OIL CONSERVATION DIV
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STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:	CASE NO. 12,271
APPLICATION OF TRIUMPH EXPLORATION, INC., FOR AMENDMENT OF DIVISION ORDER NO. R-9082 TO AUTHORIZE A TERTIARY RECOVERY PROJECT BY MICROEMULSION FLOODING IN ITS TONTO LEASE PROJECT AREA AND TO QUALIFY THIS PROJECT FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, LEA COUNTY, NEW MEXICO	ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MARK ASHLEY, Hearing Examiner

October 21st, 1999

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MARK ASHLEY, Hearing Examiner, on Thursday, October 21st, 1999, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

October 21st, 1999
Examiner Hearing
CASE NO. 12,271

* * *

E X H I B I T S

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* * *

A P P E A R A N C E S

FOR THE DIVISION:

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By: WILLIAM F. CARR

* * *

WHEREUPON, the following proceedings were had at 12:03 p.m.:

EXAMINER ASHLEY: The Division calls Case 12,271, Application of Triumph Exploration, Inc., for amendment of Division Order Number R-9082 to authorize a tertiary recovery project by microemulsion flooding in its Tonto lease project area and to qualify this project for the recovered oil tax rate pursuant to the Enhanced Oil Recovery Act, Lea County, New Mexico.

Call for appearances.

MR. CARR: May it please the Examiner, my name is William F. Carr.

I'm with the Santa Fe law firm Campbell, Carr, Berge and Sheridan, and we represent Triumph Exploration, Inc., in this matter. I have three witnesses.

EXAMINER ASHLEY: Any additional appearances?

Will the witnesses please rise to be sworn in?

(Thereupon, the witnesses were sworn.)

EXAMINER ASHLEY: Mr. Carr?

STELLA M. SWANSON,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. Stella Swanson.

Q. Ms. Swanson, where do you reside?

A. Midland, Texas.

Q. And by whom are you employed?

A. In the terms of this project, Triumph Exploration, Inc.

Q. And what is your position with Triumph Exploration in regard to this particular project?

A. Petroleum landman.

Q. Have you previously testified before this Division and had your credentials as an expert in petroleum land matters accepted and made a matter of record?

A. Yes, sir.

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

A. Yes, sir, I am.

Q. Are you familiar with the Tonto EOR project and Triumph's plans to utilize microemulsion flooding in this tertiary recovery project?

A. Yes, I am.

Q. And are you familiar with the status of the lands in the subject area?

A. Yes.

Q. Have you prepared exhibits for presentation here today?

A. Yes, I have.

MR. CARR: May it please the Examiner, we tender Ms. Swanson as an expert witness in petroleum land matters.

EXAMINER ASHLEY: Ms. Swanson is so qualified.

Q. (By Mr. Carr) Would you briefly summarize the history of the Wallen Tonto waterflood project?

A. Under Division Order Number R-9082, dated December 14th, 1989, it approved a Wallen Production Company waterflood project on its Tonto lease for the injection of water into the South Tonto-Yates-Seven Rivers Pool through its Wallen Tonto Well Number 7, located 1650 feet from the south line, 1980 feet from the east line of Section 30, Township 19 South, Range 33 East, Lea County, New Mexico.

And this project was expanded by Division Order -- Administrative Order Number WFX-689.

Q. Ms. Swanson, was water ever actually injected or was waterflooding ever actually undertaken by Wallen?

A. No.

Q. And what is the relationship of Triumph to Wallen Production Company?

A. Triumph took over operation of this project as successor operator in April 1st of this year.

Q. Has water been injected into this formation at any time pursuant to the previous waterflood order?

A. No, it has not. When Triumph took over the operations, they immediately converted the Number 7 well into an injection well, but we have not injected any water.

Q. If this Application is approved, will Triumph use the same injection well that -- It will use the Number 7, will it not?

A. Yes, it will, and also the proposed Number 2 and 9 Y.

Q. Are Triumph Exhibits Number 1 and 2 copies of Division Order Number R-9082 and Order WFX-689?

A. Yes, they are.

Q. Would you explain to Mr. Ashley what it is that Triumph is seeking with this Application?

A. Triumph seeks to amend the amendment of the Order 9082 to authorize tertiary recovery by microemulsion flooding into the Yates-Seven Rivers Pool and the qualification of the project for the recovered oil tax rate authorized by the New Mexico Enhanced Oil Recovery Act.

Q. Generally, what benefits does Triumph seek to obtain from the proposed tertiary microemulsion flood?

A. We seek increased recovery from improved efficiency, and this type of recovery project will be reviewed later by Mr. Atnipp.

Q. Could you identify what has been marked as Triumph Exhibit Number 3?

A. Yes, it's the OCD Form C-108 with its attachments.

MR. CARR: Mr. Ashley, I have numbered the pages, so as we go through this we'll be referring to page numbers just for ease getting in and out of this exhibit.

EXAMINER ASHLEY: Okay.

Q. (By Mr. Carr) Ms. Swanson, would you refer to page 5 in this exhibit, identify it and explain what it is?

A. Page 5 outlines the project area, which is Section 30. It's the southwest quarter, the north half of the southeast quarter and the southeast of the southeast, Township 19 South, Range 33 East.

It also shows the offsetting tracts and operators, shows all wells within the two miles of each injection well and shows one-half-mile radius, which is the area of review for each injection well.

Q. And the area-of-review circles are shown on what is page 4 --

A. Four.

Q. -- of this exhibit; is that right?

A. That's correct.

Q. The area that is the project area, that is the identical area that was included and approved as part of the Wallen original proposed waterflood project; is that right?

A. Yes, sir, it contains 280 acres.

Q. Let's go to page 4, stay with page 4. Can you identify for us the injection wells that you're proposing to use?

A. We propose to use Number 7, which has been converted, Number 2 and Number 9 well, 9 Y.

Q. And how many producing wells are you initially going to be utilizing in the project area?

A. Eight, the Number 1, 3, 4, 5, 6, 8, 10 and 11.

Q. How were the boundaries for the project area originally determined?

A. Through the structural position of the Yates productive sand.

Q. In the project area, what is the character of the lands?

A. It's one lease, and the lease is on federal acreage. It's a BLM lease.

Q. It's all federal land?

A. Yes.

Q. Have you reviewed the plans to implement the microemulsion tertiary flood with the BLM?

A. Yes, sir, and I spoke with Armando Lopez with the BLM, and he's reviewed the plan and has accepted it as a microemulsion project and its boundaries. The sundry notices have been approved.

Q. Can you identify and review Triumph Exhibit Number 4?

A. The notice affidavit.

Q. And to whom was notice provided?

A. All offsetting leasehold operators within a half mile of any proposed injection well in the proposed project, and the BLM as the owner of the surface of the land.

Q. Does Triumph seek approval of an administrative procedure whereby additional injection producing wells can be added to the project without hearing?

A. Yes, sir, we do.

Q. Will Triumph also be calling additional witnesses to review the technical portions of this case?

A. Yes.

Q. Were Exhibits 1 through 4 either prepared by you or compiled under your direction?

A. Yes, they were.

MR. CARR: Mr. Ashley, at this time we would move the admission into evidence of Triumph Exhibits 1 through 4.

EXAMINER ASHLEY: Exhibits 1 through 4 will be admitted at this time.

MR. CARR: And that concludes my direct examination of Ms. Swanson.

EXAMINATION

BY EXAMINER ASHLEY:

Q. Ms. Swanson, on Exhibit 3, page 5 --

A. Yes, sir.

Q. -- can you tell me again what the boundaries are for this?

A. It's the southwest quarter.

Q. Of Section 30?

A. Of Section 30.

Q. Okay.

A. The north half of the southeast quarter.

Q. Okay.

A. And the southeast of the southeast.

Q. So it's essentially the south half of the section, minus the southwest quarter of the southeast quarter?

A. Yes, sir, that's correct.

Q. And then on the prior page, page 4, can you tell me specifically which wells -- where these wells are located, the three wells?

MR. CARR: Mr. Ashley, are you asking about the injection wells?

EXAMINER ASHLEY: Yes, I'm sorry.

MR. CARR: I think the next witness is going to reference some data sheets that have the exact footage --

EXAMINER ASHLEY: Okay.

MR. CARR: -- location on each of the injection wells.

EXAMINER ASHLEY: Okay, that's fine. I have nothing further. Thank you.

MR. CARR: May it please the Examiner, at this time we would call Randall Foster.

RANDALL FOSTER,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. Yes, Randall Foster.

Q. Mr. Foster, where do you reside?

A. Midland.

Q. And by whom are you employed?

A. I'm an owner of Triumph Exploration, Incorporated.

Q. Have you previously testified before this Division?

A. No.

Q. Are you a petroleum engineer?

A. By training, yes.

Q. And that means you're a practical oilman; isn't

that right?

A. Yes, sir.

Q. Okay. Can you review your experience in the oil and gas industry?

A. I have been an independent oil and gas operator/producer since 1978. I've been involved in numerous oil and gas projects in both Texas and New Mexico.

Q. Has your work involved waterflood projects as well as drilling exploratory wells?

A. Yes, sir, it has.

Q. And in these efforts do you function as a landman, a geologist, an engineer and the operator.

A. Yes, sir, on occasion.

Q. And anything else that needs --

A. Yes, sir.

Q. Okay. What is your position with Triumph?

A. I'm president.

Q. Are you familiar with the Application that's been filed in this case?

A. Yes, I am.

Q. Are you familiar with the Tonto EOR tertiary project and Triumph's plans to utilize microemulsion flooding?

A. Yes, I am.

Q. Have you made a study of the area?

A. Yes, sir, I have.

Q. Are you prepared to share the results of your work with Mr. Ashley?

A. Yes, sir.

MR. CARR: We tender Mr. Foster as a practical oilman.

EXAMINER ASHLEY: Mr. Foster is so qualified.

Q. (By Mr. Carr) Let's first talk briefly about the geology involved in this matter. What intervals are to be utilized in the proposed tertiary microemulsion project?

A. The intervals would be the Yates-Seven Rivers sands.

Q. This is the uppermost part of the Permian --

A. It would be the uppermost member of the Permian series.

Q. Can you generally describe the characteristics of the Yates-Seven Rivers formation in the project area?

A. It is an upper and lower sand lens, a very distinct lens, that is separated with a dolomitic series between the two sand intervals.

Q. How would you characterize the sands?

A. They are a very loosely unconsolidated sand that will perform very nicely under waterflood.

Q. Is gas produced from this reservoir?

A. The GOR in this particular reservoir is very,

very small. The gas production has been minimal.

Q. In terms of the reservoir and how it is suited for a microemulsion flood, how would you rank this as a candidate for this kind of a project?

A. I would say that it is probably one of the better candidates for microemulsion flooding.

Q. Is the interval which is the subject of this Application shown on the log which is contained on page 28 of Exhibit 3?

A. Yes, it is.

Q. And the injection interval is identified on page 22 of the exhibit, is it not?

A. Yes, sir, it is.

Q. And what is that interval?

A. That interval would be from 2900 feet to 3113 feet.

Q. Now, you indicated there were two intervals separated by a dolomitic stringer or interval. Are you intending to waterflood both of the sands?

A. Yes, at the same time.

Q. What is the current status of Triumph's efforts to implement this project?

A. The current status is that we have actually installed one well ready for microemulsion injection. We are proposing that we put in two more, and again our

emulsion flood.

Q. How soon could you be ready to actually commence the injection of micro-organisms?

A. I would say easily within 30 days.

Q. Let's refer to pages 7 through 9 of Exhibit 3.

EXAMINER ASHLEY: What pages did you say, Mr. Carr?

MR. CARR: Seven through 9.

EXAMINER ASHLEY: Thank you.

Q. (By Mr. Carr) And Mr. Foster, I'd ask you to just identify the information that is set forth on these pages in this exhibit.

A. This is a listing of all the wells that are involved in our proposed microemulsion waterflood, as well as the wells that offset us.

Q. Does this exhibit contain all the data on each of these wells required by Division Form C-108?

A. Yes, sir, it does.

Q. Let's go to pages 10 through 17, and I'd ask you to identify and review those?

A. Pages 10 though 17 would be a schematic on all wells that have been plugged and abandoned within our project area offsetting us.

Q. And this shows the plugging detail on each of these wells?

A. Yes, sir, it does.

Q. Have you reviewed the information available on each of these wells and satisfied yourself that there's no remedial work required on any of these wells?

A. Yes, sir, I have satisfied myself to that fact.

Q. Let's go to page 21 and look at pages 21 through 25. Could you identify those for Mr. Ashley and explain what they show?

A. These are schematics, as well as a pressure test, a backside pressure test, on the Number 7. These would be the schematics and information on the three wells that we are proposing to use as the initial microemulsion injectors.

Q. And so what we've got is, we've got well data on pages 21, 22, some supporting data -- on page 22 we have information on the Number 7 with some supporting information --

A. Yes.

Q. -- and then on page 25 we have information and data on the --

A. -- Number 9 well.

Q. -- on the Number 9 injection well.

Is Exhibit Number 5 schematic drawings for each of these wells?

A. Yes.

Q. And this shows the current configuration of each of the wells; is that right?

A. Yes, sir, it does. Yes.

Q. Will the casing tubing annular space in each of the injection wells be loaded with an inert fluid and equipped with a pressure gauge at the surface to facilitate detection of leakage in the casing tubing or packer?

A. Yes, sir, it would.

Q. What is the source of the water you propose to inject in these wells?

A. The source of the water would be zone known as the Capitan Reef. In our particular region it is a nonpotable water that is just below the Yates-Seven Rivers series.

Q. And do you have a water supply well you will be using?

A. Yes, sir, we have designated our Number 12 Tonto as a water supply well.

Q. What volumes of water do you propose to inject?

A. Initial injection would be in the range of 250 barrels of water a day. I would say maximum would be 500.

Q. That's a daily rate?

A. That's a daily rate, to just start with.

Q. Will your system be open or closed?

A. It will be closed.

Q. And what pressures will you be injecting at?

A. We will be injecting at 580 p.s.i., surface.

Q. Is this your average pressure?

A. That would be both average and maximum.

Q. Let's go to page 32 in this exhibit, Exhibit 3. Can you identify that for me?

A. Yes, this is a water analysis that was performed on our produced water that is currently being produced from the Yates-Seven Rivers zone.

Q. Explain for us what water you're going to actually be injecting, what fluids you're going to be injecting in this proposed project.

A. We will be injecting both the current produced water as well as the nonpotable makeup water from the Capitan Reef.

Q. Are there freshwater zones on the area?

A. No, sir, there are not.

Q. Have you had a hydrologist investigate and establish that for you?

A. Yes, sir, we have had a -- or actually Wallen Production had a report prepared by a hydrologist firm, and there was no fresh water detected on any electric logs in our area.

Q. And are there any freshwater wells within a mile of any of the proposed injection wells?

A. No, sir, there are not.

Q. Are you aware of any geologic conditions which would allow fluids injected as part of this proposed tertiary flood to escape from the injection interval or otherwise pose a threat to freshwater supplies in the area?

A. I know of no geological condition.

Q. Each of the wells that you're using here, have you satisfied yourself as to the integrity of the wellbores that you're going to be using in this project?

A. Yes. As a matter of fact, this is a rather unique case in that the gentleman who drilled all these wells ran 7-inch casing and circulated all of the long strings to the surface. So we have what would be considered actually a federal Class 1 situation as far all our integrities on our long strings.

Q. Let's talk for a minute about your Application for certification of an enhanced oil recovery project. Could you identify what has been marked as Exhibit 6?

A. Exhibit 6 would be a letter stating that we are proposing the tertiary enhanced oil recovery project. There is a plat, there is a listing of all wells involved in the project area, there is a historical production curve on the property, and there is also a production forecast curve based on what we feel the results would be of a microemulsion flood.

Q. Mr. Foster, what are the estimated additional capital costs to be incurred in this project?

A. We estimate $1,570,000.

Q. And what are the total tertiary project costs?

A. The total tertiary costs, I would say, are in the range of $2.2 million.

Q. And that number would include the capital costs, operational expenses, and the microemulsion; is that right?

A. Yes, that's right.

Q. How much additional production does Triumph expect to obtain from this microemulsion tertiary flood?

A. Well, we expect at least 506,000 barrels of oil recoverable.

Q. And what would you estimate the total value of this additional production to be?

A. Assuming a price of $18 a barrel, it would be $9,108,000 total revenue.

Q. Assuming this tertiary flood is successful, does Triumph plan to expand the project?

A. Yes, we do.

Q. And if you expand the project, then you would be back seeking certification of additional acreage as an enhanced oil recovery project and treat those on a stand-alone basis; is that right?

A. That is right.

Q. Attached to the letter which is marked as Exhibit 6, you made reference to a production history and production forecast. Those are marked Exhibits 7 and 8. Generally what do they show?

A. They basically show that the Tonto lease is at its very last stages of primary depletion. This, of course, is due to the fact that the GOR.

Exhibit Number 8 would be the production forecast, which would show basically what we think the response will be to the microemulsion flooding. This is also based on an analogous field that we have that is approximately four miles south of us that responded in a very similar fashion with only a typical waterflood, not utilizing microemulsion, which we hope will benefit us greatly over a typical waterflood.

Q. In your opinion, will approval of this Application and the implementation of the proposed tertiary microemulsion flood in the Tonto project area be in the best interests of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, sir.

Q. Were Exhibits 5 through 8 prepared by you or compiled under your direction and supervision?

A. Yes, sir, they were.

Q. And can you testify as to the accuracy of these

exhibits?

A. Yes, sir, I can.

MR. CARR: At this time, Mr. Ashley, we would move the admission into evidence of Triumph Exhibits 5 through 8.

EXAMINER ASHLEY: Exhibits 5 through 8 will be admitted as evidence.

MR. CARR: And that concludes my direct examination of Mr. Foster.

EXAMINATION

BY MR. ASHLEY:

Q. Okay, Mr. Foster, now back to the wells, which ones are -- I guess I'm looking at Exhibit B -- Exhibit 6 and then Exhibit B in Exhibit 6?

A. Yeah, it would be pages 7, 8 and 9 of Exhibit --

Q. -- 6.

A. -- Exhibit 3, isn't it?

MR. CARR: Are you looking at Exhibit B to Exhibit 6, Mr. Ashley?

THE WITNESS: I think your question was, you wanted a description on the two proposed --

Q. (By Examiner Ashley) Yes, well, I wanted to know which ones were the proposed wells.

A. Okay, it is the 2 --

Q. You're looking at Exhibit 3?

A. Yes, page 7 through 9.

Q. Okay.

A. Okay? The first injector would be about midway down the first page, Number 7.

Q. Okay.

A. That well was P-and-A'd by the initial operator, Wallen. We have re-entered that well and have already prepped it for the beginning of microemulsion flooding.

Q. Okay.

A. The tubing and packer is in the hole and packer fluid on the back side.

Q. So Number 7 is ready to go?

A. Yes, sir.

Q. All right.

A. Okay, the next well would be the second well from the top, second page, page 8, Number 2. That well is a current producer. And what we're proposing is to convert it to injection. That well being our furthest west injector.

Q. Okay.

A. Okay, the third well would be about halfway down that same page, 9 Y. Now, there is a little confusion. There is a 9 and 9 Y there. The 9 was a J-and-A'd well, the 9 Y was a replacement. That well is a current producer. We're proposing also there to convert it to

injection.

Q. All right. Which wells were originally approved as injectors under the waterflood order?

A. The Number 7.

Q. Only the Number 7 --

A. Yes, sir.

Q. -- nothing has ever been done with that one?

A. Yes, sir.

Q. It was completed as an injector, and then it's just set there?

A. Yes, sir. Actually, Mr. Krug -- It was Wallen Production that got that well approved before the OCD several years ago, but the well was never re-entered until May of this year. The Number 7 was a P-and-A'd well. But it had 7-inch casing set to TD and circulated to surface. So again, it is a Class 1 wellbore.

Q. So that was the original injection well under R-9082?

A. Yes, sir. But Mr. Krug never got the well re-entered.

Q. Okay. And the Number 2 and the Number 9 Y, they also have cement circulated --

A. Yes, sir.

Q. -- 7-inch?

A. Yes, sir.

Q. Wow.

A. Every well out there has 7-inch circulated. It's a very good situation.

Q. Okay. Now I'm looking at Exhibit 6 --

A. Okay.

Q. -- Exhibit B of Exhibit 6, and you have the three injection wells, and then you have these producing wells, 1, 3, 4, 5, 6, 8, 10 and 11?

A. Yes, sir.

Q. Those are all within the boundaries of the --

A. -- project area.

Q. -- project area?

A. Yes, sir.

Q. Okay.

A. And all have 7-inch casing circulated.

Q. Okay.

A. Nice.

Q. Yeah.

A. Yeah.

Q. Okay. Now, the P-and-A'd wells on Exhibit Number 3, it starts at page 10, is a list of the P-and-A'd wells.

A. Yes.

Q. Okay. And just kind of going through them all, the Cleary Petroleum, is that open hole from -- I guess it shows 5-1/2 set at 1540 and then it's open hole down to TD?

A. Make sure I'm on the right -- Okay, Cleary, the Hi Yo Silver Federal?

Q. Yes.

A. Okay. Yes, sir, we have 5-1/2 set to 1540 and then open hole from there down.

Q. And then the next page is Sinclair Oil and Gas, page 13?

A. Uh-huh.

Q. Same thing, they set surface and then drilled to TD, and then that's all open-hole?

A. Yes, sir, with four plugs.

Q. Okay. Okay, what about the one on page 14? Is that casing that they've cut, or is that a liner in there or --

A. No, sir, they actually ran casing on that well. I apologize, it's just not denoted here, but they did run casing on that well --

Q. Okay.

A. -- and cut it off. That well is actually within the south half of 30, which is our area.

Q. Okay.

A. And again, page 15, the Tonto 9 was a J-and-A'd well. Mr. Krug lost that well on cable tool and moved over and drilled the 9 Y.

EXAMINER ASHLEY: Okay, I have nothing further.

Thank you.

THE WITNESS: Thank you.

MR. CARR: At this time we would call H.L. Atnipp.

H.L. ATNIPP,

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

DIRECT EXAMINATION

BY MR. CARR:

Q. Would you state your name for the record?

A. H.L. Atnipp.

Q. Mr. Atnipp, where do you reside?

A. Midland, Texas.

Q. By whom are you employed?

A. Self-employed.

Q. What is your relationship with Microbac International?

A. I have a distributorship from Microbac International for the utilization of micro-organisms in various things, not just oilfield but water purification and all the applications that are available to them.

Q. Have you previously testified before this Division and had your credentials as an expert accepted and made a matter of record?

A. Yes, I have.

Q. And how were you qualified at that time?

A. As I am an engineer and a registered professional engineer in the State of Texas.

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

A. Yes, I am.

Q. And are you familiar with Triumph's proposed microemulsion tertiary flood, which is the subject of this Application?

A. Yes, I am.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER ASHLEY: Yes, they are.

Q. (By Mr. Carr) Could you explain to Mr. Ashley what is Microbac International?

A. Microbac International has growth facilities. They have been able to isolate naturally occurring micro-organisms for utilization in various things. In our case it happens to be in the oil industry, but they do a lot of work in bioremediation, also in farming, hog farms and things of that nature. They are not always the same micro-organisms for each of these separate phases.

Q. In this case, what are we trying to do with these micro-organisms in a reservoir?

A. We have selected micro-organisms who use as their

food source carbonate scales, sulfate scales and iron sulfide.

Q. And what is our objective in a tertiary microemulsion flood in this reservoir?

A. The by-product of the micro-organisms that we utilize that will digest the things we just said is a surfactant, and that is what we are creating. We are creating a surfactant flood, but instead of a commercial surfactant, we are creating it downhole.

Q. And when you do that, what benefits do you achieve in the reservoir?

A. Well, you get two benefits. Number one is, with the surfactant you will change the irreducible oil saturation and get additional recovery. The second thing, and not a minor thing, is, by removing the scale you should also get a better sweep efficiency and affect portions of the reservoir that would not otherwise be affected.

Q. Could you just briefly explain how Triumph's proposed microemulsion tertiary flood will work?

A. Yes. We have selected a slug size of 200,000 barrels, the first initial 200,000 barrels of water will contain 125 parts per million of the naturally occurring micro-organisms. That's five gallons per 1000 barrels of water injected. That will be the initial slug size.

When that slug is in, then we will discontinue

utilizing the micro-organisms in the water, but we may pick it up again if the scale and iron sulfide begins to form there again.

Q. And if you expanded the project again, you would be adding additional slugs of the micro-organisms to the reservoir; is that right?

A. Yes, if we had areas that had not been affected, yes.

Q. How long will it take to get this initial slug into the reservoir in this tertiary project?

A. Utilizing the numbers that Randall quoted, we're in the range of 9 to 11 months of injection. That number could be more or less. Our experience is that the injection rate actually increases initially, once we have started injecting the micro-organisms. So we may be able to inject more than the 500 barrels a day he talks about, maintaining the same injection pressure that he's utilizing.

Q. And so if I understand it, what you do is, you inject over a 9- to 11-month period, this initial slug, then you monitor the reservoir. If you start seeing signs of scale, you would reinject additional micro-organisms, and then as the project succeeds, you would be adding additional areas, and at that time there would be new applications and requests for authorization to put

additional organisms in the reservoir; is that correct?

A. That is correct.

Q. In terms of the benefits of using micro-organisms, what sort of an environmental impact is there from using these materials?

A. Very environmentally safe, because the EPA does not require anything, because these are naturally occurring micro-organisms. They're there. You spill it on the ground, you do not have a problem. You get it in a freshwater sand, you do not have a problem. You get it on your body and there is no detriment. It's very much environmentally safe.

Q. What sort of costs are associated with the initial 200,000 barrels that we're going to be injecting in terms of the cost being the microemulsion?

A. $70,000, over and above their cost for the facilities and everything.

Q. How much additional production do you anticipate may be recovered by the use of this microemulsion tertiary flood?

A. Well, there's a lot of work that has been done about surfactant flooding, by the way, by the New Mexico Petroleum Research Institute. And they estimate that between 4 and 16 percent of the original oil place is possible by microemulsion flooding. If we got the lower

number, which is 4 percent, that would be an additional 160,000 barrels of oil over and above what Randall stated. The number he gave you was what was anticipated simply from the waterflood. We would anticipate a minimum of 160,000 barrels additional as the result of going to the tertiary microemulsion flood.

The upside of that would be four times that much, and almost an equivalent number to what you would get from just waterflooded by itself again.

Q. Mr. Atnipp, do you have anything you'd like to add to your testimony?

A. No.

MR. CARR: That concludes my direct examination of this witness.

EXAMINATION

BY EXAMINER ASHLEY:

Q. Mr. Atnipp, what did you say that this source was for these micro-organisms, food source?

A. Scale and iron sulfide, which is present and always the big problem with the floods. That is the secret to the whole thing, that they -- The work done in the past has always come up with that a commercial surfactant will definitely increase significantly the ultimate recovery. The problem has always been that the commercial surfactant didn't let you make any money out of it.

And they've always known that it was possible that if you could come up with something such as we have here, where the food source and the surfactant was created downhole, it makes it an economically feasible set of circumstances.

Q. You talk about this initial slug of -- what volume?

A. 200,000 barrels of fluid, but water. To that we will add 125 parts per million, which is five gallons per 1000 barrels of micro-organisms, and we will put it on that basis, we will inject the micro-organisms into the water at the rate of 125 parts per million until the full 200,000-barrel slug is completed.

Q. And then you will -- then the injection will just be --

A. -- water.

Q. Water, okay.

A. Unless we encounter a problem which we'll -- that would then use the micro-organisms again.

EXAMINER ASHLEY: Okay, I have nothing further. Thank you.

MR. CARR: Mr. Ashley, that concludes our presentation in this case.

EXAMINER ASHLEY: Mr. Carr, would it be possible for me to ask Mr. Foster another question?

MR. CARR: Yes, sir.

RANDALL FOSTER (Recalled),

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

DIRECT EXAMINATION

BY EXAMINER ASHLEY:

Q. When you were talking about the produced water coming from the Capitan Reef and then you said you also had some studies done as far as freshwater and no water wells and things like that --

A. Yes.

Q. -- I just had one question to follow up on that. How deep is the Capitan aquifer there?

A. Approximately 3200 feet. It is actually below the Yates-Seven Rivers sand.

Q. So tell me again, what depth are you looking at injecting in?

A. 2900 to approximately 3115.

Q. So you're injecting right on top of the aquifer, but you say it's nonpotable there?

A. It's non-potable, yes, sir.

Q. Are there any other waterfloods in that area?

A. The nearest that I would be aware of would be the Teas Waterflood Unit, which is approximately four miles south of us, and they also used Capitan Reef water as

makeup.

Q. It's about four miles south of there?

A. Yes, sir. I have a production curve on that waterflood if you'd like to see that.

Q. On the West Teas?

A. Yes, sir.

Q. Sure. Yeah, that's fine.

MR. CARR: Would you like that marked as an exhibit?

EXAMINER ASHLEY: That would probably be a good idea.

MR. CARR: Mr. Ashley, that will be Triumph Exhibit Number 9.

EXAMINER ASHLEY: Thank you. Exhibit 9 will be admitted as evidence.

Q. (By Examiner Ashley) And I had another question. The produced water, what was the source of the produced water, other than Capitan Reef, but then you have other produced water?

A. It's the water that's indigenous to the Yates-Seven Rivers --

Q. Okay.

A. -- that we produce along with the oil.

EXAMINER ASHLEY: Okay, that's all I have. Thank you.

THE WITNESS: Thank you.

MR. CARR: That concludes our presentation.

EXAMINER ASHLEY: There being nothing further in this case, Case 12,271 will be taken under advisement.

(Thereupon, these proceedings were concluded at 12:50 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case 12271 heard by me on 10-21 1999.

Mark Ashley, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL November 3rd, 1999.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002