X axis across
13 the bottom and the top is the temperature. I took 77 and
14 followed that up until I hit 1.0 -- or just a little less
15 than 1.1 -- it's kind of hard to be exact with these
16 things -- and then follow that curving line down and read
17 that it's just below -- or just above 5,000, because
18 that's what that curving line that's closest to it
19 represents. I call that 5,200.

20 Q. So your calculation was 5,200 milligrams per
21 liter?

22 A. Yeah. I also did it for that interval below
23 that I marked with the red arrow.

24 Q. Is that the next exhibit?

25 A. Yes.

1 Q. So that's OCD Exhibit 1D, and that's the next
2 worksheet.

3 A. Go ahead.

4 Q. I'm sorry. I'm just saying I'm moving on to
5 the next worksheet for you to go ahead and review.

6 A. This represents what I had interpreted as
7 probably a sequence boundary in that set of
8 parasequences -- it's the La Ventana here -- where you'd
9 have a grade size change in maybe -- a little more
10 permeability and porosity. Although if you look at
11 the -- the gamma curve is increased there. Oftentimes,
12 these kind of surfaces have a lot of oxidations on them.
13 It includes iron oxides that usually have some thorium
14 associated with them that will raise the gamma.

15 Q. Would you like to review the worksheet and
16 your calculations on this?

17 A. Through the same business, except I estimated
18 the near well bore resistivity at 25 ohms and the deep
19 resistivity at 100, based on the scale on the well log
20 itself. And in this case, using the same process, came
21 up with a resistivity of the water at 77 degrees and 2.83
22 ohms done on the same Halliburton chart in the next
23 exhibit, comes up with 1,900 milligrams per liter for
24 that zone.

25 Q. And the next exhibit is labeled OCD Exhibit

1 1E.

2 A. Yes.

3 Q. Again, you used the same method to use the X
4 and Y axes to find where you've marked with the green
5 arrow at 1,900 milligrams per liter?

6 A. Yes. With the red arrow, I believe, the
7 bottom of the two.

8 Q. Right. But on the OCD Exhibit 1E, the value
9 is marked with big green arrow?

10 A. No, with a red arrow. Let me go back and make
11 sure I'm not -- the lower of the two.

12 Q. Right. But on the actual chart for salinity
13 temperature conversion, you've used a large green arrow
14 to mark the X and Y axis conversion.

15 A. I didn't have those on my copy, I guess.

16 Q. I just want to make sure on the record that
17 we're clear.

18 A. On the chart, itself, yes.

19 Q. Moving on to the final slide that you put
20 together, OCD Exhibit 1F --

21 A. This just shows where I plotted the
22 resistivity versus temperature of the sample that Key
23 analyzed.

24 Q. So this is based on the data that was actually
25 submitted to Key by Rosetta from the sample that was

1 taken on the --

2 A. No. It's what Key measured when they took the
3 sample.

4 Q. So this is the Tsah Tah Number 11?

5 A. It's 27 ohms at 59 degrees. I just put it on
6 there to see where it came out.

7 Q. For the sample that they measured to be over
8 16,000 TDS --

9 A. I have no explanation for this.

10 Q. -- you came up with a value of 10,000 TDS?

11 A. Yes.

12 Q. Okay. Just for clarification, you put
13 together Exhibits 1A through 1F?

14 A. Yes.

15 MS. ALTOMARE: I would move Exhibits 1A
16 through 1F into the record.

17 MR. BRUCE: No objection, Mr. Examiner.

18 MR. BROOKS: Okay. OCD Exhibits 1A
19 through 1F are admitted.

20 (OCD Exhibits 1A through 1F were admitted.)

21 MR. BRUCE: And this one?

22 MR. BROOKS: That's OCD Exhibit 1.

23 MS. ALTOMARE: No. That was just a
24 demonstrative aid, but it just wasn't legible so I just
25 made copies of it.

1 Q. (By Ms. Altomare) Were your log calculations
2 consistent with the lab determined salinity referenced by
3 Rosetta in their application?

4 A. No.

5 Q. What, if any, explanation do you have for
6 this?

7 A. Well, as I mentioned before, my -- some
8 possibilities that occurred to me are infiltration of
9 more saline floods during the drilling into this part of
10 the permeable formation.

11 Q. Okay. And you talked a little about induction
12 log numbers. What is the significance of that?

13 A. I'm not sure what you --

14 Q. I'm sorry. The difference between the mud
15 salinity and the --

16 A. Oh. Well, when they record the Rmf, they
17 recorded the total resistivity of the mud and the rock
18 and the water in the formation, and you go through these
19 calculations to separate out the formation factor, which
20 is the F factor I mentioned in the first one where I
21 divided the Rmf -- or the resistivity near -- for
22 resistivity by the calculated Rmf at this depth, at this
23 temperature.

24 Q. What kind of --

25 A. It gives us a figure to work with to reduce

1 the total resistivity near well bore two, the resistivity
2 of the water.

3 Q. What kind of additional sampling or data would
4 you like to see to support the submission of the 16,000
5 plus TDS that's being argued by Rosetta at this point as
6 being the true value of the salinity of the Cliff House
7 at that location?

8 A. Actually, I'd like to see samples taken during
9 drilling before there's a chance of contamination, which
10 we can't do on this well, obviously. Maybe swab it a
11 whole bunch of times more. I'm not sure.

12 Q. What about additional testing on the 36 in
13 addition to the 11?

14 A. No. The 36 hasn't been tested at all. Cliff
15 House.

16 Q. Is there testing that can be done to ascertain
17 whether the -- did you refer to it as inverse resistivity
18 or reverse --

19 A. I just said that a normal relationship between
20 those resistivity curves when you're drilling a well is
21 because the deep resistivity is lower than the shallow
22 because it's saltier. In this case when we see the deep
23 resistivity as higher than the shallow, that means it's
24 less salty than the mud or it means that there's
25 hydrocarbons present. Lacking evidence of hydrocarbons,

1 I take it to mean it's fresher.

2 Q. Is there testing that can be done to determine
3 whether or not there are, in fact, hydrocarbons there?
4 Or, as Mr. Sutton had speculated, maybe minerals or other
5 situational factors that could be affecting that
6 resistivity log calculation and explain away that
7 inconsistent value?

8 A. I suppose taking a sample and having chemistry
9 done and looking for hydrocarbons would be one thing.

10 Q. So there is additional testing Rosetta could
11 do to clarify and make sure that it is, in fact, that the
12 water -- a fact that the water is saline and not that it
13 is something else that's causing the discrepancy in
14 the --

15 A. For one thing, to pump it longer to see what
16 happens with the water. The other thing is testing, like
17 I said. Although, I'm not really familiar with those
18 tests. I'm not a chemist. That would be best asked of
19 somebody -- a water-quality specialist.

20 Q. Mr. Hayden, I have up on the screen the chart
21 that I think you're familiar with that shows several
22 different columns showing where the different depths of
23 testing that has been done.

24 A. If you take these and move the 36 over to the
25 right and compare them, you'll see there's about 100 feet

1 or so per section increase in depth as you go north/
2 northeast, which works out to about 1 degree. And
3 depositional dip of these shorelines is presumed to be 1
4 to 3 degrees at the time that they were laid down, so
5 they correlate really well to me.

6 Q. But on this chart, we can see clearly, can't
7 we, that the sample that was taken that's being relied
8 upon by Rosetta falls well within the same areas as the
9 Coleman Oil & Gas area that has been determined to be
10 protectable and the other areas that were --

11 A. Yes, it does.

12 Q. Okay. And the proposed areas of the injection
13 by Rosetta are overlapping or virtually the same as that
14 of the Juniper which is just over two miles away?

15 A. Yes.

16 Q. Okay. What's your impression, having been
17 involved in the process with the EPA during the whole
18 issues that arose with the Juniper Number 1 Saltwater
19 Disposal Well -- what is your impression of what might
20 happen if the OCD approves an application to allow an
21 operator to begin injecting in this area into the Cliff
22 House formation?

23 A. In my discussion with Jim Walker from Region 9
24 about the wells on Indian land, we were questioning some
25 of his conclusions and asked him to back up his results.

1 He responded by notifying Region 6 that our ability to
2 control or to adequately oversee the saltwater disposal
3 wells in New Mexico might be in question, and they did a
4 pretty good investigation, and they've now allowed us to
5 continue with our primacy in this situation. But they
6 concurred with his conclusions about the salinity of
7 these formations, and I guess you could say they're the
8 elephant in the room that no one notices.

9 Q. So it's safe to say that the EPA -- while New
10 Mexico has been granted primacy in these instances, the
11 EPA definitely has a dog in the fight and has an interest
12 in protecting this Cliff House and is very interested in
13 making sure that this formation remains protected?

14 A. True. Region 9 is also -- they awarded
15 primacy on the reservation to the Navajo EPA, which has
16 asked the BLM to oversee it. So the BLM has an interest
17 in this area, also. And I believe they sent a letter to
18 the hearing examiners covering their feelings on this.

19 Q. Is it your understanding that the BLM is not
20 supportive of the approval of these applications?

21 A. Yes.

22 Q. Is there anything else that you feel that we
23 haven't adequately covered or any other concerns after
24 hearing the testimony this morning that you would like to
25 address?

1 A. I think that's pretty much it.

2 MS. ALTOMARE: I'll go ahead and pass the
3 witness.

4 MR. BROOKS: Mr. Bruce?

5 CROSS-EXAMINATION

6 BY MR. BRUCE:

7 Q. Mr. Hayden, can you hear me?

8 A. Yes.

9 Q. This is Jim Bruce, Mr. Hayden. Let me start
10 off -- you mentioned there was a couple -- two or three
11 Dugan wells, three or four Coleman wells and a couple of
12 Maralex wells -- you didn't have their exact locations --
13 where you indicated that you thought the La Ventana, or
14 at least the Cliff House water, was -- I don't know.
15 What's the right word to use?

16 A. Protectable.

17 Q. Were any -- other than the Coleman Juniper
18 well, were any physical samples taken of the water?

19 A. I am not aware of the process in all those
20 cases. I know that resistivity from the logs was a
21 factor, but I'm not sure about physical samples.

22 Q. And you don't have any precise numbers for
23 those wells, do you?

24 A. Juniper Number 1 was in the 3,000 to 4,000
25 range, as, I believe, was the Juniper Number 4.

1 Q. Thank you.

2 A. Those are the only ones I looked at.

3 Q. Okay.

4 A. Permits were all done by Will Jones.

5 Q. On your Exhibits 1A through 1E, Mr. Hayden, in
6 your calculations, were you using formation resistivity?

7 A. I was excluding formation resistivity with
8 those calculations. That's what the F factor was for
9 that I divided the resistivity by.

10 Q. You were not using water resistivity?

11 A. I was deriving the water resistivity by using
12 the formation resistivity to divide the near well born
13 resistivity to come up with an Rwa, but that was the
14 process developed by Schlumberger to account for
15 formation resistivity and to isolate the resistivity of
16 the water.

17 Q. Let me ask you a few questions about the
18 Coleman well, the well that was the subject of a prior
19 OCD case. Do you know how that sample was taken in that
20 well?

21 A. No, I don't.

22 Q. Do you know if it was done, basically, on a
23 DST basis, rather than swab basis?

24 A. I don't.

25 Q. If a DST is used, do you know how much volume

1 of water would be tested compared to swab volume?

2 A. I don't know that it's ever been done here. I
3 suggest that that might be a way, but I don't --

4 Q. Had Coleman already been injecting water
5 before the sample was taken?

6 A. In that one well, they had, yes.

7 Q. Could that lead to an inaccurate --

8 A. That was originally brought up by Jim Walker
9 with EPA based on resistivity values.

10 Q. But could that have affected the results of
11 whatever test was taken?

12 A. It would have made it less fresh, and his
13 calculations were in the 3,000 range. His calculations
14 were in the 3,000s, and they were taken from open hole
15 logs, which would have been done before injection into
16 that formation, other than drilling fluid.

17 Q. Just a few more questions. If you go to
18 your -- the exhibit -- the plat, your Cliff House map
19 from the 1990 Thorn study.

20 A. I didn't put that in there, but, yes, I'll go
21 to it.

22 Q. I just want to ask you a few questions on
23 that. I didn't count them, Mr. Hayden, but there look to
24 be maybe more than 30 data points on that plat. I'm not
25 trying to hold you to a number. But in looking at that,

1 it seems like the overwhelming majority of these numbers
2 seem to be -- well, first and foremost, do you know if
3 these TDS values were taken from the La Ventana or
4 another member of the Cliff House?

5 A. I assume they're from the Cliff House. That's
6 the area where most of them occur, with the exception of
7 along the southwest margin including in the -- for the
8 Tsah Tah area, or areas where the La Ventana curves. As
9 you go further north and east, it doesn't.

10 Q. Okay. And do you know how these TDS values
11 were determined? Are they from actual water samples or
12 are they calculations?

13 A. I suspect they're from well logs.

14 Q. And the reason I ask, Mr. Hayden, if you look
15 at these numbers -- well, first of all, if you look at
16 the data points, right in the center, for instance, that
17 data point just north of Farmington, the 39,000 plus
18 number?

19 A. Yeah. That's at the disposal well south of
20 Aztec.

21 Q. But that data point, the 6,051 number, and
22 over to the east, the 7,573 number, have a little
23 different symbol by them than virtually all the other
24 data points.

25 A. The only copy I have isn't good enough to see

1 that.

2 Q. Ms. Altomare can correct me if I'm wrong, but
3 the other data points are all solid data points, and I
4 wonder, do you know if that was used to differentiate how
5 the measurement was made or calculated?

6 A. It may well have been. I don't know. This
7 map isn't my figure.

8 Q. I understand that. But it's being used to
9 assert that this is all fresh water. And the reason I'm
10 questioning this -- and maybe we just have to go look at
11 it -- is if you look at virtually all of the numbers on
12 the edge of the Cliff House, they're all approximate
13 numbers, 2,100, 3,200, 1,000, 3,000, whereas the other
14 three or four data points are all down to a different
15 digit. In other words, for instance, one of the
16 different data points is 7,573. Another one 6,051,
17 whereas all the others seem to be approximate. And I'm
18 just speculating and I don't know, because I've never
19 seen this report, but could it be that there are several
20 actual data points and the overwhelming majority of these
21 are just calculated?

22 A. Calculated data points are not imaginary.
23 Calculated data points would be from well logs and just
24 the accuracy of the logs.

25 Q. I understand that they are data points, but --

1 A. Those others may be samples. I know the one
2 between Aztec and Bloomfield is probably taken from the
3 disposal facility down here or right next to it.

4 Q. And I guess the question is, are log analyses
5 better than just taking a physical sample?

6 A. Depends on how the physical sample is taken.
7 Log analyses are developed over long periods with a lot
8 of scientific input. And like I said before, it's
9 qualified by whether or not hydrocarbons are present --

10 Q. And --

11 A. -- no way to establish if hydrocarbons are
12 present in the Cliff House anywhere south of the Blanco
13 Mesa Verde pool, which are a good 10 miles away, at
14 least, from Rosetta stuff.

15 Q. But assuming an actual physical water sample
16 is taken in the proper way and by a qualified service
17 company or lab, would that be better than resistivity
18 calculations?

19 A. Assuming there's some method you could use to
20 eliminate any chance of infiltration prior to taking the
21 sample, yes. But you'd have to stop all your drilling
22 and use absolutely fresh water, stop all your drilling,
23 pump all the fresh water you might have infiltrated out,
24 and then --

25 Q. But --

1 A. -- prior to drilling anything deeper.

2 Q. If you're using fresh water, wouldn't that
3 make the sample more protectable?

4 A. That's why I said you have to pump all the
5 fresh water out until the sample changed. That's the
6 only way I can think of to absolutely exclude any
7 contamination.

8 Q. But if you didn't pump the fresh water out,
9 wouldn't that make the water appear fresher than is
10 actually in that zone or member of the Point Lookout?

11 A. Might be. You'd have to look at all the
12 available data, part of which is well logs, 85 years'
13 worth of science in well logs that's well established.

14 Q. One other -- I don't know if I have much more,
15 but just a couple of things. Again, looking at this
16 Cliff House plat, it appears that the extremely low
17 numbers are near the edge of the Cliff House.

18 A. That's because meteoric waters have been
19 infiltrating the Cliff House and washing -- we'd expect
20 there to be marine salinities in all of these formations
21 and, basically, none of them have -- are up to marine
22 salinity because of infiltration of water from the basin
23 margins. Cliff House basin margin is the closest, and
24 it's the most permeable and porous of all these by a long
25 shot. The Point Lookout is very tight sand, and it

1 doesn't -- it wouldn't conduct fluids anywhere nearly as
2 fast as the Cliff House, which is the problem with the
3 disposal here that allows fresh water to infiltrate
4 further into the formation.

5 Q. What is the permeability in the Cliff House?

6 A. I don't have figures on that. I can give you
7 the approximation of porosity, which is in the 20 percent
8 range. It's obviously permeable or it wouldn't be a good
9 disposal.

10 Q. I think just one more question and I'll let
11 you off the hook here. If a zone had high resistivity
12 because of gas, would those resistivity values be valid
13 to calculate formation water Total Dissolved Solids?

14 A. They would change that equation, but you'd
15 have to establish how much gas was there or the fact that
16 there was some gas to start with.

17 MR. BRUCE: I think that's it.

18 MR. BROOKS: Okay. I just have a few
19 questions here, Mr. Hayden, and then I'll turn it over to
20 the technical examiner.

21 On the Coleman Juniper well, I was a little
22 confused with the testimony about that. Were there
23 actually samples taken from the Coleman Juniper well, or
24 was that 3 to 4,000 parts per million, was that based on
25 computation from the logs?

1 THE WITNESS: At least initially based on
2 computation from the logs. I was peripheral to that.
3 That was Will Jones. It started out with Jim Walker with
4 the EPA.

5 MR. BROOKS: Do you know if there were
6 samples taken from that well?

7 THE WITNESS: I don't know.

8 MR. BROOKS: So, obviously, if you don't
9 know if there were samples taken, you don't know what the
10 results were?

11 THE WITNESS: No.

12 MR. BROOKS: Okay. Something I didn't
13 quite understand and Mr. Bruce was trying to ask you
14 about this -- I'm not sure I ever understood the answer,
15 though. If you drill through a formation using fresh
16 water, one would think that any contamination resulting
17 from the drilling process would tend to dilute, rather
18 than further concentrate the dissolved solids in the
19 formation water. Is that not true?

20 THE WITNESS: Yes, that's true.

21 MR. BROOKS: So why, then, would that be a
22 reason why you would expect to find a higher --

23 THE WITNESS: Because as you drill deeper,
24 you're drilling into formations that have considerably
25 more Total Dissolved Solids, and you're circulating that

1 up the hole, expressing it to the more permeable and
2 porous Cliff House.

3 MR. BROOKS: You're saying you're getting
4 your cross flow from the deeper formations?

5 THE WITNESS: Yes.

6 MR. BROOKS: I think I understand that.
7 Now, this exhibit from Thorn et al., this is from a
8 published source; right?

9 THE WITNESS: Yeah.

10 MR. BROOKS: What book did this appear in?
11 Do you know?

12 THE WITNESS: I didn't dig this up. That
13 was entered by Ms. Altamore.

14 MS. ALTOMARE: If I might interject. That
15 particular map was pulled out of an exhibit that was
16 submitted by Coleman as part of their application in the
17 Juniper case. It was a plat that happened to be
18 submitted as part of their application that I found
19 helpful simply because it had the salinities. But I was
20 using it only as a demonstrative aid. The only reason I
21 made a copy of it was because it was not large enough to
22 read on the screen.

23 MR. BROOKS: Well, I think it has some
24 rather definite evidentiary value in this case, and as a
25 published document, it would be admissible into evidence.

1 MS. ALTOMARE: If the hearing examiners
2 are willing to consider it as a piece of evidence,
3 without the full treatise being available, I would move
4 it as an exhibit for the OCD.

5 MR. BROOKS: Okay. I would like to get it
6 marked since it's been before everyone here and make it
7 part of the record, and we'll give Mr. Bruce a chance to
8 make any further observations about it. Of course, he's
9 already questioned the witness about it.

10 MR. BRUCE: Mr. Examiner, what I would
11 like to know is where it came from.

12 MR. BROOKS: Well, I would like to know
13 that, too, but I assume that can be obtained if it's in
14 an exhibit.

15 MR. BRUCE: If Ms. Altomare could dig that
16 up and give it to us, I have no objection.

17 MS. ALTOMARE: I can provide you with
18 the -- it's public record, Coleman's application. I
19 tried to pull the actual Thorn document online, and I had
20 to pay for it. So I haven't been actually able to pull
21 the Thorn publication, but I haven't made it to the
22 library yet to see if I could check it out.

23 MR. BROOKS: I would like to have the
24 record supplemented with that information if it can be
25 obtained. In the meantime, let us mark this as OCD

1 Exhibit Number 2 and made part of the record.

2 (OCD Exhibit Number 2 marked for identification.)

3 (OCD Exhibit 2 was admitted.)

4 MR. BRUCE: Could I get the name of the
5 publication?

6 MS. ALTOMARE: Sure.

7 MR. BROOKS: That's all I have. Mr.
8 Ezeanyim?

9 MR. EZEANYIM: No questions. This is what
10 I wanted. I have no questions.

11 MR. BROOKS: Mr. Warnell?

12 MR. WARNELL: I have no questions.

13 MR. BROOKS: Okay.

14 MR. BRUCE: Mr. Examiner, I would like to
15 put up Mr. Sutton to discuss a couple of items very
16 quickly.

17 MR. BROOKS: That's fine. But you have no
18 redirect?

19 MR. BRUCE: No.

20 MR. BROOKS: Recross, Ms. Altomare?

21 MS. ALTOMARE: The only clarification I
22 want --

23 MR. BROOKS: I'm sorry. The other way
24 around. I should give you the chance first to redirect,
25 and then he would have a chance to recross. Go ahead.

1 MS. ALTOMARE: The only thing I wanted to
2 do was clarify one thing. Steve, are you still with us?

3 MR. HAYDEN: Yes, I am.

4 REDIRECT EXAMINATION

5 BY MS. ALTOMARE:

6 Q. Steve, is it your understanding that the use
7 of these logs and these calculations based on this log
8 data is a standard way of calculating these salinity
9 measurements and that it's relied upon in the industry?

10 A. Yes.

11 Q. Do you have any reason to question the values
12 that are derived using this methodology?

13 A. Only if you have evidence of there being
14 hydrocarbons.

15 Q. Do you find that these logs and the
16 calculations utilizing this methodology is a good way to
17 check other methods of measuring salinity for
18 consistency?

19 A. To my knowledge, yes.

20 MS. ALTOMARE: That's the only
21 clarification I have.

22 MR. BROOKS: Very good. Recross, Mr.
23 Bruce?

24 MR. BRUCE: No, sir.

25 MR. BROOKS: Very good. You may call your

1 rebuttal witness.

2 MR. BRUCE: I call Mr. Sutton back to the
3 stand.

4 MS. ALTOMARE: I want to leave him on the
5 line it that's okay. Steve, do you mind sitting with us
6 a little bit longer?

7 MR. HAYDEN: No. I hope to.

8 MS. ALTOMARE: Thank you.

9 CHRIS SUTTON

10 REBUTTAL EXAMINATION

11 BY MR. BRUCE:

12 Q. Mr. Sutton, you sat here and listened to Mr.
13 Hayden's testimony. Did you not?

14 MR. BRUCE: And I suppose the record
15 should reflect that he's still sworn, Mr. Examiner.

16 MR. BROOKS: He is. He still has to tell
17 the truth.

18 Q. (By Mr. Bruce) Did you review the OCD
19 Exhibits 1A through 1F?

20 A. Yes.

21 Q. Do you have a copy of that in front of you?

22 A. No.

23 Q. The top.

24 A. There it is.

25 Q. And I'll probably just turn you loose, but are

1 there certain calculations in here or certain usages of
2 the log that you disagree with?

3 A. Yes, definitely. In particular, the second
4 example of the resistivity that was used where Mr. Hayden
5 was using the resistivity of 100 ohms.

6 Q. Is that the red line on page 1?

7 A. Yes, sir.

8 THE WITNESS: Is it possible to put that
9 back up on the screen?

10 MS. ALTOMARE: Sure.

11 THE WITNESS: Thank you.

12 Q. (By Mr. Bruce) 1A.

13 A. So the red line indicating the location where
14 he's using 100 ohm on the deep resistivity to calculate
15 total resolved solids, just at a glance at the log,
16 that's clearly an anomaly on the log that it would be
17 very inaccurate to use that as representative of the
18 Cliff House.

19 Q. It appears to spike there and a few minor
20 spikes below that, but, overall, the log moves a lot
21 further to the left?

22 A. Absolutely. The highest resistivity on the
23 log at this one spike, very anomalous and completely
24 unrepresentative of the Cliff House

25 MR. EZEANYIM: Are you talking about the

1 red line?

2 THE WITNESS: Yes, sir.

3 MR. EZEANYIM: Do you have any problem
4 with the green line? Do you have any problem with that?

5 THE WITNESS: No. That's usable. I think
6 Mr. Hayden was using 10 ohms and I was using 7.8. I will
7 still stand by the 7.8. That's where our sample was
8 taken. But, regardless, that's an appropriate place.

9 MR. EZEANYIM: What do you think caused
10 the anomaly on that red line?

11 THE WITNESS: When I look at it at a
12 glance -- I hadn't had time to review it before. I've
13 seen it several minutes ago. At a glance, it looks, to
14 me, like a tide streak. A tide interval would cause high
15 resistivity.

16 Q. (By Mr. Bruce) Do you have anything else to
17 say on this?

18 A. No, not on this.

19 Q. But using that anomalous value would lead to a
20 lower-than-actual TDS figure based on that resistivity
21 calculation?

22 A. Yes. Because, again, the resistivity is not
23 measuring formation water. It's measuring just the
24 formation resistivity where you're trying to calculate
25 the formation water from that. Formation resistivity is

1 affected by many things, not just the water present in
2 the formation. In the absence of other hard data, you
3 would use it. But when you have hard data, a physical
4 sample would far override log calculations.

5 Q. One final thing, Mr. Sutton, there was a
6 question lost somewhere along the line, but Mr. Hayden
7 was asked about the infiltration of fresh water during
8 the drilling process, and he said, well, there was a
9 cross flow because of flow back from the deeper
10 formations. What do you think of that?

11 A. Mud system is placed in the hole to push the
12 the formation back, so you don't have the formation
13 flowing up on you. That's the design of your drilling
14 mud. Based on that, it would be quite a stretch to say
15 there would be any cross flow, even considering the
16 tightness of these reservoirs. Between the tightness of
17 the reservoir and the hydrostatic head of your mud
18 system, you're going to have minimal, if any, cross flow.

19 It's also important to note that we pumped in
20 the swab test 18 barrels, which is three barrels over
21 what was in the formation. That's 180 gallons of water
22 over the bore hole volume. That's a lot of water.
23 You're not going to -- minimal cross flow, if any, is not
24 going to contaminate 180 gallons of water.

25 Q. Again, if you were -- if it was being

1 infiltrated with fresh water, you would expect the
2 salinity to be reduced?

3 A. Yes. If it was infiltrated by your drilling
4 fluid, your drilling mud, that would skew the results to
5 fresher, which would make TDS lower, not higher.

6 Q. That gets to a question I asked Mr. Hayden.
7 Do you know how that Coleman sample was taken on the
8 Juniper well?

9 A. I'm not as familiar with it as I hoped Mr.
10 Hayden would have been, but from my understanding, that
11 was a case of a very small sample chamber. When you
12 compare that small several cc sample chamber, that's far
13 more inaccurate than 180 gallons of water additional that
14 we pumped on the swab test. That's quite a disparity,
15 and I would definitely take the higher --

16 Q. The much higher volume swab test?

17 A. Absolutely.

18 MR. BRUCE: Thank you, I have nothing
19 further.

20 MR. BROOKS: Ms. Altomare?

21 FOLLOW-UP EXAMINATION

22 BY MS. ALTOMARE:

23 Q. So you acknowledge that you don't fully know
24 what kind of sampling was done on the Coleman Juniper
25 well?

1 A. No. I would have hoped that the person
2 showing the analysis would know the process that it was
3 taken, but we didn't bring it. We didn't show it.

4 Q. But you testified earlier that you had
5 discarded that data long ago as being not valid, as being
6 bad science?

7 A. From what I know about it, it was a
8 contaminated formation, because they were pumping
9 produced water into the formation, so that's not virgin
10 formation water that they sampled. That's number one.
11 Number two --

12 Q. You said you didn't have full information.
13 You discarded the data without even having the full
14 information.

15 A. I'm telling what information I know about --

16 MR. BROOKS: Before you go to that
17 question, let Mr. Sutton finish his answer to the
18 previous question. You were going to give a second
19 reason why you didn't --

20 THE WITNESS: Yes. First of all, it was
21 contaminated by the produced water that they were
22 injecting into it. That's not an accurate sample of
23 virgin formation water. That's number one. Number two,
24 from my understanding, and I could be wrong, but from my
25 understanding, it was a very small sample, which would be

1 much less accurate than a swab test that Rosetta has
2 done.

3 Q. (By Ms. Altomare) My recollection from your
4 testimony earlier was that the kind of testing that was
5 done on the Coleman Juniper well was not as accurate as
6 the testing that was done on this well and that you,
7 therefore, did not trust the values that were pulled from
8 the Coleman well?

9 A. From what I know about, yes.

10 Q. But you just now testified that you really
11 don't know what was done on the Coleman well.

12 A. Do I know 100 percent? No. I would have
13 expected that the person submitting the sample would know
14 that.

15 Q. But you're willing to hang your hat on this
16 sample and discard that data?

17 A. Because Rosetta has a good sample that is
18 definitely formation water in our well. That's what our
19 case is based on.

20 MR. BROOKS: I'll ask you the reciprocal
21 of the question that I asked Mr. Hayden. If the Coleman
22 well -- if they injected water into the well, the
23 injected produced water, they would probably be injecting
24 water that was fairly high in TDS?

25 THE WITNESS: I don't know the TDS of the

1 water they were injecting. I can't really answer that.

2 MR. BROOKS: But you wouldn't ordinarily
3 inject water that was under 3,000, would you, not in the
4 same one basin?

5 THE WITNESS: I don't know of many
6 intervals that produce water less than 3,000 parts per
7 million.

8 MR. BROOKS: I didn't think there was in
9 the San Juan Basin.

10 THE WITNESS: I don't know of any.
11 Regardless, it's contaminated.

12 MR. BROOKS: So wouldn't you expect if the
13 the sample was contaminated by injected water, that that
14 would make it a higher TDS, rather than lower?

15 THE WITNESS: If the injected water was
16 higher TDS than what was in the formation, yes, but I
17 don't know what that --

18 MR. BROOKS: I understand. One other
19 thing, did I understand your testimony correctly this
20 morning that you took two samples from each formation?

21 THE WITNESS: That's what our records
22 indicate. Well, one formation, we took three samples.
23 One formation we took two. And most important, La
24 Ventana, we did take two samples from our records.

25 MR. BROOKS: And you sent both samples to

1 Key for testing?

2 THE WITNESS: That's my understanding.

3 MR. BROOKS: And they only reported the
4 results on one?

5 THE WITNESS: Yes, sir, as they did with
6 the other two formations.

7 MR. BROOKS: I would like for you to
8 investigate, Mr. Bruce, if we can get the results of the
9 testing on the other samples.

10 MR. BRUCE: We will check, Mr. Examiner.
11 I think one of my clients told me, I think, that Key
12 Laboratories shut down, but we will do our best to find
13 out.

14 MR. BROOKS: I appreciate that. That's
15 all I have. Mr. Ezeanyim?

16 MR. EZEANYIM: I know you don't like this,
17 using the Halliburton chart to estimate the concentration
18 here.

19 THE WITNESS: I do like it in the absence
20 of physical data. But in the presence of physical data,
21 my opinion is that physical, actual samples far outweigh
22 log calculations.

23 MR. EZEANYIM: The Halliburton chart is
24 good. We use it in industry all the time.

25 THE WITNESS: In the absence of physical

1 data.

2 MR. EZEANYIM: Even if you question it and
3 you use your 7.8 ohms, you told me it's 200?

4 THE WITNESS: Yes, sir.

5 MR. EZEANYIM: Now, that comes back to
6 what I asked you the first time. You know that you have
7 two orders on those two wells. I will ask you to do this
8 work to get the samples and test them. I expected you to
9 take at least two samples. So the only way to dispute
10 whatever this is is to take that current sample. Of
11 course, the sample must be accurately taken, because you
12 can contaminate the water and test the water you're
13 drinking and bring it over. No. We want good water
14 sample from the formation we're talking about, two
15 samples, test them.

16 Because when I look Swab Number 1, I didn't
17 see Swab Number 2. If you had done Swab Number 1 and
18 Swab Number 2 and average them and they are consistent.
19 Then you can, then, say, see, this doesn't work. But
20 absent of those -- I don't know now. We had to base it
21 on one sample. But here, I can use whatever the
22 perimeters I have, as you agree, that we can use this,
23 and then get -- maybe that might help me make a decision
24 here.

25 But as I said, if you could get those two

1 samples on those two wells and analyze the swabs, show us
2 where they are, average them, and see whether they are
3 consistent with what is here or what you presented. See,
4 that's really what we looking for here. Because if you
5 took those three samples and give me one, I get
6 suspicious. What happened to the other two samples? Why
7 did you take them in the first place and didn't test them
8 and then give only one result? Because that's what I
9 see, Swab Number 1. So that's my problem here. I mean,
10 I want to see results of Number 3, you know, all those --
11 from those formations so I can take an average and maybe
12 make a termination based on what you present.

13 THE WITNESS: There's always room to get
14 more data, but this is the data that we have. And being
15 that it is a true test of the formation water, I don't
16 think it's easy to throw it out and use logs that are
17 affected by other things.

18 MR. EZEANYIM: Oh, no, not throw it out.
19 But I think it's better we do it twice, three times --

20 THE WITNESS: A hundred samples would be
21 better, but Rick --

22 MR. EZEANYIM: At least two. If you get
23 two, that might help us here. But two good samples, two,
24 three samples, but you reported only one. Then maybe I
25 ask you, where did the other samples go? Why did you

1 take it in the first place? So that's my question. You
2 know, those -- if you have given me all those samples and
3 everything, then I could look at it. Now Key is out of
4 business, but you could find somebody else.

5 MR. BRUCE: They're not out of business.
6 That particular location closed down.

7 MR. BROOKS: Just to clarify the record,
8 there were only two samples taken from Cliff House?

9 THE WITNESS: That's what we understand
10 from our records.

11 MR. BROOKS: And that was in the Number 11
12 well?

13 THE WITNESS: Yes, sir.

14 MR. BROOKS: But no sample was taken from
15 the Number 36?

16 THE WITNESS: Correct?

17 MR. BROOKS: Anybody have anything
18 further?

19 MR. BRUCE: I want to get out of here, Mr.
20 Brooks.

21 MR. BROOKS: Subject to the supplement we
22 talked about of the record, Cases Numbers 14265 and 14266
23 are taken under advisement, and we stand adjourned.

24
25

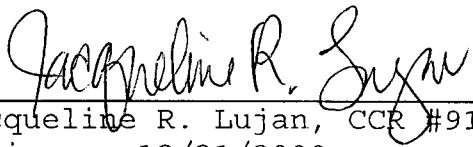
I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 14265/14266
heard by me on 2-19-09
J. K. B. Examiner

REPORTER'S CERTIFICATE

I, JACQUELINE R. LUJAN, New Mexico CCR #91, DO
HEREBY CERTIFY that on February 19, 2009, proceedings in
the above captioned case were taken before me and that I
did report in stenographic shorthand the proceedings set
forth herein, and the foregoing pages are a true and
correct transcription to the best of my ability.

I FURTHER CERTIFY that I am neither employed by
nor related to nor contracted with any of the parties or
attorneys in this case and that I have no interest
whatsoever in the final disposition of this case in any
court.

WITNESS MY HAND this 23rd day of February,
2009.


Jacqueline R. Lujan, CCR #91
Expires: 12/31/2009