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 BC OPERATING, INC., FOR AUTHORIZATION TO INJECT WATER FOR LEASE PRESSURE MAINTENANCE OPERATIONS AND DESIGNATION OF A PROJECT AREA, LEA COUNTY, NEW MEXICO

Case No. 14571

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: WILLIAM V. JONES, Technical Examiner
DAVID K. BROOKS, Legal Examiner

December 2, 2010

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, WILLIAM V. JONES, Technical Examiner, and DAVID K. BROOKS, Legal Examiner, on Thursday, December 2, 2010, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South St. Francis Drive, Room 102, Santa Fe, New Mexico.

REPORTED BY: Jacqueline R. Lujan, CCR #91
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A P P E A R A N C E S

FOR THE APPLICANT:

MONTGOMERY & ANDREWS
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EXAMINER JONES: With that, we'll call Case 14571, application of BC Operating, Incorporated, for authorization to inject water for lease pressure maintenance operations and designation of a project area in Lea County, New Mexico.

Call for appearances.

MR. HALL: Mr. Examiners, Scott Hall, Montgomery & Andrews Law Firm, Santa Fe, on behalf of the applicant, BC Operating, with one witness this morning.

EXAMINER JONES: Any other appearances?

Will the witness please stand and state your name? Will the court reporter please swear the witness?

MR. WACKER: My name is Herbert Jason Wacker.

(One witness was sworn.)

HERBERT JASON WACKER

Having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HALL:

Q. For the record, please state your name.

A. Herbert Jason Wacker.

Q. Mr. Wacker, where do you live and where are you employed?

A. I live in Midland, Texas. I'm employed by BC Operating as its operations manager.

Q. Have you previously testified before the Division Examiners and had your credentials as a petroleum engineer established as a matter of record?

A. Yes.

Q. Are you familiar with the application and the lands that are the subject of this application?

A. Yes.

MR. HALL: At this time, Mr. Examiner, we offer Mr. Wacker as an expert petroleum engineer.

EXAMINER JONES: He's so qualified.

Q. (By Mr. Hall) If you would, Mr. Wacker, please explain to the Examiner what BC seeks by this application?

A. BC proposes to convert the Angell Number 3 well for use as a water injector in connection with pressure maintenance operations in the San Andres Formation. BC also proposes the designation of the east half of the northeast quarter of Section 11, Township 17 South, Range 36 East, Lea County, New Mexico, as the project area for pressure maintenance operations.

Q. And for the record, is the Angell Number 3 well located in Unit H of Section 11?

A. Yes.

Q. And has BC previously submitted a C-108 administrative application with the Division for

approval?

A. We have.

Q. Let's look at Exhibit 1. If you could tell the Examiner what that demonstrates.

A. Exhibit 1 is a locator map that shows the two wells within the project area. They're south of the City of Lovington, New Mexico.

Q. And Exhibit 2?

A. Exhibit 2 is a form C-102 showing the location of the Angell Number 3.

Q. And what is the source of the disposal fluids you plan to inject into the well?

A. The fluid that we're going to use for pressure maintenance operations is produced water from two offsets, San Andres wells, our Angell Number 1 and Angell Number 2.

Q. And your C-108 application specified injection in the San Andres Formation?

A. Yes, it did.

Q. How did you select that interval?

A. We selected that interval by looking at the correlative porosity interval in the Angell Number 1.

Q. And is Exhibit 3 a copy of your C-108 application previously submitted?

A. Yes, it is.

MR. HALL: Let's look at some of the components of that.

If we could turn to the fifth page of that, which we've tabbed for you, Mr. Examiner. We haven't numbered that.

Q. (By Mr. Hall) Mr. Wacker, is that a copy of the wellbore schematic for the Angell Number 3?

A. Yes.

Q. Could you discuss the casing and cement tubing for the Examiners?

A. We said eight-and-five-eighths, 32-pound casing at 1,974 feet. We cemented that casing with 700 sacks and did get circulation to the surface. On the five-and-a-half, 15.5 pound production casing, that was set at 5,640 feet and cemented with 350 sacks. We did run a cement bond log and found the top of the cement to be 2,970 feet.

Q. Are you proposing an open hole completion for the well?

A. No.

Q. Will the liquids be injected under pressure?

A. Yes.

Q. Will the well head be equipped with a back-pressure valve?

A. No.

Q. What materials will be used for the tubing?

A. We're going to use plastic-coated, two-and-seven-eighths, J55 tubing.

Q. What are the average maximum daily injection rates that you're proposing?

A. The average injection rate should be 400 barrels of water per day, and the maximum injection rate is 500 barrels of water per day. And we looked at the two wells that are producing in the San Andres on our lease, and that's the amount of water that we had available for this pressure maintenance project.

Q. Will BC Operating be operating this facility as a closed system?

A. We will.

Q. All right. What are the anticipated average maximum injection pressures for the well?

A. The average injection pressure is expected to be 900 psi, and the maximum injection pressure is expected to be 960 psi and not to exceed .2 psi per foot to the top perforation.

Q. It's the standard fracture gradient?

A. Yes.

Q. Let's talk about the chemical analysis for the injection fluids.

A. Basically, the chemical analysis is San Andres

produced water. We're just going to recycle that water and inject it into the down-dip well.

Q. Would you briefly discuss for the Examiners the geology of the San Andres Formation in this area?

A. The lithology consists of a tan/gray finely crystallin dolomite and porosity ranges from pinpoint to small vugs.

Q. How did you determine that? What's the source of that information?

A. That was taken from the Roswell Geological Society write-up on the Lovington San Andres field, which is this area.

Q. And what's the gross vertical extent of the injection interval within the San Andres?

A. The gross injection interval is 4,756 feet and down to 6,150 feet. The San Andres is 1,400 feet thick in this area.

Q. What geologic criteria were you looking for when you selected this injection interval?

A. We looked at the porosity interval that we completed in the Number 1 well. The Number 3 well is down-dip, and we completed the same correlative interval in the Number 3 to inject fluid into.

Q. How will the pressure maintenance project work?

A. Basically, San Andres water produced from the up-dip well will be returned to the reservoir by injection into the down-dip Angell Number 3. This will help reduce total reservoir voidage and improve oil recovery from the up-dip well.

Q. And you anticipate that the project will enable BC to recover incremental volumes of oil?

A. Yes.

Q. Have you indicated what lands you're designating as the project area?

A. BC would like to designate the east half of the northeast quarter of Section 11, Township 17 South, Range 36 East, Lea County, New Mexico, as the project area for pressure maintenance operations.

Q. Are these lands under a common lease held by BC?

A. They are.

Q. Let's look at Exhibits 4 and 5, your structure map and cross-sections, and if you would discuss those for the Hearing Examiner, please.

A. Exhibit Number 4 is a structure map on the top of the San Andres. It shows the project area outlined in black, our Angell Number 1 well and the Angell Number 3 well, which is down-dip.

Q. And Exhibit 5?

A. Exhibit 5 is a cross-section between the Angell Number 1 and the Angell Number 3. It shows the top of the San Andres and the interval that we have designated for pressure maintenance operations.

Q. Tell us briefly about the permeability and porosity of the reservoir.

A. The permeability is estimated at 6 millidarcies, and the porosity is 10 percent in the pay interval.

Q. Now, are you satisfied that injected fluids will remain contained within the disposal intervals?

A. Yes.

Q. How did you make that determination?

A. The San Andres Formation in the area contains a tight dolomite cap that's about 50 foot thick, and that should be more than sufficient to contain the injected fluids. And you can see that they're at the top of the cross-section.

Q. Is the San Andres generally productive in this area?

A. Yes.

Q. And for purposes of your hydrogeologic and geologic analysis, what was the Area of Review?

A. The geologic Area of Review included an area enclosed by a one-half mile radius from the proposed

injector.

Q. If we look at the last page of the C-108 and also Exhibit Number 6, does that show us your AOR?

A. Yes.

Q. And is there currently any non-San Andres production within the AOR above the injection interval?

A. No.

Q. How about below?

A. Yes. We have three wells that produce oil and gas from the Paddock Formation at a depth of 6,200 feet, and another well that produces from the Drinkard Formation at 8,000 feet.

Q. All right. And again, if we look at the C-108 at page 8 and also at Exhibit 7, is this a list of all of the wells within the Area of Review?

A. Yes.

Q. On the top page of Exhibit Number 7, you have highlighted two wells. What does the highlighting indicate?

A. The highlighting indicates that those wells do not penetrate the injection interval.

Q. And under the top page, is this a compilation of all the wellbore schematics for all of these wells?

A. Yes, it is.

Q. What is the data source for the well list and

wellbore schematics?

A. We used well file information obtained from the OCD website and also some of our internal records for the cement bond logs and those kind of things.

Q. From the data that you reviewed, were you satisfied that you were adequately able to determine the casing depths and the tops of the cement in each of the wells?

A. Yes.

Q. Did you see any evidence of casing leaks in any of the wells?

A. We did not.

Q. Are you satisfied that the conditions of the wells within the Area of Review are such that none will act as a conduit from fluids from the injection interval to fresh water aquifers?

A. Yes.

Q. Could you identify the fresh water aquifers in the Area of Review?

A. The fresh water aquifer in the area is the Ogallala, and it occurs from 50 foot below the surface to a depth of 200 feet.

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

A. No.

Q. Have you examined the available geologic and engineering data for evidence of open faults or any other hydrologic connection between the disposal zone and any source of underground drinking water?

A. I have examined the geologic and engineering data for evidence of open faults connecting the injection interval to sources of underground drinking water and have found none.

Q. Let's look at Exhibit 8. What does that show us?

A. Exhibit 8 is a list of all of the fresh water wells within one mile of our Angell Number 3. And I found one active injector within one mile of our proposed injection well, and I have attached a chemical analysis of its produced water.

Q. Is the active one the one highlighted in blue?

A. Yes.

Q. And the C-108 contains the proof of notice and affidavit of publication of the original administrative application; is that right?

A. Yes.

Q. And do you foresee any need to request a higher injection pressure from the Division in the future?

A. Not at this time.

Q. In your opinion, can the project be operated so injection fluids remain contained within the injection formation?

A. Yes.

Q. In your opinion, will injection operations pose any threat of impairment to correlative rights or waste of hydrocarbon resources?

A. No.

Q. And can the project be operated so that public health and safety and the environment will be protected?

A. Yes.

Q. Were Exhibits 1 through 8 prepared by you or at your direction?

A. Yes.

Q. In your opinion, will granting BC's application promote the interest of conservation and result in the prevention of waste and the protection of correlative rights?

A. Yes.

MR. HALL: That concludes our direct of this witness. Mr. Examiner, we move the admission of Exhibits 1 through 8.

EXAMINER JONES: Exhibits 1 through 8 will be admitted.

(Exhibits 1 through 8 were admitted.)

EXAMINATION

BY EXAMINER JONES:

Q. That Lovington well field, is that pretty close to here?

A. Yes. It's to the north. It's outside of the Area of Review. It's out about a mile and a half to two miles. And I did work with the City of Lovington Water Department to locate some of their wells in the area and actually went out to that location and visited with them about the project. But we're actually outside that water supply field for the City of Lovington, but it is very close.

Q. Where does the water go for these two wells right now?

A. Right now we haul that water to public disposal.

EXAMINER JONES: Okay. And who did you notice for this -- I probably heard that, and I just spaced it out.

MR. HALL: It's in the C-108 application, Mr. Jones. I'm sorry. I didn't tab that for you.

EXAMINER JONES: As far as who the affected parties would be --

MR. HALL: Mr. Darr Angell, Chevron Midcontinent and the State Land Office.

EXAMINER JONES: The surface owner was Star Angell?

MR. HALL: Darr.

EXAMINER JONES: Darr? Okay.

Q. (By Examiner Jones) And the State Land Office, are they the real surface owner? Mr. Angell is the lessee?

A. Actually, I'm not sure. They may have -- there may be some surface in the area that is owned by the State Land Office. But they came through on our list to notify them, so we did notify them.

Q. This is a -- who does own those surrounding leases, then? Like this well, if you draw a circle, over to the west, it would be -- like the north?

A. The west is actually BC Operating. To the east is Vanguard Petroleum and BC Operating, and to the north is Chevron Midcontinent.

Q. Okay. So Chevron has that waterflood to the north?

A. Yes. It's called the Lovington Paddock Unit.

Q. That's the one that's in the well field?

A. Yes.

Q. It's a real thick San Andres here, isn't it? 1,400 feet?

A. It's thick. I think the pay interval is

thinner on the cross-section. There's some porosity intervals that are within that gross interval, but it is 1,400 feet thick.

Q. So that 6 millidarcy, is that a geometric -- I mean a commonly used number for that area?

A. Yes. I actually got that information from the Roswell Geologic Society. And then we also used our well logs to evaluate the porosity in the area.

Q. Okay.

A. We don't have any core data or anything like that.

Q. Are the logs on the website?

A. They are. And the cross-section also has a smaller copy of the logs on it.

Q. What about the bond log? Is the bond log on the website? Because I don't think -- sometimes on these type of applications, if there is a bond log, we ask that it be sent to -- a copy of it to Paul Kautz.

A. I can do that. No problem.

EXAMINER JONES: Thank you. I'll turn it over to David.

EXAMINATION

BY EXAMINER BROOKS:

Q. BC Operating is 100 percent working interest owner?

A. There are some partners in the well. Vanguard Petroleum is a partner.

Q. They're common throughout this unit?

A. Yes, they are.

Q. Okay. Now, the surrounding areas, the rule requires notification to operators or working interest owners within one-half mile of any tract that's within one-half mile.

The only person you notified is Chevron. You said their ownership was to the north. They're operator of the land to the north. So is that your testimony?

A. Yes.

Q. Now, is BC the operator of all the other tracts within one-half mile of this well location?

A. I don't believe we are. I think the other operator is Vanguard Petroleum, who is a partner of ours.

Q. Okay. Does anybody else have ownership anywhere in this area, or is the ownership of the other leases that BC has identical to the ownership of this lease?

A. Yes. It's the same parties.

EXAMINER BROOKS: That's all I have.

EXAMINER JONES: Okay.

FURTHER EXAMINATION

BY EXAMINER JONES:

Q. But this is going to be -- you want it classified as a pressure maintenance project?

A. Yes.

Q. That's kind of what we call it when it's --

A. Yeah, when it's only one well. And it's not really a waterflood, so --

Q. But it might help the production of the surrounding wells? Are those surrounding wells depleted?

A. No. But they are being depleted as their own production. Our hope is to provide pressure support to the up-dip Number 1.

Q. San Andres is a commonly water flooded reservoir?

A. Yes.

Q. It's amenable to water flooding, also?

A. Yes.

EXAMINER JONES: I have no other questions.

MR. HALL: That concludes our case. We request that the matter be taken under advisement.

EXAMINER JONES: Case Number 14571 Will be taken under advisement.

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

_____ Examiner
Oil Conservation Division

REPORTER'S CERTIFICATE

I, JACQUELINE R. LUJAN, New Mexico CCR #91, DO HEREBY CERTIFY that on December 2, 2010, proceedings in the above captioned case were taken before me and that I did report in stenographic shorthand the proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability.

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

WITNESS MY HAND this 14th day of December, 2010.

Jacqueline R. Lujan, CCR #91
Expires: 12/31/2010