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 OPERATING, LP, FOR APPROVAL OF A 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

CASE NOS. 14265, 14266

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.

REPORTED BY: Jacqueline R. Lujan, CCR #91
Paul Baca Professional Court Reporters
500 Fourth Street, N.W., Suite 105
Albuquerque, NM 87103 505-843-9241

APPEARANCES

FOR THE APPLICANT:

James G. Bruce, Esq.
Attorney at Law
P.O. Box 1056
Santa Fe, New Mexico 87504

FOR THE OIL CONSERVATION DIVISION:

Mikal Altomare, Esq.
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

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

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

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

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

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

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

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

here.

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

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

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

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

MR. BRUCE: One is a geologist.

MR. BROOKS: His name is?

MR. BRUCE: Chris Sutton.

THE BROOKS: Who is the other one?

MR. BRUCE: Chad McGehee.

MR. BROOKS: What is his expertise?

MR. BRUCE: He is an engineer.

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

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

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

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

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

MR. WOOD: My name is Brian Wood.

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

MR. SUTTON: Chris Sutton.

MR. BROOKS: Please swear these two

witnesses.

[Witnesses sworn]

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

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

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

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

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

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

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

I'm not good at dialing these remote phones.

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

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

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

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

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

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

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

MR. HAYDEN: Steven Hayden.

MR. BROOKS: Please swear Mr. Hayden.

[Witness sworn]

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

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

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

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

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

MR. BROOKS: Proceed.

BRIAN WOOD

Having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

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

Q. And what is your occupation?

A. I'm president of Permits West.

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

A. Provide environmental and regulatory services.

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

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

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

A. Yes, I did.

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

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

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

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

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

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

A. Yes. Exhibit 1 is Number 11 well.

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

A. That's correct.

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

A. Yes. That's correct.

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

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

Q. What is requested in this case?

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

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

A. Yes.

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

A. From Rosetta and, also, state files.

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

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

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

A. Yes.

MR. BROOKS: What was the maximum pressure?

THE WITNESS: 508 psi.

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

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

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

A. Yes.

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

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

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

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

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

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

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

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

A. Yes. That is correct.

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

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

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

A. Yes, it is.

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

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

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

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

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

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

Q. What is sought in this particular case?

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

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

A. Yes.

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

A. Yes, similar.

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

A. That is correct.

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

A. Yes, sir.

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

A. That is correct.

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

A. There are none.

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

A. Yes, they do.

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

A. Correct.

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

A. Correct.

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

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

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

A. Yes, they were.

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

MS. ALTOMARE: No objection.

MR. BROOKS: Exhibits 1 through 4 are admitted.

(Exhibits 1 through 4 were admitted.)

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

MR. BROOKS: Cross-examination?

MS. ALTOMARE: Yes. Thank you.

CROSS-EXAMINATION

BY MS. ALTOMARE:

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

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

I saying that --

A. Yes.

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

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

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

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

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

A. I don't have that information.

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

A. Correct.

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

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

Q. Mr. Bruce referenced that the second packet of

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

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

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

A. That's correct.

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

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

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

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

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

A. Yes.

Q. Are you aware that that particular well at

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

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

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

A. I think it would be further.

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

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

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

A. Yes.

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

A. Yes.

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

A. That well has not been drilled.

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

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

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

A. All three wells are in the same township.

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

A. That is correct.

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

A. I do not.

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

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

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

you do the work?

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

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

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

MR. EZEANYIM: Of which one?

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

MR. EZEANYIM: The shallow end?

THE WITNESS: That's correct.

MR. EZEANYIM: Now, on the 36, what

happens?

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

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

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

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

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

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

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

THE WITNESS: Yes.

MR. EZEANYIM: That's all I have.

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

REDIRECT EXAMINATION

BY MR. BRUCE:

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

A. Yes. That's correct.

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

A. That is correct.

MR. BRUCE: Thank you.

MR. BROOKS: Anything further?

MR. EZEANYIM: Nothing further.

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

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

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

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

(A recess was taken.)

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

Mr. Bruce, you may proceed.

CHRIS SUTTON

Having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

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

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

A. Rosetta Resources as a geologist.

Q. Have you previously testified before the Division?

A. No, sir.

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

A. My employment in the oil and gas business

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

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

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

A. Yes, sir.

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

A. Yes, sir.

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

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

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

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

MR. BRUCE: I am submitting the witness as an expert petroleum geolotist.

MR. BROOKS: Any objection?

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

MR. BROOKS: So qualified.

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

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

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

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

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

THE WITNESS: Of course.

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

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

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

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

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

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

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

A. Yes.

Q. What does this slide reflect?

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

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

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

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

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

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

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

MR. EZEANYIM: Which zones are you talking about?

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

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

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

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

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

THE WITNESS: I didn't understand the question.

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

THE WITNESS: Yes.

MR. EZEANYIM: La Ventana --

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

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

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

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

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

MR. EZEANYIM: Okay.

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

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

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

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

Q. Anything further on that slide?

A. No.

Q. What is that slide?

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

Q. The next slide, what do those reflect?

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

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

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

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

Q. What is the next slide?

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

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

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

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

resolved solids 22,953.

Q. Again, that's the Point Lookout?

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

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

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

Q. There is similar water quality in both the

Point Lookout and the Menefee; is that right?

A. True.

Q. Next slide.

A. This last slide shows the last sample that was taken in the La Ventana Tongue of the Cliff House. Again, retrieveable bridge plug was set and the packer was set to isolate the La Ventana perforated interval. It was swabbed. The bore hole volume is calculated to be 13 barrels, and through swabbing, we recovered 18 barrels. Samples were taken on the last two runs.

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

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

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

Q. In your opinion, are these three samples

accurate?

A. Absolutely.

Q. What is the next slide?

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

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

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

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

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

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

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

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

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

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

A. Yes, it is.

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

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

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

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

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

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

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

A. Yes, from our files.

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

A. Yes.

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

MS. ALTOMARE: No objection.

MR. BROOKS: Five and 6 are admitted.

(Exhibits 5 and 6 were admitted.)

MR. BRUCE: Pass the witness.

MR. BROOKS: Okay. Cross-examination?

CROSS-EXAMINATION

BY MS. ALTOMARE:

Q. Mr. Sutton, you provided testimony regarding

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

A. I believe that's correct.

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

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

Q. How do you define similar versus largely different?

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

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

A. Yes.

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

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

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

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

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

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

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

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

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

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

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

A. Can I ask what location?

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

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

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

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

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

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

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

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

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

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

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

A. Yes.

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

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

Q. When those particular wells were completed,

they drilled through the Fruitland formation; is that right?

A. Yes.

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

A. Very minimal.

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

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

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

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

Q. Were you involved in the process of the

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

A. Can you repeat the question?

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

A. Not in the original application.

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

A. Yes.

Q. Why wasn't that well ever drilled?

A. Budget constraits.

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

A. I don't.

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

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

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

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

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

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

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

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

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

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

A. I believe -- yes.

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

A. Yes.

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

A. Yes.

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

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

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

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

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

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

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

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

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

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

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

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

A. Yes.

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

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

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

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

THE WITNESS: Yes, sir.

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

THE WITNESS: I did not.

MR. BROOKS: Please do so.

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

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

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

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

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

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

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

MR. BROOKS: Okay. Looking at the fourth

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

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

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

THE WITNESS: Yes, sir

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

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

MR. BROOKS: You're not aware?

THE WITNESS: No, sir.

MR. BROOKS: Thank you.

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

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

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

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

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

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

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

THE WITNESS: No, sir.

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

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

MR. EZEANYIM: Now, when we approve this,

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

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

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

THE WITNESS: I do.

MR EZEANYIM: What is it?

THE WITNESS: It is --

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

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

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

THE WITNESS: I do. Ninety-two degrees.

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

MR. EZEANYIM: What is that --

THE WITNESS: .6.

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

THE WITNESS: The resistivity of the formation is 7.8.

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

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

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

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

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

THE WITNESS: Yes, sir.

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

THE WITNESS: The factors that were

affected?

MR EZEANYIM: Yeah.

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

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

THE WITNESS: Not that I'm aware of.

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

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

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

THE WITNESS: Yes, sir.

MR. EZEANYIM: The porosity is 24 percent?

THE WITNESS: Yes, sir.

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

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

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

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

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

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

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

THE WITNESS: Gas prices have come done a

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

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

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

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

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

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

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

day.

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

THE WITNESS: Yes, sir.

MR. EZEANYIM: And how much do you inject?

THE WITNESS: Around 2,500 barrels.

MR. EZEANYIM: A day?

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

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

THE WITNESS: Yes, sir.

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

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

MR. EZEANYIM: Three thousand what?

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

MR. EZEANYIM: Okay.

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

MR. EZEANYIM: Because -- why is that?

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

roads, 50 miles each way.

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

THE WITNESS: What area are you referring to?

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

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

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

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

MR. EZEANYIM: Could you repeat that?

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

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

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

MR. EZEANYIM: Okay. What about the 36?

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

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

THE WITNESS: Tsah Tah.

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

THE WITNESS: Which is approve the perfs.

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

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

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

THE WITNESS: Yes.

MR. EZEANYIM: Up to 3,107?

THE WITNESS: Down to 3,197.

MR. EZEANYIM: Currently you perforated

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

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

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

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

MR. EZEANYIM: Yeah.

THE WITNESS: Yes, sir.

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

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

MR. WARNELL: No questions.

MR. BROOKS: Mr. Bruce?

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

REDIRECT EXAMINATION

BY MR. BRUCE:

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

A. Yes, sir.
Q. Does that minimize cross flow?
A. Absolutely.
Q. Then you were talking about the difference between the Mesa Verde and Fruitland coal. Both are pretty much basin-wide zones; correct?
A. There's stratographic changes basin-wide, but those formation are seen across the basin.
Q. But in the Fruitland coal, even though it always seems to be present, isn't that more where zones come and go, from well to well?
A. It's far more discontinuous than the Mesa Verde formation.
Q. Again, one of reasons why you refer to actual -- in your opinion, is an actual, accurate water sample always better than a log analysis estimate?
A. Without a doubt.
MR. BRUCE: That's all I have, Mr. Examiner.
MR. BROOKS: Ms. Altomare, any recross?
MS. ALTOMARE: I don't believe so.
MR. BROOKS: Very good. The witness may stand down. I believe Mr. Ezeanyim wanted to recall Mr. Wood?
MR. EZEANYIM: Yes.

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

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

MR. EZEANYIM: Exactly.

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

MR. EZEANYIM: Page 21?

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

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

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

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

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

MR. EZEANYIM: Okay. That's fine.

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

BRIAN WOOD

FOLLOW-UP EXAMINATION

BY MR. BRUCE:

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

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

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

A. Correct. Yes.

MR. BRUCE: Thank you.

MR. EZEANYIM: Thank you

MR. BROOKS: You may stand down.

MR. BRUCE: That concludes my case.

MR. BROOKS: Very good. Ms. Altomare, how long do you estimate your case will take?

MS. ALTOMARE: My portion, probably will only take about probably about a half an hour or so, but I would request a recess.

MR. BROOKS: How long do you think you need?

MS. ALTOMARE: To speak with --

MR. BROOKS: -- with your witness?

MS. ALTOMARE: I'd like about 20 minutes or so.

MR. BROOKS: First, let me ask Mr. Bruce, do your people have transportation plans that --

MR. BRUCE: Some people are driving and some people are flying. I don't want this to go late in the afternoon, but I don't think it will.

MR. BROOKS: What I'm proposing is to take a lunch recess at this time to give Ms. Altomare plenty of time and accommodate my schedule. Okay. We will stand in recess until 1:15.

(A lunch recess was taken.)

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

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

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

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

MR. BROOKS: Okay. You may proceed.

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

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

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

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

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

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

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

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

THE COURT REPORTER: I can't hear him.

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

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

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

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

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

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

MS. ALTOMARE: Oh, I apolgize.

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

STEVEN HAYDEN

Having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MS. ALTOMARE:

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

A. Yes.

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

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

Q. How long have you held that position?

A. Nine years.

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

MR. BROOKS: Any objection?

MR. BRUCE: No objection.

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

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

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

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

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

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

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

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

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

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

A. Yes.

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

A. Yes, I was.

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

A. Yes.

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

A. Yes, I am.

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

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

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

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

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

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

A. Right.

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

A. Right.

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

A. 2.23.

Q. So approximately the same distance between the

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

A. Yes.

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

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

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

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

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

A. No.

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

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

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

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

THE WITNESS: All of the wells?

MS. ALTOMARE: No, just starting with

Maralex.

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

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

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

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

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

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

A. No, I haven't.

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

A. Yes.

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

A. Yes.

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

A. Fresh water.

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

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

Q. The single sample from Tsah Tah Number 11?

A. Yes.

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

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

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

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

A. Yes.

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

A. Right.

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

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

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

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

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

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

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

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

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

A. Not to my knowledge.

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

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

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

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

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

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

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

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

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

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

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

A. The induction log on the SWD Number 11.

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

A. Right.

Q. Why did you choose to use the BLM -- the Halliburton and Schlumburger worksheets that are used by the BLM?

A. The easiest way to do it.

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

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

Juan Basin, as far as I know.

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

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

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

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

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

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

Q. Is that the next exhibit?

A. Yes.

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

A. Go ahead.

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

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

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

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

Q. And the next exhibit is labeled OCD Exhibit

1E.

A. Yes.

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

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

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

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

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

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

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

A. On the chart, itself, yes.

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

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

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

taken on the --

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

Q. So this is the Tsah Tah Number 11?

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

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

A. I have no explanation for this.

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

A. Yes.

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

A. Yes.

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

MR. BRUCE: No objection, Mr. Examiner.

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

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

MR. BRUCE: And this one?

MR. BROOKS: That's OCD Exhibit 1.

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

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

A. No.

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

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

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

A. I'm not sure what you --

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

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

Q. What kind of --

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

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

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

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

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

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

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

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

I take it to mean it's fresher.

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

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

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

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

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

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

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

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

A. Yes, it does.

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

A. Yes.

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

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

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

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

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

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

A. Yes.

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

A. I think that's pretty much it.

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

MR. BROOKS: Mr. Bruce?

CROSS-EXAMINATION

BY MR. BRUCE:

Q. Mr. Hayden, can you hear me?

A. Yes.

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

A. Protectable.

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

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

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

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

Q. Thank you.
A. Those are the only ones I looked at.
Q. Okay.
A. Permits were all done by Will Jones.
Q. On your Exhibits 1A through 1E, Mr. Hayden, in your calculations, were you using formation resistivity?
A. I was excluding formation resistivity with those calculations. That's what the F factor was for that I divided the resistivity by.
Q. You were not using water resistivity?
A. I was deriving the water resistivity by using the formation resistivity to divide the near well born resistivity to come up with an Rwa, but that was the process developed by Schlumberger to account for formation resistivity and to isolate the resistivity of the water.
Q. Let me ask you a few questions about the Coleman well, the well that was the subject of a prior OCD case. Do you know how that sample was taken in that well?
A. No, I don't.
Q. Do you know if it was done, basically, on a DST basis, rather than swab basis?
A. I don't.
Q. If a DST is used, do you know how much volume

of water would be tested compared to swab volume?

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

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

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

Q. Could that lead to an inaccurate --

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

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

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

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

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

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

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

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

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

A. I suspect they're from well logs.

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

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

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

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

that.

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

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

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

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

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

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

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

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

Q. And --

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

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

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

Q. But --

A. -- prior to drilling anything deeper.

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

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

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

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

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

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

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

Q. What is the permeability in the Cliff House?

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

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

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

MR. BRUCE: I think that's it.

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

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

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

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

THE WITNESS: I don't know.

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

THE WITNESS: No.

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

THE WITNESS: Yes, that's true.

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

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

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

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

THE WITNESS: Yes.

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

THE WITNESS: Yeah.

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

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

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

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

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

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

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

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

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

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

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

Exhibit Number 2 and made part of the record.

(OCD Exhibit Number 2 marked for identification.)

(OCD Exhibit 2 was admitted.)

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

MS. ALTOMARE: Sure.

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

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

MR. BROOKS: Mr. Warnell?

MR. WARNELL: I have no questions.

MR. BROOKS: Okay.

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

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

MR. BRUCE: No.

MR. BROOKS: Recross, Ms. Altomare?

MS. ALTOMARE: The only clarification I want --

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

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

MR. HAYDEN: Yes, I am.

REDIRECT EXAMINATION

BY MS. ALTOMARE:

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

A. Yes.

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

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

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

A. To my knowledge, yes.

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

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

MR. BRUCE: No, sir.

MR. BROOKS: Very good. You may call your

rebuttal witness.

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

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

MR. HAYDEN: No. I hope to.

MS. ALTOMARE: Thank you.

CHRIS SUTTON

REBUTTAL EXAMINATION

BY MR. BRUCE:

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

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

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

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

A. Yes.

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

A. No.

Q. The top.

A. There it is.

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

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

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

Q. Is that the red line on page 1?

A. Yes, sir.

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

MS. ALTOMARE: Sure.

THE WITNESS: Thank you.

Q. (By Mr. Bruce) 1A.

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

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

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

MR. EZEANYIM: Are you talking about the

red line?

THE WITNESS: Yes, sir.

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

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

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

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

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

A. No, not on this.

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

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

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

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

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

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

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

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

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

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

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

Q. The much higher volume swab test?

A. Absolutely.

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

MR. BROOKS: Ms. Altomare?

FOLLOW-UP EXAMINATION

BY MS. ALTOMARE:

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

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

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

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

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

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

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

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

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

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

A. From what I know about, yes.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. BROOKS: And you sent both samples to

Key for testing?

THE WITNESS: That's my understanding.

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

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

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

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

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

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

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

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

THE WITNESS: In the absence of physical

data.

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

THE WITNESS: Yes, sir.

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

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

But as I said, if you could get those two

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

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

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

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

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

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

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

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

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

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

THE WITNESS: Yes, sir.

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

THE WITNESS: Correct?

MR. BROOKS: Anybody have anything further?

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

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

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.

David K. Brooks, Examiner
Oil Conservation Division

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