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:	)	CASE NO. 12,812
APPLICATION OF AGAVE ENERGY COMPANY FOR APPROVAL OF A SALTWATER DISPOSAL WELL, EDDY COUNTY, NEW MEXICO	)	

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

March 7th, 2002

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, March 7th, 2002, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

March 7th, 2002
Examiner Hearing
CASE NO. 12,812

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E X H I B I T S

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A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 10:24 a.m.:

EXAMINER CATANACH: At this time we'll call Case 12,812, the Application of Agave Energy Company for approval of a saltwater disposal well, Eddy County, New Mexico.

Call for appearances in this case.

MR. CARR: May it please the Examiner, my name is William F. Carr with the law firm Holland and Hart, L.L.P. We represent Agave Energy Company, and I have two witnesses.

MR. BUTZIER: Mr. Examiner, my name is Stuart Butzier with the Modrall Sperling law firm in Albuquerque. I'll be representing the objecting party Gretchen Ainsworth.

EXAMINER CATANACH: Do you have any witnesses, Mr. Butzier?

MR. BUTZIER: I have no witnesses.

EXAMINER CATANACH: Will the witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

MR. CARR: Mr. Examiner, at this time we call George Freeman.

GEORGE H. FREEMAN,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CARR:

Q. Would you state your full name for the record, please?

A. George Freeman.

Q. Mr. Freeman, where do you reside?

A. Artesia, New Mexico.

Q. By whom are you employed?

A. By Yates Petroleum Corporation.

Q. And what is your position with Yates Petroleum Corporation?

A. Reservoir engineering supervisor.

Q. What is the relationship between Yates Petroleum Corporation and Agave Energy Company?

A. Agave is a wholly owned subsidiary of Yates Petroleum Corporation. It's responsible for gas gathering and marketing for Yates Petroleum.

Q. Have you previously testified before the New Mexico Oil Conservation Division?

A. Yes.

Q. At the time of that testimony, were your credentials as an expert in petroleum engineering accepted

and made a matter of record?

A. Yes.

Q. Are you familiar with the Application filed in this case on behalf of Agave Energy Company?

A. Yes.

Q. Have you made an engineering study of the proposal to inject acid gas into the interval from the Devonian, through the Ellenburger formations?

A. Yes.

Q. Are you prepared to share the results of this study with the Examiner?

A. Yes, I am.

MR. CARR: We tender Mr. Freeman as an expert witness in petroleum engineering.

MR. BUTZIER: No objection.

EXAMINER CATANACH: Mr. Freeman is so qualified.

Q. (By Mr. Carr) Mr. Freeman, would you initially review for the Examiner what it is that Agave Energy Company seeks with this Application?

A. Yes, we seek approval to re-enter and deepen the Metropolis "AZL" State Com Well Number 1, located 1650 feet from the south and west lines of Section 36, Township 18 South, Range 25 East, Eddy County, New Mexico, for the purpose of disposing of acid gas which is generated from the Agave Dagger Draw Gas Plant, used to sweeten sour gas

from production in the Dagger Draw field.

Q. What is acid gas?

A. It's a mixture of hydrogen sulfide and carbon dioxide.

Q. And what do you do? Do you mix it with water and then inject it through an injection well?

A. Yes, it will be mixed with produced water from Dagger Draw field and then disposed of in the Devonian through Ellenburger formations.

Q. Has the Oil Conservation Division previously approved the disposal of acid gas by injection?

A. Yes, they approved an application by Marathon in Indian Basin field, Division Administrative Order SWD-784, in August of 2000.

Q. And is this a fairly large injection effort that Marathon is undertaking pursuant to that order?

A. Yes, they applied for a maximum rate of 40,000 barrels of water per day and 5 million cubic feet per day of acid gas.

Q. When did Agave file its Application to convert the subject well to injection?

A. They filed the C-108 in November 26th, 2001, and this was received by the Division on December 28th, 2001.

Q. And to whom was notice of this Application provided?

A. The surface owner where the Metropolis well is located, which is the New Mexico State Land Office, and to leasehold operators within a half-mile radius of the well in question. Also we provided notice to mineral owners in the area of review.

Q. What response to this Application and notice did Agave receive?

A. We received an objection from M.A. Nolan, dated December 21st, 2001; Ms. Gretchen Ainsworth on December 26th, 2001; and from the Alleys on January 6th, 2002.

Q. And why was Ms. Ainsworth notified of this Application?

A. Well, we notified mineral owners in the area of review, although we were not required to do so by rules.

Q. And so you provided notice to Ainsworth, Alley and Nolan?

A. Yeah, these were mineral owners within the half-mile area of review.

Q. And where is their mineral ownership located?

A. They're in the northwest quarter of Section 1 in Township 19 South, Range 25 East, which offsets the Section 36 to the south.

Q. The Application, once objections were received, was set for hearing; is that correct?

A. Yes, it was scheduled on February 21st, and then

it was continued after the Ainsworths requested a continuance, and we agreed at their request.

Q. In your opinion are Ms. Ainsworth or the Nolans or the Alleys leasehold operators in the area of review for the injection well?

A. No.

Q. And what do you base that on?

A. Well, the definition of operator given in Rule 7 is, operator is any person or persons duly authorized or in charge of the development of a lease or the operation of a producing property.

Q. Is Yates the leasehold operator of all tracts within the one-half-mile area of review?

A. Yes, Yates is the operator, and the lease that the Ainsworths, Nolans and Alleys own part of was leased to Yates in August of 2000.

Q. And you testified that the Commissioner of Public Lands of the State of New Mexico is the surface owner for the tract on which the Metropolis well is located?

A. Yes.

Q. Let's go to what's been marked Agave Exhibit Number 1, and I'd ask you to first identify them, then generally review what it is for the Examiner.

A. Okay. This is an Application for authorization to inject in the Metropolis Well Number 1, and the list of

required information is on the first page, and the attachments are included, and their pages are numbered for reference.

Q. Let's go to this Exhibit -- Well, before we do that, let's go to what has been marked Agave Exhibit Number 2. Would you identify that?

A. Okay, this is a map of the area. It shows leases within two miles.

Q. Is this similar to the area-of-review map that is included within the C-108?

A. Yes, it's been -- I haven't found it yet, sorry. Okay. Yeah, this is a map that's been blown up to be easier to read. It shows the location of the subject well, shows lease ownership and oil and gas wells within a half-mile radius of the Metropolis.

Q. Would you generally review for us the history of the Metropolis "AZL" State Com Number 1 well?

A. Yes, it was drilled in August and September of 2001, intended to test the Morrow formation of gas. It was drilled to a total depth of 9360 feet and was plugged and abandoned without running pipe on it.

Q. Does Exhibit Number 1 contain all data required for wells within the area of review which penetrate the injection interval?

A. Yes. There are no wells within the area of

review that penetrate the proposed --

Q. And so --

A. -- injection interval.

Q. -- there's no data required there?

A. Right, no data is required.

Q. All right, let's go to Exhibit Number 1, page 7, and I would ask you to identify first what that is and then explain that exhibit.

A. Okay, this is a wellbore schematic of the Metropolis well in its current status, which shows that it was cased down to a depth of 1200 feet and then was drilled to a total depth of 9360 feet and then plugged.

Q. And so this is a relatively new wellbore, having been drilled approximately six months ago?

A. That's right.

Q. When it was drilled, it was drilled by Yates?

A. Yes.

Q. Was cement circulated back to the surface on the casing strings?

A. Yes, initially a 26-inch hole was drilled for surface pipe to 40 feet, or 20-inch conductor pipe was set at 40 feet, and the hole outside the casing was filled with cement to the surface. Then a 17-inch hole was drilled to a depth of 400 feet and 13-3/8-inch casing was run to 400 feet, and then 450 sacks of cement were used to cement the

casing into the hole, and 109 sacks were circulated to the surface.

Then a 12-1/4-inch hole was drilled to a depth of 1200 feet, and 8-5/8-inch casing was set at 1200 feet. 600 sacks of cement were used to cement the casing into the hole, and 110 sacks were circulated to the surface.

Q. So there's casing cemented in the hole, cement circulated to the surface, down to a depth of approximately 1200 feet?

A. That's correct.

Q. Do you know what is the depth of the base of the lowest freshwater in this area?

A. The deepest well producing freshwater in the area of review is 455 feet.

Q. And so you've got casing cemented down --

A. Yes.

Q. -- what?

A. 754 feet below the depth of the deepest well.

Q. Let's go back one page. Let's look at page 6 in Exhibit 1. Would you explain what that is?

A. This is a schematic of the proposed completion of the Metropolis Number 1. The plan is to deepen the well to a depth of 11,400 feet, then run 5-1/2-inch casing, which will be set at 9900 feet and would be cemented in the hole with approximately 1400 sacks of cement. Then 2-7/8-inch

tubing would be run to a depth of 9800 feet, a packer -- either nickel-plated or plastic-coated packer would be set at 9800 feet.

There is an error on the schematic that I'd like to correct. It's showing that the tubing would be N-80 tubing. This would actually be L-80 tubing, which is more resistant to corrosion from acid gas, and the tubing would also be internally plastic coated.

Q. Are there any plugged and abandoned wells within the area of review that penetrate the injection interval?

A. No, there are not.

Q. And into what formation are you proposing to inject acid gas?

A. This would be in the Devonian through the Ellenburger formations.

Q. And what depths are we talking about?

A. From 9900 feet to approximately 11,200 feet.

Q. So how thick, approximately, is the interval into which you are proposing to dispose?

A. Approximately 1200 feet.

Q. Is that gross, or is that --

A. Gross interval, yes.

Q. In your opinion, is the proposed injection interval capable of the production of oil or gas anywhere in the immediate area?

A. No.

Q. How close is the nearest producing well from the Devonian or Ellenburger interval?

A. Approximately 30 miles to Devonian production.

Q. Will the proposed injection into this interval result in the waste of any recoverable or commercial oil and gas reserves?

A. No, this interval is not productive, and so it will not waste any -- the ability to produce.

Q. Will Agave call a geological witness to review the lithologic or geological characteristics of the area around this particular injection well?

A. Yes.

Q. Are there any other hydrocarbon-productive zones in the immediate area?

A. Yes, the next highest productive zone is the Morrow formation, which is at nine thousand three hundred something. My geologist can identify that more clearly, the tops. There are also other formations above the Morrow which are productive.

Q. What is the source of the fluids you're proposing to inject in this well?

A. The acid gas is generated from an amine sweetening process at the Agave Energy gas plant, and it will be mixed with produced water from Dagger Draw, upper

Pennsylvanian production, and injected together.

Q. And what volumes are you proposing to inject?

A. Propose an average rate of 2500 barrels per day of water and a maximum rate of 10,000 barrels of water per day, also an average gas injection rate of 370 MCF, thousand cubic feet per day, maximum rate of 400,000 cubic feet per day.

Q. Is this an open or a closed system?

A. It's closed.

Q. Will you be injecting under pressure?

A. Yes, under pressure.

Q. And what is the proposed average injection pressure?

A. Approximately 400 p.s.i., subject to change.

Q. And what would be the maximum injection pressure?

A. Approximately 1995 p.s.i.

Q. Would a maximum injection pressure of .2 pound per foot of depth to the top of the injection interval be sufficient for Agave's purposes?

A. Yes, at least initially, and probably always.

Q. If it had to be increased, would you first show -- or conduct witnessed step rate tests to confirm that pressure could be increased without damaging the confining strata?

A. Yes.

Q. How will Agave monitor these wells to assure there is no problem with escapes of injected substances in or from the well?

A. The annulus between the tubing and casing will be filled with fluid and equipped with pressure gauges to show if there's any increase or decrease of pressure in the annular space. Actually on this well, there will be an automatic control system which will monitor the tubing and casing pressure continually, and there will be an alarm system which will shut the well in, shut the injection down on either high or low pressure, or high or low rate, and would also have an alarm for the presence of H_2S and would automatically notify operating personnel.

Q. So you're going to be with this system continuously monitoring the well?

A. Yeah, there will be continual monitoring of the rate and pressure.

Q. And you will know immediately if there's a problem with the well?

A. Yes.

Q. Could you identify the pages in Agave Exhibit Number 1, pages 12 and 13?

A. Yes, this is a water analysis, a typical Dagger Draw produced water, which is the source of water that will be mixed with the acid gas disposal.

Q. What does this show in terms of the extent to which this is contaminated or --

A. Well, this particular sample shows 6800 parts per million total dissolved solids, which is a typical number for Dagger Draw. It varies, but typically is below 10,000 parts per million TDS.

Q. Let's go to what has been marked Agave Exhibit Number 3. What is that?

A. This is an analysis of a water sample from the Devonian formation, which -- you know, it came from the Routh well, which is a disposal well that was drilled to the Devonian, approximately seven miles away.

Q. And what does this show you about total dissolved solids?

A. This is showing that TDS in this formation is approximately 47,000 parts per million, which is much higher than the water that we're proposing to inject into it, and considerably higher than 10,000 parts per million.

Q. Mr. Freeman, do you anticipate any compatibility problems with the injected fluid placed in these receiving formations?

A. No, the water that we propose to inject into the Devonian-Ellenburger is the same type of water that's being injected into these formations in other disposal wells in the Dagger Draw area. Yates operates ten disposal wells,

which have injected 150 million barrels of water into this formation, Dagger Draw. The acid gas will be a fairly minor proportion of the total injectant and will not cause compatibility problems.

Q. Are there freshwater zones in the area?

A. Yes.

Q. And do you know what they are?

A. Well, there's the Queen and the Grayburg, which is probably the most common source of fresh water in this area.

Q. And are they shallow horizon?

A. Yes, our geologist can give you the precise tops of those layers, but the wells that are producing from them are no deeper than 455 feet.

Q. In your opinion, does the proposed injection pose a threat to any fresh water in the area?

A. No, we've shown that we will properly case and cement tubing in the well, in order to protect freshwater zones, and that the injectant will be well below the level of fresh water.

Q. Have you examined the available engineering data on this area?

A. Yes.

Q. As a result of that examination, have you found any evidence of open faults or other hydrologic connections

between the injection zone and any underground source of drinking water?

A. No. We operate over 1800 wells in Eddy County and a considerable number in the immediate area around the proposed well. There's very substantial vertical separation, 10,000 feet, between the injection interval and the freshwater zones.

There are also hydrocarbon-productive zones in this area, which demonstrate that there is a vertical segregation between the different formations in between.

Q. If we refer to Exhibit Number 1, pages 17 through 28, those are copies of letters. Are those the owners to whom notice of the Application was actually provided?

A. Yes. Let's see, page 17 is a letter to the Commissioner of Public Lands that owns the section where the Metropolis is located, and pages 19 through 26 are notices that went out to mineral owners within the area of review, although these weren't strictly necessary to be sent out. And --

Q. Was a legal advertisement also published in the Artesia paper?

A. Yes, it was. I think that's shown on page 27.

Q. Would you identify what has been marked as Agave Exhibit Number 4?

A. Oh, yeah, these are letters of objection that

were received from Ms. Nolan, Ms. Ainsworth and the Alleys.

Q. And then Exhibit Number 5, again, is just copies of the same letters that were included in the C-108, again confirming that notice of the Application was provided; is that right?

A. I think so. Would you restate that, please?

Q. Exhibit Number 5 is, again, copies of the same letters that are included --

A. Yes.

Q. -- within Form C-108, the notice letters?

A. Yes, that's correct.

Q. In your opinion, will granting this Application and the use of this well for the injection of acid gas cause any damage to any underground source of drinking water in this area?

A. No, it will not.

Q. Do you see that the injection of acid gas in this well could otherwise damage any property interest in the area?

A. No.

Q. Will, in your opinion, approval of the Application otherwise be in the best interest of conservation, the prevention of waste and the prevention of correlative rights?

A. Yes, it will.

Q. And Agave will call a geological witness to review that portion of the case; is that correct?

A. Yes, that's true.

Q. Were Agave Exhibits 1 through 5 prepared by you, or have you reviewed them and can you testify as to their accuracy?

A. Yes.

MR. CARR: At this time, Mr. Examiner, we would move the admission into evidence of Agave Exhibits 1 through 5?

EXAMINER CATANACH: Any objection?

MR. BUTZIER: Yes, Mr. Examiner, I do have some objections. Specifically, I notice some of the analyses reports that are included as Exhibit 1 were prepared, apparently, by individuals that I don't believe are here today from a company called Petrolite Oilfield Chemicals Group. They basically range from six to eight years old. They purport to show various water analyses, and I would object to the admission of these exhibits on the basis that they're basically nonresponsive to the Application requirements and are also of a sufficient age that they're essentially worthless in trying to determine anything associated with this Application.

Further, Mr. Hearing Examiner, I would object to the admission of Agave proposed -- Agave Exhibit Number 3,

which purports to be a water analysis report dated February 11, 1981, some 20 or so years ago. Again, I would say that the age of that is sufficient that it should not be admitted for the purposes offered.

MR. CARR: May I ask Mr. Freeman a couple of questions, perhaps respond to that?

EXAMINER CATANACH: Certainly, Mr. Carr.

Q. (By Mr. Carr) Mr. Freeman, are the documents to which Mr. Butzier has been objecting from the records of Yates Petroleum Corporation?

A. Yes.

Q. Is it the custom of Yates Petroleum Corporation to keep records of this nature?

A. Yes.

Q. Have you reviewed these individual documents?

A. Yes.

Q. Are you familiar with the general characteristics of the types of water that are injected into the formations in southeastern New Mexico?

A. Yes.

Q. Are you familiar with the types of waters in the formations in the area immediately surrounding this Application?

A. Yes.

Q. Is the information set forth on these exhibits

generally consistent with the waters that are both injected and in receiving formations in this area?

A. Yes. Actually, having an older water analysis is probably better in this case, because it would possibly indicate the water quality before activities were entered into that might change them.

In particular, on the Routh water analysis from the Devonian formation, this is a sample that was taken before the disposal of great quantities of Devonian water was started, so this would be a more representative sample than could be obtained today from the formation in the area.

MR. CARR: Mr. Examiner, we believe that these are business records kept in the ordinary course of Yates' business. It is typical and ordinary for them to keep these records, that they are responsive to the issues in this case and the matters that need to be addressed in the Application, that they are accurate, that this witness can testify to that, and that they are perhaps the best information available on the water analyses on these formations.

We move the admission of these exhibits.

EXAMINER CATANACH: Mr. Freeman, let me ask you this. The water well analysis that you've provided, I assume this is a -- Is this a freshwater well?

THE WITNESS: There are two freshwater analyses that are included. Page 8 is not a freshwater analysis. That is actually produced -- I'm sorry, yeah, page 8 is a freshwater analysis, excuse me. Yeah, this is a water well that is located at the Dagger Draw plant.

EXAMINER CATANACH: And who owns this well, do you know?

THE WITNESS: This well is owned by Yates Petroleum.

EXAMINER CATANACH: Okay, and on page 9, is this a different freshwater well?

THE WITNESS: Well, page 9 is a continuation of the same analysis on page 8, and on page 10 there is another water sample from another water well in that area, which I don't have the precise location of this water well. It's a windmill that's close by.

EXAMINER CATANACH: Again, page 11 is just a continuation of that?

THE WITNESS: Yes.

EXAMINER CATANACH: Page 12 is an analysis of what, sir?

THE WITNESS: This is an analysis from a battery in the Dagger Draw field.

EXAMINER CATANACH: So this is produced water from the Dagger Draw field?

THE WITNESS: Yes.

EXAMINER CATANACH: And would that comprise pages 12, 13 and 14?

THE WITNESS: No, page 14 is an analysis of acid gas from the Dagger Draw plant, which is the gas that will be mixed with water and disposed of in this well.

EXAMINER CATANACH: All right, and is Exhibit Number 3 is an analysis of --

THE WITNESS: Exhibit Number 3 is an analysis of water from the Devonian formation, which was taken from a well that's approximately seven miles away from the Metropolis.

Devonian samples are not easy to get in this area because, for one thing, most of the wells that are drilled that deep are disposal wells, and so we cannot obtain a suitable sample -- or a representative sample from them at this point. And also the wells don't -- the water is taken on a vacuum in these wells, and so only bottomhole samples can be recovered.

EXAMINER CATANACH: Are you saying that when you recomplete or when you drill the Metropolis well, that it will be not feasible to obtain a water sample from the Devonian and the other formations? Is that what you're saying?

THE WITNESS: No, we could get a sample when we

drilled into the Devonian.

EXAMINER CATANACH: Okay. What I'm going to do is, I'm going to let you provide these water samples into the record in this case, but I'm going to ask you to supplement these with some more current data. These are data from 1996, 1994, 1993 in some cases. So I'm going to ask you to obtain a more current analysis of the produced water and the fresh water in this area --

THE WITNESS: Okay.

EXAMINER CATANACH: -- and provide that, supplement the record in this case, Mr. Carr.

MR. CARR: Yes, sir, we'll do that.

EXAMINER CATANACH: With that, did you have any other objections to the admission of this evidence, Mr. Butzier?

MR. BUTZIER: Well, I guess I did, Mr. Hearing Examiner. Some of the exhibits that were attached -- the exhibits attached to the Application, all of which is Exhibit 1, basically don't indicate the sample point. I think that we don't have competent evidence before us today to show how these samples were collected, where the actual sample points were, and I would expect that the additional information to be provided would be satisfactory in that regard.

EXAMINER CATANACH: Okay, we'll try and do our

best to get that; is that correct, Mr. Carr?

MR. CARR: Yes, Mr. Catanach.

EXAMINER CATANACH: Okay. With that, we will admit Exhibits -- 1 through 5, is it?

MR. CARR: Yes, that's correct.

EXAMINER CATANACH: All right. And I would assume that you have some questions of this witness, Mr. Butzier?

MR. BUTZIER: I do.

EXAMINER CATANACH: You may proceed.

CROSS-EXAMINATION

BY MR. BUTZIER:

Q. Mr. Freeman, are you a groundwater hydrologist?

A. No, I'm not.

Q. So you're not proposing to offer any expert opinion concerning things like the permeability of a particular formation in terms of its water transmissivity or any of those kinds of things; is that correct?

A. I could offer evidence on that if I had measured it, but I don't have measurements on that.

Q. Basically, you don't have any information, outside of seven miles away from the proposed injection well, concerning the chemical or the water makeup of the formations in the proposed interval?

A. Our produced water sample from this formation is

taken from wells approximately seven miles away, that's correct.

Q. And I notice that the Application refers to Canyon. Can you tell me what Canyon is and how that relates to --

A. Canyon is more generally referred to as upper Pennsylvanian formation. It's an oil- and gas-productive zone that -- it produces in Dagger Draw field.

Q. So that's going to be the source of the produced water, and the acid gas is actually going to be from the Dagger plant; is that correct?

A. That's right.

Q. And hydrogen sulfide and CO_2 are highly corrosive, are they not?

A. They are. Well, they are corrosive when they are wet, when they're mixed with water.

Q. Okay.

A. When they're dry, they're not particularly corrosive.

Q. I notice that you -- when asked the question about the volume that Agave is proposing to dispose, that you provided some average estimates of daily disposal. Did you also have any information concerning the proposed total amount of disposal in this injection well?

A. No, I don't have the total.

Q. Okay, so that's basically unknown at this time?

A. Yes. I could calculate an upper limit, but I haven't done so yet.

Q. You also made reference to -- referring to the geologic data available, and I'm not sure specifically what it is you're referring to in that regard.

A. What reference are you talking about?

Q. In your testimony you indicated that you had reviewed all of the available geologic information or something to that effect, and I was wondering exactly what it is that you're referring to.

A. We have information from well logs in this area and production histories from wells in the area.

Q. Can you expand on what you mean by wells in the area?

A. Well, we operate over -- approximately 300 wells in Dagger Draw area. We have several wells surrounding that drilled in other formations, various productive formations in this area.

Q. Well, I think you also testified that none of them, or very few of them, are actually drilled to the Ellenburger and --

A. That's correct.

Q. -- Devonian formations?

A. Yes.

Q. Okay. So you don't have any geologic data on the Ellenburger or Devonian formations; is that correct?

A. We have some. Like I said, there are wells within several miles of this formation, but none within the area of review. And also we'll have a geological witness who can give more information about that.

Q. Now, reference was made to the fact that the closest production from the Devonian or Ellenburger is roughly 30 miles away; is that correct?

A. Yes.

Q. Have you done any particular studies in this particular area concerning the potential productivity of those formations?

A. I have not done a lot of study in this area except to look for wells that have produced from those formations in the area.

Q. And since there are no other wells in the Devonian or Ellenburger, you really have no information; is that correct?

A. I have information that wells that were outside our area of review were drilled down to that depth and did not produce economically --

Q. And --

A. -- within several miles of this location.

Q. Ten miles, 20 miles?

A. Yes, there have been tests within 20 miles, probably.

Q. And were you personally involved in those tests?

A. No.

Q. And none of the exhibits that we have here today make any reference to those; is that correct?

A. That's correct.

MR. BUTZIER: I have no further questions.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Freeman, is this the closest Devonian test, this one seven miles away, as far as you know?

A. Yes, I believe that's true.

Q. Now, when Agave is deepening this well, is it possible to test the formations on the way down to see if they're productive?

A. Yes, it is possible.

Q. Does Yates have any plans to do that, or Agave?

A. No, we don't intend to. I probably should defer that -- We will be running well logs which can be analyzed for productive potential. There will also be mud logs run, which will possibly detect the presence of hydrocarbons and potential.

Q. And you will be able to obtain formation water samples from each of the injection intervals?

A. If we set out to recover that, we could.

Q. That's going to be required, that will be required, just to make sure that the water in that interval is -- just to obtain an analysis of that formation water --

A. Uh-huh.

Q. -- that will be a requirement.

The surface facilities that you guys will utilize at this wellbore, can you explain that to me? Are you just going to have tanks set up?

A. No -- Well, the primary feature we're talking about is the acid gas injection. There will be a low-pressure line from the gas plant, coming from the amine unit to the disposal site. There will be an acid gas compressor there, which will compress the gas to approximately 1200 p.s.i. It will then be mixed with the produced water that will be brought in from Dagger Draw. There will be a flow line from Dagger Draw. And then it will be injected into the wellhead after they're mixed together.

Q. So the acid gas will be piped over just through a standard steel tubing, steel pipeline?

A. I haven't actually studied the pipe that will go from the plant to the thing, but it will be steel pipe, yes. It will be designed to handle acid gas.

Q. Have you been out to the wellsite, Mr. Freeman,

this particular wellsite?

A. I have not been to this particular wellsite, no.

Q. I was just wondering if there's any -- Are there any houses or ranches or anything of that nature in this area, do you know?

A. There are houses in the general area. I couldn't tell you how close they are.

Q. Certainly this gas, if you were to have a leak in one of these pipelines, it could pose a health problem to some of these --

A. Yes, Agave will be very, very aware of that.

EXAMINER CATANACH: I believe that's all I have, Mr. Carr.

MR. CARR: I have nothing further of Mr. Freeman.

EXAMINER CATANACH: This witness may be excused.

MR. CARR: At this time we'll call Mr. Humphrey.

JOHN F. HUMPHREY,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CARR:

Q. State your name for the record, pleas.

A. John Humphrey.

Q. Where do you reside?

A. Artesia, New Mexico.

Q. By whom are you employed?

A. Yates Petroleum Corporation.

Q. And what is your position with Yates?

A. I'm a senior geologist with Yates Petroleum Corporation.

Q. Mr. Humphrey, have you previously testified before the New Mexico Oil Conservation Division?

A. Yes, I have.

Q. At the time of that testimony, were your credentials as an expert in petroleum geology accepted and made a matter of record?

A. Yes, they were.

Q. Are you familiar with the Application filed in this case on behalf of Agave Energy Company?

A. Yes, I am.

Q. Have you made a geological study of the area which is the subject of this Application?

A. Yes, I have.

Q. Are you prepared to share the results of that work with Mr. Catanach?

A. Yes, I am.

MR. CARR: We tender Mr. Humphrey as an expert witness in petroleum geology?

EXAMINER CATANACH: Any objection?

MR. BUTZIER: No objection.

EXAMINER CATANACH: Mr. Humphrey is so qualified.

Q. (By Mr. Carr) Mr. Humphrey, have you prepared exhibits for presentation in this hearing today?

A. Yes, I have, Mr. Carr.

Q. Generally, how many Devonian-Ellenburger injection wells does Yates operate in this general area?

A. They operate ten injection wells in the Devonian.

Q. Let's go to what has been marked Agave Exhibit Number 6. First, could you identify what that is?

A. Agave Exhibit 6 is an index map as well as a type log for the closest well that has penetrated the Silurian through Ellenburger sections, which is the Roy AET Water Disposal Well Number 3. It's in Section 7, 19 South, 25 East. It's approximately four and a half miles southwest of the Metropolis well, and it was drilled in 1992.

Q. And what you've got on the right side of the exhibit is a section of the log from that well?

A. That's correct.

Q. What does this show us?

A. Basically, it shows -- gives a general lithologic detail for the Devonian through Ellenburger formations. As a whole, it's entirely dolomite. It's comprised -- the porous parts of it are comprised of intercrystalline and vuggy porosity.

The gross injection interval, the gross dolomite

interval, is approximately 1200 feet. Your average crossplot porosity over the entire interval is 4.9 percent. You can see the middle curve on the exhibit shows the resistivity curves, and that does show good -- you can see a good invasion profile on the resistivity log, and that's a qualitative indication of good permeability.

Another indication of permeability in the area is that the Devonian through Ellenburger zones can take upwards of 30,000 to 40,000 barrels of water a day, injected. That's commonly what a lot of operators inject into the Devonian through Ellenburger zones in the area. So while we don't have a physical measure of permeability, we do have good qualitative evidence as to the permeable nature of the Devonian through Ellenburger intervals.

Q. And this injection interval looks like for a good candidate for injection of acid gas; is that right?

A. That's correct, I believe so.

Q. Let's go to what has been marked Exhibit Number 7. Would you identify this, please?

A. Exhibit 7 -- and you have a bigger copy of what's in the -- is a structure map on the top of the Devonian interval. Structure -- If you look at the Exhibit Number 7, you notice structure is updip to the northwest. The Ainsworth acreage in the northwest part of Section 1 is approximately structurally flat with the Metropolis Number

1 well.

Q. What is the significance of that?

A. Generally what we're going to be injecting into the formation, most likely, will go updip to the northwest, away from Ms. Ainsworth's acreage.

Q. So you anticipate migration to be away from the Ainsworth --

A. I would anticipate that. And there is one Devonian test over in 18-26, if you notice on your map. That's in Section 29. That was a well drilled in 1959 by Ralph Nix -- by Marathon Oil, excuse me, the Ralph Nix Number 1. It drill stem tested the top of the Devonian and recovered all basically formation water. And that particular well we anticipate to be structurally flat with the Metropolis Number 1 well. And if you look at the map, it's structurally flat with the northwest part of Section 1, 19-25.

And I apologize profusely for jumping in a while ago, but we are going to be monitoring this very carefully as we drill down. And any hydrocarbon shows will be drill stem tested on the way down, if we do encounter hydrocarbon shows.

Q. Your test in Section 29, you say it is flat to the injection well. What's the significance of that?

A. Well, if you've got water in that well, you'll

most likely get formation water, you know, either at the Metropolis location or in Section 1. There's no water analysis; it's a very old well. The amount of water recovered in the drill pipe is unreported, and there is not an actual water analysis for that formation water, that I have available to me anyway.

Q. Are you aware of any pressure gradient in the reservoir?

A. Yes, it's from south to north. Again, it's away from the tract in question.

Q. In your opinion, can the interval from the Devonian through the Ellenburger produce any oil and gas in commercial quantities?

A. From the mapping I've done in the area, I just -- typically with the Ellenburger and the Devonian, you need a structural trap. And basically your structural -- I've mapped all the horizons from the Devonian on up, and there's just not a structural trap where you'd see commercial quantities of hydrocarbon in the Devonian through Ellenburger intervals, in my opinion.

Q. Are you aware of wells that have been completed in these horizons?

A. Closest one is, I think, down 21, 23. It made a little less than 1000 MCF. It was just --

Q. And how long ago was that?

A. I don't have the hard data on that. But I have not -- We looked pretty hard. There's no production -- the only -- closest established production that we, myself and Mr. Freeman, could find is the production 30 miles away that he alluded to in earlier testimony.

Q. Could you identify the underground sources of drinking water in the area?

A. Again, as George mentioned, it's Queen-Grayburg zones. The data from the first water wells in the area, 455 feet is the deepest water production that we've found in data that we got from the State Engineer's Office, and that's in Section 26 to the north. There's an old well that I believe is abandoned. We could not find the well in Section 36, which is 1500 feet to the southwest of the Metropolis well. The base of the freshwater zone was reported at 430 feet at that. And both of these sources are well above the base of the casing in this particular example.

Q. Are there any sources of drinking water below the injection interval?

A. Basically below the injection interval you're looking at granite, so no.

Q. About how far from any source of drinking water is the injection interval?

A. 9500 feet, more or less.

Q. Have you reviewed the available geologic information on the area?

A. Yes, I have.

Q. As a result of that review, have you found any evidence of faulting or hydrologic connections between the injection zone and any source of underground drinking water?

A. In this area I -- I've mapped extensively in this area from the Devonian on up, and I see no evidence from the subsurface mapping that I've done to indicate faulting in this particular area. And as you go higher up in the section above the Devonian you get quite a bit of control in the area. There's been a lot of Morrow activity in this particular area, so you have a fair amount of control.

Q. Were Agave Exhibits 5 and 6 prepared by you?

A. Yes, they were.

MR. CARR: I move the admission of Agave Exhibits 5 and 6.

EXAMINER CATANACH: Any objection?

MR. BUTZIER: Are you referring to 6 and 7, or 5 and 6?

MR. CARR: I'm actually referring to 6 and 7.

MR. BUTZIER: Okay. With the Hearing Examiner's permission, I'd like to ask a couple of questions associated with the objections that I may want to make.

EXAMINER CATANACH: Certainly, go ahead.

VOIR DIRE EXAMINATION

BY MR. BUTZIER:

Q. Mr. Humphrey, referring to Exhibit 6 --

A. Uh-huh.

Q. -- where is this information drawn from?

A. This is information from the standard electrical log suite that was ran in this well after it was drilled in 1992. On the left you see a gamma-ray curve. The middle curve on the type log is the resistivity curves that I alluded to, that indicate qualitative indication of permeability. And the curves to the right are porosity curves, and the green curve is a photoelectric curve, which is an indication of lithology in this particular case.

Q. But this is not the well -- the proposed injection well?

A. No, this is a well four and a half miles away to the southwest. This is the closest well that's penetrated the entire Devonian through Ellenburger formation.

The dry hole I alluded to two miles to the northwest of the proposed location just penetrated the very top part of the Devonian, it didn't go all the way down. And it's a very old well, and the logging data is not nearly the quality of the modern data that we can get.

Q. And with respect to Exhibit 7, can you tell me

where in relation to the injection well this data was collected or what it relates to?

A. Exhibit 7, is that the type log still?

MR. CARR: Exhibit 7 is the structure map.

THE WITNESS: Oh, Exhibit 7. The data, it's basically -- that's a subsurface map of the top of the Devonian and basically a geologic pick, and the map was done by myself. And again, my conclusions were based on a well that's two miles away from the proposed location, and it's at an equivalent structural location that produced water on the drill stem tests in that particular case.

And there's no evidence, at least at that juncture, to me, to indicate the Devonian will be productive at the Metropolis location. Again, we will be evaluating as we go down, and we'll test any and all shows as we go down.

MR. BUTZIER: I guess I would lodge an objection to both exhibits on the basis that they are not basically from the area of the well but rather from two and four-plus miles away.

EXAMINER CATANACH: Well, I would say that that's pretty much the only data that's available at the current time. I don't believe that there is any data available from the well that you're --

THE WITNESS: No.

EXAMINER CATANACH: -- proposing to re-enter at the time --

THE WITNESS: No.

EXAMINER CATANACH: -- and this is the method that a lot of the data presented in this forum is presented in, Mr. Butzier.

So I would overrule your objection and allow these exhibits to be entered in this case.

And you may cross-examine if you want.

CROSS-EXAMINATION

BY MR. BUTZIER:

Q. Mr. Humphrey, are you a groundwater hydrologist?

A. No, I'm not.

Q. Have you done any modeling to determine what the potential pathways are, or what the potential groundwater gradient is in the area of the proposed injection well?

A. No, I have not. Again, it's -- All the freshwater zones, we believe, are protected by the surface casing. George went into this in a lot of detail. You had circulation of the cement to the surface, so we feel you've got a good cement job there, and I think the risks of that are extremely minimal.

But I am not a groundwater hydrologist, to answer your question, no.

Q. And do you have any information concerning the

total volume of acid gas or produced water that's proposed to be injected into this well?

A. No, I do not.

Q. That's unknown at this time?

A. I think he -- did you -- I think that was covered by the engineering witness, wasn't it?

EXAMINER CATANACH: I believe it was.

THE WITNESS: I do not have -- Again, that's out of my sphere.

Again, typically, we're not going to inject -- again, the permeability question. Again, typically in a standard disposal well in this area, you -- it will typically -- it will take 30,000 or 40,000 barrels of water a day. And the zone does have quite good permeability, but again I'm getting off the subject at hand.

Q. (By Mr. Butzier) Have you done any studies to determine the capacity of the pack to withstand the corrosive characteristics of CO_2 and hydrogen sulfide?

A. No, that's -- again, that's out of my area of expertise.

Q. Have you done any studies to determine what minerals may precipitate out and affect the permeability once this water is injected into the Devonian and Ellenburger formations?

A. No, I have not done any studies, but typically we

have not seen any -- occasionally you do get some scale on some of these -- and correct me if I'm wrong, George -- occasionally you do get scale on some of these injection wells, which has to be treated every now and then. But typically you don't see a degradation of the permeability with time, with injection of the formation fluids from the Dagger Draw area.

MR. BUTZIER: I have no further questions?

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Humphrey, on the Roy well --

A. Yes.

Q. -- on Exhibit Number 6, now, this log was run on the whole injection interval that you plan on injecting into?

A. That's correct.

Q. And in this well there were no hydrocarbon shows?

A. That's correct.

Q. And that's four miles away?

A. Yes, sir.

EXAMINER CATANACH: I believe that's all the questions I have.

Are there any other questions of this witness?

MR. CARR: No further questions.

EXAMINER CATANACH: Okay, this witness may be

excused.

Would you like to make a closing statement in this case, Mr. Butzier?

MR. BUTZIER: Mr. Hearing Examiner, I respectfully submit that the information they've provided is largely speculation and relates to either old data or data from quite some distance away from the proposed injection well. We've heard testimony that there has been no study to determine the ability of the pack to withstand the corrosive aspects that have been admitted here today of the hydrogen sulfide and the CO_2 that's proposed to be included in the acid gas mix with the produced water.

Basically what we have is a lot of speculation and no real hard data that would satisfy us that there is no potential for recovering from these formations or would satisfy us that there is no potential for contamination of groundwater in this area. Both witnesses admitted that they were not hydrologists, they have not performed any studies to determine what hydrological connection there may be between this formation and other formations, and we just object to the Application and feel that there's not enough information in the record to grant the Application.

EXAMINER CATANACH: Thank you, sir.

Mr. Carr?

MR. CARR: May it please the Examiner, I guess

we're forced in a position of generally having to speculate when we come before you with an application of this nature. The best data, of course, would be from the well itself, but we have to have your permission to drill it before we got permission, I guess, if we were to do that.

When we talk about speculation it seems to me that it's a sort of interesting argument for Ainsworth to be raising, because what they've said in their prehearing statement is, this Application may cause -- *may* -- cause the waste of oil and gas. We're going to drill to this horizon, we're going to test for hydrocarbon shows.

It would be the first well in 30 miles that was able to produce in commercial quantities, but that is something we will test on the way down. And we believe that the evidence before you is that by approving this Application requiring us to test those intervals as we go through the drilling of -- the deepening of the injection well and the injection of hydrocarbon gases, I mean, acid gas will not jeopardize any hydrocarbon recovery.

Ms. Ainsworth also says, may cause damage to fresh water. Well, we have shown you that we're going to case and cement the well to a depth -- surface casing to 1200 feet, which is 700-plus feet below the bottom of the deepest fresh water in the area. We've got about 9000 feet, maybe 9500 feet, between the injection interval and

the lowest drinking water in the area, and we've told you that in this area we see nothing that would suggest in the intervening horizons that the hydrocarbons are not segregated. And the point of that is that there aren't faults, there aren't hydrologic connections, these formations are not leaking and they're not going to be channels that are going to let water migrate vertically 9000 feet to contaminate fresh water.

We also, while we haven't told you exactly how we're going to be able to complete the lines or the wells to protect against corrosion, we have shown you how we're going to monitor the well in a way where we will immediately know if there is a problem, so we can assure that these problems, if they should occur, would not go undetected and they could not be corrected.

As to Ms. Ainsworth's property interest, she's downdip and south of the well. We're going to be injecting 1650 feet from her in a 1200-foot interval, in a situation where the pressure gradient and general migration trends in the formations would say this material is going to move away from her.

We believe what we've put before you is not speculation, it's the kind of data that you look at every day, the kind of data you base these decisions on, and we believe you have before you an Application that you should

be able to approve so that Yates can go forward -- Agave can go forward with its plans to inject acid gas in the Metropolis "AZL" State Com Number 1 well.

EXAMINER CATANACH: Thank you, Mr. Carr.

Can I get you to submit the updated water analysis to supplement the record in this case, can I get you to submit a copy of that to Mr. Butzier?

MR. CARR: Oh, yes, we will.

EXAMINER CATANACH: And with that, there being nothing further in this case, Case 12,812 will be taken under advisement.

(Thereupon, these proceedings were concluded at 11:29 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 12812, heard by me on March 7, 2002.

David K. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL March 14th, 2002.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002