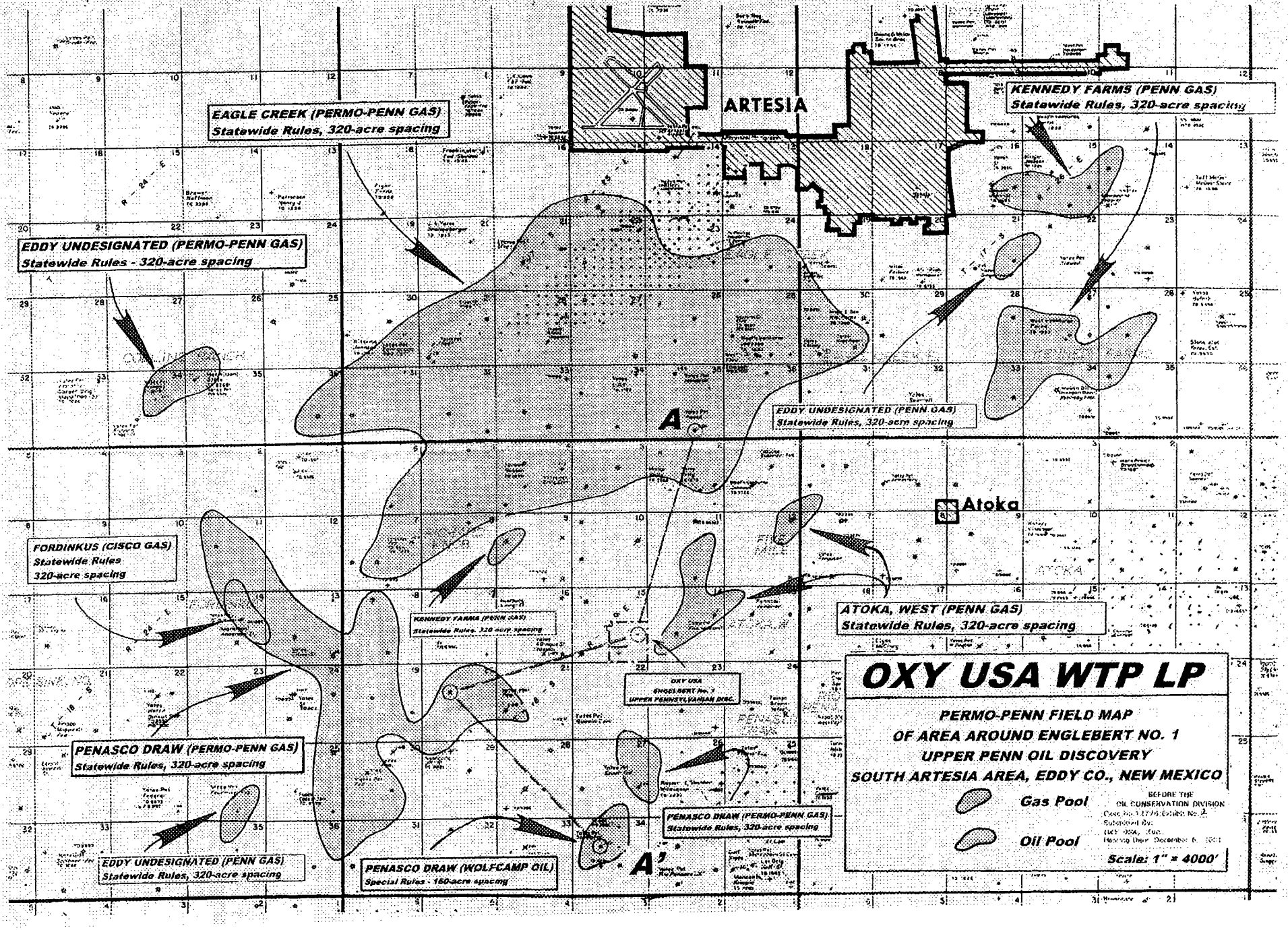
ARTESIA
EAGLE CREEK (PERMO-PENN GAS)
Statewide Rules, 320-acre spacing
KENNEDY FARMS (PENN GAS)
Statewide Rules, 320-acre spacing
EDDY UNDESIGNATED (PERMO-PENN GAS)
Statewide Rules - 320-acre spacing
EDDY UNDESIGNATED (PENN GAS)
Statewide Rules, 320-acre spacing
A
A'
Atoka
FORDINKUS (CISCO GAS)
Statewide Rules
320-acre spacing
KENNEDY FARMS (PENN GAS)
Statewide Rules, 320 acre spacing
ATOKA, WEST (PENN GAS)
Statewide Rules, 320-acre spacing
OXY USA
ENGLEBERT No. 1
UPPER PENNSYLVANIAN DISC.
PENASCO DRAW (PERMO-PENN GAS)
Statewide Rules, 320-acre spacing
PENASCO DRAW (PERMO-PENN GAS)
Statewide Rules, 320-acre spacing
EDDY UNDESIGNATED (PENN GAS)
Statewide Rules, 320-acre spacing
PENASCO DRAW (WOLFCAMP OIL)
Special Rules - 160-acre spacing
OXY USA WTP LP
PERMO-PENN FIELD MAP
OF AREA AROUND ENGLEBERT NO. 1
UPPER PENN OIL DISCOVERY
SOUTH ARTESIA AREA, EDDY CO., NEW MEXICO
Gas Pool
Oil Pool
BEFORE THE
OIL CONSERVATION DIVISION
Case No. 1177 Exhibit No. 2
Submitted By:
OXY USA, Inc.
Hearing Date: December 6, 1001
Scale: 1" = 4000'

PRO WELL TESTING & WIRELINE	Main Results	Analysis 1
	Company Oxy Permian, Ltd.	Field
	Well Oxy Engelbert #1	Test Name / #

Test date / time	
Formation interval	
Perforated interval	7174-94
Gauge type / #	
Gauge depth	
TEST TYPE	Standard
Porosity Phi (%)	4.5
Well Radius rw	0.33 ft
Pay Zone h	14 ft
FLUID TYPE	Oil
Volume Factor B	1.45272 B/STB
Viscosity	0.425146 cp
Total Compr. ct	9.38531E-5 psi-1

Selected Model

Model Option	Standard Model
Well	*Uniform Flux*
Reservoir	Two Porosity PSS
Boundary	Infinite

Results

TMatch	0.0163 [hr]**-1
PMatch	0.00464 [psia]**-1
C	0 STB/psi
skin	0
Delta P Skin	0 psi
Xf	284 ft
Pi	2127.69 psia
k.h	126 md.ft
k	8.99 md
Omega	0.305
Lambda	2.05E-7
Rinv	694 ft
Test. Vol.	1.69747E+5 Barrels

BEFORE THE
OIL CONSERVATION DIVISION
Case No.12776 Exhibit No. 6
Submitted By:
OXY USA, Inc.
Hearing Date: December 6, 2001

AVG PHI = 4.5%
AVG SW= 25.5%
FVF=1.45 BBL/STB
RESERVOIR AC-FT = 5,784.75
SE/QTR of Section 15 = 963.7 ac-ft
EST OOIP = $\frac{(7758)(.045)(.745)}{1.45}$ = 179.37 STB/ac-ft

ECONOMIC PARAMETERS:
DRILL AND EQUIP COST = $769,907
$20/BBL OIL FLAT
$2.20/MCF GAS FLAT

160 ACRE SPACING

SE/QTR OF SECTION 15

EST OIP = 963.7 ac-ft x 179.37 bbl/ac-ft = 172,859 STB

EST GIP = 230,902 MCF

EST RECOVERABLE OIL AT 25% RF = 43,215 STB

EST RECOVERABLE GAS @ 80% RF = 184,722 MCF

RATE OF RETURN = 20.02%

NET PRESENT VALUE AT 10% = $59,962

80 ACRE SPACING

EST OIP = 86,430 BBL

EST GIP = 115,451 MCF

EST RECOVERABLE OIL AT 25% RF = 21,608 BBL

EST RECOVERABLE GAS AT 80% RF = 92,360 MCF

RATE OF RETURN = 0%

NET PRESENT VALUE AT 10% = -$233,491

BEFORE THE
OIL CONSERVATION DIVISION
Case No.12776 Exhibit No. 8
Submitted By:
OXY USA, Inc.
Hearing Date: December 6, 2001

I N D E X

December 6th, 2001
Examiner Hearing
CASE NO. 12,776

* * *

Q. (By Mr. Kellahin) Let's talk a little bit about the well. Mr. Smith told us it had been drilled originally as a Morrow test, but that was unsuccessful. OXY came back up and has made an oil well in the Cisco formation? You're familiar with all that process?

A. Yes, I am.

Q. Give us a short summary of the history of the well.

A. It was indeed drilled to a depth of approximately 8900 feet in the Morrow formation. There was no sands to complete in, Morrow sands, so the Cisco/Canyon zone was identified by log analysis and it was indeed perforated at the depths of 7174 to 7194, at two shots per foot, and then stimulated with a 20-percent acid, gelled acid, with CO_2 foam.

Q. Have you run any type of test on the well, and if so, what types of tests have been run?

A. The well was flow-tested after the stimulation job. It was then shut in for a pressure buildup.

Q. What type of initial flow test results did you achieve?

A. Initial flow testing was done for a period of approximately 11 days, and the purpose of the test was trying to establish if the reservoir was indeed limited, and we did test the well until we felt like we had a

stabilized flow rate.

Q. What stabilized flow rate did you achieve?

A. It was approximately 230 barrels a day, on a 22/64 choke.

Q. What then was the next test you ran?

A. We ran a subsequent test later on to establish a potential for the well.

Q. And how would you do that?

A. It was a 24-hour test that was done, the choke size on this test was a 26/64 choke, and we did reach a stabilized flow rate of 408 barrels per day.

Q. Have you determined what would be your depth bracket oil allowable at this depth if the well is spaced on 160 acres?

A. Yes, I have.

Q. What is that number?

A. 382 barrels per day.

Q. Have you done the calculation, Mr. Womack, to show us what would be the additional discovery oil allowable that the well might be entitled to?

A. Right, our calculations would be taking the top perf of 7174 and multiplying that by 5 to get a bonus volume of 35,890, of which you would divide that bonus number by 730 to equal 49.2 barrels of oil per day additional.

Q. You used the rules set forth in the Division Rule Book under Rule 509? I believe you did.

A. Yes.

Q. All right, sir. What else have you done to the well to test it?

A. It's just been flow test and the pressure buildup.

Q. All right, let's talk about the pressure buildup. Is there an exhibit that demonstrates the data and the conclusions from the pressure buildup?

A. Yes, Exhibit 6 is the pressure buildup, with the first page being the results sheet.

Q. All right, sir, take us through the process. Give us a summary of the procedure and then your conclusions about the test.

A. Okay, after the well was flow-tested for approximately 11 days the well was shut in. At that time the pressure bombs were run in the hole, the well was shut in for 120 hours. That was the length of the pressure buildup. At that time the pressure gauges were retrieved, the data was downloaded, computer-type modeling software is used. This particular software is Saphir, it's produced by Kapp Engineering, it's a type-curve-modeling program.

Q. What are the conclusions from the test?

A. Conclusions, that it basically gave us a perm

number to work with.

Q. And what is the permeability, based upon the test?

A. The calculated permeability was 8.99 millidarcies.

Q. Now, Mr. Smith by his log calculation has an average porosity of 4 1/2 percent.

A. That's correct.

Q. If you take that number and integrate your 8.99 millidarcies of permeability, what can you as an engineer conclude about the reservoir and what should be the initial density of wells drilled in that reservoir?

A. Well, as Mr. Smith has stated, it's definitely anomalous as far as the Cisco/Canyon goes. We do have several other producers in the Cisco/Canyon, not in this particular zone but in the Permo-Penn Gas, and several pressure buildups, of course, have been done on those, and the typical permeability is less than 1 millidarcy.

So you could infer that there is fracturing involved here to get a correlation between the low porosity, the relatively high permeability.

Q. In order to develop a recommendation for the Division on the initial appropriate spacing, have you attempted to obtain data on what is expected for the cost components that you would utilize for determining how many

wells you could drill in this resource?

A. Yes.

Q. Let's turn to Exhibit Number 7. What are we looking at here?

A. Exhibit Number 7 is a detailed well estimate for drilling and equipping a Cisco/Canyon producer.

Q. this is the one for the Engelbert well?

A. Yes, it would be for a second well.

Q. Oh, this would be for a number two?

A. That's correct.

Q. How does this compare to the actual cost for the Engelbert Number 1?

A. Well, as I stated before, the Engelbert Number 1 was drilled to a depth of 8900 feet, so this is quite a bit of difference in depth.

Q. I see what you've done, you've adjusted this --

A. Right.

Q. -- as if it were to be a Cisco-only test?

A. That's exactly right, a depth of 7300 feet.

Q. All right. Have you taken the costs associated with wells and tried to forecast what you would believe to be the volume of oil within any given size spacing unit within this accumulation?

A. Yes, I have.

Q. Let's go through that process. If you'll look at

Exhibit 8, before we look at the calculation, let's look at the data or the assumptions you've made that go into the calculation.

A. Okay.

Q. First number is a porosity number?

A. First number is the average porosity number of 4 1/2 percent, the average water saturation of 25.5, an estimated formation volume factor of 1.45. The reservoir acre feet was calculated from the isopach map that was presented in Exhibit 4.

Q. All right, then you have some economic parameters?

A. That's correct.

Q. All right. Have you taken the numbers, the cost components and the reservoir data, and made an assumption about utilizing a 160-acre spacing unit, being the southeast quarter of Section 15?

A. Yes, I have.

Q. What have you estimated to be the original oil in place within that quarter section?

A. Estimated original oil in place is estimated to be 173,000 stock tank barrels.

Q. Of that original oil in place, what in your opinion is an estimate of the recoverable percentage?

A. 25 percent was the percentage used.

Q. If you use 25 percent, is that within the range of probabilities for recoveries of reservoirs of this type?

A. Yes.

Q. And if you use 25 percent, what will be your volume of recoverable oil?

A. Approximately 43,000 stock tank barrels.

Q. If you take that, coupled with the gas recovery, apply the economic parameters, what does it tell you?

A. We've recorded a rate of return of approximately 20 percent with the net present value at 10 percent being 60,000.

Q. Have you run your calculation to see whether or not it would be economically possible to drill on a density of less than 160 acres per well?

A. Yes, I have.

Q. Have you tried it on 80 acres?

A. Yes, I have.

Q. Show us what you did and what you concluded.

A. Okay, below the 160-acre spacing case there's an 80-acre spacing case, and simply what was done was to take the reserves and divide them in half.

Q. And when you do that, what is the result? You are going to recover just short of 22,000 barrels of oil?

A. That's correct.

Q. Well, you can't pay for a well like this with

that kind of resource, can you?

A. That's right, it shows basically that the well is marginally economic in a 160-acre spacing.

Q. Net present value at 10 percent shows a negative number. That's a negative $233,000 plus change?

A. That's correct.

Q. Okay. So neither you, OXY or any other reasonable operator could try to develop this, at least initially, on less than 160 acres?

A. I wouldn't think so.

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

We move the introduction of his Exhibits 6, 7 and 8.

EXAMINER STOGNER: Exhibits 6, 7 and 8 will be admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Womack, let's go back to the discovery allowable here and make sure I've got the numbers correct, where you got the numbers.

A. Okay.

Q. Okay, 382 barrels of oil per day, that's the average -- I'm sorry, the regular depth bracket allowable for a well spaced on 160, completed between 6000 and 7000