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 OXY USA INC. TO RE-OPEN CASE NO. 15616 FOR ADDITIONAL REPORTING PURSUANT TO ORDER NO. R-14322, EDDY COUNTY, NEW MEXICO — CASE NO. 15616

Consolidated with

APPLICATION OF OXY USA INC. FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT, EDDY COUNTY, NEW MEXICO. — CASE NOs. 20193, 20194, 20195

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

January 11, 2019

Santa Fe, New Mexico

BEFORE: PHILLIP GOETZE, CHIEF EXAMINER
TERRY WARNELL, TECHNICAL EXAMINER
DAVID K. BROOKS, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, Phillip Goetze, Chief Examiner, Terry Warnell, Technical Examiner, and David K. Brooks, Legal Examiner, on Friday, January 11, 2019, at the New Mexico Energy, Minerals and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

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EXHIBITS OFFERED AND ADMITTED

(9:24 a.m.)

EXAMINER GOETZE: Next we will go to Case 15616, re-opened, application of OXY USA Inc. to re-open Case 15616 for additional reporting pursuant to Order Number R-14322, Eddy County, New Mexico.

Call for appearances.

MR. FELDEWERT: May it please the examiner, Michael Feldewert, with the Santa Fe office of Holland & Hart, appearing on behalf of the Applicant. We ask that this case be consolidated.

EXAMINER GOETZE: And you want to do it with all the other OXY pressure maintenance?

MR. FELDEWERT: Yes, sir. So that would be Case 20193, 20194 and 20195.

EXAMINER GOETZE: Very well. We will consolidate Cases 20193, application of OXY USA, Inc. for approval of a pressure maintenance project, Eddy County, New Mexico, along with Case 20194, application of OXY USA, Inc. for approval of a pressure maintenance project, Eddy County, New Mexico, and Case 20195, application of OXY USA Inc. for approval of a pressure maintenance project, Eddy County, New Mexico.

Call for appearances.

MR. FELDEWERT: May it please the examiner, Michael Feldewert, with the Santa Fe office of Holland &

Hart, appearing on behalf of the Applicant in all three of these consolidated cases.

MR. PADILLA: Mr. Examiner, Ernest L. Padilla for EOG Resources in Case 20193.

EXAMINER GOETZE: You want to come up and have a seat? We'll let you sit in the front row.

MR. PADILLA: Very good.

MR. FELDEWERT: Mr. Examiner, give me a minute. I've got -- we have separate exhibits in each case, and I'll be calling four witnesses here today who will testify about all four cases in one sitting --

EXAMINER GOETZE: Very good.

MR. FELDEWERT: -- to the extent necessary.

EXAMINER GOETZE: At this time we would ask the four witnesses to stand, identify yourself to the court reporter and be sworn in please.

MR. FOPPIANO: My name is Rick Foppiano.

MR. TROUTMAN: Tony Troutman.

MR. VAN LIEW: Peter Van Liew.

DR. LIU: Shunhua Liu.

(Mr. Foppiano, Mr. Van Liew, Mr. Troutman and Dr. Liu sworn.)

MR. FELDEWERT: I'd like to call our first witness.

EXAMINER GOETZE: Proceed.

PETER VAN LIEW,

after having been first duly sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your name, identify by whom you're employed and in what capacity?

A. My name is Peter Van Liew. I work for Occidental Petroleum Corporation, and I'm a land negotiator.

Q. And how long have you worked for OXY?

A. About four years.

Q. In the capacity as a landman?

A. Yes, sir.

Q. Have you had the opportunity to previously testify before this Division?

A. I have not.

Q. Would you please outline your educational background?

A. I have a BA from Texas State University in political science and then a J.D. from South Texas College of Law in Houston.

Q. When did you get your law degree?

A. I graduated in 2013.

Q. Did you pass the bar?

A. I did, the State Bar of Texas.

Q. Okay. What's been your work experience since you passed the bar in Texas?

A. For the first year and a half out of law school, I worked as an independent field landman in east Texas compiling ownership records, leasing projects and curative. After that, I came to OXY. I've been here for the past four years or so.

Q. Are you a member of any professional associations or affiliations besides the Texas State Bar?

A. Yes, sir, the Houston Association of Petroleum Landmen and the American Association of Petroleum Landmen.

Q. Mr. Van Liew, are you familiar with the four applications that have been filed by OXY in these consolidated cases?

A. Yes, I am.

MR. FELDEWERT: Mr. Examiner, I would tender Mr. Van Liew as an expert in petroleum land matters.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: He is so qualified.

Q. (BY MR. FELDEWERT) Mr. Van Liew, in front of

you, I have four separate exhibit packets. Okay?

A. Yes, sir.

Q. I'd like to first turn to the exhibit packet for Case 15616.

A. Uh-huh.

Q. And I'd like you to -- if you turn to Exhibit Number 1, does this contain a copy of the Division's order issued in April of 2017 in this case, 15616?

A. Yes, sir, it does.

Q. If I go to the last page of that exhibit, if I look at paragraph 19, Mr. Van Liew, this order approved a pilot project for OXY's injection operations in Section 16, correct?

A. Yes, sir, it does.

Q. Now, if I look at paragraph 19, it requested that the company -- it indicates that within two years following commencement of injection, the injection authority under the order would terminate, right?

A. That's correct.

Q. And it requests that the operator shall make an application and come back before the Division to present the results of its pilot project?

A. Yes, sir.

Q. Is that why we're here today?

A. We are.

Q. When did OXY commence injection in the approved pilot area?

A. April 29th, 2017.

Q. So if we don't receive an order by April of 2019, under this order, the project will terminate --

A. Yes, sir.

Q. -- I mean injection authority will terminate?

A. Yes, sir. That's correct.

Q. Does OXY intend to call a reservoir engineer to present the results of that project to date with the examiners?

A. Yes, sir, we do.

Q. When this matter was initially heard by the Division back in February of 2017, did the company notify the surface owner and the affected parties within a half mile?

A. Yes, sir, we did.

Q. Was there anyone that objected?

A. No one objected.

Q. Was there one party that appeared?

A. Yes, Matador Resources.

Q. Okay. And since Matador appeared at the last hearing, did the company provide notice of this additional hearing to Matador Resources?

A. Yes, sir, we did.

Q. And if I turn to what's been marked as OXY Exhibit Number 2, is this an affidavit prepared by my office with the attached letters and the documentation confirming that notice was provided to Matador of this hearing?

A. Yes, sir, it does.

MR. FELDEWERT: I would move the admission of OXY Exhibits 1 and 2 in this matter.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 1 and 2 are so entered.

(OXY USA Inc. Exhibit Numbers 1 and 2, Case Number 15616, are offered and admitted into evidence.)

Q. (BY MR. FELDEWERT) Okay. With that, then, Mr. Van Liew, I'd like to move to the next case, which is Case 20193, and it involves the Cedar Canyon Federal 4H well.

A. Yes, sir.

Q. Do you have that exhibit?

EXAMINER BROOKS: What case number?

MR. FELDEWERT: 20193, and it would be the Cedar Canyon Federal 4H well packet.

EXAMINER BROOKS: 20193?

EXAMINER GOETZE: 20193.

Q. (BY MR. FELDEWERT) Okay. Would you turn to what's been marked as OXY Exhibit Number 1 in this case? And we see here a map. Would you please explain what the company seeks -- first explain what is shown on this map and then what the company seeks under this particular application?

A. Yes, sir.

So on the map, the red line is going to indicate the Cedar Canyon 23 Number 4H, which is the proposed injection well. Both north and south, there are a benefiting well, the Cedar Canyon 5H and the Cedar Canyon 3H. And with those benefiting wells, looking at the rules, we're required to create a contract area that encompasses the entirety of the injections and the benefiting wells. And what OXY is seeking to do is to seek authorization to inject produced gas, produced water and CO2 into the existing 4H well for the benefit of the 5 and the 3.

Q. And what interval or zone does the company seek authority to inject?

A. These are 2nd Bone Spring wells.

Q. Okay. So all three of these are currently completed in the 2nd Bone Spring?

A. Yes, sir.

Q. Okay. And you seek authority to have the 4H converted into an injector in the 2nd Bone Spring?

A. Yes, sir.

Q. Just the 2nd Bone Spring interval, correct?

A. Correct.

Q. All right. Now, you've identified the project area in blue here?

A. Yes, sir.

Q. What type of acreage is involved here?

A. This is all federal -- one federal lease.

Q. So the north half of Section 23 and the northwest of 24 covers one federal lease?

A. Correct. And that constitutes the project area.

Q. Okay. Is OXY the only operator in this area --

A. Yes.

Q. -- for this project area?

A. Yes. For this -- yeah. This lease, we don't operate in.

Q. If I then turn to what's been marked as OXY Exhibit Number 2, does this provide the examiner with the filed C-102 plats for each of the three wells shown in Exhibit Number 1?

A. Yes, it does.

Q. And it indicates on these C-102s that the pool

that's involved is the Pierce Crossing; Bone Spring, East?

A. That's correct.

Q. And then do each of these C-102s provide an API number?

A. Yes, they do.

Q. All right. You mentioned that there would be offsetting benefiting wells?

A. Uh-huh.

Q. Is OXY presenting some other witnesses to address these injection operations and the benefits that are expected?

A. Yes, we will.

Q. If I turn to what's been marked as OXY Exhibit Number 3, is this a C-108 application that was filed for this particular injection project?

A. Yes, sir, it is.

Q. And if I turn to page 5, does this depict the half-mile area of notice?

A. Yes, 4 and 5, in conjunction with the half-mile radius.

Q. Okay. And we have someone who is going to testify to how this was developed?

A. Yes.

Q. But from your perspective, having received this

information, did the company identify the affected parties in this half-mile notice area?

A. We did.

Q. And if I look on the last page of this Exhibit 3, is that a list of parties in that half-mile area?

A. Yes, it is.

Q. And does it also include the surface owner for the -- at the location where the surface hole is for the injector well?

A. Yes.

Q. Who is the surface owner at that location?

A. The BLM.

Q. Okay. If I turn to what's been marked as OXY Exhibit Number 4 -- so we'll skip over Tab C and go to OXY Exhibit Number 4.

A. Yes.

Q. Is this an affidavit prepared by my office indicating that notice of this application and hearing was provided to the parties within the area of notice?

A. Yes, sir.

Q. And in the course of examining that list, did the company determine prior to this hearing that there was an operator -- or an affected party in the area of notice that had not received a mailing about this hearing?

A. Yes, sir.

Q. Okay. And who was that?

A. That was Shackelford Oil Company.

Q. And did you or someone on your behalf contact Shackelford Oil Company about this hearing?

A. Yes, we did.

Q. And in the course of those discussions, did the company receive an email from Shackelford Oil Company waiving notice of this hearing and waiving any objection to OXY's request for injection authority in this case?

A. Correct. We did.

MR. FELDEWERT: If I may approach?

EXAMINER GOETZE: You may.

Q. (BY MR. FELDEWERT) And if I look at what's been marked as OXY Exhibit 4A, is that the email notice?

A. Yes, sir, it is.

Q. And finally if I look at OXY Exhibit Number 5 in our packet, is this the -- an Affidavit of Publication in a local newspaper advising the public of this application and of this hearing before the Division?

A. Yes, sir, it is.

MR. FELDEWERT: At this point, then, Mr. Examiner, I would move the admission into evidence of OXY Exhibits 1, 2, 3, 4 and 4A and 5.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 1, 2, 3, 4, 4A and 5 are so entered.

(OXY USA Inc. Exhibit Numbers 1 through 5 and 4A, Case Number 20193, are offered and admitted into evidence.)

MR. FELDEWERT: Thank you.

This actually concludes my examination of this witness on this case. I don't know if Mr. Padilla wanted to ask him any questions at this point before I move to the other cases.

EXAMINER GOETZE: We should give him the opportunity.

MR. PADILLA: I don't have any questions, Mr. Examiner.

EXAMINER GOETZE: Thank you.

We'll proceed to the next one.

Q. (BY MR. FELDEWERT) I'd like to move to the next case, which are the exhibits for Case 20194, which would -- which involve the Cedar Canyon 27 6H and the Cedar Canyon 28 6H. Do you have those packets in front of you, Mr. Van Liew?

A. I do.

Q. Okay. Are they similarly organized to what we

just went through?

A. They are.

Q. So if I go to Exhibit Number 1, would you please identify what's shown here and what the company seeks under this case?

A. So for this project, there are two wells that we propose to inject CO2, produced gas and produced water. They are the Cedar Canyon 28 6H, which resides in Section 28, and then the Cedar Canyon 27 Federal 6H, which is in Section 27.

Each well -- so there are three benefiting wells in this scenario. The first is north of both the 28 6H and 27 6H. It's denoted in green. It's the Cedar Canyon 28-27 Federal Com Number 5.

And then there are individual one-mile wells that benefit the 27-28 that run south of each of those injector proposals, and that's the Cedar Canyon 28 7H in green and the Cedar Canyon 27 7H in green.

And just as in the other case, we've created the project area, which covers the south half of Sections 27 and 28, and then provided the same notice a half mile outside that project area.

Q. And, again, what interval do you seek authority to inject to?

A. These are also the 2nd Bone Spring.

Q. Okay. And we note -- and I note that both of the proposed injection wells in red were drilled from the same surface location?

A. That's correct.

Q. Okay. All right. Again, what acreage comprises this particular project area?

A. This is also one single federal lease.

Q. And is OXY again the sole operator?

A. Yes, we are.

Q. If I turn to what's been marked as OXY Exhibit Number 2, do we have C-102 plats for each of the wells you just discussed?

A. Yes, we do.

Q. And that would identify both the pool that's involved and provide an API number for each well?

A. Correct.

Q. If I turn to what's been marked as OXY Exhibit Number 3 again, is this the C-108 for this case?

A. Yes, sir, it is.

Q. If I turn to page 7 -- fortunately, they were marked at the bottom. If I turn to page 7, does that again depict the half-mile notice area for -- when we take into account the wellbore for both of these wells?

A. Yes, in conjunction with page 6 as well.

Q. Okay. So it's really an oblong, oval --

A. Yeah.

Q. What do you call that? An ellipse?

A. Ellipse, yeah.

Q. Who is the surface owner at the injection location?

A. The BLM.

Q. And if I turn to the last page of this exhibit, does it contain a list of the affected parties within this ellipse?

A. Yes, sir, it does.

Q. And includes the BLM, correct?

A. Correct.

Q. And if I turn to what's been marked -- we'll skip over the next tab and go to Exhibit 4. Is this an affidavit prepared by my office with the attached letters providing notice of this hearing and this application to all the parties that we saw on the last page of Exhibit 3?

A. Yes, sir, it is.

Q. And then finally, is Exhibit 5 an Affidavit of Publication in the local newspaper again advising the public of this hearing and this application?

A. Yes, sir, it is.

MR. FELDEWERT: Mr. Examiner, at this time I would move the admission into evidence of OXY Exhibits

1 through 5.

EXAMINER GOETZE: You don't want to play with the other two cases?

MR. PADILLA: No objection. We're not in this case.

EXAMINER GOETZE: Okay. Very good.

Exhibits 1 through 5 are so entered.

(OXY USA Inc. Exhibit Numbers 1 through 5, Case Number 20194, are offered and admitted into evidence.)

Q. (BY MR. FELDEWERT) Okay. Mr. Van Liew, I'd like to get to the last packet. It involves Case 20195, which involves the Cypress 34 Federal 3H and the Cypress 34 Federal 8H.

A. Yes, sir.

Q. Do you have that in front of you?

A. I do.

Q. If I turn to what's been marked as OXY Exhibit Number 1, we see a little different depiction, correct?

A. Correct.

Q. All right. Why don't you walk us through this and tell us what the company seeks under this application?

A. Okay. So the first small box at the top of the page depicts the project area, which covers the entirety

of Section 34. The reason it covers the entirety of Section 34 is because we have two candidates that are in different formations and that run in different orientations through the section.

So starting with the first one to the left, the Cypress 34 Fed 3H, is a 1st Bone Spring producer that runs horizontal or lay-down in the section. And that has two benefiting wells, one north and one south, the Cypress 34 2H and the Cypress 34 Federal 1.

Q. And I'm going to stop you right there. Are they both likewise completed in the 1st Bone Spring interval?

A. Yes, sir, they are.

Q. Okay.

A. And moving on to the right-hand side of the page, similar situation, except this is a Cypress 34 Fed 8H, which is a 2nd Bone Spring producer. It runs north-south or stand-up orientation. It also has two benefiting wells. They are also found in the 2nd Bone Spring. So because of that, we have created a project area that covers the entirety of Section 34.

Q. So the lay-down wells in the 1st Bone Spring, the stand-up wells in the 2nd Bone Spring?

A. Correct.

Q. Okay. What's the nature of the acreage here in

Section 34?

A. These are federal -- this is a federal lease.

Q. And, again, is OXY the sole operator?

A. Yes, sir, we are.

Q. If I then go to what's been marked as OXY Exhibit Number 2, does this contain the C-102 plats for the six wells that you just discussed?

A. Yes, it does.

Q. Okay. And I note that the first page indicates that -- it looks like the initial well was put into a wildcat Bone Spring pool. But has this pool since been identified by the district office?

A. Yes. It's the, I believe, Cedar Canyon Bone Spring well.

Q. So if I look at the second page, I see the pool name and the pool code?

A. Correct. Yes, sir.

Q. If I go on to the third page here, it looks like for the 3H, which is the lay-down injection well, right --

A. Right.

Q. -- that you have two pages here. You have the C-102 and then the federal cover C-101?

A. Yes.

Q. Is it the first page that provides the API

number?

A. Yes. It was just left off of the 102.

Q. Okay. So the documentation in here not only gives the pool involved for the 1st Bone Spring but also the API number?

A. Correct.

Q. And as I continue on paging through this, the remaining three wells involve -- as you said, that would be the stand-up 2nd Bone Spring injection project?

A. Uh-huh.

Q. And that involves the Cedar Canyon; Bone Spring Pool?

A. Yes, sir, it does.

Q. And they have the API numbers?

A. Yes, sir.

Q. If I go to what's been marked as OXY Exhibit Number 3, do I again find the C-108 for this project?

A. Yes, sir.

Q. If I go to page 7 -- pages 6 and 7, does it identify the area of notice for these two injection wells?

A. Yes, sir, it does.

Q. And we have some ellipses on page 7 that form kind of a -- how would you describe that shape? Cross? Odd? Something?

A. Yes, cross.

Q. And if I -- first off, when we're dealing with the surface owner where the injection wells are located, again, is that the BLM?

A. Yes, it is.

Q. And if I look at the last page of this Exhibit 3, does it contain a list of all the affected parties within the ellipses -- cross and ellipses that we see on page 7?

A. Yes, sir, it does.

Q. Turning to what's been marked as OXY Exhibit Number 4, is this an affidavit prepared by my office with the attached letters of this hearing to the affected parties?

A. Yes, sir, it is.

Q. And is OXY Exhibit Number 5 an Affidavit of Publication in the local newspaper comprising of this hearing and this injection application?

A. Yes, sir, it is.

MR. FELDEWERT: Mr. Hearing Examiner, I would move the admission of OXY Exhibit Numbers 1 through 5 in Case 20195.

EXAMINER GOETZE: So in Case Number 20195, Exhibits 1 through 5 --

MR. FELDEWERT: Yes, sir.

EXAMINER GOETZE: -- have been entered.
(OXY USA Inc. Exhibit Numbers 1 through 5, Case Number 20195, are offered and admitted into evidence.)
MR. FELDEWERT: And that concludes my examination of this witness.
EXAMINER GOETZE: Mr. Padilla, no questions?
MR. PADILLA: No questions.
EXAMINER BROOKS: No questions.
EXAMINER GOETZE: I have no questions of this witness either.

CROSS-EXAMINATION

BY EXAMINER WARNELL:

Q. Point of clarification: On -- I believe it was the first case. No. I'm sorry. It was the second, 20193, Exhibit Number 1. I don't know if it was mentioned, the pad. Are you going to be drilling the 4H off of the same existing pad where the 5H --

A. Are they drilled on the same pad?

Q. Yes.

A. I believe so, yes, based on the orientation I see.

Q. This way --

MR. FELDEWERT: Mr. Examiner, these wells

exist now. In fact, the 4H is a producing well that they're converting into an injector. I'll get to that later. And I did neglect to point out that the surface location for that injector well is off of the project area in Section 22.

REDIRECT EXAMINATION

BY MR. FELDEWERT:

Q. So I should ask: With respect to notice, is -- the surface owner in that west half of the northeast quarter of Section 22, is that the BLM?

A. Well, it's actually the southeast quarter of northeast. Yes, it is the BLM.

Q. Okay.

A. They were noticed as well.

Q. Okay.

EXAMINER WARNELL: Thank you.

EXAMINER GOETZE: Next witness, please.

MR. FELDEWERT: We'll call our next witness.

SHUNHUA LIU, Ph.D.,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your name, identify by

whom you're employed and in what capacity?

A. I'm Shunhua Liu, and I'm the director of unconventional simulation and the process design. I'm working for Occidental Petroleum.

Q. And how long have you been with OXY?

A. I've been with OXY for 11-and-a-half years.

Q. Okay. And how long have you worked as a petroleum reservoir engineer?

A. Since the beginning.

Q. Okay. And, Dr. Liu, did you previously testify before this Division as an expert in petroleum engineering?

A. Yes, twice.

Q. Yes.

And, in fact, didn't you testify in the case that we saw earlier when we had the order approving the pilot project in Section 16 known as the Cedar Canyon Pressure Maintenance Pilot Project?

A. That's correct.

Q. And are you familiar with the applications that have been filed by OXY in these consolidated cases?

A. Yes.

Q. And, more importantly, are you familiar with the proposed injection projects?

A. Yes.

Q. Is it your team that helped put these projects together?

A. Yes.

MR. FELDEWERT: I will retender Dr. Liu as an expert witness in petroleum reservoir engineering.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: He's so qualified.

Welcome back.

THE WITNESS: Thanks.

Q. (BY MR. FELDEWERT) Dr. Liu, I want to go in the same order. Okay? I want to address Case Number 15616 first.

A. Uh-huh.

Q. And we've made note of the order under Exhibit Number 1. This is the case in which you testified previously back in -- it would have been February of 2017.

A. Right.

Q. And on page 19 -- or the last page, paragraph 19, it requested that the company come back and report the results?

A. Yes.

Q. Are you prepared to do that?

A. Yes.

Q. Before we get there, let me ask you this. In your opinion, has the company had sufficient time to gauge the results of this approved injection project?

A. Yes.

Q. And briefly, before we get into a more detailed explanation, what has the company learned?

A. So we have learned this pressure maintenance project has yielded additional oil, incremental oil that cannot be recovered by the primary drainage, and we have a case that demonstrates this. So we request --

Q. Okay. In your opinion, has the project been successful?

A. Yes.

Q. And in your opinion, should the authority provided under this order be made permanent?

A. Yes.

Q. If I then turn to what's marked at OXY Exhibit Number 3, does this contain a series of slides going up to page 8 that you and your team put together to present the results of this pilot project?

A. Yes.

Q. If I turn to what is marked as page 2 of Exhibit Number 3, we see the reason why you're here, right?

A. Yes.

Q. Okay. And it notes that the currently approved pilot project involves two injection wells?

A. Uh-huh.

Q. Into the 2nd Bone Spring?

A. Yes.

Q. Then if I go to page 3, I think that's where we start an explanation of what you've been doing over the last year and a half or so?

A. Yes.

Q. All right. Would you please walk us through this project beginning on page 3 of Exhibit 3?

A. Okay. So on page 3, as you can see, this is the map showing the location of the Section 16 and then the plot on the right side that shows the two injectors, the 7H -- 16 7H and the 16 12H. And then there are three offset producers, the 8H, 6H and 12H. And as you can see --

Q. You mean 2H?

A. Yeah, 2H. Sorry.

Q. Go ahead.

A. Yeah. So as you can see, you know, in the north side, the spacing is a little bit wider. It's about like 160 acre, and in the south side, it's about 80 acre.

Q. Now, with respect to this project, was there

actually kind of two mini projects within this project?

A. Yes.

Q. Why don't you explain those?

A. Yes. So if you can turn the page to the next page, page 4, so we did -- we did injection in the two wells, but we also did the two different processes for these two wells.

So the pilot one, we did a huff and puff. The huff-and-puff process is we injected produced gas from the Cedar Canyon, produced gas into the well, the 7H and the 12H. And after a while, we shut in for a period of time and then produced back. Sometimes we call it a flowback.

And so the schematic showed the yellow -- kind of a yellow area is what we think may contact the rock. It's not exact. This kind of shale [sic] is just to show that we can make contact with rock and then get additional oil -- drain additional oil out. And then after we did the huff and puff -- we did the huff and puff both oil. And after we did that, we continue injection in the 7H and 12H, did some line drive tests, and then we get positive result from all the offset producers.

Q. Now, what type of -- of fluid or injectant did you utilize for both your huff-and-puff project and both

your line drive injection?

A. We used produced gas from Cedar Canyon.

Q. Now, your authority under the order authorized not only the use of produced gas but produced water?

A. Yes.

Q. Okay. But thus far, you did not use produced water?

A. Because in the first time, you know, when we applied that, we want to do some -- you know, if -- because we never done this before. If we got a serious breakthrough problem, we have a typical -- like a WAG process, you know, injecting water, alternating gas. This is commonly used in conventional EUR process. And then since our process is pretty good -- actually, we got a really positive result -- we didn't try the water in this short period of time. But in the future, to optimize the process, we still want the water in that -- in the scenario in the Permian.

Q. So you would like to maintain the authority allowing you to use produced water, correct?

A. Yes, that's correct.

Q. And that would give you the flexibility to use it in the future?

A. Uh-huh.

Q. But is the point here that you have -- and

correct me if I'm wrong. Have you seen success without using produced water?

A. Yes.

Q. Okay. All right. Then we have two different projects here, the huff and puff and the line drive. Do we want to -- can we now move to talk about the huff and puff first?

A. Yes.

Q. Let's go to page 5 of Exhibit Number 3.

A. So page 5 shows the huff-and-puff result from the two wells. So that's the 7H and the 12H. If you look at the plot, it's a little bit of a busy plot. Let me explain and go through it a little bit.

So the solid green line, that's the test data. That the daily test data. And then the hollow circle in red is the produced gas rate. And then the magenta solid circle, that's the injection rate. So as you can see, before the injection, before April 2017, the well is in decline -- constant decline. The dashed green line, that's our PDP reserve. That's our reserve line. So as you can see, it's continued decline and then under, you know, primary drainage.

So after we inject the produced gas for several months, as you can see, when we flow this back, the well is flowing with much higher oil and much higher

gas. And then I have to point out, it's a logarithmic scale. So as you can see, from the bottom, we realized six times the oil response, six times the pre-injection oil rate. And the other thing I want to point out is before the injection, it was on the lift. It was on pump. And after the flowback, the oil is on flowing. So the rate is on flowing. So that's the positive result we got from 7H.

So similar to the 12H, we have injected for a short period of time, and then you still can see, you know, an oil rate increase, gas rate increase.

So that concludes our huff-and-puff result.

Q. Now, Dr. Liu, when I was looking at this, we noted that, you know, one time frame involves a period of time in 2017 and then a period of time for the 12H later in 2017.

A. Yeah.

Q. Why didn't -- this huff-and-puff graph, why didn't it continue?

A. So there are a couple of reasons. So why is -- we also test like a continuous injection, you know, on the same oil. And the other reason is when we tested that, that will become an injector. So you don't have test data after that. And the other reason, you know, we are a little bit short of the gas source for the

injection, especially since this is a temporary injection water. So typically when we want to have a gas resource, we have to skew a little bit long-term, you know, contract. So that's the main reason.

Q. Okay. I want to talk about that in a minute. So when I look at the end of the data here for the huff-and-puff project, is that roughly the time that you would have commenced the line drive injection?

A. Yes. Yes, especially for the 12H. Yeah.

Q. Okay. And before we turn to the line drive injection --

A. Uh-huh.

Q. -- in your opinion, what are the conclusions that you get from the huff-and-puff project?

A. So from this, we can conclude, you know, huff and puff can yield additional oil from this process, and that's our main conclusion.

Q. Okay. Now, the next slide, slide six, deals with the second part of this project, the line drive?

A. Yeah.

Q. Okay. And if I'm looking at slide six, what well is involved here?

A. So slide six, that shows the 8H. If you flip back to slide three, 8H is north of the pilot area. It's north of the pilot area, directly north of that 7H.

Q. Okay. So this would be the slide that would reflect injection in the 7H --

A. Yes.

Q. -- and then the results in the offsetting 8H to the north?

A. Yes.

Q. Okay. Walk us through this.

A. So that's a similar plot. You know, you can see the daily oil test in the green -- solid green, and the red is the gas. So you can see it was in a constant, like, decline, normal decline on the primary. So after we started injecting the 7H, you can see oil start ramping up and so does the gas. And then we get up to a certain point where we stop 7H injection, and then you can see oil go back to the original decline mark and so does the gas. So the wedge in that injection, that will be the incremental oil. That will never be recovered by primary drainage.

Q. Okay. Let me ask you a couple of questions about that. So if I go back to slide three, put it in perspective here --

A. Yeah.

Q. -- this particular graph involves the 7H and 8H. So that's an area where you would have roughly 160-acre spacing between the wells?

A. Yes. Yes.

Q. Okay. And you mentioned that you saw the increase in oil production, and you said incremental oil produced.

A. Yes.

Q. How do you know that it's incremental oil?

A. So typically when we do like a primary recovery, we did -- this is normally DCA, decline analysis, right? So if we don't change any artificial lift, we don't have any support or pressure maintenance, it will follow the same decline train [sic]. Of course, it will be up and down a little bit, but it won't -- it won't perform like this. Another evidence is the gas also increased from this significantly. So that's the evidence. This is -- the oil come from the gas injection, not from other things. We have not changed this well, any artificial lift, anything. This well stayed the same.

Q. So in your opinion, does this type of injection project result in the recovery of incremental oil that would otherwise not be produced in a primary recovery?

A. That's correct.

Q. Okay. All right. Now, this involved those two wells. Do you have another slide involving different wells with a line drive?

A. Yes.

Q. Is that in slide seven?

A. Yes. So slide seven shows a similar plot, but that's for the 6H, which is the middle well. That got support from both the 7H and the 12H in the south.

Q. All right. Let me stop you right there. Hold on. If I go to slide three --

A. Yeah.

Q. So this would involve -- this graph involves the 6H well?

A. Yeah. It was in the middle, the middle well.

Q. That's the producing well. And then the offsetting injector is the 7H?

A. Yeah, and the 12H.

Q. And the 12H.

And the 7H being roughly 160 acres away, and the 12H being 80 acres away?

A. Yes.

Q. Okay. All right. Then we'll go back to slide seven.

A. Uh-huh.

Q. We see all your lines again.

A. Yeah.

Q. What did you see here?

A. That would be a similar line. And then when we

start the 7H injection, you can see actually oil and gas ramping up, similar impact. So when you stop injection, it start coming back to the original decline. And we did 12H -- actually, this kind of -- we tried to get continuous injection, but sometimes we have a constrain, like a gas resource. So we inject maybe a few weeks. We'd inject maybe at most one month. So you can see. Each time when we turn on the 12H, you see oil response. And then when we stop injection, the oil go back to the original decline. And so does the gas. When we get an oil response, you see the gas production also went up. And then when you stop, the gas go back.

Q. And, again, in your opinion, the increased production that we see here, is that incremental oil that would otherwise not be produced with primary recovery?

A. That's correct.

Q. Okay. If I then go to slide eight --

A. Yeah.

Q. -- is this the result that you saw from the most southern well?

A. Yeah. That's the 2H. That's the southmost well in the project area.

Q. All right. And what do you observe with respect to the effect on the most southern well, what

would be just the 12H injection --

A. Yeah. This would just be in response to 12H injection. However, for this well, you know, we did see the response, but there is some well problem with this well, operational problem with this well, so we don't have enough data, you know, like as much data as the 6H. You can see the whole injection response. We just show one of these. But we still, you know, have a positive response showing from this well as well. So all three offsets show --

Q. Now, let me ask. You mentioned that you have kind of on-again, off-again injection because of the availability of gas.

A. Yes.

Q. And you mentioned briefly -- and I just want to have you talk about it a little more -- the availability of gas throughout this roughly year-and-a-half project, was that in part driven -- or in part affected by the temporary nature of this order?

A. That's correct.

Q. Explain that to us.

A. So for this -- you know, OXY, usually for the gas contractor, we have a long-time contract commitment to the gas, you know, pipeline company. So if we have actual gas, we can inject, but if we are kind of on or

below, we have to, you know, sell those gas to the pipeline company. And then since -- this is a temporary injection permit, so we cannot, you know, guarantee the long-term, kind of, gas resource for that. So we just -- when we have gas, we inject. When we don't, we just stop.

Q. Now, you've had success with this injection project?

A. Yes.

Q. And if the order is made permanent, will that allow you and your team to get a more firm gas commitment for these projects?

A. That's correct.

Q. Okay. And, in fact, as we'll see following a few more points here in this case, the other case, is that you hope to take this line drive positive responses that you see and apply them to three other areas, correct?

A. Yes, that's correct.

Q. In fact, are there also additional areas that the company is going to seek approval for in the future by using this type of technology?

A. That's correct.

Q. Okay. All right. Now, the other thing that we note in the order, Exhibit Number 1, if I go to page 6,

paragraph nine, it approved the use of unlined tubing --

A. Yeah.

Q. -- but it was to be re-evaluated at the end of pilot project period when the operator comes back and presents its summary.

A. Yeah.

Q. Okay. Has -- the company, during this gas injection, was it using unlined tubing?

A. That's correct.

Q. Okay. And has the company observed any failures, corrosion, breaches or any other problems with the use of the unlined tubing?

A. No failure.

Q. And has the company, in the course of getting ready for this hearing and throughout this project, actually closely examined that tubing?

A. Yes. Actually, we did that a few months ago. We even scanned the whole tubing, and then we did not find any failure for that.

Q. In your opinion, does the continued use of unlined tubing for gas injection provide operational benefits?

A. Yes.

Q. Okay. And in your opinion, does the continued use of unlined tubing for gas injection pose any threat

to groundwater or the environment?

A. No.

Q. And in your opinion, is it appropriate to continue not only this project but the use of unlined tubing for this gas injection project?

A. Yes.

Q. Dr. Liu, should the authority under this order be made permanent?

A. Yes.

Q. And will it allow you to get the gas commitment you need to continue with the success that you saw in this project?

A. That's correct.

Q. Okay. As part of making this authority permanent, did the company also ask in its application filed here today that the standard language be added to allow additional injection wells to be approved administratively if it deems to be prudent in the future?

A. Uh-huh. Yes.

Q. Okay. Were the slides comprising OXY Exhibit Number 3 prepared by you or compiled under your direction and supervision?

A. Yes.

MR. FELDEWERT: Mr. Examiner, I would move

the admission into evidence of OXY -- of the slides comprising Exhibit 3.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibit Number 3 in Case 15616, re-opened, is so placed into record.

(OXY USA Inc. Exhibit Number 3, Case Number 15616, is offered and admitted into evidence.)

MR. FELDEWERT: Mr. Examiner, as you can tell, I was going to move on to the next three cases, but my thought is maybe if you have some questions about the results of this project, you might want to ask them now.

EXAMINER GOETZE: Well, you are very predictive in this situation. Yes. We'd like to move on to the other ones because they're about new projects. Let's talk about this one.

Do you have any questions, Mr. Padilla?

MR. PADILLA: I don't have any questions.

EXAMINER GOETZE: Mr. Brooks?

CROSS-EXAMINATION

BY EXAMINER BROOKS:

Q. Just one, really. I've been interested in asking this for a while, but I've never asked it because

it's so basic. What is a huff-and-puff operation?

A. Okay. So a huff-and-puff operation is for our producer. So you temporary just -- just shut in that producer and inject- -- we inject to something, inject -- actually, this is a miscible gas. In this case it's a produced gas. We inject that for a certain time. And then -- so you can see that the hole pressure will increase. You know, the gas will be miscible. We release the oil -- the hydrocarbon in the ground, and then we shut in that for a short period of time and then produce back. So it's like a huff: Put the -- put the gas in the ground. And to puff it back is to flow back the whole thing.

Q. So for a period of time, you inject and then for a period of time --

A. You produce.

Q. And you allow the well to --

A. Yeah.

Q. Now, these wells, when you huff, then they produce -- they flow. It's not necessary to apply artificial lift?

A. No. No. So it -- it actually -- we -- not only in this case, we have other case in other state where we did that as well. When you flow back initially, typically, you don't need any artificial lift

because your bottom-hole pressure is high enough. The gas, we are coming out with hydrocarbons. And then for later time, when the bottom-hole pressure is going down, you may need to turn on the artificial lift, but at that time, you still can realize significant additional oil.

Q. Okay. What do you mean -- what is meant by the term "miscible gas"? What is the term you used?

A. So miscible -- miscible is, you know -- at the surface, you can see the oil and the gas. They are separating, the two phases, right? You have a gas phase; you have an oil phase. But when you inject at a higher pressure, then it becomes like the single phase. The gas will go into the hydrocarbon, and then they mix. They will expand. Actually, this will lower all this surface tension, and also the expansion will help this produce back.

Q. So the oil vaporizes, and so oil and gas mix?

A. Yeah. Oil also -- initially, it will be the single phase coming out, but later it will, you know, separate. Yes.

Q. Okay. Does it separate in the reservoir, or does it separate when it comes out of the reservoir?

A. So it depends. Initial flowback, it will be separated at the surface, but later it will be, you know, separated close in the wellbore. On the bottom of

the wellbore is the high pressure, but then when you go out, it will be -- separate somehow.

Q. Thank you.

EXAMINER GOETZE: Mr. Warnell?

CROSS-EXAMINATION

BY EXAMINER WARNELL:

Q. One question on your unlined tubing.

A. Yeah.

Q. How exactly did you test the integrity of that to see if there was a corrosion problem?

A. So we -- actually for that -- for that -- for that part, it was -- you know, we tried to retrieve the downhole pressure gauge. So when we have that downhole pressure gauge retrieved out, we pull up the tubing and do the scan. So that's not -- this is just specially for this project, not -- you know, normally we wouldn't do that. We just want to make sure, because we didn't see the pressure change in the annulars [sic]. So we feel it's okay, no failure, but we still put -- just scan it to make sure.

Q. So you're scanning it on the surface?

A. I -- I think part of that should be. I'm not a production engineer, but he -- he gave me the scan report. So I think part of that should be, but I'm not sure. Sorry.

EXAMINER WARNELL: Do you have a copy of the scan report?

EXAMINER GOETZE: No. I do not see a copy of the scan report.

THE WITNESS: So we can -- I think we can provide that.

EXAMINER GOETZE: Yes. Can we request that and some sort of analysis or discussion with it, so we have a --

MR. FELDEWERT: I'm sorry?

EXAMINER GOETZE: The scan analysis for the tubing, could you provide that in an email, along with the observations by someone who reviewed it --

MR. FELDEWERT: Certainly.

EXAMINER GOETZE: -- so we can have it as part of the record?

MR. FELDEWERT: I'll check with the client. It shouldn't a problem.

EXAMINER GOETZE: Very good.

Any more?

A question for the attorney. Your other two witnesses are going to testify as to?

MR. FELDEWERT: We have geology, and then Mr. Foppiano is going to talk about the area of review and how it was done of the C-108.

EXAMINER GOETZE: Okay. Well, then we won't give him any wrong questions.

CROSS-EXAMINATION

BY EXAMINER GOETZE:

Q. My understanding is we want to make this somewhat of a permanent project.

A. Yeah.

Q. At what point do we know we're no longer doing pressure maintenance but have actually gone into what we know as a waterflood condition, that we're actually driving the entire system by the operation of the injection?

A. I cannot give the exact time frame because --

Q. Well, no. I'm just saying is there a mile marker, a response that at one point you would probably come back and ask for a water flood as a standing as opposed to -- my concern here is after seeing these various applications, I have these little blocks of Cedar Canyon, and we start making them permanent. Why not, if you want to do a project that's large, get it done, move down the road, and so -- like we have with the Hobbs, North Hobbs and South Hobbs, instead of just smaller? But it's something for you folks to consider. At what point does this move away from the pressure maintenance in these little boxes and it becomes a

larger type of activity? And the only reason we're asking -- I'm asking this is because this is a whole new frontier for us. We're doing this with horizontals, and you folks are probably the first to take it this far.

There was a request, I believe, to be able to use CO2?

A. Uh-huh.

Q. Okay. We had a -- we had a pressure analysis. You ran a diagnostic fracture injection test, a DFIT, for the produced gas. We also ask that you run it for the CO2 so that we have a pressure that's representative of the .2 gradient and that we can include that in the order so that we have people in the field who know what you have.

MR. FELDEWERT: I think what you'll find is they did a -- and Dr. Liu's going to get into this on these other cases. They did a -- what's that model? PROPSER --

THE WITNESS: Yeah, Petroleum Experts PROSPER.

Q. (BY EXAMINER GOETZE) So we're willing to be able to carry it from the other Cedar Canyon project over. Let's make a note of that, along with the information on the tubing, what you are going to recommend for CO2 as pressure to put in the order.

And to that end, the .2, did that represent a problem? Did you have any issues with what was in the order as far as pressure?

A. No. No. We -- actually, in the previous one, we used the same calculation that we did for these three. And we just used the .2-psi-per-foot gradient that's water, and then we back-calculated for the CO2 and produced gas.

Q. And this range was no difficulty? It did not limit your project as far as --

A. It seems like it's okay.

Q. Okay. With regards to injection, was there any indication there was effect to the east or west?

A. We operate east and west, and we have not observed.

Q. Okay. Let's see. Is there anything I put in the order we didn't get?

MR. FELDEWERT: Just probably the approval to add additional injection wells administratively in this project area.

EXAMINER GOETZE: Okay. And the last time you applied for that, you cited the wrong rule, so --

MR. FELDEWERT: Who did?

EXAMINER GOETZE: You did. You put down F3. It's about allowables. Are you worried about

allowables?

MR. FELDEWERT: No.

EXAMINER GOETZE: No. You want the option to go ahead and do it through a PMX expansion or a C-108.

MR. FELDEWERT: Yes. Yes. And just to defend myself, I think maybe what I did was ask to eliminate the allowables because they were still in place for these types of projects.

EXAMINER GOETZE: Yeah. We don't normally worry about these because we can't figure out what the allowables are. Okay?

MR. FELDEWERT: Okay.

EXAMINER GOETZE: So yes, the administrative aspect of it, but you will still have to go through the C-108 process.

MR. FELDEWERT: Correct.

EXAMINER GOETZE: No further questions?

Thank you. Thank you for coming back.

MR. FELDEWERT: We'll go on to our next case?

EXAMINER GOETZE: Yes, the next show.

Q. (BY MR. FELDEWERT) Dr. Liu, if you could turn to --

MR. FELDEWERT: Unless you want to take a

break.

EXAMINER GOETZE: Let's go ahead and take a break for 15 minutes and come on back.

(Recess, 10:21 a.m. to 10:41 a.m.)

EXAMINER GOETZE: All right. Ladies and gentlemen, let's go back on the record, please.

Q. (BY MR. FELDEWERT) Dr. Liu, I'd like to go now to the exhibits for Case 20193, which involves the Cedar Canyon 23 Federal 4H well.

MR. FELDEWERT: Yes, sir.

Q. (BY MR. FELDEWERT) If I turn to --

EXAMINER BROOKS: I don't think I got a copy of that.

EXAMINER GOETZE: We don't give you copies of these things.

(Laughter.)

EXAMINER BROOKS: Okay. If that's the rule, that's the rule. These are from the --

EXAMINER GOETZE: No. We're still going down the road. Look at the bottom.

EXAMINER BROOKS: 20193?

EXAMINER GOETZE: Yeah.

EXAMINER BROOKS: Okay. Thank you.

EXAMINER GOETZE: You're welcome.

Q. (BY MR. FELDEWERT) So if I go to what's been

marked as Exhibit Number 6, is this --

So let me ask you this before we get into these other three cases, Dr. Liu. Is this project that we're seeing here in this case and in the other two cases, is it basically the same as the one we just went through?

A. Yes.

Q. Except you're not going to do a huff and puff, you're going to do a line drive?

A. Yes, mainly. But we still want to keep the huff-and-puff options open because typically for a lot of cases, huff and puff might be easier to do, you know, to implement. And then the other thing is, you know, we really don't have long-term gas. If you have, you know, a good gas market or something, you want to use that kind of a huff-and-puff scenario. So it depends.

Q. And, again, on that point, is one of the purposes here of you getting these three -- that one case approved permanently and then these additional three cases approved so that you can get the gas commitment that you need?

A. Yes.

Q. Okay. Now, with respect to all three wells that we see on Exhibit Number 6, they're all existing wells, correct?

A. That's correct.

Q. Okay. And you're converting that middle one into a producer?

A. Yes, injection.

Q. Using this exhibit, what do you expect to happen here with this particular project?

A. So we would expect a similar result from that Cedar Canyon 16, but if we get a long-term contract, you know, commitment -- gas commitment, we'll probably see an even better result than what we have seen in the pilot area.

Q. In addition to the benefits from a production standpoint that you have laid out here and talked about, is there another benefit here with respect to the use of this produced gas?

A. Yes. As you can see in the fourth bullet point, you know, currently there is a lot of highly constrained gas market, so sometimes people have to flare. So this will provide a benefit, you know, to mitigate that problem. You can inject the gas into the reservoir, save the hydrocarbon and get additional hydrocarbon.

Q. What is the -- now, for this project, what is the source of the produced gas?

A. It's from the Cedar Canyon central delivery

point.

Q. It's the same source --

A. Same source.

Q. -- as the Section 16 project that we just reviewed?

A. Yes. Yes.

Q. And is that gas dehydrated?

A. Yes.

Q. What's going to be the source of the produced water if you move to produced water?

A. That will be the Cedar Canyon Water Treatment Facility.

Q. And is that water treatment facility that's the source, is it the same source that was approved for the Cedar Canyon 16?

A. That's correct.

Q. Okay. So same sources for gas, same sources for water?

A. That's correct.

Q. Does the -- have you examined the compatibility studies in the C-108?

A. Yes. OXY experts perform a lab and model study for this compatibility. We didn't see a compatibility problem.

Q. Are there any issues?

A. No issues.

Q. Does the application also request authority to utilize CO2 if it becomes available, right?

A. Yes.

Q. Does CO2 create any issues in this injection project and any compatibility issues or anything similar to that effect?

A. No.

Q. Okay. Will this be a closed system?

A. Yes.

Q. Now, when I look at this project here -- and there was a question about this -- you expect the benefit to go -- move roughly north and south from the injection well?

A. Yeah. Yes.

Q. Why will it not move east-west?

A. So as we testified in the first case, mostly we know that in the area -- that's why we laid the horizontal well, the hydraulic fracture orientation, make sure, you know, it moved north to south. The other biggest part is we have two biggest pressure sinks, you know, from these two producers, and then they tend to -- you know, the gas tends to move or push to that direction. And the other evidence we have from the Section 16 pilot is we see the response from

north-south, but we operate east to west. We didn't see the response.

Q. And for this particular project here, does OXY likewise operate producing wells east and west of this area?

A. Yes.

Q. So if there was some kind of an effect east to west, you would see it?

A. Yes.

Q. Okay. Do you expect -- in your opinion then, do you expect to receive the same positive results from this project as you saw in the Cedar Canyon Section 16 Pressure Maintenance Project?

A. Yes.

Q. And in your opinion, will the approval of this injection project result in the recovery of oil under the project area that will otherwise not be recovered by primary means?

A. Yes.

Q. Now, I want to move then to what's been marked as OXY Exhibit Number 7 in this case, and does this reflect how you arrive at the requested surface pressure limits?

A. Yes.

Q. What did you do with respect to water?

A. So for water, we based it on the NMOCD manual, Section 3A(2). You know, we utilized a .2 psi per foot for water, and then just basically we calculate the pressure based on the TVD of the well and then multiply by the .2 psi per foot for water.

Q. And the project we see here, is this a similar reservoir setting as we see for the Cedar Canyon Section 16 Pressure Maintenance Project?

A. Yes.

Q. Okay. And did you observe any issues with respect to -- or let me step back.

Did you use this same approach in arriving at the surface injection pressure for water in the Section 16 project area?

A. That's correct.

Q. And did you observe any issues?

A. No.

Q. Okay. So in your opinion, is this model that was used -- or this calculation that was used to arrive at the surface and pressure for water, is it a -- is it an appropriate method to use for this project?

A. Yes.

Q. Okay. How did you then arrive at the proposed surface injection pressures for produced gas and CO2?

A. So basically we use this .2 psi per foot for

water, and then we calculate the bottom-hole pressure of this well, you know, at this max injection pressure limit. And then we used an industry standard PROSPER model -- Petroleum Experts PROSPER model to back calculate the surface pressure for gas -- for produced gas and for CO2. And we take into account the gas composition, the friction loss, and then that's how we arrived -- derived the maximum tubing head pressure.

Q. Okay. Now, was this the similar process that was utilized to arrive at the surface injection pressure for produced gas in the Cedar Canyon Section 16 project?

A. Yes.

Q. And have you observed any concerns or issues with respect to that surface injection pressure?

A. No.

Q. And in your opinion, is this the appropriate methodology to use to arrive at the surface injection pressures for produced gas and CO2 for this project?

A. Yes.

Q. Okay. Is there any -- there was a discussion about DFIT, D-F-I-T.

A. Uh-huh. Yes. Uh-huh.

Q. Should that come into play here for produced gas and CO2?

A. No. We didn't use that for the calculation --

for this calculation. We just --

Q. Okay. And why is that?

A. So we think, you know, this -- DFIT is when actually the rock failed. So we used a little bit of a conservative approach for this. We used the lowest -- like a .2 psi per foot for the water to calculate that. So it's a more conservative approach.

Q. Okay. Is there another reason why this is a more -- what you did here and the numbers that you arrived at here, is there another reason why this is a more conservative number than perhaps would be warranted if you used a straight PROSPER model with a .2?

A. So actually in this, we put a little bit more conservative on this side because this is actually -- we have three other -- two other areas. So we utilized all the TVD, the true vertical depths, of all the wells, and we choose the shallowest one to back-calculate the pressure we request.

Q. All right. So let me step back. So the number we arrive at here, the 4,350 and the 2,300 --

A. Yeah.

Q. -- that's not necessarily -- that's not based on the actual depth of these wells?

A. Uh-huh. Maybe, but it's the shallowest we use.

Q. Okay. So you looked at a number of proposed

injection wells for this area?

A. Yes.

Q. And you determined the shallowest TVD for the 2nd Bone Spring?

A. Yes.

Q. And you calculated all of your proposed injection -- based on that shallowest total vertical depth?

A. Yeah.

Q. Not the actual deeper depth of the well?

A. That's correct.

Q. Okay. So are we going to see this same number, 4,350 for produced gas and 2,300 for CO2, in the other projects as well?

A. That's correct.

Q. Because they're all deeper?

A. Deeper or equal.

Q. Or equal.

A. Yeah.

Q. And with respect to Mr. Goetze's question about the approval of the Cedar Canyon Section 16 Pressure Maintenance Project, is this value here for CO2, 2,300 psi, is it equally applicable to the depth that is involved for that pressure maintenance project?

A. Yes.

Q. Okay. So this -- why did you decide to use just one conservative number for produced gas and one conservative number for CO2?

A. So there are a couple of reasons. One is, of course, we don't want to make -- we want to make sure our reservoir, you know, don't be -- won't be hurt [sic], so we want to use the most conservative number. The other thing is for this process design for the operation, we want the same number for all the people. We don't want, you know -- because this would be -- eventually would be one system. So we want to make sure all this design operation into one kind of guidance instead of each well you specify different numbers.

Q. So in other words, rather than having maybe 4,380 psi for produced gas in another area and 4,375 in another, you instruct your operational people that 4,350 is what applies to all of them?

A. Yes.

Q. Because you used the shallowest --

A. Yeah, the shallowest.

Q. -- example?

A. Yes.

Q. Does OXY request authority to increase these pressures administratively if it proves to be necessary in the future?

A. That's correct.

Q. Okay. But in your opinion, does OXY believe that it can operate its proposed injection project using these conservative surface injection pressures?

A. Yes.

Q. And in your opinion, will these conservative injection pressures pose a threat to the integrity of the targeted reservoir?

A. No.

Q. In your opinion, will OXY's proposed injection pressures impair the correlative rights of mineral owners in adjacent sections?

A. No.

Q. Were OXY Exhibits 6 and 7 prepared by you or compiled under the direction and supervision of your team?

A. Yes.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibits 6 and 7 in this case.

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 6 and 7 for Case 20193 are so entered.

(OXY USA Inc. Exhibit Numbers 6 and 7, Case Number 20193, are offered and admitted into

evidence.)

Q. (BY MR. FELDEWERT) Okay. Dr. Liu, I'd like to move now to the exhibits --

EXAMINER GOETZE: Do we want to cross?

MR. PADILLA: I don't have any cross-examination.

EXAMINER GOETZE: Okay. Okay. Then let's move on to the next one.

Q. (BY MR. FELDEWERT) If I move to the exhibits for Case 20194, which is the Cedar Canyon 27 Federal 6H and the Cedar Canyon 28 Federal 6H, we have similar exhibits --

A. Yes.

Q. -- for this case; is that correct?

A. Uh-huh.

Q. So if I turn to what's been marked as OXY Exhibit Number 6, we again have the overview slide?

A. Uh-huh.

Q. Is that correct?

A. Yes.

Q. And just to keep us all straight, is this basically the same type of injection project as you just discussed in Case 20193 and that you discussed with respect to the Cedar Canyon Section 16 Pressure Maintenance Project?

A. That's correct.

Q. We just have different wells involved?

A. Yes. It's different wells. The only difference you can see from that plot -- you know, the north offset is one two-mile-long horizontal well.

Q. And we have -- we have two injection wells here --

A. Yeah.

Q. -- from the same pad going different directions?

A. Going different directions.

Q. And offset to the south by --

A. Yeah, by two other producers. The concept is the same.

Q. All right. Same interval? 2nd Bone Spring interval?

A. Yes.

Q. Same source for the produced gas and the produced water?

A. Yes.

Q. And, again, the compatibility studies and the C-108 and the analysis shows no issues utilizing that produced source for produced gas or produced water?

A. That's correct.

Q. Do you also here seek authority to use CO2 if

it becomes available?

A. Yes.

Q. And do you likewise see any issues in using CO2 to inject?

A. No, no issue.

Q. In fact, if CO2 becomes available, is that a better injection fluid, I guess, for lack of a better word?

A. Yes. Typically, CO2 can recover more.

Q. Okay. Will this again be a closed system?

A. Yes.

Q. And do you again expect the benefit to move north and south?

A. Yes.

Q. And not east and west?

A. That's correct, not east and west.

Q. For the same reasons you --

A. For the same reasons, yes.

Q. Okay. Let me finish.

For the same reasons you previously discussed?

A. Yes.

Q. Okay. Got it.

Is OXY the operator of offsetting wells to the east and west?

A. Yes.

Q. So if there was any movement, you would know?

A. Yes.

Q. And do you expect to see the same successful results here that you saw from the Cedar Canyon Section 16 Pressure Maintenance Project?

A. Yes.

Q. And in your opinion, will the approval of this project result in the recovery of oil under the project area that would otherwise not be recovered under primary means?

A. Yes.

Q. If I then go to what's been marked as OXY Exhibit Number 7, does this again describe the same methodology that was utilized to arrive at the surface injection pressures for water, produced gas and CO2?

A. Yes.

Q. Now, the number, as we pointed out earlier, for produced gas and CO2 is the same, right?

A. Yes.

Q. For the reasons you previously discussed?

A. That's correct.

Q. I see the number for water has changed a little bit?

A. Yeah. The water -- if you look at that, we

request the same water pressure. And this same water pressure, 1,720, that's calculated by the shallowest one. We have 27 6H, 28 6H. 28 6H is about 100 feet shallower, so we used that as our maximum injection pressure for water.

Q. So that 1,720 would apply to both wells?

A. Yes.

Q. Okay. Got it.

In your opinion, are these conservative surface injection pressures?

A. Yes.

Q. And if the need arises to increase those injection pressures, does the company seek authority to receive those through an administrative process?

A. Yes.

Q. And, again, does OXY believe it can operate its injection project at these proposed conservative pressures?

A. Yes.

Q. And in your opinion, do these pressures pose any threat to the integrity of the reservoir?

A. No.

Q. And will these proposed surface injection pressure limits impact the correlative rights of mineral owners in adjacent sections?

A. No.

Q. Were OXY Exhibits 6 and 7 in this case prepared by you or compiled under your direction and supervision?

A. Yes.

MR. FELDEWERT: Mr. Examiner, I would move the admission of OXY Exhibits 6 and 7 in this case.

EXAMINER GOETZE: And that would be Case 20194?

MR. FELDEWERT: Yes, sir.

EXAMINER GOETZE: Okay. Exhibits 6 and 7 for Case 20194 are so admitted.

(OXY USA Inc. Exhibit Numbers 6 and 7, Case Number 20194, are offered and admitted into evidence.)

Q. (BY MR. FELDEWERT) Now, if we move, Dr. Liu, to the exhibits in Case 20195. First off, let's get oriented in this case. Let's go to Exhibit 1 just to refresh us. And you and I have seen this, but the examiners have not.

A. Yeah.

Q. So under this case, we actually have two injection intervals, the 1st Bone Spring --

A. Yes.

Q. -- and the 2nd Bone Spring.

A. That's correct.

Q. Each offset by producing wells?

A. Yes.

Q. And just to remind me, which one is the 1st Bone Spring and which one is the 2nd Bone Spring?

A. So the 34 3H is the 1st Bone Spring, and that's east-to-west oriented.

Q. So that's a lay-down well?

A. Yes. That's a lay-down on the left side.

And then 8H is the 2nd Bone Spring well.

Q. Okay. All right. And the project area is all of Section 34?

A. Yes.

Q. Okay. Now if you go to what's been marked as OXY Exhibit Number 6, is this a summary slide of what you expect to receive -- or how to operate this project for this case?

A. Yes.

Q. And do you -- even though it involves different intervals, do you intend to operate this project in the same fashion as we saw in cases -- in the three prior cases?

A. Yes.

Q. Is it going to be the same source for produced gas and produced water?

A. Yes.

Q. And, again, do the compatibility studies and the analysis of the gas for both the 1st Bone Spring interval and the 2nd Bone Spring interval show any issues?

A. No issues.

Q. And do you likewise in this case seek authority to utilize CO2 if it becomes available?

A. Yes.

Q. Will this be a closed system?

A. Yes.

Q. Do you expect the fluid for the lay-down well, the 3H, the impacts, to move north and south?

A. For the --

Q. 3H in the 1st Bone Spring.

A. Oh. For the 1st Bone Spring? No.

Q. Do you expect -- let's see. That's the lay-down well?

Let me ask you this: So looking at the 3H, which involves the 1st Bone Spring interval --

A. Oh, the 1st Bone Spring.

Q. -- the lay-down interval --

A. Yeah, yeah, yeah.

Q. -- where do you expect the benefit to occur?

A. So that's still, you know, support to the north-south, the offset, like we were presenting in the

previous case. The north-south offset will be the benefit, and then the east-west won't be affected.

Q. Now, you have a stand-up --

A. Uh-huh.

Q. -- well, the 8H now, in the 2nd Bone Spring interval?

A. Yeah.

Q. Okay. Why do you expect the benefit from that to move east to west rather than north to south?

A. So for this, it's still the single reason for that, because the pressure sink generated by the two offsets, that will be the pressure sink for -- for the gas and also the hydraulic fracture orientation in this area. Why we lay this horizontal well in this way is because we see, you know, in this area -- this is what we call the Cypress section. It is a little bit different with the other sections, so we lay the well differently to maximize the recovery.

Q. So you drilled these wells as stand-up and lay-down in this area?

A. Yeah, that's right.

Q. Okay. Is the biggest factor here, though, the pressure sink or the fracture orientation in terms of impact?

A. So for this, it should be both, you know. I

don't see which one -- I would think both have almost a significant impact.

Q. Okay. Does OXY operate wells in the surrounding area?

A. Yes.

Q. So if there is a different benefit in the 1st Bone Spring than what you expect, you would know?

A. Yes.

Q. Same thing for the 2nd Bone Spring?

A. Yes, same thing.

Q. Do you expect to see the same successful results from this project as you've seen in the Cedar Canyon Section 16 project for the 2nd Bone Spring?

A. Yes.

Q. Is this your first time to do this in the 1st Bone Spring?

A. That's correct.

Q. Okay. In your opinion, having analyzed the results from the prior projects, even though you're moving to a different interval, do you expect to see the same results?

A. Yeah. We expect to see the same positive result. The main reason is, you know, we analyzed the oil properties, the rock properties. The oil properties are similar to the 2nd Bone Spring, you know, still

light oil. The API is similar, and then the composition is similar. And also the rock is also the Bone Spring Sand. Permeability-wise, it's similar. The difference we see is actually the saturation. There is some difference, so -- but usually saturation -- we'll get the kind of magnitude that will benefit, but you will definitely still see the benefit, but -- the benefit of the incremental oil. But how much? This is the first time we do, so we cannot guarantee how much, but we think we will get benefit.

Q. So in your opinion, based on the information you have now, would you expect both the injection project in the 1st Bone Spring and the injection project in the 2nd Bone Spring to produce oil that would otherwise not be recovered under primary needs?

A. Yes.

Q. If I then turn to what's been marked as OXY Exhibit Number 7, does this identify how you arrived at the pressure calculations?

A. Yes.

Q. In fact, this Exhibit 7 has two pages?

A. Two pages.

Q. We have one for the 8H, which is in the 2nd Bone Spring, right?

A. Uh-huh. Yeah.

Q. And then the second page of this exhibit is for the 3H --

A. 3H.

Q. -- which is in the 1st Bone Spring?

A. Yes.

Q. The methodology was the same for both intervals?

A. That's correct.

Q. And we see a difference in the -- we see the same produced gas and CO2 pressure limits for the 8H as we saw for the other 2nd Bone Spring intervals?

A. That's correct.

Q. We see a different number for the 3H involving the 1st Bone Spring interval?

A. That's right.

Q. And how did you arrive at those produced gas and CO2 numbers?

A. Yeah. Because the 1st Bone Spring in this -- all this well landing place, it's much shallower than the 2nd Bone Spring. So as you can see from all these previous exhibits, you can see all the 2nd Bone Spring. All the TVD is about 8,600 feet, you know, or more. And then for this 1st Bone Spring, the vertical depths is 7,900. So there are several hundred feet difference, so we have to address that. So for this 1st Bone Spring,

we lowered our injection pressure limit for that.

Q. In your opinion, are these conservative injection pressures?

A. Yes.

Q. Okay. And are these pressures that OXY believes it can use to successfully operate this injection project?

A. Yes.

Q. In the event that an additional injection pressure limit authority is needed, do you request that it be approved administratively?

A. Yes.

Q. In your opinion, will these proposed pressure limits pose any threat to the reservoir?

A. No.

Q. And in your opinion, will these proposed limits pose any threat to the correlative rights of mineral owners in adjacent sections?

A. No.

Q. Dr. Liu, were OXY Exhibits 6 and 7 prepared by you or compiled under the direction and supervision of your team?

A. Yes.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibits 6 and 7 in

Case 20195.

EXAMINER GOETZE: Exhibits 6 and 7 for Case 20195 are so entered.

(OXY USA Inc. Exhibit Numbers 6 and 7, Case Number 20195, are offered and admitted into evidence.)

MR. FELDEWERT: Thank you. That concludes my examination of this witness.

EXAMINER GOETZE: Again, Mr. Padilla, any questions?

MR. PADILLA: No questions.

EXAMINER GOETZE: Mr. Brooks?

CROSS-EXAMINATION

BY EXAMINER BROOKS:

Q. Well, one of my very elementary questions. And you may have explained this, but so I will know something about it, why are the injections pressures for CO2 so much lower than the injection pressures for produced gas?

A. Okay. So CO2, you know, dense phase, hydrostatic gradient, the density of CO2 is much higher than the produced gas. So when you have -- back-calculate the surface pressure, you don't need that high -- you don't get that high surface pressure for CO2. Think about that, that you have -- let's say you

have 1,000 psi on the downhole and then you have a corner of the fluid, either CO2 or produced gas. Your CO2 is denser. Your surface pressure would be lower, right?

Q. Right.

A. If it's just the gas, then the surface pressure would be higher. So basically --

Q. You're getting to the same downhole pressure?

A. Same downhole pressure, and then surface pressure would be different.

Q. Okay. I'm not at stupid as I thought. I thought it probably had something to do with the density of the gas.

A. Yes. It's the density of the gas.

Q. Okay. Thank you.

EXAMINER GOETZE: Mr. Warnell, cross?

CROSS-EXAMINATION

BY EXAMINER WARNELL:

Q. Yeah. Dr. Liu, I notice that on Case 15616, your produced gas pressure is 4,250 --

A. Uh-huh.

Q. -- and on the other three cases, 193, 194 and 195, it's 4,350.

A. Uh-huh. Oh, okay. I see what you're saying. Yes.

Q. Would you like to see that 15616 at 4,350?

A. I think 4,350 -- because currently -- actually, we operate -- 4,250 is good enough for that. We won't ask to amend that right now. The depths of the 16 and these are slightly different. Yeah.

Q. Slightly different. Okay.

EXAMINER GOETZE: That's it?

EXAMINER WARNELL: That's it.

CROSS-EXAMINATION

BY EXAMINER GOETZE:

Q. Okay. I have one question for you.

A. Yeah.

Q. In any of these three projects, are we looking at some sort of pre-stimulation or some pre-injection stimulation of the wells or anything like that? No treatment?

A. No. No.

Q. Anything along that line?

A. No. When we did Section 16, we didn't do any.

Q. I didn't know if you had any change in thoughts after Cedar 16.

EXAMINER GOETZE: We have no more questions for this witness, and thank you for coming.

THE WITNESS: Thank you.

MR. FELDEWERT: We'll call our next

witness.

EXAMINER GOETZE: Yes, please.

TONY TROUTMAN,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your full name for the record and identify by whom you're employed and in what capacity?

A. Tony Troutman. I'm employed by Occidental Petroleum as a geologist.

Q. And how long have you been working as a petroleum geologist?

A. 20 years.

Q. How long have you been with OXY?

A. Four years.

Q. Have your responsibilities in those four years included the Permian Basin?

A. Yes.

Q. Now, you have, Mr. Troutman, previously testified before this Division as an expert in petroleum geology?

A. I have.

Q. Have you conducted a geologic study of the

subject areas in the proposed injection zones that are at issue under Cases 20193, 20194 and 20195?

A. Yes, I have.

Q. And, in fact, are you the person that certified the geologic statement in the C-108 applications?

A. Yes, I am.

MR. FELDEWERT: I would retender Mr. Troutman as an expert witness in petroleum geology.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: He is so qualified.

Q. (BY MR. FELDEWERT) Mr. Troutman, if you would be so kind as to turn to the exhibit packet for 20193, which involves Cedar Canyon 23 Federal 4H. And if we go to Tab 8 --

EXAMINER BROOKS: Which one is this?

MR. FELDEWERT: This is the Cedar Canyon 23 Federal 4H, Case 20193.

EXAMINER BROOKS: And Mr. Feldewert's predictions about what would happen to the exhibit folder has come true by what's already happened.

MR. FELDEWERT: There you go.

Q. (BY MR. FELDEWERT) Is this a log that you or your team created for identifying the proposed injection interval for this surface?

A. Yes, it is.

Q. I'm sorry. For this pressure maintenance project?

A. Yes, it is.

Q. Now, is this the same type log that we're going to see in the other three -- two cases?

A. Yes, it is.

Q. Where is this type log located?

A. It's located between Cedar Canyon and Cypress, so it's representative of the geology for the entire area.

Q. And having identified the 2nd Bone Spring injection interval in the Cedar Canyon in this log, what do you observe about the nature of that interval?

A. It's well confined above and below by limestone units that are impermeable and very low porosity.

Q. These wells out there have already been drilled and completed, right?

A. Yes, they have.

Q. Okay. And these barriers are a sufficient frac barriers, in your opinion, as well?

A. Yes, they were.

Q. And is there a sufficient barrier, for example, between the 1st Bone Spring and the 2nd Bone Spring?

A. Yes, there is.

Q. And between the 2nd Bone Spring and the 3rd Bone Spring?

A. Yes, there is.

Q. And that's why the company treats these as separate, independent injection intervals?

A. Yes.

Q. Okay. And is this -- in your opinion, is the lithology of this injection interval consistent as you move from the Cedar Canyon area down into the Cypress area?

A. Yes, it is.

Q. Are there -- are there any -- what's the depth of groundwater in this particular area?

A. The deepest groundwater would be around 500 to 550 feet.

Q. Are there any freshwater wells within a mile of the entire wellbore of the proposed injection interval?

A. No, there are not.

Q. And you looked at the entire wellbore of the horizontal well?

A. Yes, we did.

Q. Okay. Does the type log that we see here identify various impermeable barriers between the injection zone and the lowest source of fresh water?

A. Yes. You can see a zone known as 1st Bone

Spring Carbonate, also called the Avalon, that consists of shale and limestone that's an upper barrier. Above that, you have the Castile Formation, which is an anhydrite, about 1,500 feet thick, and we're got the Salado salt, which is another 1,300 feet thick. So we've got very substantial barriers between us and fresh water.

Q. Have you prepared a cross section for this interval?

A. I have.

Q. If I turn to what's been marked as OXY Exhibit 9, is this the cross section you prepared?

A. Yes, it is.

Q. Would you please orient us to the project area and the wells that are involved in your cross section using this exhibit?

A. Okay. Going from left to right on the cross section, we're going from north to south following that pink line on the location map.

Q. And have you identified on that upper right insert map the proposed injection well?

A. I have, with a label and an arrow.

EXAMINER BROOKS: I don't see a pink line.

EXAMINER WARNELL: It's pretty hard to see.

EXAMINER GOETZE: Yes. It's very.

EXAMINER BROOKS: Oh. Is it over on the right-hand side?

THE WITNESS: That's it.

EXAMINER BROOKS: This one that goes down -- slanting down to the right and then it turns to the left about five-eighths of the way down --

THE WITNESS: That's it.

EXAMINER BROOKS: -- seven-eighths of the way down?

Okay. Go ahead.

Q. (BY MR. FELDEWERT) And the three wells that you used to create this cross section from north to south in this area, why did you choose these three wells?

A. These have the best well logs that were available in the area.

Q. And do they cover the entire interval?

A. They do.

Q. And in your opinion, are these wells representative of the entire area?

A. Yes, they are.

Q. Now, what's the -- before I forget, what's the significance of the green dots that we see in the insert here on Exhibit Number 9?

A. Those are all 2nd Bone Spring producers.

Q. Okay. And do we have a -- we're going to get

to this in a minute, but do you have a structure map that follows this?

A. I do.

Q. And it will also have the green dots?

A. Correct.

Q. Before we get to that structure map, when I look now at this broader cross section, what do you observe about the target interval for the proposed 2nd Bone Spring injection operation?

A. Well, both the reservoir interval of the 2nd Bone Spring Sand and the barriers above and below it are very consistent and similar thickness across the entire area.

Q. Okay. Let's then turn to your structure map, which is marked as Exhibit Number 10; is that right?

A. Yes.

Q. Again, you have our injection well identified here?

A. I do.

Q. What do you observe about the structure?

A. The structure is very even. It's dipping to the east.

Q. How far apart are your contours?

A. The contours are 50-foot-height intervals.

Q. And have you included the data points that were

utilized to create your structure map?

A. I have. The red diamonds with the red numbers above them are my data points.

Q. In your opinion as an expert in petroleum geology, is there any evidence of faulting that could act as conduits for migration of fluid out of the proposed injection zone?

A. No, there isn't.

Q. And in your expert opinion, does the proposed injection project pose any threat to underground water sources?

A. No.

Q. And in your opinion, will the proposed injection project have any negative impact on the correlative rights of mineral owners in the shallower or deeper oil and gas producing zones?

A. No.

Q. Were OXY Exhibits 8, 9 and 10 in Case 20193 prepared by you or compiled under your direction and supervision?

A. Yes. They were prepared by me.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibits 8, 9 and 10 in Case 20193.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 8, 9 and 10 in Case 20193 are so entered.

(OXY USA Inc. Exhibit Numbers 8, 9 and 10, Case Number 20193, are offered and admitted into evidence.)

MR. FELDEWERT: And I'd like to admit two similar exhibits in these other two cases.

EXAMINER GOETZE: Do you want --

MR. PADILLA: No.

EXAMINER GOETZE: Not at this time. Okay. Let's go ahead with the other two cases.

Q. (BY MR. FELDEWERT) Mr. Troutman, if you would be kind enough to pull out the exhibit package for 20194, the Cedar Canyon, for both Section 28 and 27. Now, is this project located very close to the one you just examined?

A. It is.

Q. What direction are we moving?

A. We're moving to the south.

Q. Okay. And is the injection zone the same?

A. It is.

Q. And if I look at what's been marked as OXY Exhibit Number 8 in Case 20194, is that the same type log?

A. It is.

Q. And the injection zone has been identified?

A. It has.

Q. Okay. And if I look at -- and, in fact, this is comprised of two pages showing the injection zone for both the 27 6H and the 28 6H?

A. Correct.

Q. Okay. And then similarly do I see the same cross section --

A. You do.

Q. -- that you previously testified to under Exhibit Number 9?

A. Correct.

Q. And if I look at Exhibit Number 10, do I see the same structure map for both wells that you previously testified to?

A. Yes.

Q. The only difference being that you've identified in each case the wells at issue?

A. Correct.

Q. Okay. Just so we're clear, if I look, for example, at the structure map on the first page under Exhibit 10, you've identified the 6H?

A. Yes.

Q. Where is the area that we just examined under

Case 20193?

A. It's to the north just off the map.

Q. Is it up there -- in this case, isn't it up there in Section 23?

A. Oh. You're -- yes, it is. I'm sorry. I was thinking of Cypress.

Q. So this particular area is within almost -- well, it's within a mile of the one we just reviewed, correct?

A. Yeah.

Q. Is that why you used the same material?

A. It is.

Q. Are your opinions the same in this case as was identified in the prior case?

A. Yes.

Q. Were OXY Exhibits 8, 9 and 10 in this case prepared by you?

A. Yes, they were.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibits 8, 9 and 10 in Case 20194.

EXAMINER GOETZE: Exhibits 8, 9 and 10 in Case 20194 are so entered.

(OXY USA Inc. Exhibit Numbers 8, 9 and 10, Case Number 20194, are offered and admitted

into evidence.)

Q. (BY MR. FELDEWERT) I'd like to move to the exhibit package in Case 20195, Mr. Troutman, and that involves the Cypress 34 3H and the Cypress 34 8H. Now, this is a slightly different area?

A. Slightly different.

Q. Okay. Is the geologic setting very similar?

A. It is very similar.

EXAMINER BROOKS: Excuse me, Mr. Feldewert. Are you moving to 20195?

EXAMINER GOETZE: Yes, we are.

MR. FELDEWERT: Yes.

EXAMINER BROOKS: Okay. Thank you.

Go ahead.

Q. (BY MR. FELDEWERT) And is this within a couple of miles of the area as we just discussed?

A. It is.

Q. Just to orient us, this case involves two different injection --

A. It does. One of the wells is in the 2nd Bone Spring Sand, and the other one is the 1st Bone Spring Sand.

Q. If I turn to what's been marked as -- what will now be OXY Exhibit 8, in this case we see two -- the same type log, right?

A. Same type log, different intervals.

Q. There you go.

You've identified the 1st Bone Spring and the 2nd Bone Spring?

A. Correct.

Q. And is your testimony the same with respect to the confinement nature of both the 1st Bone Spring and the 2nd Bone Spring?

A. Yes, it is.

Q. Are there any freshwater wells within a mile of the wellbores?

A. No, there are not.

Q. Okay. And the depth to groundwater, does it remain the same?

A. It's very similar at 500 to 550 feet.

Q. And we have the same impermeable barriers between both of these injection zones and the fresh water?

A. Yes.

Q. Then if I turn to what's been marked as Exhibit Number 9, we see a different cross section, correct?

A. Right. We have a different cross section for the 1st Bone Spring.

Q. Okay. Why don't you walk us through this?

A. Going from left to right in the cross section,

I'm going from the upper -- in the location map, it starts at the upper northwest corner where the N is. It goes down just past the well we're looking at to the bottom of the location map.

Q. And, again, why did you choose these three wells?

A. These are the best available well logs in the area.

Q. And in your opinion, are these representative of the area in question?

A. They are.

Q. And you've identified in each case -- this exhibit comprises two pages, right?

A. Yes.

Q. Same cross section for both pages?

A. Yes.

Q. But you've identified both the -- on the first page, the lay-down well, injection well, and on the second page, the stand-up injection well?

A. Correct.

Q. What do you observe about the -- both the 1st Bone Spring injection interval and the 2nd Bone Spring injection interval in this particular area?

A. They're both very consistent both in terms of reservoir and barriers above and below those reservoirs.

Q. And can you confirm and have you confirmed that both the injection well and the offsetting producing wells in each case are in the same correlative zone?

A. I have. Yes, they are.

Q. If I then turn to what's been marked as OXY Exhibit Number 10, what do you have here in Exhibit 10?

A. That is a 1st Bone Spring structure map. I'm showing my well control. And, again, the wells that are highlighted with the green are 1st Bone Spring producers.

EXAMINER BROOKS: Are we still on Case 20195?

MR. FELDEWERT: Yes, sir, on Exhibit Number 10.

EXAMINER BROOKS: Okay. I don't see anything green on it.

THE WITNESS: They're a little bit hard to see. The green surrounds the black dot.

EXAMINER BROOKS: Oh, okay. I see. Mr. Goetze has been kind enough to point out the green.

(Laughter.)

EXAMINER GOETZE: It's tough, the color change.

EXAMINER BROOKS: Go ahead.

Q. (BY MR. FELDEWERT) So does the first page

involve the 1st Bone Spring Sand?

A. Yes.

Q. Okay. And what do you observe about the structure here?

A. It's very consistent. It's dipping to the west -- I mean to the east gently.

Q. And when you look specifically at the 1st Bone Spring Sand structure, do you see any evidence of faulting that could act as conduits for migration of the fluid in the proposed injection zone?

A. No, I do not.

Q. And on the second page here, we see the structure map specifically for the 2nd Bone Spring Sand?

A. Correct.

Q. These green dots -- these green wells are a little easier to see, right?

A. They are.

Q. Again, is there any evidence of faulting that could act as conduits for migration of the fluid out of the proposed 2nd Bone Spring injection interval?

A. No.

Q. In your opinion, will this Cypress injection project pose any threat to underground water sources?

A. No.

Q. And will this proposed injection project have

any negative impact on the correlative rights of mineral owners in any shallower or deeper oil and gas producing zones?

A. No.

Q. Were OXY Exhibits 8, 9 and 10 in Case 20195 prepared under your direction or prepared by you?

A. Yes. They were prepared by me.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibits 8, 9 and 10 in Case 20195.

EXAMINER GOETZE: Exhibits 8, 9 and 10 in Case 20195 are so entered.

(OXY USA Inc. Exhibit Numbers 8, 9 and 10, Case Number 20195, are offered and admitted into evidence.)

MR. FELDEWERT: And that concludes my examination of this witness.

EXAMINER GOETZE: That was pretty good testimony. Not even "geologic impediment" raised once.

MR. FELDEWERT: That's right.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No questions.

EXAMINER GOETZE: Mr. Brooks?

CROSS-EXAMINATION

BY EXAMINER BROOKS:

Q. On these last two exhibits, which direction is the slight dip in this formation, in the east or to the west?

A. Which -- are we on --

Q. Case 20195, Exhibits 9 and 10.

A. Okay.

Q. I may not correctly understand structure maps.

A. The structure contours are all oriented roughly north and south.

Q. Right. Go ahead.

A. So you're getting deeper as you go to the east, to the right on that map.

Q. Oh. These are depths, not elevations.

A. It's depth, yeah. It's subsea depth.

Q. Okay. I understand. Thank you.

EXAMINER GOETZE: Mr. Warnell?

EXAMINER WARNELL: No questions.

CROSS-EXAMINATION

BY EXAMINER GOETZE:

Q. I have a few questions -- actually a question and a request. With regards to Case 20195, we're going into the first Bone Spring Sand. Have we had any production or plays in the Avalon in this area?

A. There has been some Avalon drilling about four miles away to the east by XTO. They have not completed their wells, so I haven't seen their results yet. XTO also has some Avalon wells that are south of us, south of Cedar Canyon, that were drilled quite a few years ago that do produce. They haven't been very good. But I think the Avalon will eventually become a target here.

Q. But as of now, no one is encroaching on your project as far as getting close?

A. Right.

Q. Okay. The second will be a request. You've asked for an exception placement of the packer, and so what we've done with the 36 -- excuse me -- with the 16 is that we would like your geologist to give us a pick for the top of the confining layer. So I've got a 2nd Bone line. Give us that interval. And what we've been doing is giving you the authority to come within 100 feet of the top of that. So that way you have the option of moving down -- up and down the casing in that confining layer based upon your operation of what you can get your packer to seek [sic].

A. Okay.

Q. So for each of these wells that are going to be injection, go ahead and take the confining layer as you see in your type log, send it to us in an email through

the attorney, and we will incorporate that in the order as a way to address the option for you to place the packer the way it best fits you.

A. Okay.

Q. Okay?

Otherwise, you may get something out of me that may not be even close. So --

MR. FELDEWERT: As I was looking at the prior order, I noted it said "100 feet above the true vertical depth of the kickoff point."

EXAMINER GOETZE: Yeah. That was an experiment on that, and you've actually come back and said you want to get away from the kickoff point. So the placement of the packer in the confining layer, again we're going to give you a maximum. We're going to ask you to place it as practically close but at the same time give you an end point that says we can't permit you to go beyond that. So it'll be up to you as the operator to choose what's the best practical application.

THE WITNESS: Okay. I understand.

EXAMINER GOETZE: And then when the EPA comes, we've done our homework. Okay?

MR. FELDEWERT: Got it.

EXAMINER GOETZE: No more questions for

this witness?

MR. FELDEWERT: Okay. We have one more witness, which we'll be able to finish before noon hopefully.

EXAMINER GOETZE: He says mildly. Okay. Let's give it a try. We like to hear from this witness because he's one of our favorite witnesses.

EXAMINER BROOKS: He's a familiar face, very familiar face.

THE WITNESS: Get the knives out (laughter).

EXAMINER GOETZE: Oh, no, no, no. We don't take the knives out. We enjoy your participation.

RICHARD E. FOPPIANO,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your name for the record, identify by whom you're employed and in what capacity?

A. My name is Richard E. Foppiano, and I'm currently a consultant -- petroleum engineering consultant. I'm self-employed, and I am under contract to Occidental for this matter and other matters.

Q. And how long did you previously work for OXY before you went to the consulting side?

A. I've been consulting for five years, and prior to that, I worked 36 years for Occidental in a variety of capacities and in a variety of locations. I was a completions manager at one point, an HES manager, an audit manager, a lobbyist, and spent a lot of time, over 20-plus years, doing regulatory -- supervising regulatory activities throughout the United States. And then before I went to work for Occidental, I was actually a Halliburton engineer. I spent three years with Halliburton as a cementing and frac engineer.

Q. Mr. Foppiano, you previously testified not only before this Division but also before the Oil Conservation Commission as an expert in petroleum engineering, correct?

A. I have, yes.

Q. Are you familiar with the applications submitted to the Division in these three consolidated cases?

A. Yes, I am.

Q. Cases 20193, 20194 and 20195?

A. Yes.

Q. Are you prepared to review the C-108 for these projects?

A. I am.

MR. FELDEWERT: I would retender Mr. Foppiano as an expert witness in petroleum engineering.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: No objection.

EXAMINER GOETZE: He's so qualified.

Q. (BY MR. FELDEWERT) Mr. Foppiano, would you turn to what's been marked as Exhibit Number 3 in Case 20193, which is the C-108 application for this particular case. It would be the Cedar Canyon 23 Federal 4H.

A. Got it. Page 3?

Q. Exhibit 3.

A. Exhibit 3. Excuse me. Yes.

Q. And first off, I believe the injection well data for this single injection well is contained on pages 2 and 3 of this exhibit?

A. Yes.

Q. Okay. It includes the wellbore schematic?

A. It does, yes, on the left-hand side of the page.

Q. Now, there's been some discussion about the packer setting. At this point does this reflect the change in the packer setting?

A. Yes. On page 3, the second line indicates what

type of packer will be set, and line three, which is the packer setting depth, is proposed to be 8,100. And this was based on the approximate -- the location of the kickoff point. The plan was to set the packer within about 100 feet of where the kickoff point was in this well to make it consistent with the order in Case Number 15616.

Q. Okay. And changing that depth is based upon instructions from Mr. Goetze; is that correct?

A. Correct.

EXAMINER GOETZE: Don't get too excited until I write the order. Okay?

MR. FELDEWERT: Okay.

Q. (BY MR. FELDEWERT) Are there -- and just for the record, are there operational benefits in having the packer set in and around this area of the vertical portion of the wellbore?

A. Yes. The idea with this kind of operation is obviously to set the packer as low as possible in the wellbore to protect the casing and for other reasons, but you don't want to set it too far in the inclined part of the lateral because then that makes wireline operations difficult to prosecute, setting plugs and that sort of stuff in that packer. The company desires to set the packer as low as possible, but it is limited

to where the wellbore starts to turn and go horizontal.

Q. Now, with respect to the -- when I look at the information here on the second page, it talks about the tubing size and then it says "the lining material." Do you see that?

A. Yes.

Q. What does the company request with respect to the tubing for this particular project?

A. Well, as previously discussed, the company feels like it's appropriate to use unlined tubing when the injectant is produced gas or CO2 and obviously lined tubing when the injectant is water. And the idea is that with lined tubing, anytime you do kind of a wireline operation inside of tubing with a lining, there is the potential to nick it and actually create a corrosion hot spot at that particular point but also to cause some of that lining material to fall off and create problems with wireline operations. So the idea is not to use lined tubing unless you absolutely need lined tubing.

And in the case of the injectant here being produced gas or CO2, that injectant is dehydrated before it is utilized for injection service. And based on OXY's analysis of that type of injectant not only here but elsewhere throughout the Permian Basin, the

likelihood of any significant corrosion with CO2 or produced gas that is dehydrated is extremely low. So they felt comfortable even in other cases using unlined tubing and piping where the injectant is dehydrated, and similar situation here.

Q. So just to confirm, the source of the produced gas to be utilized for these injection projects is the Cedar Canyon central delivery point?

A. It is the central delivery point, which would be downstream of the dehydration unit.

Q. Okay. So this would be dehydrated gas?

A. Dehydrated gas, yes.

Q. And in your opinion as an expert in petroleum engineering, is there -- is it sufficient to use -- or is it appropriate to use unlined tubing where you will be injecting dehydrated gas or dehydrated CO2?

A. I think so, yes.

Q. But the company will use lined tubing in the event that it injects produced water?

A. Correct. Yes.

Q. How does OXY intend to monitor this injection well to ensure the integrity of the wellbore?

A. Well, there'll be pressure gauges on both the tubing and the tubing casing annulus that will be continually monitoring the pressures, and that data

feeds into a SCADA system which actually allows the engineers to real-time monitor the pressures and set alarms for certain conditions and that sort of stuff.

Q. Will the annular space be filled with inert fluid?

A. An inert fluid that is treated with biocide and filtered, clean inert fluid.

Q. When I look at the cement for this injection well, how is it determined on the casings?

A. In this particular case, the top of cement behind the split casing of 4-1/2, 5-1/2 production casing as determined by a cement bond log.

Q. In your opinion, having reviewed the schematic here for this injection well, is it designed to safely and efficiently inject produced gas, produced water and CO2 into the Bone Spring Formation of this pressure maintenance project?

A. Into the 2nd Bone Spring, yes, it is.

Q. Okay. I want to turn to the area of review. If I stay within this exhibit and move to page 4, is this a schematic that identifies how the area of review was determined?

A. Yes. Page 4 and additionally on page 5, which is the actual area of review with the wells identified.

Q. How did you develop this area of review?

A. I developed this area of review with a certain process utilizing publicly available data, starting with the proposed injection well and its surface location and the first perforation all the way to the terminus. I took that information and using the NMOCD's GIS website, I put that information out there so that I could draw a half-mile circle around each point of the wellbore of the proposed injector from the surface location all the way to the terminus.

So on page 5, in the kind of pink-shaded area, that is meant to show this one-half mile area of review around the entire wellbore of the proposed injector from surface to terminus.

Following that, I then obtained all the information for the proposed injector from the NMOCD's website to look at how the well was constructed but also to identify the TVD of the Bone Spring Formation so that I could then, utilizing the GIS system and that information, identify any well with a wellbore that was located within a half a mile of the wellbore of the proposed injector. And as you can appreciate with horizontal wells, it's getting a little interesting doing this exercise because I actually have wells that have a surface location outside the AOR and a bottom-hole terminus outside the AOR, but the lateral

goes through the AOR.

So my attempt was to utilize, first and foremost, publicly available information to identify any wellbore that was within a half a mile of the wellbore of the proposed injector. And then I even supplemented that with information from OXY's mapping system about the actual location of any horizontal wellbore in the area to double-check to make sure that I had any wellbore that was within a half a mile of the proposed injector. And then I made a cut to that of any well that penetrated the Bone Spring within that half mile.

And as a result of all that analysis, any well that did make that cut, in other words, it penetrated the Bone Spring and it was within the half mile, as shown on pages -- the details are shown on pages 6 and 7 for those particular wells.

Q. Okay. Before we get to that, so if I'm understanding you correctly, you took a little more conservative approach. You didn't just look at the injection interval. You analyzed any wellbore penetrating the Bone Spring Formation?

A. That's correct. Yeah.

Q. Even if they were completed, for example, in the Avalon or the 1st Bone Spring?

A. Correct.

Q. And, secondly, if you came across a horizontal wellbore that was -- any part of that horizontal wellbore was within the half mile, did you include that in your analysis?

A. I did, yes.

Q. And that's -- the list is then comprised on pages 6 and 7?

A. That's correct.

Q. And to make things a little easier, if I turn to Exhibit 3, there is a tab behind it. For some reason, it has Tab C, but it's just a tab. Do you have a blowup of pages 6 and 7?

A. We do, yes.

Q. So it's a little easier to read?

A. There's a lot of information presented there, so we blew it up to make it a little easier for everyone to read.

Q. Okay. And what did you observe about -- first off, are there any wells in the area that are not active?

A. There's one well that is shut in identified as well number five -- I'm sorry -- well number four.

Q. But it has not been plugged and abandoned?

A. It has not been plugged and abandoned.

Q. And with respect to the remaining wells, what

did you find?

A. With respect to the remaining wells -- these wells, you can see on the left-hand column, are numbered 1, 2, 3, 4 and so forth, and that corresponds to the AOR map that has the numbers with the yellow circles around them. So the location is identified on the AOR map.

Q. So when you say AOR map, you mean page 5 of the C-102?

A. I believe that's correct. Yes.

Q. So if I look at page 5 of Exhibit 3, I see various yellow circles with numbers in them?

A. Yes. Yes, with numbers, and those numbers correspond to the numbers on this spreadsheet.

Q. Okay.

A. And so this spreadsheet shows all the well construction information that's publicly available about these wells. And in particular, if you'll look towards the middle -- a little bit to the right side of the middle set of columns, you can see the columns talking about the hole size, casing size, the depths that these particular casings are set at, the number of sacks of cement that were used to cement that casing in place and then the cement top behind that casing and then how that cement top was actually measured.

And I've shown -- under "How Measured," you

see C-I-R-C. That's meant to be that that cement was circulated. And some you'll see T-S. That means by temperature survey. Some by C-B-L. That means cement bond log. And there are others that may say C-A-L-C. That's meant to reflect that it's a calculated top of cement.

Q. Were you able to determine the top of cement to all of these wells?

A. Yes, I was.

Q. Was there anything unusual you found about these active wells?

A. There were two wells -- and these would be wells number six and well number 29 -- that are downhole commingled between the Bone Spring and the Delaware under approved orders, NMOCD.

Speaking first about well number six, if you look at some of the detail of that, in particular I want to note that the Bone Spring that is open in that well is a 1st Bone Spring Sand. It's not 2nd Bone Spring. So, essentially, well number six is commingling 1st Bone Spring with Delaware.

And the last column to the right indicates a proposal by OXY to set the bridge plug above those Bone Spring perfs to isolate the Bone Spring from the Delaware. And that was at my recommendation because I

felt that it would be necessary to come before the OCD and have a plan to isolate the Bone Spring from anything else. And upon further reflection, you know, I don't think that bridge plug is actually necessary because I think, as the previous witness testified to, there is more than adequate confinement by 500 feet of limestone between the 2nd Bone Spring and the 1st Bone Spring. And now these wells are cased and cemented in such a way that I don't see that being a potential conduit for injectant to get out of the 2nd Bone Spring. So the fact that you have a well here with 1st Bone Spring perforations open to the Delaware should in no way allow that injectant into the 2nd Bone Spring to migrate out of zone. So I would suggest that no bridge plug be set in that particular well to deal with that situation.

Q. What about the second commingle well?

A. The second one is a little bit different. If you turn the page, this is well number 29. This is -- this well has 1st Bone Spring perforations open and 2nd Bone Spring perforations open with Delaware perforations. And in that particular case, OXY will set a bridge plug over the 2nd Bone Spring perforations to isolate that 2nd Bone Spring from everything else and then allow that well to continue producing.

Q. And so in your opinion, with that additional

bridge plug in that well number -- which well was that?

A. It would be well number 29.

Q. -- 29, that will avoid any potential migration from the injection zone uphole into the Delaware or the 1st Bone Spring?

A. I think if that's done, then I don't see any -- any indication, any potential, based on the well-construction data presented here and that bridge plug being set, that there would be any potential for the migration of any injectant in the 2nd Bone Spring to go anywhere else. It will stay within that zone.

Q. In your opinion as an expert in petroleum engineering, are all of the remaining wells on this list sufficiently cased and cemented to prevent fluid migration out of the proposed injection zone?

A. They are, yes.

Q. In your opinion, does this injection project pose a threat to the public health or the environment?

A. No, it does not.

Q. And does it pose a threat to the correlative rights of operators above or below the proposed injection zone?

A. No, it does not.

Q. And would approval of this proposed injection project promote the efficient recovery of oil underlying

the project area?

A. Absolutely, yes.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibit -- I think 3's already been admitted, so 3A. I think it's marked as 3A, the blowup.

EXAMINER GOETZE: That's behind C?

MR. FELDEWERT: Yes.

EXAMINER GOETZE: Exhibit 3A for Case -- wrong number on that one -- 20193 is so entered.

(OXY USA Inc. Exhibit Number 3A is offered, Case Number 20193, and admitted into evidence.)

Q. (BY MR. FELDEWERT) We would like to move to the next case, which is Case 20194.

MR. FELDEWERT: And before I get there -- thank you, Mr. Examiner -- I need to note for the record that Exhibit 3A that was just admitted is actually in Case 20193, even though it lists Case Number 15616 on there. So thank you.

EXAMINER GOETZE: That threw me off.

MR. FELDEWERT: Threw me off.

EXAMINER BROOKS: You said you'd be through by noon. You've got six minutes.

THE WITNESS: I need to talk faster.

(Laughter.)

Q. (BY MR. FELDEWERT) If I then go to Case 20194 and I go to OXY Exhibit Number 3, again we see here the C-108 application.

A. I'm sorry. Can you help me out which well it is?

Q. I'm on the Cedar Canyon 27 Federal 6H and 28 Federal 6H. Go under Tab 3. Exhibit Number 3 contains the C-108?

A. Yes.

Q. And here we have two injection wells involved, correct?

A. We do, yes.

Q. If I go to pages 2 through 5, does this contain a schematic and information on these two injection -- proposed injection wells?

A. Yes, it does.

Q. Again, will you be using -- do you request the authority to use unlined tubing when you're injecting gas and CO2?

A. Correct. Yes.

Q. Because it'll be dehydrated?

A. Yes.

Q. And in the event you do inject water as this reflects on page 3, you would use the lined material?

A. Yes.

Q. Okay. And your opinions on that are equally applicable here?

A. Yes, they are.

Q. How does OXY plan to monitor these two injection wells?

A. The same as the previous injection wells, with pressure gauges on tubing and tubing casing annulus hooked up to SCADA systems.

Q. And will the annular space be filled with inert fluid?

A. Yes.

Q. As previously discussed?

A. As previously discussed.

Q. And were you able to determine the top of cement for each of these casing points?

A. Yes.

Q. In your opinion, are these two injection wells sufficiently cased and cemented to prevent -- to operate as an injection wells for produced gas, produced water and CO2 in the 2nd Bone Spring interval?

A. Yes.

Q. If I then turn to the area-of-review map -- I believe it starts on page 6.

A. Yes.

Q. And we had two injection wells involved here?
A. Yes.
Q. Did that result in a longer oval?
A. Longer oval, yes, ellipse. Uh-huh.
Q. Okay. And was your approach the same in this case as it was and as you testified to in Case 20193?
A. Yes, it was.
Q. And if I look at pages 8 and 9, does that contain a tabulation of the data for any wellbore that penetrated the Bone Spring Formation within a half mile of these injection wellbores?
A. It does, yes.
Q. And, again, do we have -- and this time under Tab A, with the right case number. Do we have the blowup of the data sheets so it's easier to read?
A. We do. We do, yes.
Q. Were you able to determine the top of cement for each of those wells?
A. Yes, I was.
Q. Are all of the wells in the area of review active?
A. Yes, they are.
Q. And did we have any commingled wells in the area of review in this particular case that you had to address?

A. No, we did not.

Q. No P&A'd wells?

A. No P&A'd wells.

Q. Are these active wells sufficiently cased and cemented to prevent fluid migration out of the proposed injection zone?

A. Yes, they are.

Q. And in your opinion, does this proposed injection project pose any threat to the public health or the environment?

A. No, it does not.

Q. And will this proposed injection project promote the efficient recovery of oil underlying the project area without impairing correlative rights?

A. Yes, it will.

MR. FELDEWERT: Mr. Examiner, I would move the admission of Exhibit 3A in Case 20194.

EXAMINER GOETZE: Case Number 20194, Exhibit 3A is so entered.

(OXY USA Inc. Exhibit Number 3A is offered, Case Number 20194, and admitted into evidence.)

MR. FELDEWERT: And I don't mean to -- if there are any specific questions on this, we can certainly get them now, or I have one more case.

EXAMINER GOETZE: Well, no. We'll come back to it.

Q. (BY MR. FELDEWERT) Let's go to Case Number 20195, and this, Mr. Foppiano, would be for the Cypress wells?

A. Yes.

Q. Again, we have two injection wells involved in this case?

A. We do, yes.

Q. And if I go to OXY Number 3, does this contain the C-108 application?

A. It does, yes.

Q. And if I look starting at page 2 and continuing through page 5, does that include the information on the proposed injection wells?

A. It does, yes.

Q. Were you able to -- was the company able to determine the top of cement for each of these casing points?

A. Each of the proposed injectors? Yes.

Q. Yes.

Okay. And, again, does the company request the authority to use unlined tubing when injecting produced gas and CO2?

A. Yes.

Q. But will use lined tubing if they use these to inject water?

A. That's correct.

We're also, of course, requesting the packer exception.

Q. For all three cases?

A. All three cases.

Q. Okay. For the reasons you discussed in Case 20193?

A. Yes.

Q. Again, will OXY monitor these two injection wells in the same fashion that you previously testified to?

A. Yes.

Q. And in your opinion, are these two injection wells designed to safely and efficiently inject produced gas and produced water and CO2 into the 1st Bone Spring interval and the 2nd Bone Spring interval for this pressure maintenance project?

A. Yes.

Q. Now, with respect to your area of review, are the -- if I turn to page 6 and continue onto page 7, does this identify your area of review?

A. Yes, it does.

Q. And you had two crossing ellipses that you

resulted in because of the different orientation of the injection wells?

A. That's correct, yes.

Q. And, again, your methodology for identifying the wells in the area of review was the same as 20193?

A. It was, yes.

Q. If I look at Exhibit 3A, does this contain a more readable tabulation of the well data that we see on pages 7 and 8 of the -- I'm sorry -- 8 and 9 of the C-108 application?

A. It does.

Q. Were you able to determine the top of cement for all of these wells?

A. Yes, I was. And that's shown, as it is on the other spreadsheets, in those couple of columns that are just off to the right of the center on this spreadsheet.

Q. And are all the wells within the area of review active?

A. Yes.

Q. Okay. And did you find any commingled wells within the area of review for this particular case?

A. I did not.

Q. So in your opinion, are all of these active wells within the area of review sufficiently cased and cemented to prevent fluid migration out of the active

injection zone?

A. They are, yes.

Q. In your opinion, does this injection project pose a threat to public health and the environment?

A. It does not.

Q. And will the approval of this injection project promote the efficient recovery of oil in the project area?

A. Yes.

Q. And will it negatively impair the correlative rights of oil and gas operators above or below the injection intervals?

A. No, it will not.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of OXY Exhibit 3A --

EXAMINER GOETZE: Exhibit 3A --

MR. FELDEWERT: -- in Case 20195.

EXAMINER GOETZE: -- in Case 20195 is so entered.

(OXY USA Inc. Exhibit Number 3A, Case Number 20195, is offered and admitted into evidence.)

MR. FELDEWERT: And that concludes my examination of this witness.

EXAMINER GOETZE: Mr. Padilla?

MR. PADILLA: None. No questions.

EXAMINER GOETZE: Mr. Brooks?

EXAMINER BROOKS: No questions.

EXAMINER GOETZE: Mr. Warnell?

EXAMINER WARNELL: No questions.

EXAMINER GOETZE: Quickly, we will take a look at the AOR wells and confirm what you've done. So if we have any comments, we'll send you an email.

MR. FELDEWERT: Okay.

CROSS-EXAMINATION

BY EXAMINER GOETZE:

Q. Question for you: Having been through the experience of acid gas wells and whatnot, I note that we're looking at using an inert fluid for the annular filling. Any suggestions or ideas with regards to whether it's a typical SWD-type fluid as opposed to, say, a diesel?

A. Well, other than the obvious challenges of handling diesel and pumping it --

Q. Yeah, I know that.

A. -- placing it.

Q. Is there enough concern as a result of having CO2 injection that would provide any better benefit with regards to -- I understand in an AGI well, we're moving lot bigger volumes and a lot more --

A. Yes.

Q. So there is no real advantage to doing something like that. It would just be your typical annular fluid?

A. I would say, based on OXY's experience particularly with CO2 injection and even produced gas injection, that they believe -- and I agree with that -- that the inert fluid, if it's properly treated and filtered and utilized, is a much better way to handle it than, say, a diesel would be. Because of another reason, every time the tubing is changed or the packer is moved, that stuff gets dumped on the formation. So if you have diesel in there, then you're going to potentially lose that diesel to a formation, and that may present some issues in producing that back. So I would say inert fluid, if it's properly treated, should be sufficient to deal with any kind of issues about that fluid on the back side.

Q. Okay. That answers that question. Thank you.

A. You're welcome.

MR. FELDEWERT: Mr. Examiner, that concludes our presentation in these consolidated cases.

I only have one issue of concern. It involves Case 15616.

EXAMINER GOETZE: We know the deadline. We

are trying to keep that in mind, but remember, the legislature starts next week.

MR. FELDEWERT: And that was my concern. If I look at the authority under paragraph 19, in that order, it expires by its terms two years from the commencement of injection, which the Division records will reflect occurred on April 29th.

EXAMINER GOETZE: Okay.

MR. FELDEWERT: Paragraph 19 does provide for an extension of that time by the Division. And so I'm requesting perhaps -- or I am requesting whether you would be in a position to grant that extension until the date of the issuance of the order in this case so that I can avoid a step in the process and not have to come back in the middle of April and file an application for an extension.

EXAMINER GOETZE: Or leave lots of emails and messages on my phone.

MR. FELDEWERT: Exactly.

EXAMINER GOETZE: We will make the recommendation to the director and go ahead and prepare an extension letter.

MR. FELDEWERT: That would be --

EXAMINER GOETZE: And then we'll tie it in with approval of the order -- the next order, because I

don't know if you're going to get the same number on the order. So this is a new game we have, too.

MR. FELDEWERT: Okay.

EXAMINER GOETZE: So in that thought, yeah, we'll make it part of this hearing and have a motion -- not a motion but move forward with an extension and tie it in so that the operator should continue without having to worry about being suspended.

With that, no more questions, Mr. Padilla? No closing statements?

MR. PADILLA: No.

EXAMINER GOETZE: Okay. Very good. Then we will take Cases 15616, 20193, 20194 and 20195 under advisement.

And let us come back here 1:15, and let's get NGL out of the way.

Thank you.

(Case Numbers 15616, 20193, 20194 and 20195 conclude, 12:06 p.m.)

STATE OF NEW MEXICO

COUNTY OF BERNALILLO

CERTIFICATE OF COURT REPORTER

I, MARY C. HANKINS, Certified Court Reporter, New Mexico Certified Court Reporter No. 20, and Registered Professional Reporter, do hereby certify that I reported the foregoing proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings that were reduced to printed form by me to the best of my ability.

I FURTHER CERTIFY that the Reporter's Record of the proceedings truly and accurately reflects the exhibits, if any, offered by the respective parties.

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

DATED this 23rd day of January 2019.

MARY C. HANKINS, CCR, RPR
Certified Court Reporter
New Mexico CCR No. 20
Date of CCR Expiration: 12/31/2019
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