BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 5, 1975

EXAMINER HEARING

IN THE MATTER OF:	
Application of Amoco Production Company for a pilot pressure maintenance project, San Juan County, New Mexico.	Case No. 5434

BEFORE: Richard L. Stamets, Examiner.

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

E X H I B I T S

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MR. STAMETS: Call the next case, 5434.

MR. CARR: Case 5434. Application of Amoco Production Company for a pilot pressure maintenance project, San Juan County, New Mexico.

MR. STAMETS: Call for appearances in this Case.

MR. COOTER: Paul Cooter with Atwood and Malone in Roswell, Mr. Examiner, appearing on behalf of Amoco Production Company. The presentation of the Case itself will be handled by Oscar Swan, Amoco's House Counsel in Denver and a member of the Colorado Bar Association.

MR. STAMETS: Are there other appearances in this Case?

MR. SPERLING: James E. Sperling, Albuquerque, appearing on behalf Mobil. We will have no testimony; we don't anticipate any testimony but simply would like to ask a few questions.

MR. STAMETS: Are there any witnesses to be sworn at this time?

MR. COOTER: Yes.

(Witness sworn.)

MR. SWAN: Mr. Examiner, before commencing with the testimony, this is perhaps getting into some fancy sematics, but actually what we are seeking to do here

doesn't quite reach the stature of a pilot pressure maintenance program; I think it is included in that, but we're not going even that far. It is a necessary preliminary; I think the notice is certainly adequate to cover it; it covers a lot more than we are asking for approval of at this point, and with that, may I put on the Witness; I think he can explain what it is we are trying to do.

R.B. GILES

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SWAN:

Q Would you state your name, please?

A R.B. Giles.

Q By whom are you employed and what is your position?

A Amoco Production Company in its Denver Division, as a Senior Staff Engineer.

Q Have you testified previously before this Commission and had your qualifications as an engineering witness admitted?

A Yes, on both counts.

MR. SWAN: May his qualifications be admitted?

MR. STAMETS: The Witness is qualified.

BY MR. SWAN:

Q I think perhaps, Mr. Giles, at this point would you explain to the Commission just what it is that we are asking approval for at this time?

A Amoco is requesting approval to conduct, as Mr. Swan said, a limited gas injection test in the Pennsylvanian D Formation in Tocito Dome Field. We propose to reinject produced gas into the Penn D Formation for a 30-day period to determine at what rates and at what pressures the formation will accept injected gas. We must emphasize once again that this is not a pressure maintenance project; it is simply a feasibility study for gas injection using our current compression facilities. We really need to determine whether or not the present compressors are capable of gas reinjection at existing reservoir pressures. I would like to refer to our Exhibit No. 1. This is a structure contour map on the Penn D Zone with contour intervals of 10 feet. The minor fault on the left, on the west of the Exhibit is just that, a minor fault with perhaps 200 feet of displacement. The major fault running along the east side of the Penn D Pool is a major fault with 2000 foot throw.

The stipled or dashed lines on the map represent where ownership changes as between lessees. Basically it shows that Texaco has the south end of the pool and we have the middle and Mobil is up on the north side. This Exhibit shows that two arrows indicating the well or wells that we will want approval to inject produced gas into on the Amoco U Lease. What we are going to do is take the produced gas from the P, the N, the U, and Z leases of Amocds and for a short term gas injection test we'll take the gas from these oil wells. All wells on these leases produce from the Penn D Formation and we tentatively are looking at injection from two to five MMCFD, but this, of course, is dependent on what we can actually inject with our current compression facilities.

Use of one of the five existing gas compressors is all we expect to need for this short-term injectivity test and we can go up to 1500 psi with this sales compressor.

Initially U-3 in the Southwest Southwest of Section 15, 26 North, 18 West, will be used as a test injection well. Why did we select that one? Well, because as you can see from Exhibit 1, it's in a high structural position. It is also in close proximity to the gas sales

compressors in the central tank battery, which is located just southwest of that well in the extreme northeastern corner of Section 20, and that means a short injection line length. U-3 also produces 46 barrels of oil per day, not a heck of a lot, so that will help ease the pain of taking a well off production.

The approximate reservoir pressure in the area of U-3 is 1000 psi at this time. Now, if a satisfactory rate of injection cannot be initiated into Tribal U-3, then we will have to select another well and we prefer to use U-8.

(Whereupon, a discussion was held off the record.)

MR. STAMETS: You may continue Mr. Giles.

A (Continuing) I have said, Mr. Stamets, that if a satisfactory rate of injection cannot be initiated into Well U-3 then we'll prefer to select as an alternate location Well U-8, another arrow on Exhibit 1. I want to make it clear that U-8 will not be used if U-3 accepts gas in a satisfactory manner.

We have two other Exhibits labeled Exhibits 2 and 3 and they are simply wellbore diagrams for these two wells, U-3 and U-8, containing pertinent information on

the casing, tubing and cement programs. Gas will be injected down 2-7/8-inch tubing underneath the packer. So, our requested gas injectivity test at one or both of these wells, in our view,will not impair the correlative rights of any party because it is purposely intended as only a short term injectivity test and is not designed as a pressure maintenance project. Amoco holds the full working interest in the Navajo Tribal N, P, U, and C leases; the Navajo Tribe is the only royalty interest owner and there are no overriding royalty interests. Now, following this 30-day test period Amoco will analyze the injection data to determine what future steps, if any, should be taken. If we determine it is feasible to continue gas injection then we will make the proper and necessary applications under Rule 701 with the Commission for any extended long-term gas injection program.

That's really what we are here for and what it is all about.

Q Mr. Giles, maybe this is a layman's way of expressing it, but is this test as much a test of the use of the existing sales compressors for injection use as it is a test of the formation itself?

A Yes, it is.

Q In other words you are trying to see if we can make due with what is already on the lease there?

A That is correct.

MR. SWAN: That concludes our Case. I submit him for questioning.

MR. STAMETS: Okay.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Giles, is it possible that you could be injecting into both of these wells or would you just be injecting into one?

A Plans are just to inject into one; U-3 initially, and then if its reservoir pressure is too high to allow the existing sales gas compressor to operate properly to inject gas there then we'll take U-8 and use it.

Q Since this is a short-term project, there is no real concern here about corrosion prevention, anything like this, so far as your lines or tubing and so on?

A That is correct.

Q Since this is a short-term project, just assuming that you would inject into U-8 for the 30 days, would you expect that to have any effect on the Mobil acreage to the north?

A No, I wouldn't, because under such a short-term test we should be able to observe any northward movement of the gas at our Well U-16, between Mobil's lease and U-8. Actually -- I might say it even another way -- if there were an effect felt on Mobil's lease it would probably be a beneficial-oil-migration effect to them.

(Whereupon, a discussion was held off the record.)

BY MR. STAMETS:

Q Mr. Giles, will Amoco submit a report on the limited gas injection test, advising us what volumes were injected and the pressures and so on in this particular well or wells?

A You bet, and I would think it to be proper for you to put it in your Order that you require this; we would do it, however.

Q Do you anticipate that you might be looking at more than a 30-day test?

A Well, this is a good question. If we -- we will use U-3 to start with, and I could envision that in 10-days or two-weeks time we decide that that well is not taking gas acceptably and we want to move to U-8, I would think we ought to be permitted the 30 days on U-8 in order

to adequately and properly evaluate this short-term test.

Q If an order were entered authorizing 30-day injection test on U-3 and/or U-8, this should take care of that circumstance?

A Certainly.

MR. STAMETS: Are there any other questions of this Witness?

MR. SPERLING: Yes.

MR. STAMETS: Mr. Sperling?

CROSS EXAMINATION

BY MR. SPERLING:

Q Mr. Giles, you indicated that this was in addition to the determining the ability of the reservoir to take gas injection and equipment to test the existing equipment. How would you propose to vary the equipment used in the event you find it necessary to move to U-8?

A We would just simply --

Q (Interrupting) Lay a line over there?

A (Continuing) Lay a line over there, yes, sir.

Q What type of reservoir are we dealing with here?

A We have a Vuggy limestone.

Q Has it been Amoco's experience that the permeabilities in this area are excellent?

A They are quite good; they're as good in this area as probably anywhere in the field.

Q Would that indicate to you that the ability of the reservoir to take gas injection?

A I think it would improve the capability of the taking of gas and I think that's conducive to why we selected a top-structure U-3 Well initially. It is in an area of better permeability; we ought to learn our objective results sooner.

Q What is the drive mechanism in the reservoir?

A Gravity segregation predominately with perhaps a very limited water influx from the southwest in some areas, but predominately and essentially gravity segregation.

Q This is classified as a combination gas-oil reservoir is it not?

A It's an oil reservoir with a solution gas-oil ratio of about 800.

Q But there are wells classified as gas wells within the field?

A Yes. At this time we have a gas cap where there are seven wells on the very top part of the structure that are shut in to conserve energy.

Q Do you have any idea where the gas oil contact might be at this point in time?

A Not a precise idea, no.

Q Do you have an opinion?

A Up in the area where the 7 wells are shut in.

Q What contour line on your map would that be? At the outside 500 minus 500 contour line on the Exhibit?

A I don't really know precisely where it would be; it would be up on the southern part of the N lease, the Southern Half of Section 17 and the North Half North Half of Section 20, up in that area.

Q Well, you don't have an opinion as to the contour line -- I assume this is a structure map?

A It is a structure map.

Q Where would the contact be in your opinion insofar as your indicated lines are concerned; minus 500, minus 510 or where?

A I don't precisely know.

Q And you have no opinion as to where it is?

A I'd rather not venture that opinion; that's a little more precise than I'd like to say at this time.

Q Well, you would say that the U-3 Well is above the gas-oil contact? In other words, U-3 is in the gas cap?

A Very close to it if it's not.

Q And what about U-8?

A Not in my opinion in the gas cap.

Q Would you have any objection to notifying the other operators in the field in the event that your decision is to shift injection from U-3 to U-8?

A No, no. I think all operators should be fully informed as to what we are doing at all times. We intend to do this.

Q Well, it would seem to me -- maybe you agree with this and maybe you don't, we'll find out I guess -- the optimum place to inject gas would be within the so-called gas cap area, and you have indicated that that is your preference by your selection initially of the U-3 Well I take it, is that right?

A It is a very high-structure well, yes.

Q The U-8 Well is not nearly as high a structure, it being approximately 531 minus 531, some 42 or 3 feet lower than U-3?

A Well, of course U-8 is in an area that has the -- the pressure is probably about 200 pounds lower than in U-3 and that could have a decided advantageous benefit in trying to utilize the existing gas sales compressor to try

this short-term test. That is why U-8 would be a promising alternative. To go back up into N-12, N-3, or wells close to U-3 when your U-3 Well didn't work out very well, you're just picking a well with the same type of reservoir pressure and your chances diminish appreciably for a second test being successful there.

Q Do you have any current bottomhole pressure information on either of these wells?

A Yes.

Q What is that bottomhole pressure?

A The bottomhole pressure of U-3, we don't have a recent measurement, but at N-12, to the northwest, it was 1075 psi; at U-8 it was 776, so that's 300 pounds difference. The pressure gradient moves to the southwest to the highest pressure, and it is just normal that it would do that because we are reinjecting produced water at N-2 and U-1.

Q You have been injecting water for a considerable period of time, isn't that true?

A Yes, produced water.

Q Produced water, yes.

A And Texaco has down at AL-3 in Section 28.

Q Has the Formation's reaction to injected water

changed appreciably since you started that? In other words, are you injecting more water than you did initially?

A We're injecting 3500 barrels of water per day into our two wells at this time. No substantial change in performance as a result of that.

Q I think the Examiner expressed Mobil's concern in the matter, and you have already indicated that you expect to come back anyway with whatever data you are able to collect if it appears that the project is feasible, but to state Mobil's concern, it is that of the possibility of a channeling as a result of the injection of gas in U-8. I would assume that if you find it to be feasible then you would plan to try and inject as much produced gas as possible into the reservoir on a full-fledged pressure-maintenance program. Is that what you have in mind?

A Well, you're getting a little ahead of our plans for talking about a full scale --

Q (Interrupting) This is presuming the ultimate, now.

A I will say this: Amoco has studied this Pool for possible -- call it extra recovery mechanism, and we will come not only to Mobil but to Texaco with our findings and would hope we could all have togetherness before we come before the Examiner for a long-term, full-scale, secondary

so-called recovery project. So, we will keep you informed.

MR. SPERLING: Thank you; that is all I have.

MR. STAMETS: Mr. Swan?

REDIRECT EXAMINATION

BY MR. SWAN:

Q Mr. Giles, getting to the question of whether you inject into U-3 or decide to go down into the U-8, if the U-3 will not take the gas, will it be, in your opinion -- well, what will be the reason it won't take? Will it be a rock condition or --

A (Interrupting) No, no, not a rock condition, but the fact that the sales gas compressor is limited by 1500-pound-pressure rating and the reservoir pressure is 1000 or 1075 pounds. We are going to have a little line loss and down-hole-pressure loss, maybe a couple of hundred pounds, so we are kind of at a teeter-tooter position as to how much gas we can inject bucking that reservoir pressure. That's why, if it is not successful at U-3, we would want to move to a slightly lower pressure to give that sales gas compressor an opportunity to inject gas.

Q And if you have to move to that U-8, might that mean that your sales compressors just aren't going to get the job done?

A It could, and it may mean we'll have to go for additional compression.

Q Would that U-8 test be necessary so that you'd know what kind of additional compression to go for?

A I would.

MR. SWAN: That's all.

MR. STAMETS: Any other questions of the Witness? He may be excused. Anything further in this Case?

MR. SWAN: Oh, I'm sorry. There are Exhibits 1, 2, and 3.

MR. STAMETS: Without objection Exhibits 1, 2, and 3 will be admitted.

(Whereupon, Amoco's Exhibits Nos. 1, 2, and 3 were admitted into evidence.)

MR. STAMETS: Anything further in this Case? We will take the Case under advisement.

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

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

RICHARD L. NYE, Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 5434, heard by me on 3-5, 1975.

Richard L. Stamets, Examiner
New Mexico Oil Conservation Commission