STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

21 November 1985

EXAMINER HEARING

IN THE MATTER OF:

Application of Tenneco Oil Company for downhole commingling, San Juan County, New Mexico. CASE 8762, 8763, 8764, 8765

BEFORE: Michael E. Stogner, 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

MR. STOGNER: Call next Cases Number 8752, 8763, 8764, and 8765 at the applicant's request.

MR. TAYLOR: The application of Tenneco Oil Company for downhole commingling, San Juan County, New Mexico, each of them are.

MR. STOGNER: We will call for appearances in each and every one of these matters.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of Tenneco Oil Company, and I have one witness.

MR. STOGNER: Are there any other appearances in any of these cases?

Will the witness please stand and be sworn?

(Witness sworn.)

MR. STOGNER: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Stogner.

By way of introduction, Mr. Stogner, Tenneco has filed with the district office a number of applications to commingle the Basin Dakota and the Blanco

Mesawerde in wells.

Mr. Chaves of the district office approved others but requested that these four wells be set for hearing because the administrative application did not have enough information by which he could determine the economics of the two zones to be commingled.

As you may recall, one of the rules of the Division for administrative approval of gas zones is set forth in Paragraph (g) 1 and talks about the economics of the zones to be commingled.

Mr. Chaves believed that additional testimony was needed through a hearing process to satisfy the Commission on that point.

Accordingly, what you have before you are a number of exhibits.

Exhibit One applies to all the cases.

Exhibits Two, Three, Four, and Five are the package of documents that affect each of the four wells.

We propose to go through Exhibit One and Exhibit Two and then to summarize the rest of the exhibits. The information contained as to each well is virtually identical. The essential information that we want to convey to you can be outlined by using one of the cases

as an example.

We propose to use the Dawson A-1 as the example case that applies to all wells.

FRANK G. WEISS, III,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Weiss, for the record would you state your name and occupation?

A Frank G. Weiss, the third, Senior Production Engineer for Tenneco Oil.

Q Mr. Weiss, have you previously testified before the Division?

A No, I have not.

Q Would you identify briefly where you obtained your degree?

A I received a BS in engineering from the University of Wyoming in 1978.

Q Would you identify for the Examiner what has been your employment background as an engineer since graduation?

A Upon graduation I spent three years with

Gulf Oil, one year as a field foreman, field engineer; two years as an area engineer in the Caspar office, upon which I left Gulf's employment and have been with Tenneco for four and a half years.

Q As an engineer with Tenneco, Mr. Weiss, would you describe generall what your responsibilities are?

A I have responsibilities for the Largo area. It is an area within the San Juan Basin. It has currently about 308 gas well completions, an active drilling program, and an active workover and recompletion program.

Q Have you been assigned a responsibility by your company to process the downhole commingling applications that are before the Commission today?

A Yes, I have.

Q And are you familiar with the facts surrounding each of those applications?

A I am.

Q Would you give the examiner an introduction as to the basis why you believe as an engineer that the downhole commingling of the Dakota and the Mesaverde formations in each of these wells is one that's appropriate?

What's the basis that we're starting with?

A First I think we need to look at the mechanical completion of the wellbore on these wells. The

majority of these are older Mesaverde completions that were completed in about '52 to '55. They were open hole completions that were shot with solidified nitroglycerin.

In the mid and late sixties Tenneco came back in, drilled out the shot hole and deepened these wells to the Dakota formation and ran 4-1/2 inch casing strings from total depth to surface; the restriction being at 4-1/2 casing string you cannot run two strings of tubing. We were therefore forced to produce the Dakota from underneath a packer up strings of 2-3/8ths inch tubing and the Mesaverde is produced via the 2-3/8ths by a 4-1/2 inch annulus.

Q That's the way each of these wells is completed now?

A Yes, sir.

Q Dual completion; Dakota up the tubing; Mesaverde up the annulus.

A Yes.

Q What do you propose to do if the Division approves the downhole commingling? How will the zones be produced?

A The zones will be commingled downhole and produced via one string of 2-3/8ths inch tubing.

Q I believe you've told us the casing string to the surface is 4-1/2 inch?

A Yes.

Q In your opinion as an engineer is it feasible to dually complete these wells where each formation is produced up tubing?

A It is not. You know, there's no way we can get two strings of tubing, it's physically possible, but they do not make the appropriate wellhead equipment.

Q Have you studied other Mesaverde and Dakota wells in this area, Mr. Weiss, to determine what has happened in the past with regards to wells that were dually completed in the manner that these wells are?

A Yes, I have. Exhibit Number One is an example of was completed identical to these others, the Hamner No. 1. The first page --

Q All right, let's find out where the Hamner No. 1 is. Is there something on the exhibit that identifies the location?

A Yes, the Hamner No. 1 is 29, 9 West, 20 -- I'm sorry, but --

Q All right, we'll get the correct description later.

A The correct description is not correct.

Q Yeah.

A That last one is supposed to be --

Q The Hamner Well is operated by Tenneco?

A Yes.

Q All right. Before you discuss the exhibit would you describe how this well was set up to produce both the Dakota and the Mesaverde?

A Okay. Once again this was 4-1/2 inch casing to surface with a packer, 2-3/8ths tubing, a Dakota -- underneath the packer the Dakota produced by a 2-3/8ths inch tubing, the Mesaverde producing up the 2-3/8ths by 4-1/2 inch annulus.

Q Okay. What does the exhibit show?

A The exhibit shows that as the Dakota became marginal and nonproductive, 11 MCF per day, we received approval to plug it.

If you'll note that in 1981, the end of '80, the beginning of '81, on the Mesaverde, which is the following curve, the rate from the Mesaverde increased from 66 MCF per day to 158 MCF per day, an increase of 92 MCF per day.

Q When the Dakota was abandoned, the Mesaverde then was produced up the tubing string in this well?

A Yes. It was abandoned and a string of 2-3/8ths tubing was run to produce the Mesaverde.

Q And it increased the Mesaverde production by more than twice.

A Yes.

Q Okay. And what happened to the Dakota?

A The Dakota was plugged and abandoned.

Q In the event that downhole commingling is not approved for these four wells, Mr. Weiss, do you have an opinion as an engineer as to what will occur for these wells?

A Yes, I do. I feel that as a result of not commingling these wells it will allow liquids build-up on both formations currently we see in the Mesaverde. You know, we had problems with liquid build-up and the fact that there was not enough annular velocity between the 2-3/8ths by 4-1/2 inch casing to produce these liquids; therefore as your gas brings liquids into the wellbore you get an increasing build-up of liquids, your mobility ratio for the gas decreases as the liquids build up.

In addition, the Dakota, Tenneco feels these are marginal, ranging in production from roughly 49 MCF a day, and I think the best one is around 115 MCF a day.

We blow these wells on a regular basis to unload liquids from the Dakota, also. If we continue to produce them in this manner, there will be a point where we can no longer unload the liquids from the Dakota and at that point I feel we will lose reserves.

Q You have concluded, then, Mr. Weiss, that the most effective and efficient way to produce both pools is to downhole commingle these wells now, is that correct?

A Yes, sir.

Q Do you have an opinion as to whether or not the downhole commingling now will result in greater ultimate recovery from either or both zones in terms of hydrocarbons than if we postpone the downhole commingling to some time in the future?

A I feel both wells will ultimately recover more reserves as a result of these downhole comminglings. As stated, you know, when the Dakota reaches a point when it becomes noneconomic and we can no longer lift those fluids, it will either be -- it would be plugged, whereas if we can use the Mesaverde's, you know, low pressure/high volume to effectively lift those liquids also, we can increase the cumulative recovery from the Dakota.

In addition, you know, by allowing us to produce the Mesaverde up 2-3/8ths inch tubing it will effectively help, as I said, to unload all the wellbore fluids that are currently restricting the production, and hopefully, change that mobility ratio and allow all those fluids that have built up to be produced.

Q For each of your four wells, Mr. Weiss, have you prepared a package of exhibits that conforms to the Commission requirements for administrative approval?

A Yes, I have.

Q For each of those wells is the pressure

differential between the lower pressure and the higher pressure zone not more than twice?

A It is within requirements.

Q All right, and have you notified and obtained waivers from any offset operators with regards to the downhole comingling?

A We have.

Q And is the ownership for each zone common?

A It is.

Q Let's build a little list here, Mr. Weiss, and let's have one column with Mesaverde, one column with Dakota, and then we'll run down the page with the well name, and if you'll pick whichever of the four wells you want to start with, let's start with the well name and then tell us what, in your opinion is the current producing rates from each formation.

A Okay. I will give you the current producing rate based on decline curve and these are extrapolated from the straight line decline on the curves.

Q Now your package of exhibits contains the decline curves, does it not?

A Yes, it does, and it does show the decline that is proposed.

Q All right, sir, let's have the numbers.

A The Dawson A-1, it is from the Dakota. It produces 49.3 MCF per day. The Mesaverde produces 59 MCF per day.

The Florance No. 36, Dakota produces 51.6 and the Mesaverde produces 224 -- excuse me. For the Florance 36 that rate is 36.2 from the curve.

Q I've been confused. Florance 36, the Dakota is 51.6 MCF?

A It's 36.2 MCF per day and the Mesaverde is 224.

Q All right, next well.

A The Florance No. 6, the Dakota produces 42.7; the Mesaverde produces 164.

The State Com No. 1, the Dakota produces 115 MCF per day and the Mesaverde produces 52.6 MCF per day.

Q Based upon your decline curves, Mr. Weiss, have you reached an opinion as to how to allocate on a percentage basis the production between the Mesaverde and Dakota?

A I have.

Q And what are those numbers?

A It would be on a strictly decline basis, you know, with remaining reserves calculated from decline curve analysis.

Q Let's take the package of exhibits marked

Two for the Dawson No. 1 Well, which is Case 8764, and have you show the Examiner the declie curve information and how you propose to allocate the production between the two zones.

A You'll find the decline curves at the very back of the package with the Dakota decline curve first, followed by the Mesaverde.

You can see we were able to draw in pretty much a straight line decline for the Dakota and from this we calculated remaining reserves, using decline curve analysis.

Q All right.

A You'll see on the curves for the Mesaverde, once again we took the straight line portion. In the last few years you can see the result of demand. This was neglected and we followed the straight line portion as it had been producing, you know, when it was on a good decline, straight decline as you would anticipate once pressures come back and demand picks up.

Okay, from those, having gone through those, we calculated what the percentage of remaining reserves for each would be and that would be one page in front of the decline curves.

You will see that the Mesaverde was on 8 percent decline and analysis showed that there's 246 MCF re-

maining reserves.

The Dakota, 6 percent decline, 271 MMCF reserves.

And the volume content of my letter, it breaks it out, I believe, at 48 percent and 52 percent, which would be percent of equity found right after the plat.

Q And if we turn to the plats, you have a written summary with the information on the Dawson 1?

A Yes.

Q And when we get to the bottom, the last paragraph gives your proposed percentage allocation for each fo the zones, is that correct?

A Exactly.

Q And for each of the packets of exhibits for each well you've done a similar summary with a similar recommendation.

A Right. And as I said, in this one 48 percent would be assigned to the Mesaverde and 52 percent assigned to the Dakota.

It may be of interest also to read the one paragraph I did which sums up our feelings as to how this well increased recovery.

Q If you can paraphrase what it says, it's not necessary to read the whole paragraph.

A Well, what it says is, roughly, the cross

area section of the tubing is 321 square inches, the --

Q Whoop, you're going too fast for her.

A In other words, the cross section area of flow through the tubing is much smaller than it would be up the annulus. As a result we can get a 3.6 fold increase in average flow velocity by bringing the Mesaverde and Dakota up the tubing. This will result, this increase in velocity will result in a better cleaning mechanism for the fluids within the wellbore and as a result you will have greater producing rates, which in turn will help lift fluids and remove the hydrostatic head that the formations are currently seeing.

Q Okay. Following that summary, if you'll turn the page, you have some gas well pressure information, Mr. Weiss. I believe you've reached the opinion that the pressure differential between the two zones was so small that there would be no risk of cross flows, is that right?

A This is correct.

Q Is this the beginning of the documentation on pressures from which the Examiner can confirm your opinions?

A Yes, it is.

Q Would you identify for him on this exhibit how you reached your conclusion?

A For the Mesaverde it says it is 4-1/2 by

2-3/8ths annulus. We took dead weight surface pressure. These were corrected to a common datum using fluid levels where available, the common datum in this instance being 5000 feet. The bottom line on this page shows you that the pressure was 617 psig.

The next page is a dip in gradient with a pressure bomb run by B & R Services in Farmington. You can see that at 5000 feet, the common datum, that the pressure was 1,109 psig. They are within the stipulation of 50 percent of each other.

Q All right, sir. Have you done a study to determine whether the fluids produced by the wells are compatible?

A Yes, we have.

Q And are they?

A They are.

Q In your opinion, Mr. Weiss, will approval of the applications requested by Tenneco be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, I do.

Q And were the Exhibits One through Five prepared by you or compiled under your direction and supervision?

A They were.

MR. KELLAHIN: That concludes my examination of Mr. Weiss.

We move the introduction of Exhibits One through Five.

MR. STOGNER: Exhibits One through Five will be admitted into evidence.

Are there any questions of this witness?

Mr. Weiss, or Mr. Kellahin, you alluded to Mr. Frank Chavez' feelings on the economic justification administratively not being followed.

Was this done by written correspondence with you, Mr. Weiss, and him or telephone correspondence, or what type of communications?

A This was done by telephone correspondence between myself, David Catanach, and Frank Chavez.

CROSS EXAMINATION

BY MR. STOGNER:

Q Okay. I'd like to bring up the question now on condensate production. In reviewing your Exhibit Number Two for Case Number 8764, that's the Dawson A Well No. 1, there shows to be a little bit of condensate production according to the C-116's on both zones.

Do you have a recommendation on the allo-

cation of condensate, what little there is?

A I feel that it should be broken out on a percentage basis, also.

Q The percentage basis that you show on your cover letter?

A Yes, sir, both for the gas and condensate reserve.

Q Does this 48 -- let's take, for instance, on your Dawson Well, the 48 percent and 52 percent for the Mesaverde and Dakota respectively, should be -- does that correspond with the condensate production from this well as shown on the C-116, or does it differ some way?

A I believe it may differ somewhat. I'd have to make actual calculations. This is the only one that shows any condensate production. I think you'll find in the remainder of these three applications there was on the C-116's, there was no production.

Q Mr. Weiss, is the Basin Dakota Pool and the Mesaverde Pool, are they prorated in the San Juan Basin?

A Yes, they are.

Q And also is the Mesaverde formation and Dakota formation in this area approved for infill well drilling on two -- for having two wells on a single 320-acre tract?

A Yes, it is.

Q Does any of these wells have a second well o the same tract?

A I believe they do.

Q Okay. For the proration unit for each of these wells, dedications, are any of them presently overproduced, or what is the status of the proration unit on these wells?

A To be totally frank, I believe that some are overproduced, the combination of the two, the two wells on the proration unit, and we discussed this. Our feelings are that the Mesaverde in these wells, as it is currently produced up 2-3/8ths by 4-1/2 inch annulus, they are very poor deliverability tests because of the hydrostatic head and therefore, you know, your allocation being determined directly from deliverabilities, these wells do not receive what I would consider a deliverability test and allocation that is comparable with the other surrounding wells, and therefore, that proration unit is probably penalized and we are allowed to produce less gas as a result of that.

Q Okay, and you're aware that if, say, the Basin Dakota in one of your proration units overproduces as such that that particular downhole commingled well would have to be shut in, the whole well would have to be shut in?

A We are.

Q Okay. Good deal. Your plan is to run 2-

3/8ths tubing in each one of these wells, subject wells today?

A Yes, will be to produce -- the plan is to produce both formations up 2-3/8ths inch tubing, is what we plan.

Q Do you know the order approving the tubing annulus dual completion of these wells? Are they covered in each one of these exhibits?

A Excuse me, I'm --

Q There was an order issued sometime ago, I'm sure, approving this downhole commingling method through our offices. Do you know the order number?

A Of these, oh, these were not approved.

Q For dual completion?

A Oh, for dual completion?

Q Right.

A No, I don't know that number. I'm sorry.

MR. STOGNER: I'll take administrative notice. I'm sure we have it on file here.

A I can verify what that location is on that Hamner Well at this time.

Q Okay, let's do that.

A It would be Section 20, 29 North, 9 West.

Q Okay.

A The computer threw me for a loss the way

it wrote it.

MR. STOGNER: I have no further questions of this witness.

Are there any other questions of Mr. Weiss?

MR. KELLAHIN: No, sir.

MR. STOGNER: Does anybody else have any questions of this witness?

If not, he may be excused.

Anything further in any of these cases?

If not, Cases Numbers 8762, 8763, 8764, and 8765 will all be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 8762, 8763, 8764, 8765 heard by me on 26 Nov. 1985.

Michael E. Stogner, Examiner
Oil Conservation Division