

1 STATE OF NEW MEXICO  
2 ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
3 OIL CONSERVATION DIVISION

4 IN THE MATTER OF THE HEARING )  
5 CALLED BY THE OIL CONSERVATION )  
6 DIVISION FOR THE PURPOSE OF )  
7 CONSIDERING: ) CASE NO. 10647  
CASE NO. 10648

8 APPLICATIONS OF SEELY OIL COMPANY  
9 -----

10 REPORTER'S TRANSCRIPT OF PROCEEDINGS

11 EXAMINER HEARING

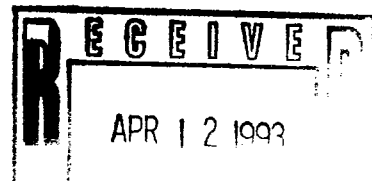
12 BEFORE: Michael E. Stogner, Hearing Examiner

13 March 18, 1993

14 Santa Fe, New Mexico

15 This matter came on for hearing before the  
16 Oil Conservation Division on March 18, 1993, at the  
17 Oil Conservation Division Conference Room, State Land  
18 Office Building, 310 Old Santa Fe Trail, Santa Fe, New  
19 Mexico, before Deborah O'Bine, RPR, Certified Court  
20 Reporter No. 63, for the State of New Mexico.

21 **ORIGINAL**



## I N D E X

March 18, 1993  
 Examiner Hearing  
 CASE NOS. 10647 and 10648

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## A P P E A R A N C E S

FOR THE DIVISION: ROBERT G. STOVALL, ESQ.  
General Counsel  
Oil Conservation Commission  
State Land Office Building  
310 Old Santa Fe Trail  
Santa Fe, New Mexico 87501

FOR THE APPLICANT: CAMPBELL, CARR, BERGE & SHERIDAN  
P.O. Box 2208  
Santa Fe, New Mexico 87504  
BY: WILLIAM F. CARR, ESQ.

CUMBRE COURT REPORTING

P.O. BOX 9262

SANTA FE, NEW MEXICO 87504-9262

(505) 984-2244

1 EXAMINER STOGNER: This hearing will come  
2 to order. Call next case, No. 10647.

3 MR. STOVALL: Application of Seely Oil  
4 Company for statutory unitization, Lea County, New  
5 Mexico.

6 EXAMINER STOGNER: Call for appearances.

7 MR. CARR: May it please the examiner, my  
8 name is William F. Carr with the Santa Fe Law Firm,  
9 Campbell, Carr, Berge & Sheridan. We represent Seely  
10 Oil Company, and I would request that this case be  
11 consolidated with the following case in which Seely is  
12 seeking approval of a waterflood project for this  
13 unit.

14 EXAMINER STOGNER: Are there any other  
15 appearances in case 10647? In that case we'll call  
16 Case 10648.

17 MR. STOVALL: Application of Seely Oil  
18 Company for approval of a waterflood project and  
19 qualifications for the recovered oil tax rate, Lea  
20 County, New Mexico.

21 EXAMINER STOGNER: For the record, are  
22 there any appearances for 648?

23 There being none, Mr. Carr?

24 MR. CARR: May it please the Examiner,  
25 these cases were originally filed in early December

1 1992. At that time, as you will recall, we drew  
2 opposition from Ray Westall, BTA, Marathon, and we  
3 also had questions raised about the application by  
4 Santa Fe Exploration Company. Since that time, we  
5 have been able to resolve our differences with each of  
6 these interest owners. Part of the arrangement was  
7 concluded, oh, approximately two weeks ago, a little  
8 over two weeks ago, and we've agreed to adjust the  
9 unit boundary. But I can stand before you today  
10 saying that we anticipate that we will have 100  
11 percent of the working interest and royalty interest  
12 voluntary joining in this unit, and we would therefore  
13 request that we be permitted to present an application  
14 for approval of a voluntary unit in lieu of presenting  
15 a case for statutory unitization.

16 EXAMINER STOGNER: Thank you, Mr. Carr.

17 MR. CARR: At this time we would call  
18 Clarence Stumhoffer.

19 (Witnesses sworn.)

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

23 EXAMINATION

24 BY MR. CARR:

25 Q. Will you state your name and place of

1 residence?

2 A. I'm Clarence Stumhoffer. I live in Fort  
3 Worth, Texas.

4 Q. By whom are you employed?

5 A. Seely Oil Company.

6 Q. And in what capacity?

7 A. Consulting petroleum engineer.

8 Q. Mr. Stumhoffer, have you previously  
9 testified before this Division?

10 A. Yes, I have, but it was back in the 1960's  
11 and early 1970's.

12 Q. Would you summarize your educational  
13 background and work experience for the examiner?

14 A. I have a Bachelor of Science Degree in  
15 petroleum engineering from the University of Texas in  
16 Austin, 1953. And I have 40 years of experience in  
17 the oil industry working for various companies. And  
18 during the 60's and '70's, I worked with Newmont Oil  
19 Company and Anadarko Petroleum Company, doing  
20 secondary recovery projects in the southeastern part  
21 of the state.

22 Q. Are you familiar with the applications  
23 filed by Seely in this case seeking approval of the  
24 Central EK Queen Unit Agreement, and also a waterflood  
25 project for that unit?

1 A. Yes, I am.

2 Q. Are you familiar with the status of the  
3 lands in the unit area and the technical  
4 considerations that were involved in deciding to go  
5 forward with this project?

6 A. Yes.

7 MR. CARR: Are Mr. Stumhoffer's  
8 qualifications as a petroleum engineer acceptable?

9 EXAMINER STOGNER: They are.

10 Q. (BY MR. CARR) Could you briefly state what  
11 Seely Oil Company seeks with these applications?

12 A. Seely Oil Company seeks the approval of the  
13 Central EK Queen Unit as a voluntary secondary  
14 recovery project.

15 Q. And how many acres are now included within  
16 the proposed unit boundaries?

17 A. 988.4 acres of state land.

18 Q. Does Seely also request approval for a  
19 waterflood project in the unit area?

20 A. Yes.

21 Q. Have you prepared certain exhibits for  
22 presentation in this case?

23 A. Yes, I have.

24 Q. Could you identify and review what has been  
25 marked as Seely Exhibit No. 1?

1           A.   Exhibit No. 1 is a Unit Agreement of the  
2   proposed unit, prepared on the form that's approved by  
3   the State of New Mexico Land Commissioner Office.

4           Q.   Does this form provide for a waterflood  
5   operations in the unit?

6           A.   Yes, it does, under Section 11.

7           Q.   Does Exhibit C to this Unit Agreement set  
8   out the tract participation factors for each of the  
9   tracts in the unit area?

10          A.   Yes, it does.

11          Q.   And could you now review Seely Exhibit No.  
12   2 and basically review for the examiner the basis for  
13   unit participation?

14          A.   The basis for unit participation is a  
15   single phase formula composed of (90) percent primary  
16   recovery as of January 1, 1991, from the Queen Sand  
17   and it includes a 5,000-barrel credit for each usable  
18   well in the unit area. This usable well credit is to  
19   adjust for the large number of plugged and abandoned  
20   wells that will be redrilled on this project. And  
21   plus in addition it has a (10) percent factor for  
22   acreage.

23          Q.   Let's now refer to Seely Exhibit No. 3, and  
24   I would ask you to identify that and review it for the  
25   examiner?



1           A.     Exhibit No. 3 is -- there are two pages.  
2     The first page is a map of the -- is Exhibit A to the  
3     Unit Agreement, and it shows the revised unit area as  
4     it is today. The second page was the unit area as it  
5     was originally set out.

6           Q.     Mr. Stumhoffer, the proposed unit now  
7     consists of nine leases and 13 tracts; is that  
8     correct?

9           A.     That's correct.

10          Q.     And to get this unit into a voluntary  
11     posture, Seely deleted certain tracts from the  
12     original proposed unit area?

13          A.     Yes.

14          Q.     Has that deletion had any material impact  
15     on the waterflood project that is being proposed?

16          A.     No, it has not.

17          Q.     When those tracts were originally included,  
18     what was their real value?

19          A.     Their value was the fact that they had  
20     usable well bores on the tracts that we could use for  
21     water injection wells.

22          Q.     And now with those tracts out, is Seely  
23     prepared to drill new injection wells to replace the  
24     well bores that are no longer available?

25          A.     Yes. Three new injection wells are

1 necessary now by the deletion of these tracts at a  
2 cost of approximately \$600,000.

3 Q. So the actual physical aspects of the  
4 project haven't changed, but the costs have been  
5 substantially increased?

6 A. That's correct.

7 Q. Does Exhibit No. 3 also show the lessee of  
8 record for each of the tracts within the unit area?

9 A. Yes, it shows lessee of record.

10 Q. Have you reviewed this agreement with the  
11 New Mexico State Land Office?

12 A. Yes, I have.

13 Q. Could you identify what is marked as Seely  
14 Exhibit No. 4?

15 A. Exhibit No. 4 is a letter from the  
16 Commissioner of Public Lands Office dated March 17,  
17 giving Seely Oil Company preliminary approval of the  
18 proposed unit.

19 Q. And in the negotiations with the  
20 Commissioner of Public Lands, has Seely reviewed with  
21 the Commissioner staff the need to use fresh water as  
22 a make-up water source for injection in this unit  
23 area?

24 A. Yes, we have.

25 Q. Do we now stand with approval to go forward

1 with that plan from the Land Office?

2 A. Yes.

3 Q. Could you go to what has been marked Seely  
4 Exhibit No. 5, identify that, and review it, please.

5 A. Exhibit No. 5 is the Exhibit B to the Unit  
6 Agreement in which we set out the working interest and  
7 royalty interest ownership.

8 Q. It shows the ownership by tract, does it  
9 not?

10 A. It shows the ownership by tract.

11 Q. What working interests have been committed  
12 to the unit?

13 A. 100 percent.

14 Q. Does Seely desire to be designated the  
15 operator of this unit?

16 A. Yes.

17 Q. Does this agreement provide for the  
18 periodic filing of plans of development with the State  
19 Land Office?

20 A. Yes, it does.

21 Q. Will these plans also be filed with the Oil  
22 Conservation Division at the time it's filed with the  
23 Land Office?

24 A. Yes.

25 Q. Could you identify what has been marked for

1 identification as Seely Exhibit No. 6?

2 A. Exhibit No. 6 is the proposed Unit  
3 Operating Agreement, which is on a standard form.

4 Q. And this agreement has been or will be  
5 voluntarily executed by all the working interests in  
6 the unit area?

7 A. That's right.

8 Q. Could you identify Exhibit No. 7, please.

9 A. Exhibit No. 7 is an Affidavit of the  
10 mailing of the notice of the formation of the unit and  
11 the waterflood development.

12 Q. To whom was notice of this application  
13 originally given?

14 A. The waterflood unitization notice was  
15 mailed to all the owners of any economic interest in  
16 the unit. The waterflood development -- waterflood  
17 development plan notice was mailed to all the  
18 operators within a two-mile radius of the unit.

19 Q. And has the C-108, the actual application  
20 itself, been provided to all leasehold operators  
21 within a half mile of any injection well?

22 A. Yes, it has.

23 Q. And has a copy of the C-108 also been  
24 provided to the owner of the surface of the land on  
25 which any injection well is located?

1 A. Yes.

2 Q. Are those interest owners identified in the  
3 Affidavit attached to Seely Exhibit No. 7?

4 A. Yes, they are.

5 Q. Following the final negotiations with BTA  
6 and Ray Westall and the agreement to adjust the unit  
7 boundary, were the interest owners in the waterflood  
8 project advised of the change in the boundary and the  
9 need to drill additional injection wells?

10 A. Yes, they were.

11 Q. Was a letter advising them of this also  
12 provided to them March the 5th, 1991?

13 A. That's correct.

14 Q. Were Exhibits 1 through 7 prepared by you?

15 A. Yes.

16 Q. Or under your direction?

17 A. Yes.

18 MR. CARR: At this time, Mr. Stogner, we  
19 would move the admission of Seely Exhibits 1 through  
20 7.

21 EXAMINER STOGNER: Exhibits 1 through 7  
22 will be admitted into evidence at this time.

23 Q. (BY MR. CARR) Mr. Stumhoffer, will Seely  
24 also call two additional engineering witnesses, one to  
25 review the technical aspects of the project, and

1 another to review the C-108 waterflood application?

2 A. Yes.

3 MR. CARR: That concludes my direct  
4 examination of Mr. Stumhoffer.

5 EXAMINER STOGNER: Any questions, Mr.  
6 Stovall?

7 MR. STOVALL: No.

8 EXAMINER STOGNER: I have no questions of  
9 Mr. Stumhoffer at this time.

10 MR. CARR: At this time I WOULD call Mr.  
11 Charles Seely.

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

15 EXAMINATION

16 BY MR. CARR:

17 Q. Will you state your name for the record,  
18 please.

19 A. Charles Seely.

20 Q. Where do you reside?

21 A. Fort Worth, Texas.

22 Q. By whom are you employed?

23 A. Seely Oil Company.

24 Q. And in what capacity?

25 A. Owner and President.

1 Q. Mr. Seely, have you previously testified  
2 before the Oil Conservation Division?

3 A. It sounds like a broken record, but a long  
4 time ago, 1963 and 4.

5 Q. In that case, could you summarize your  
6 educational background and review your work experience  
7 for Mr. Stogner.

8 A. B.S., petroleum engineering, from Texas A&M  
9 in 1955. Seven years with Mobil as a petroleum  
10 engineer. Three years with Newmont as a reservoir and  
11 chief engineer. Ten years with Armour Oil Company,  
12 production manager and president. Seventeen years as  
13 president and owner of Seely Oil Company, 37 years  
14 total.

15 Q. You are familiar with the applications  
16 filed on behalf of Seely in this case?

17 A. Yes.

18 Q. In fact, you are responsible and have  
19 prepared the technical study upon which the decisions  
20 were made to go forward with this project?

21 A. That's correct.

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

24 EXAMINER STOGNER: Oh, they are, and  
25 they're most welcome. It's good to see people with

1 experience back in here.

2 Q. (BY MR. CARR) Mr. Seely, could you  
3 identify first what has been marked as Seely Exhibit  
4 No. 8?

5 A. That is the report that was prepared in  
6 determining whether or not this was a feasible  
7 waterflood prospect, which includes 12 exhibits, 12  
8 figures, and 5 tables.

9 Q. What we have is a text on the right-hand  
10 side of the exhibit with some tables, and the figures  
11 are in the pouch; is that correct?

12 A. The figures are in the pouch. The tables  
13 are attached in the middle at the back.

14 Q. Let's go first to what is marked Figure 1  
15 to Exhibit 8, and I would ask you first to identify  
16 this and then review it for the examiner.

17 A. Okay. Figure 1 is a structure map  
18 contoured on top of the Queen in the central portion  
19 of the EK Queen field.

20 A little background of the Queen Sand in  
21 this area, which is located about 25 miles west of  
22 Hobbs. It's in an area of extremely good flood  
23 performance for Queen Sand waterfloods. The Queen  
24 Sand that we're talking about is in the upper part of  
25 the Queen, which is about a total interval of about 50



1 feet. It is part of the Guadalupean series of Permian  
2 age.

3 The oil-producing portion of that 50 feet  
4 is a grade of fine to medium grain friable quartz  
5 sandstone. It's probably either a wedge or a bar sand  
6 deposit. It is -- this oil-producing portion is some  
7 30 to 35 feet below the top of the Queen formation  
8 itself. The structure, as you can see, dips to the  
9 south and at the rate of about 100 to 125 feet per  
10 mile.

11 The reservoir itself is bounded at least  
12 for the entire EK Queen field to the north and the  
13 west basically with permeability pinchouts, to the  
14 south and east with a water table.

15 The reservoir is a solution gas-drive. It  
16 has had no effect from water-drive either from natural  
17 causes or from two previously installed and plugged-  
18 out floods that have been part of this EK Queen field.

19 Q. At this time, why don't we move to Figure  
20 No. 2?

21 A. Okay.

22 Q. If you could, review the primary oil  
23 production history of the area for the examiner.

24 A. Let me say, there are two figures that I'll  
25 probably refer back to. This is one of them, and the

1 other one is Figure 5, which is the isocum map. But  
2 this is a production history of the wells located  
3 inside the Central EK Queen area.

4 In addition, it shows the primary  
5 production which shows it peaks out at about 10,000  
6 barrels per month and declined in a solution gas-drive  
7 manner. Also, I show the number of producing wells.

8 At the bottom of this, which is important,  
9 I show the active time that the Mobil -- there are two  
10 units that have actually operated in the field. One  
11 to the south was the Mobil EK Queen Unit, and the  
12 other one is the Murphy Baxter to the north.

13 I think what might be important here is the  
14 fact that you see when there was water injection into  
15 the reservoir, there were only like three or four  
16 producing wells in this unit, and they were off to the  
17 side.

18 Q. The number of producing wells is indicated  
19 by this sort of solid line that steps up and down  
20 through the center of the exhibit?

21 A. Yes, it is, that's correct.

22 Q. And when you compare that to the periods  
23 when the offsets were injected, you can see that there  
24 really were only about three wells in the unit  
25 producing?

1 A. That's right.

2 Q. Anything else to show with this exhibit?

3 A. Not at this time.

4 Q. Let's to go Exhibit No. 3. Could you  
5 identify then review that for Mr. Stogner -- or Figure  
6 3?

7 A. Okay. Let me refer to the isocum map on  
8 the wall, which is Exhibit No. 5, which it shows the  
9 entire EK Queen field, and it shows that there was a  
10 flood up to the north portion, which was done by  
11 Murphy Baxter. Then there was a flood done to the  
12 south by Mobil. Then you see the outline of our  
13 proposed unit, which is in the central portion there.

14 Then back to the curve here of Figure No.  
15 3. It's simply a response curve of the Mobil unit.  
16 As you can see, they've got a very fast response in  
17 less than a year, declined at a very rapid rate,  
18 indicative of the type of pattern that was used, which  
19 is a five spot. It peaked out at about 60,000 barrels  
20 per month.

21 The flood was initiated in 1966, and most  
22 of the injection was stopped in 1978; so that by about  
23 1983, there were only maybe 6 producing wells and just  
24 a few injection wells left that were used mainly for  
25 saltwater disposal.

1 Q. If we could go now to Exhibit No. 4, could  
2 you identify and review that, please, and again I mean  
3 Figure No. 4.

4 A. Yes. Figure No. 4 is the primary and  
5 secondary history of the Murphy Baxter North EK Queen  
6 Unit, again showing the prime -- well, not again, well  
7 similar to our Central EK Queen Unit. The primary  
8 production comes down at a very fast clip, indicative,  
9 there again, of a solution gas-drive. And then water  
10 injection was started like in about the latter part  
11 of '70 and you can see a very strong response in 1971,  
12 which was something less than a year.

13 What's interesting about this one is that  
14 you don't see the same type response as you did with a  
15 five spot. This is a peripheral-type pattern, and  
16 only nine injection wells were used, but it was a very  
17 effective one, also.

18 What you see is instead of a large, tall  
19 peak, and extended increased production time period  
20 with the amount of oil, maximum amount of oil reaching  
21 about 10,000 barrels a month.

22 Q. And this is a similar injection pattern in  
23 fact to what you were proposing to implement in the  
24 proposed --

25 A. Yes, it is.

1 Q. Are you ready to go to Figure No. 5?

2 A. Well, we've kind of been on No. 5. I'd  
3 like, as I said, I've got a little problem with these  
4 things. I almost need to go back a little bit on that  
5 Central EK Queen Unit itself, Figure No. 2, which is  
6 the -- there were or there are are 25, 40-acre  
7 locations in this proposed unit. There's productive  
8 acreage of about 951 out of 988. Sixteen of the 40  
9 tracts had Queen Sand production. Thirteen of the  
10 wells that were originally drilled of the 13 that were  
11 originally drilled -- and you don't really ever see 13  
12 up here because one was plugged out very quickly. Ten  
13 of the 13 wells were plugged out at a very early time,  
14 in most cases, about 10 or 11 years.

15 I'd also like to refer to Table 1, which is  
16 in the back, back here. And what I've tried to  
17 indicate here is that there is a substantial amount of  
18 primary oil that was never recovered from this  
19 reservoir due to the premature plugging of several of  
20 these wells, these ten wells.

21 The three wells that have produced  
22 continually, as you look all the way over to the  
23 right, you can see that they've averaged 29,000  
24 barrels a well over and above what the ten that were  
25 plugged out made.

1           In addition to indicate that there's still  
2 primary oil left, four wells were redrilled, and  
3 they're shown on this curve at different times under  
4 the general operating, Amoco State General Operating,  
5 Santa Fe State 1, General Operating State AJ No. 1,  
6 and the Santa Fe State No. 2. And those four wells  
7 have averaged anywhere from 5 to 17,000 barrels, and  
8 have averaged 10,000 barrels a well.

9           The total primary recovery from this  
10 reservoir is 444,562 barrels as of 1-1-91, and that's  
11 only like maybe 65 barrels per acre foot, if you take  
12 all of the productive acreage, which is only like 11  
13 percent of the oil in place. If you take the full  
14 developed area or just the developed area only, that  
15 increases to about 93 barrels per acre foot or 16  
16 percent of the oil in place, which seems to be a  
17 little bit more logical.

18           There were also in this area three  
19 locations that have since been proved up that were not  
20 drilled by some deeper wells that had been drilled in  
21 there.

22           I think maybe now we might want to go to --  
23 back up to Figure 5 and also to the two cross-  
24 sections.

25           Q.   Those your your Figures 6 and 7?

1           A.     That's correct.

2           Q.     All right.

3           A.     What we're really trying to do here is to  
4 show the proximity of the Central EK Queen Unit to the  
5 other two floods, and to show -- and we've got a  
6 cross-section that runs north and south and one which  
7 is B-B', and one that goes east and west. And you can  
8 see the tie lines on the two cross-sections, and you  
9 can see that there is a portion of porosity about 30  
10 or 35 feet below the top of the Queen that correlates  
11 continually through the Murphy Baxter flood, through  
12 the Central EK Queen Unit area, down to the Mobil  
13 flood. And you can also see that in the one going  
14 from west to east, that you can also correlate all the  
15 way across it.

16                   The two floods themselves were studied, and  
17 there was excellent recoveries, and on that isocum  
18 map, I show the performance of both floods. The  
19 Murphy Baxter north unit had 702,000 barrels of  
20 secondary recovery for a primary recovery of 513 or a  
21 secondary primary of 1.37.

22                   The Mobil unit had a primary recovery of  
23 1,737,000 barrels and a secondary recovery of  
24 2,140,000 for a secondary to primary of 1.23.

25                   Basically what we're trying to do is to

1 show that we've got the same type reservoir  
2 characteristics as the other two. And I guess the  
3 things that certainly are common to the central and  
4 the others is that you can certainly correlate an oil  
5 productive porosity zone in from one to the other and  
6 all the way across it. All of them had similar  
7 initial potentials. There was little or no water  
8 production in any of the field. All of the three  
9 areas have a solution gas-drive. And also on Figure  
10 8, which is a structure map of the entire field, you  
11 can see that basically they're all the same type  
12 structure with a dip to the south.

13           There's further evidence of the  
14 floodability of the central area. Well No. 601, which  
15 is also Tract No. -- Well, 6 well No. 1, was used as a  
16 saltwater disposal well in the Queen Sand for the  
17 period of around 1987 to 1989.

18           Our State BC lease, Tract No. 2, which is  
19 located in the south half, southeast quarter of  
20 Section 8, responded significantly to the injection in  
21 that saltwater disposal well. This could be seen, if  
22 we go back to this Figure 2, the primary decline curve  
23 for the unit, and about in '89, you can see that  
24 production went up for some reason, and there was not  
25 anything caused that other than the fact that it



1 responded to this water injection.

2 Then in 1989, the production ceased, and  
3 the increase in production from Tract No. 2 was lost.

4 I think we --

5 Q. Are you ready to go to the isopach map?

6 A. Yes.

7 Q. Figure No. 9?

8 A. Right.

9 Q. Just identify and explain to the examiner  
10 what this shows.

11 A. Okay. Figure No. 9 is an isopachus map in  
12 the Central EK Queen area. Just to tell you the  
13 information that I had to prepare this, I did have two  
14 detailed cores plus a summary of average core data  
15 that had been presented in a report, in a report done  
16 for Mobil back in the 50's. So I actually had core  
17 data on seven wells in the unit area.

18 In addition, to make comparisons, I had a  
19 summary of core data on 24 wells in the Mobil unit.  
20 And, incidentally, the porosity for the central unit  
21 averages 13.4, for the Mobil unit 13.3. Permeability  
22 is 35 millidarcies for the central unit and 33 for the  
23 Mobil unit. So from that point you can see it's very  
24 similar.

25 In addition to the cores, I had

1 radioactivity logs on all the other wells. This would  
2 have been the time of about 1956 through around '58.  
3 But in addition to that, there were two wells that  
4 were drilled over to the east there in Section 9 that  
5 were drilled later that had modern logs. These four  
6 wells that were redrilled in -- let me just say, in  
7 Section 8 and Section 17, well, plus the Santa Fe  
8 State No. 2 in Section 18, all of these wells have  
9 modern logs. So we were able to get good porosity  
10 figures and water saturation figures.

11 In addition to that, there was a Bone  
12 Spring or there is a Bone Springs plate. Going back  
13 to Figure 5 over there on the wall, you can see  
14 there's triangles just to the west of the unit  
15 itself. All of those are deeper wells, and you can  
16 see some of those come into the unit itself. We were  
17 able to use those logs, which are modern, density  
18 neutron plus dual lateral logs, in coming up with net  
19 pay.

20 So we feel like we've had a fairly good --  
21 we think that there may be a connection with the old  
22 Mobil flood with this central flood. You can see we  
23 show zero contours. However, there's one, two, three  
24 dry holes -- four dry holes in one direction and a  
25 couple down offsetting the Mobil flood. It's our

1 opinion that it's probably not completely separated,  
2 but that it probably does have some pressure  
3 communication between the two.

4 Q. If we look at the isopach map, Mr. Seely,  
5 is the dark-hatched line that comes across kind of the  
6 southwest corner of this exhibit, that's the boundary  
7 of the old Mobil flood?

8 A. Yes, it is.

9 Q. Then we have the Murphy Baxter flood --  
10 where did it actually come in the reservoir?

11 A. I don't have it shown on there, but that's  
12 interesting to show. We're actually using two of the  
13 old Murphy Baxter injection wells for our injection  
14 wells. One of them, which is Tract 13, Well 1301, the  
15 other one is in Tract 4, Well 401. The Murphy Baxter  
16 unit came down just south of those two wells. It's  
17 been dissolved; so we were able to come up with these  
18 two wells.

19 Q. And the boundaries of this proposed unit  
20 actually conformed to the area that you've isopached,  
21 that's productive in the area?

22 A. That's right.

23 Q. Are you ready to go to your Figures 10 and  
24 11?

25 A. I think maybe we need to do maybe a little

1 bit of talking about how we came up with secondary  
2 reserves. We did it by two approaches. One was  
3 volumetric, and the other was offset production. We  
4 took the acre-feet from the isopachus map and  
5 multiplied by recovery factor to come up with the  
6 secondary reserves. That calculated to be 130 barrels  
7 per acre foot. Calculations are shown in Tables 2 and  
8 3.

9           To back up that 130 barrels per acre foot  
10 figure, another approach was taken. I had all the  
11 core data from the Mobil flood, and Mobil had done  
12 some statistical studies concerning permeability  
13 capacity distribution, and with relative permeability  
14 of water to oil, they were able to come up with  
15 recovery versus percent water saturation. And they  
16 estimated from this core data that at 1340 barrels per  
17 acre foot, the water percentage would be 96.5, which  
18 would probably be pretty close to the economic limit  
19 of this flood.

20           When you figure the reserves based on  
21 offset production, we've already talked about the  
22 isocum map and the location of it, and we've gone over  
23 the amount of production that each unit and the ratios  
24 of secondary to primary. We feel that the ratio of  
25 this 1.26 is a very good figure. The only thing that

1 we think is probably not quite right is the fact that  
2 we do have primary oil left in the reservoir because  
3 there were ten wells that were plugged out early, and  
4 there were three proved locations that have never been  
5 drilled.

6 And we've estimated that from this ten  
7 wells and the three new locations, that there would  
8 probably have been another 175 to 200,000 barrels of  
9 additional primary oil, had the wells been drilled and  
10 had the other ten wells not been plugged earlier.

11 Q. This production cannot, though, now be  
12 recovered by primary operations?

13 A. Oh, no.

14 Q. Reservoir energy no longer exists?

15 A. No, there is no energy there. By using  
16 Mobil's primary recovery factor of -- you take the  
17 1,737,000 barrels that they produced in their unit,  
18 and take that over the acre-footage, that's about 90.5  
19 barrels per acre foot.

20 If you use this recovery factor in with the  
21 acre-footage that's going to be swept, that would  
22 increase from this 444,000 to 617. Then if you use  
23 the combined flood performance of the two floods of  
24 1.26, the secondary would be 777,000 barrels, which is  
25 in good agreement with the figure we came up with

1 volumetrically, and also by the permeability, relative  
2 permeability relationships.

3 This would be secondary recovery of 130  
4 barrels per acre feet foot or about 22 percent of the  
5 oil in place. This results in an ultimate recovery of  
6 1,230,000 barrels or 180 barrels per acre foot or  
7 about 31 percent of the oil in place, which I would  
8 think would be a very reasonable figure in this case.

9 Figures --

10 Q. Are you ready to go --

11 A. We didn't really talk about -- I talked  
12 about it, but I didn't refer to it -- Figures 10 and  
13 11 were the basic data that Mobil had presented to  
14 come up with the water-cut relationship versus  
15 recovery.

16 Q. All right. Now we have Exhibit No. 12. It  
17 is a waterflood development map for the unit copied  
18 below the isocum plat?

19 A. That's right.

20 Q. Could you just generally review the plan  
21 for the examiner?

22 A. Okay. This plan, as you can see, if you  
23 follow, the injection wells are in triangles. They're  
24 colored as to when we think we'll probably put them  
25 all in. Since we are having to drill a number of

1 wells, we're staggering when we're converting and  
2 drilling the wells over a period of about three  
3 years.

4 As you can see, the yellow wells will be  
5 done in 1993, and the others in '94, '95, and '96.  
6 This total thing is going to require drilling six new  
7 water injection wells and four new producers.

8 We will also have to reenter and complete  
9 two old water ejection wells, the wells that I  
10 mentioned earlier with the Murphy Baxter unit. We  
11 will start up the injection again in the saltwater  
12 disposal well over there that we had received response  
13 earlier from.

14 We will -- there's a Well 301, which is now  
15 a Yates sand producer, which we will recomplete and  
16 make it an injection well. And we will be converting  
17 one producer to water injection. In addition, we have  
18 seven existing producing wells. We think the total  
19 number of wells will be 11 injection wells and 11  
20 producers.

21 Q. Mr. Seely, part of our negotiations with  
22 BTA resulted in the contraction of the unit boundary  
23 to exclude three, 40-acre tracts on the western end of  
24 the unit area?

25 A. That's correct.

1 Q. Because of that, there were wellbores no  
2 longer available to Seely to convert to injection?

3 A. That's right.

4 Q. And you have proposed two injection wells  
5 that are just 50 feet inside the boundaries of the  
6 unit on the western perimeter?

7 A. That's correct.

8 Q. Could you explain to the examiner why those  
9 wells are located that close to the unit boundary?

10 A. We do not feel that there is very much  
11 significant reservoir in Section 12 in that 120 acres  
12 that we have proposed for the unit. There are two  
13 wells there that show as dry holes.

14 Q. Those are in Section 12?

15 A. In Section 12. One is in the northeast of  
16 the southeast quarter. The other one is in the  
17 northwest of the northeast quarter. The first one  
18 that I talked about, actually they set pipe on it,  
19 frac'd it, did not make a well. The other well, they  
20 cored and didn't get a show and didn't set pipe on  
21 it.

22 Since that time, there have been some  
23 deeper wells drilled, and there appears to be a small  
24 amount of reservoir that exists fairly close to the  
25 line there but not really a significant amount. So



1 our maybe purpose was to put that 120 acres in to save  
2 \$400,000. We think that since they really wanted to  
3 use these wellbores for deeper wells, and I understand  
4 that, that -- and we've talked to both BTA and OXY,  
5 and they do not have an objection for us putting these  
6 wells in.

7 Q. If the injection wells sweep production to  
8 the west, is there any producing well out there, or do  
9 you foresee one that would recover that production?

10 A. Not only is there not one there, but there  
11 has never been any Queen Sand production on that  
12 lease.

13 Q. So is it fair to say that by placing the  
14 wells where we're proposing, that the production in  
15 the Queen formation that we will be sweeping will in  
16 fact be swept toward wells that can produce those  
17 reserves?

18 A. That's correct.

19 Q. And we have discussed this with both BTA  
20 and OXY, the owners in those 40-acre tracts, and by  
21 deleting the tracts and placing the wells here,  
22 they've expressed no objection?

23 A. That's correct.

24 Q. Is there anything else that you would like  
25 to review with the examiner in terms of the figures or

1 the tables contained in your technical report marked  
2 Exhibit No. 8?

3 A. I don't know if I referred to Table 2 or  
4 not, but that's just a summary of basic data. It  
5 gives all the productive acres, the acre-footage, the  
6 total acre-foot, the acre-footage within the pattern  
7 that we've proposed to flood. It gives the residual  
8 oil in place and the expected secondary, ultimate  
9 primary.

10 Table 3 is a calculation of the oil in  
11 place and also the calculation of the secondary  
12 reserves. Using a flooding efficiency of 50 percent,  
13 which I think is probably certainly within line of  
14 what we think we might get, residual oil saturation of  
15 23.5, based on water, water-based mud core analyses,  
16 and a water saturation of 30 percent which was  
17 obtained from about four recent electric logs.

18 Table 4 is nothing more than what was  
19 presented earlier. This was the basis for coming up  
20 with the unit. It just shows how the participation  
21 factors were developed.

22 Table 5 shows a plan of development and  
23 cost figures with a total cost of about \$2,375,000  
24 being the development cost to put in the flood.

25 In addition to that, we estimate the

1 operating cost over a period of about 14, 15 years to  
2 be about \$3.6 million, with a total development and  
3 operating cost of about \$6 million.

4 Q. From the study alone, I'd like to in a  
5 minute have you look at those portions of your  
6 testimony that relate to qualifying the project for  
7 the enhanced oil recovery incentive tax rate. Could  
8 you just summarize the conclusions that you have been  
9 able to reach as a result of this technical study?

10 A. There have been two previous waterfloods in  
11 the EK Queen field, the Mobil EK Queen Unit and the  
12 Murphy Baxter unit, and they've both been very  
13 successful. There has been little or no secondary oil  
14 produced from the Central EK Queen area. The ultimate  
15 recovery from the Upper Queen can be increased  
16 significantly by waterflooding.

17 Using a peripheral water injection pattern  
18 and by drilling six new injection wells and four new  
19 producers, we think reserves can be increased by  
20 786,000 barrels. Capital expenditures over 3-1/2 year  
21 period is \$2,375,000. And for the waterflood  
22 operations to be efficient, it's absolutely necessary  
23 that we unitize this Upper Queen formation.

24 Q. Seely is requesting that this project be  
25 certified for the incentive oil tax rate?

1 A. Yes, we are.

2 Q. You have indicated that the estimated  
3 capital cost for these additional facilities will be  
4 \$2,375,000; is that correct?

5 A. Yes.

6 Q. Have you estimated the total project cost?

7 A. Yes. That's at \$6 million.

8 Q. Will the proposed waterflood in this  
9 reservoir, in your opinion, result in an increase in  
10 the amount of crude oil that ultimately will be  
11 recovered from the Queen formation in this area?

12 A. Yes.

13 Q. And you've indicated that the additional  
14 recovery will be 786,000 barrels?

15 A. Right.

16 Q. What would be the estimated total value of  
17 this additional production?

18 A. About \$15.7 million.

19 Q. What price per barrel are you using to  
20 estimate this figure?

21 A. \$20 a barrel.

22 Q. In your opinion, is this area so depleted  
23 that it is now prudent to apply enhanced recovery  
24 techniques to maximize recovery from this area?

25 A. Yes.

1 Q. When do you anticipate that you could start  
2 the commencement of the actual injection into the unit  
3 area?

4 A. After approval, within six months.

5 Q. Will you advise the Division prior to the  
6 commencement of any injection?

7 A. Yes.

8 Q. Were you present this morning when Mr.  
9 Stovall discussed the requirements of this agency --

10 A. Yes.

11 Q. -- for projects of this nature? And you  
12 understand that you will have to keep them advised as  
13 to when you experience a positive production response?

14 A. Right.

15 Q. Does the proposed waterflood project, in  
16 your opinion, appear to be technically and  
17 economically reasonable?

18 A. Yes.

19 Q. And it isn't premature to begin an  
20 operation of this nature, is it?

21 A. No.

22 Q. In your opinion, would approval of this  
23 application be in the best interest of conservation,  
24 the prevention of waste, and the protection of  
25 correlative rights?

1 A. Yes.

2 Q. Mr. Seely, was Exhibit 8 prepared by you?

3 A. Yes.

4 MR. CARR: At this time, Mr. Stogner, we  
5 would move the admission of Seely Exhibit No. 8.

6 EXAMINER STOGNER: Exhibit 8 will be  
7 admitted into evidence.

8 MR. CARR: And that concludes my direct  
9 examination of Mr. Seely.

10 EXAMINER STOGNER: Mr. Stovall, do you have  
11 any questions?

12 EXAMINATION

13 BY MR. STOVALL:

14 Q. Let's just touch on the EOR tax rate here.  
15 You heard the discussion about the relationship  
16 between the time of certification and the time  
17 required to get to file the positive production  
18 response?

19 A. Five years, I believe, isn't it?

20 Q. Yes. And you're talking about injection  
21 within six months after the order?

22 A. Um-hm.

23 Q. Inasmuch as you are doing a phased  
24 development of this, do you have any requests that we  
25 delay the certification until you start injection, or

1 would you want that certification issued with the  
2 order?

3 A. I don't think it really matters because I  
4 really feel the reservoir is just almost full due to  
5 the other two floods, and I think response is going to  
6 be a lot quicker than it normally would. I don't  
7 think you'll have to wait two years or a year and a  
8 half or even a year to see a response. I think once  
9 injection starts, I think you'll see it almost  
10 instantaneously.

11 Q. It appears that what you're doing is,  
12 you're kind OF starting in the northwest and working  
13 around the south to the central part of the unit and  
14 then the east side of the unit with your injection  
15 development; is that correct?

16 A. Yeah. Actually, we're starting to the  
17 north and to the west and to the south, and then we're  
18 moving over to the east side, and we're pushing it  
19 like this, and then waiting to the last to drill those  
20 green wells there which are more in the center of --  
21 which would not have gotten response at that time.

22 Q. Is there a problem with this being a -- do  
23 you anticipate getting a positive production response  
24 throughout the unit area within the five years so you  
25 don't have to phase the --

1 A. If you mean every well --

2 Q. I don't mean every well.

3 A. But can we really see a response? Oh,  
4 yeah.

5 Q. Where I'm coming from is, under the rules  
6 as we have interpreted them, you only get a credit for  
7 essentially what you get a response for.

8 A. Um-hm.

9 Q. And you can't certify an entire area and  
10 then only initiate a flood in part of it and only get  
11 a response in part of it but then get a credit for the  
12 entire area. And we want to make sure we do this in  
13 such a way that -- assuming in fact that you do do the  
14 development of the entire project area, that you get a  
15 flood -- or that you get the credit for it, my  
16 question is whether it should be a phased -- to  
17 whether we should certify it in phases in accordance  
18 with the way you're developing it.

19 A. That seems to make sense, but it also -- I  
20 really think that we'll have response to the whole  
21 thing before the end of five years.

22 Q. That's fine. I'm asking you, I'm not  
23 telling you what to do.

24 A. Right, I know.

25 Q. And, again, it's not -- the purpose of it



1 is to, of course, make sure that you have a full  
2 project development and response. What I would think,  
3 my example would be that, say, if you did it on that  
4 eastern portion first -- if you go into the western  
5 portion in 1995, that really does, and you get a  
6 response within a year or two, that still gives you  
7 plenty of time. And the central part is just sort of  
8 filling it out. That shouldn't be a problem then?

9 A. That's right.

10 Q. It appears then that we could certify the  
11 whole project --

12 A. I really think we can.

13 Q. -- immediately?

14 I have no other questions.

15 EXAMINER STOGNER: Mr. Carr, is your next  
16 witness --

17 MR. CARR: The next witness, Mr. Stogner,  
18 will review the C-108 application and considerations  
19 related to that part of the waterflood.

20 EXAMINER STOGNER: And the actual locations  
21 of the injector wells and stuff?

22 MR. CARR: Yes.

23 EXAMINATION

24 BY EXAMINER STOGNER:

25 Q. Mr. Seely, you did mention that there was

1 an old saltwater disposal well in this area. Which  
2 one was that one?

3 A. It's in the northwest of the southwest of  
4 Section 9. It's 601, Tract 6. It's all the way over  
5 to the east.

6 Q. And that is no longer a saltwater disposal  
7 well?

8 A. We actually bought the well. The only  
9 thing that happened to it is that water was stopped  
10 being injected, but the packer, the plastic-coated  
11 tubing, everything that was in the well is still  
12 there. So it's still available for putting water in  
13 almost instantaneously. We know it's going into the  
14 right place because we got response.

15 Q. That injected into the Queen, I assume?

16 A. Yes, it did.

17 Q. What kind of water did it inject?

18 A. Bone Springs.

19 Q. Produced water?

20 A. Produced water.

21 Q. But yet you're going to be injecting fresh  
22 water out here?

23 A. Yes, that's correct. The Bone Springs well  
24 is no longer there. And we didn't own the Bone  
25 Springs well, another operator.

1 Q. If you got a response with produced water,  
2 how come you have to use fresh water?

3 A. Well, this was another company that had the  
4 Bone Springs well. It was only one well. We now own  
5 that well, and we own the disposal well, which was  
6 also a deep well. And during the time they were  
7 producing their Bone Springs well, they used 601 as an  
8 injection well.

9 Q. Into the Queen?

10 A. Into the Queen. And why it went into the  
11 Queen, I don't know, because they didn't own anything  
12 else in there, and they certainly didn't -- well, I  
13 don't know why.

14 Q. That's not what I'm asking. You saw  
15 response from that well in the Queen formation, and it  
16 utilized old saltwater or produced water, and now you  
17 have to use fresh water to get a response.

18 MR. CARR: Mr. Stogner, the fresh water is  
19 only to be used as a makeup or a fill-in.

20 THE WITNESS: That's right.

21 MR. CARR: We're going to be reinjecting  
22 all the produced water we can get, but it was just a  
23 question of availability, and we're only using that as  
24 makeup over and above what we can locate having been  
25 professional produced. And in our C-108 portion of

1 that, we can show you which wells, and we have a  
2 separate exhibit which identifies not only the  
3 existing source wells for produced well but where we  
4 will be drilling fresh water wells to use as a makeup.

5 EXAMINER STOGNER:

6 Q. Okay. I appreciate you straightening me up  
7 on that one. So within the unit area, the 601, the  
8 401, and the 1301 are the only wells that had any kind  
9 of Queen injection or disposal or whatever; is that  
10 correct?

11 A. That's correct. There was a lot of water  
12 that was put in 401 and 1301.

13 EXAMINER STOGNER: Mr. Carr, it will  
14 probably be necessary to dig out those old  
15 authorizations and supersede them at this point.

16 MR. CARR: Okay.

17 EXAMINER STOGNER: With that, I have no  
18 other questions of Mr. Seely.

19 MR. CARR: Mr. Stogner, would you like me  
20 to locate those old authorizations for you?

21 EXAMINER STOGNER: We should have one on  
22 record. I may --

23 MR. CARR: I'll check with you on that.

24 At this time I'd like to call David L.  
25 Henderson.

1                   DAVID L. HENDERSON,  
2   the witness herein, after having been first duly sworn  
3   upon his oath, was examined and testified as follows:

4                   EXAMINATION

5   BY MR. CARR:

6           Q.   Will you state your name and place of  
7   residence?

8           A.   David. Henderson, Fort Worth, Texas.

9           Q.   By whom are you employed and in what  
10   capacity?

11          A.   Seely Oil Company as Vice President.

12          Q.   Mr. Henderson, have you previously  
13   testified before this Division?

14          A.   No.

15          Q.   Could you briefly review for Mr. Stogner  
16   your educational background and then summarize your  
17   work experience?

18          A.   I have a B.S. in civil engineering from  
19   Texas A&M University. I have been with Seely Oil  
20   Company for 12-1/2 years. I'm a member of the Society  
21   of Petroleum Engineers.

22          Q.   And your work with Seely is as a petroleum  
23   engineer?

24          A.   That is correct.

25          Q.   Are you familiar with the application filed

1 in this case for approval of a waterflood project?

2 A. Yes.

3 Q. Are you the individual who was responsible  
4 for and in fact did prepare the C-108 and its  
5 attachments?

6 A. Yes.

7 MR. CARR: Are the witness's credentials  
8 acceptable?

9 EXAMINER STOGNER: They are.

10 Q. (BY MR. CARR) Could you refer to what has  
11 been marked Seely Exhibit No. 9 and identify this and  
12 explain what it shows?

13 A. Seely Exhibit No. 9 is a completed Form  
14 C-108 with all the attachments.

15 Q. And this is for a new project?

16 A. That is correct.

17 Q. This C-108 is not identical to the one that  
18 was filed with the Division in November of 1992; is  
19 that correct?

20 A. That's correct. The data has not changed  
21 per such, but we've had to delete wells that are no  
22 longer going to be used for injection or are in the  
23 area of review.

24 Q. So basically what you have done is, for  
25 wells in the east half of the east half of Section 12,

1 those wells have simply been deleted from this  
2 exhibit?

3 A. That's exactly right.

4 Q. And you are using the sample diagrammatic  
5 sketch for an injection well for the new wells, and  
6 that was also included in the original filing?

7 A. That's exactly right.

8 Q. So, in essence, we haven't put any  
9 additional information in this exhibit; we have  
10 deleted some because the boundaries have been  
11 contracted?

12 A. That is correct.

13 Q. Let's go to pages 12 and 13 of this  
14 exhibit, and could you initially just identify those  
15 for the examiner?

16 A. Page 12 is an area map showing ownership  
17 within two miles of all injection wells.

18 Q. And then on page 13, that's a similar plat,  
19 but what have you done to that?

20 A. Page 13 shows the area of review in a  
21 circle, one-half mile radius, within each proposed  
22 injection well.

23 Q. Now, I think at this point, it would be  
24 helpful again to simply define the areas that are now  
25 excluded from the unit area that were included when

1 the application was originally filed.

2 A. Okay. We have deleted the east half of the  
3 southeast quarter and the southeast of the northeast  
4 quarter of Section 12, 18 South, 33 East, and the  
5 northwest quarter of the northwest quarter of Section  
6 16, Township 18 South, Range 34 East.

7 Q. So we've deleted 40 acres in the extreme  
8 southeast corner?

9 A. That's correct.

10 Q. And we've taken 120 acres off the west edge  
11 of the unit?

12 A. That's right.

13 Q. Because of that, you're going to have to  
14 drill three additional injection wells?

15 A. That's correct.

16 Q. What are the locations of those wells?

17 A. Section 7, 50 feet from the south and 50  
18 feet from the west line. Again in Section 7, 1370  
19 feet from the south line and 50 feet from the west  
20 line. And in Section 17, 900 feet from the north line  
21 and 330 feet from the east line.

22 MR. CARR: Mr. Stogner, when we reached  
23 agreement with BTA, at that time we were within the  
24 20-day notice period preceding this hearing date. On  
25 March the 5th by certified mail, I advised all



1 interest owners or all owners who were entitled to  
2 notice in accordance with Form C-108. That's all the  
3 leasehold operators within a half mile of an injection  
4 well and all surface owners, one, of the change in  
5 unit boundary, and, two, we advised them of the  
6 location of each of the new injection wells, told them  
7 that we would go forward to hearing at this date.

8 We recognize that the time period, the  
9 statutory 20 day-time period for notice has not run,  
10 and for that reason we would request that the case be  
11 readvertised with these well locations in it so that  
12 at your next hearing, it could be taken under  
13 advisement.

14 We have talked to the affected parties, we  
15 anticipate no opposition, but we would prefer to have  
16 all the loose ends tied up before we start going with  
17 injection wells, locations 50 feet from the outer  
18 boundary of the unit.

19 EXAMINER STOGNER: Okay, Mr. Carr. I'm  
20 sure you will provide me a --

21 MR. CARR: I will do that.

22 EXAMINER STOGNER: In writing, with those  
23 locations?

24 MR. CARR: Yes, sir, I will.

25 EXAMINER STOGNER: Okay.

1 Q. (BY MR. CARR) Mr. Henderson, let's go to  
2 Exhibit No. 9. I direct your attention to pages 28  
3 through 116. I'd like you just to, in a generic way,  
4 identify what we're talking about.

5 A. Okay. This is data sheets on all the wells  
6 that are within the area of review which penetrate the  
7 injection zone. They're organized by section and then  
8 by unit letter within each section.

9 Q. What we have in this portion of the C-108  
10 is a diagrammatic or a well data sheet for each of  
11 these wells?

12 A. That is correct.

13 Q. And it contains on these sheets all the  
14 information required, well by well, for each well  
15 within an area of review?

16 A. That's correct.

17 Q. Are the plugged and abandoned wells also  
18 included in these diagrammatic sketches?

19 A. That is correct.

20 Q. How many plugged wells are we talking about  
21 within the proposed unit area, approximately?

22 A. About 32, I believe.

23 Q. We have diagrammatic sketches in this  
24 material for each of those plugged and abandoned wells  
25 showing the location of all plugs?

1 A. That's correct.

2 Q. And it shows casing strings or anything  
3 else unique in any of the wells that have been plugged  
4 and abandoned?

5 A. That is also correct.

6 Q. Did you prepare these sketches?

7 A. That is correct.

8 Q. Have you reviewed the plugging detail on  
9 each of these?

10 A. Yes, I did.

11 Q. In your opinion, are there any wells that  
12 could become, because of the way they're plugged, a  
13 vehicle for migration of injection fluids out of zone?

14 A. No.

15 Q. Has this material been provided to the  
16 Hobbs District Office of the Oil Conservation  
17 Division?

18 A. A copy of the C-108 has been provided to  
19 the district office. As late as this week there has  
20 been no -- in a conversation, there was no indication  
21 of any problems.

22 Q. And this-week contact was made with Mr.  
23 Sexton to confirm there were no problems?

24 A. That is correct.

25 Q. If anything is discovered where it appears

1 there needs to be additional work or that a well might  
2 become a problem, are you prepared to work with either  
3 the Santa Fe or the district office to address that  
4 problem?

5 A. Yes.

6 Q. Let's go to what has been marked in this  
7 exhibit pages 14 through 27. Could you identify those  
8 for Mr. Stogner?

9 A. Those are well data sheets and schematics  
10 on all injection wells that we're proposing, both the  
11 current construction and the proposed construction.

12 Q. And so you will have a proposed  
13 construction sheet, and then you will also show the  
14 current construction on each of these wells?

15 A. That is correct.

16 Q. And this gives the current location of each  
17 well that you intend to use for injection in the new  
18 unit?

19 A. Yes, along with a typical well diagram.

20 Q. And that typical well diagram is set out on  
21 page 28 of this exhibit?

22 A. That is correct.

23 Q. Now, the formation into which we're  
24 proposing to inject or flood was defined by Mr. Seely,  
25 was it not?

1           A.     That's correct.

2           Q.     Could you identify the source of the water  
3     that you propose to inject into this waterflood  
4     project?

5           A.     We will inject produced water from all  
6     producing wells within the unit along with fresh water  
7     which will be used for makeup water.

8           Q.     Has the Commissioner of Public Lands  
9     approved the use of fresh water for makeup in the unit  
10    area?

11          A.     Yes.

12          Q.     Have the fresh water wells been drilled at  
13    this time?

14          A.     No, they have not.

15          Q.     Have you obtained permits or filed permits  
16    with the State Engineer's Office?

17          A.     Yes.

18          Q.     And you have the water rights to drill  
19    these wells?

20          A.     That is correct.

21          Q.     Can you tell us the general location of the  
22    water supply wells that will be drilled as part of  
23    this project?

24          A.     Yes.    There will be two of them.    One will  
25    be in the southwest quarter of the southwest quarter

1 of Section 8. The other will be in the northeast  
2 quarter of the northwest quarter of Section 17.

3 Q. What volumes are you initially proposing to  
4 inject?

5 A. Two hundred barrels of water injected per  
6 day per well.

7 Q. And what maximum daily injection rate might  
8 you have to achieve for an effective flood?

9 A. Two hundred barrels per day per injection  
10 well.

11 Q. And you're going to have an open or a  
12 closed system?

13 A. It will be a closed system.

14 Q. Will it be necessary to inject under  
15 pressure?

16 A. Yes.

17 Q. Would a pressure limitation of .2 pound per  
18 foot of depth to the top of the injection interval be  
19 satisfactory for your purposes?

20 A. No.

21 Q. What would be the maximum injection  
22 pressure you anticipate you might need?

23 A. Approximately 2,000 psi.

24 Q. Would it be satisfactory to Seely to  
25 establish an injection pressure in excess of .2 pound

1 per foot of depth?

2 A. Yes.

3 Q. Do that by having Division-witness separate  
4 tests conducted on the injection wells?

5 A. Yes.

6 Q. And then in conjunction with the district  
7 office of the Division, you could establish a safe and  
8 appropriate injection pressure for this project?

9 A. Yes.

10 Q. Let's go to what has been marked as Exhibit  
11 No. 10. Could you identify that for Mr. Stogner?

12 A. Exhibit No. 10 is a water analysis of two  
13 injection fluids, both produced water from the eight  
14 producing wells that are currently producing in the  
15 unit plus makeup water, which is fresh water.

16 Q. So by looking at these analyses, you can  
17 not only obtain an understanding of the  
18 characteristics of the water, but you can also  
19 identify the water sources you intend to use?

20 A. That is correct.

21 Q. The fresh water samples, their locations  
22 are indicated. You, of course, will be using fresh  
23 water from the supply wells?

24 A. That's correct.

25 Q. And into what formation will you be

1 drilling these supply wells?

2 A. The fresh water will come from the Ogallala  
3 at a depth of approximately 250 feet.

4 Q. Are there any other fresh water zones in  
5 the area other than the Ogallala?

6 A. No.

7 Q. Are there any fresh water wells within a  
8 mile of the injection wells?

9 A. There are none in the State Engineer's  
10 records.

11 Q. Are the logs of the proposed injection  
12 wells -- of the wells which you will be converting to  
13 injection on file with the Division?

14 A. Yes.

15 Q. Have you examined the available geologic  
16 and engineering data on the area?

17 A. Yes.

18 Q. As a result of that examination, have you  
19 found any evidence of open faults or any other  
20 hydrologic connections between the injection zone and  
21 any underground source of drinking water?

22 A. No.

23 Q. Were Exhibits 8 and 9 prepared by you or  
24 compiled under your direction?

25 A. Yes.



1 MR. CARR: At this time, Mr. Stogner, we  
2 would move the introduction of Seely Exhibits -- I'm  
3 sorry, Exhibits 9 and 10 are the two we're talking  
4 about.

5 Q. They were prepared by you?

6 A. Yes.

7 MR. CARR: We would move the admission of  
8 Seely Exhibits 9 and 10.

9 EXAMINER STOGNER: Exhibits 9 and 10 will  
10 be admitted into evidence.

11 MR. CARR: And that concludes my direct  
12 examination of Mr. Henderson.

13 EXAMINATION

14 BY EXAMINER STOGNER:

15 Q. Your C-108 represents how many schematics  
16 and information on how many wells within the area of  
17 review?

18 A. Total number of wells within the area of  
19 review is somewhere around 60, I believe. I'm not  
20 exactly sure.

21 Q. You have tops of cement shown on all those  
22 60 wells?

23 A. Yes, I have. The schematics are drawn on  
24 the plugged-out wells plus the injection wells. The  
25 other I just have data sheets that show tops of

1 cements.

2 Q. And that either showed whether they were  
3 calculated or had actual tops of cements verified by  
4 temperature surveys?

5 A. Temperature surveys or by logs, that's  
6 correct.

7 Q. Of these 60 wells, 60 plus or minus odd  
8 wells, how many wells penetrated the injection  
9 interval?

10 A. All of them.

11 Q. And how many are P & A'd of these 60 wells?

12 A. Around 30.

13 Q. And how many of these wells are, say,  
14 producing wells but are deeper than the proposed  
15 injection interval? Do you have any deep gas wells,  
16 anything like that?

17 A. Of the plugged?

18 Q. No, of the -- let me rephrase it. Of these  
19 60-odd wells, are there any that are producing from a  
20 deeper horizon than this Queen interval?

21 A. Yes, a substantial number of them.

22 Q. Give or take?

23 A. Twenty.

24 Q. And how many of these wells will be  
25 utilized or are now being utilized as EK producing

1 wells?

2 A. There's eight producers in the unit area at  
3 this time.

4 Q. You're ultimately seeking the maximum of  
5 2,000 psi injection interval; right?

6 A. That's correct.

7 Q. Or have any of the previous two floods had  
8 a higher pressure, do you know?

9 A. I do not know, I do not know if it was  
10 higher than 2,000.

11 Q. Do you know if it was higher than the .2  
12 psi per foot?

13 A. I feel certain that it's above that.

14 Q. You feel that's going to contribute to your  
15 need of going up to 2,000 psi?

16 A. Yes.

17 Q. On your review of the old plugged and  
18 abandoned wells, about what era or what time period  
19 were they plugged and abandoned?

20 A. There were a substantial number in  
21 the '60's. Most of them were in the '60's and early  
22 '70's.

23 Q. Do you think the plugging techniques  
24 utilized back then on those wells are going to be able  
25 to withstand 2,000 psi?

1           A.    Yes.  There's standard commission plugs in  
2 all of them, 2556, whatever was required, and it's  
3 basically the same that's required now.

4           Q.    What makes you feel that they are adequate  
5 to withstand 2,000 psi?

6           A.    Because there's plugs above and below  
7 wherever there should be porosity.  And most of the  
8 wells that are plugged just went to this interval, in  
9 fact, the old wells inside the unit.  And also, in  
10 addition, most of the deep wells have 8-5/8 set  
11 through this interval in several cases.

12          Q.    I guess I'm concerned, on some of those P &  
13 A'd wells, is the production string still through that  
14 interval?

15          A.    Yes.

16          Q.    Are there a bunch that are open-holed  
17 through there or had the 5-1/2-inch casing pulled?

18          A.    No.  Oh, like I say, most of these wells  
19 were drilled before that formation, and the pipe was  
20 left.

21          Q.    So there are none of them out there that  
22 are without 5-1/2-inch production casing?

23          A.    There are some that have had the casing cut  
24 and pulled from 2,800 to 1,800 feet, something like  
25 that.

1 Q. Are there any out there absent the  
2 production casing?

3 A. Dry holes?

4 Q. Yes, or old P & A'd, for that matter.

5 A. Maybe a couple. I'm not exactly sure.

6 Q. Let's talk about one. Let's turn to page  
7 77.

8 A. Okay.

9 Q. What can you tell me about that old well?

10 A. Okay. That well was drilled -- that was  
11 drilled by Zia Petroleum. That's a recently drilled  
12 well, drilled in the '80's, and was a dry hole with no  
13 porosity in the Queen, which is our injection  
14 interval. You've got 25 sacks plugged above, which is  
15 about half above and half below the Queen interval, at  
16 around 4,350, 25 sacks at 3,150, which is above the  
17 Yates, and 25 sacks at the bottom of your surface  
18 pipe, 10 sacks surface plugged.

19 Q. So there's no casing in that well at the  
20 injection interval?

21 A. That's correct.

22 Q. But there is a 25-sack plug?

23 A. Right above -- directly -- it's across the  
24 Queen interval. Some of the plug is above, and some  
25 of it will be below.

1 Q. And that's going to seal off 2,000 psi?

2 A. There's no porosity in the well in the  
3 Queen.

4 Q. So you don't feel it will get over there in  
5 the first place?

6 A. No, I do not.

7 Q. So Exhibit No. 5 is questionable. Okay.

8 On page 99, what's the corresponding  
9 injection interval in this well?

10 A. It is around 44 -- it's on there, around  
11 4,400 feet. It's a little bit deeper, 4,450,  
12 something like that. It should correspond to some of  
13 the wells down in the EK Queen unit.

14 Q. Has this one got porosity in that interval?

15 A. Let me see. Southwest, northwest of 17.  
16 No, it does not. It was a well drilled for the Queen  
17 which was unsuccessful.

18 Q. Now, as opposed to going through all 60  
19 wells tonight -- of course, at this point we -- never  
20 mind.

21 Is there anything further, Mr. Carr?

22 MR. CARR: Nothing further, Mr. Stogner.

23 EXAMINER STOGNER: Would you give me some  
24 of the sack locations so I can re- --

25 MR. CARR: I will. I will prepare a

1 proposed advertisement and bring that to you tomorrow,  
2 if you're going to be in tomorrow.

3 EXAMINER STOGNER: No, I won't be. Will  
4 Monday be sufficient?

5 MR. CARR: Monday will be better for me.

6 EXAMINER STOGNER: And that will be for the  
7 April 22?

8 MR. CARR: Yes, sir.

9 EXAMINER STOGNER: With that, do you have  
10 anything further?

11 MR. CARR: Nothing further.

12 EXAMINER STOGNER: Do you have anything  
13 further, Mr. Stovall?

14 Does anybody else have anything further in  
15 this case?

16 With that, we can take Case No. 10647 under  
17 advisement; is that correct?

18 MR. CARR: That will be --

19 EXAMINER STOGNER: That's the Unit  
20 Agreement.

21 MR. CARR: Yes, sir.

22 EXAMINER STOGNER: Okay. So we'll just  
23 need to readvertise 10648.

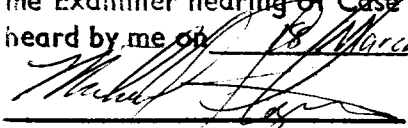
24 MR. CARR: Correct.

25 EXAMINER STOGNER: With that, I'll take

1 Case 10647 under advisement, and Case 10648 will be  
2 continued and readvertised for the hearing scheduled  
3 for April 22.

4 With that, hearing adjourned.  
5  
6  
7  
8  
9  
10  
11  
12

13 I do hereby certify that the foregoing is  
14 a complete record of the proceedings in  
15 the Examiner hearing of Case Nos. 10647 and 10648  
16 heard by me on 18 March 1993.

17   
18 \_\_\_\_\_, Examiner  
19 Oil Conservation Division  
20  
21  
22  
23  
24  
25



1 CERTIFICATE OF REPORTER  
2

3 STATE OF NEW MEXICO )

4 ) ss.

5 COUNTY OF SANTA FE )

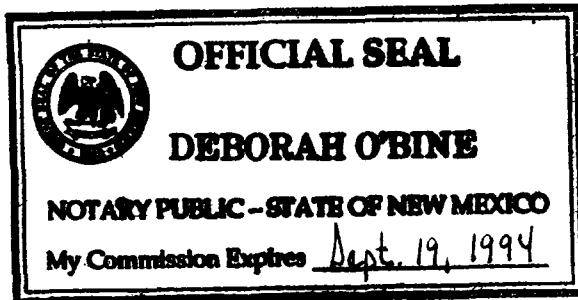
6 I, Deborah O'Bine, Certified Shorthand  
7 Reporter and Notary Public, HEREBY CERTIFY that I  
8 caused my notes to be transcribed under my personal  
9 supervision, and that the foregoing transcript is a  
10 true and accurate record of the proceedings of said  
11 hearing.

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

16 WITNESS MY HAND AND SEAL, March 30, 1993.

17 *Deborah O'Bine*  
18 \_\_\_\_\_

19 DEBORAH O'BINE  
20 CCR No. 63



CUMBRE COURT REPORTING  
P.O. BOX 9262  
SANTA FE, NEW MEXICO 87504-9262  
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UNIT AGREEMENT  
FOR THE DEVELOPMENT AND OPERATION  
OF THE  
CENTRAL EK QUEEN UNIT AREA  
LEA COUNTY, NEW MEXICO

BEFORE EXAMINED & APPROVED	
OIL COMMISSION OF NEW MEXICO	
SEEK	EXHIBIT NO. 1
CASE NO. 10647 AND 10648	

UNIT AGREEMENT  
FOR THE DEVELOPMENT AND OPERATION OF THE  
CENTRAL EK QUEEN UNIT  
LEA COUNTY, NEW MEXICO

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UNIT AGREEMENT  
FOR THE DEVELOPMENT AND OPERATION OF THE  
CENTRAL EK QUEEN UNIT  
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of October, 1992, by and between the parties subscribing, ratifying or consenting hereto, and herein referred to as "parties hereto";

W I T N E S S E T H T H A T:

WHEREAS, the parties hereto are the owners of working, royalty or other oil and gas interests in the Unit Area subject to this agreement; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by law (Sec. 3, Chap. 88, Laws 1943) as amended by Dec. 1 of Chapter 162, Laws of 1951, (Chap. 19. Art. 10, Sec. 45 N.M. Statutes 1978 Annot.), to consent to and approve the development or operation of State lands under agreements made by lessees of State land jointly or severally with other lessees where such agreements provide for the unit operation or development of part of or all of any oil or gas pool, field or area; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec. 1, Chap. 162, Laws of 1951; Chap 19, Art. 10, Sec 47, N.M. Stats. 1978 Annot.) to amend with the approval of lessee, evidenced by the lessee's execution of such agreement or otherwise, any oil and gas lease embracing State lands so that the length of the term of said lease may coincide with the term of such agreements for the unit operation and development of part or all of any oil or gas pool, field or area; and

WHEREAS, the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico is authorized by law (Chap. 72, Laws 1935, as amended, being Sec. 70-2-1 et seq. N.M. Statutes 1978 Annotated) to approve this agreement and the conservation provision hereof; and

WHEREAS, the parties hereto hold sufficient interests in the Central EK Queen Unit Area, comprised of the land hereinafter designated, to give reasonably effective control of operations therein; and

WHEREAS, it is the purpose of the parties hereto to enable institution and consummation of secondary and/or enhanced oil recovery operations, conserve natural resources, prevent waste and secure the other benefits obtainable through development and operation of the area subject to this agreement under the terms, conditions and limitations herein set forth.

NOW THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this agreement their respective interests in the Unitized Formation underlying the Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS: The oil and gas operating regulations in the effect as of the effective date hereof governing drilling and producing operations not inconsistent with the terms hereof or the laws of the State of New Mexico are hereby accepted and made a part of this agreement.

SECTION 2. DEFINITIONS: For the purpose of this agreement, the following terms and expressions are used herein shall mean:

- (a) "Unit Area" is defined as the land depicted on Exhibit "A" and described by Tracts in Exhibit "B" attached hereto and said land is hereby designated and recognized as constituting the Unit Area.
- (b) "Commissioner" is defined as the Commissioner of Public Lands of the State of New Mexico.
- (c) "Division" is defined as the Oil Conservation Division of the State of New Mexico.
- (d) "Unitized Formation" is defined as that stratigraphic interval occurring between a point of 100 feet above the top of the Queen Sand and 100 feet below the base the Queen Sand, said Queen Sand interval occurring between 4366 feet and 4426 feet in the General Operating Company Santa Fe State Well No 2 located 330 feet from the north line and 990 feet from the east line of Section 18, Township 18 South, Range 34 East, N.M.P.M., Lea County, New Mexico as recorded on the Welex compensated density dual spaced neutron log of said well dated January 20, 1986.
- (e) "Unitized Substances" is defined as all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquid or liquefiable hydrocarbons within or produced from the Unitized Formation.
- (f) "Working Interest" is defined as an interest in Unitized Substances by virtue of a lease, operating agreement or otherwise, including a carried interest, which interest is chargeable with and obligated to pay or bear, either in cash or out of production or otherwise, all or a portion of the cost of drilling, developing, producing and operating the Unitized Formation. Any interest in Unitized Substances which is a Working Interest as of the date the owner thereof executes, ratifies or consents to this agreement shall thereafter be treated as a Working Interest for all purposes of this agreement.
- (g) "Royalty Interest" is defined as a right to or interest in any portion of the Unitized substances or proceed thereof other than a Working Interest.

- (h) "Working Interest Owner" is defined as a party hereto who owns a Working Interest.
- (i) "Royalty Owner" is defined as a party hereto who owns a Royalty Interest.
- (j) "Tract" is defined as each parcel of land described as such and given a Tract number in Exhibit "B".
- (k) "Tract Participation" is defined as the percentages of Unitized Substances allocated hereunder to a Tract. The Tract Participation of the Tracts within the Unit Area is shown on Exhibit "C" attached hereto.
- (l) "Unit Participation" is defined as the sum of the percentages obtained by multiplying the Working Interest of a Working Interest Owner in each Tract having Tract Participation by the Tract Participation of such Tract.
- (m) "Unit Operating Agreement" is defined as any agreement or agreements entered into, separately or collectively, by and between the Unit Operator and the Working Interest Owners as provided in Section 9, Accounting Provisions and Unit Operating Agreement, infra, and shall be styled "Unit Operating Agreement, Central EK Queen Unit, Lea County, New Mexico".
- (n) "Unit Manager" is defined as the person or corporation appointed by the Unit Working Interest Owners to perform the duties of the Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 8, Successor Unit Operator, hereof.

SECTION 3. UNIT AREA: The area specified on the map attached hereto marked Exhibit "A" is hereby designated and recognized as constituting the Unit Area, containing ~~1448.40~~ <sup>998.40</sup> acres, more or less.

Exhibit "A" to the extent known to Unit Operator, shows the boundaries and identity of Tracts and leases in the Unit Area. Exhibit "B" attached hereto is a schedule showing, to the extent known to Unit Operator, the acreage comprising each Tract and the percentage of ownership of each Working Interest Owner in each Tract. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest as are shown in said map or schedule as being owned by such party. Exhibit "C" attached hereto is a schedule showing the Tract Participation of each Tract in the Unit Area, which Tract Participation has been calculated upon the basis of all tracts within the Unit Area being committed to this agreement as of the effective date hereof.

Exhibits "A", "B", and "C" shall be revised by Unit Operator whenever changes render such revision necessary and not less than two copies of such revision shall be filed with the Commissioner and the Division.

SECTION 4.     EXPANSION: The Unit Area may, when practicable, be expanded to include therein any additional Tract or Tracts regarded as reasonably necessary or advisable for the purposes of this agreement. Such expansion shall be effected in the following manner.

- (a) The Working Interest Owner or Owners of a Tract or Tracts desiring to bring such Tract or Tracts into the Unit Area shall file an application therefor with Unit Operator requesting such admission.
- (b) Unit Operator shall circulate a notice of the proposed expansion to each Working Interest Owner in the tract or tracts proposed to be included in the Unit and/or affected by the proposed expansion setting out the basis for admission, the Tract Participation proposed to be allocated to such Tract or Tracts, and other pertinent data. After negotiation (at Working Interest Owners' meeting or otherwise) if Working Interest Owners having a combined Unit Participation of ninety percent (90%) or more have agreed to such Tract or Tracts being brought into the Unit Area, then Unit Operator shall, after preliminary concurrence by the Commissioner and the Commission:
  - (1) Prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit Area, the reason therefor, the basis for admission of the additional Tract or Tracts, the Tract Participation to be allocated thereto, and the proposed effective date thereof; and
  - (2) Furnish copies of said notice to the Commissioner and the Division, each Working Interest Owner and to the lessee and lessor whose interests are proposed to be committed, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objections to such proposed expansion; and
  - (3) File, upon the expiration of said thirty-day period as set out in Subsection (2) immediately above, with the Commissioner and Division the following: (a) Evidence of mailing copies of said notice of expansion; (b) An application for such expansion; (c) An instrument containing the appropriate joinders in compliance with the qualification requirements of Section 13, Tracts Qualified for Unit Participation, *infra*; and (d) Copies of any objections received.

The expansion shall, after due consideration of all pertinent information and upon approval by the Commissioner and Division, become effective as of the date prescribed in the notice thereof. The revised Tract Participation of the respective Tracts included within the Unit Area prior to such enlargement shall remain in the same ratio one to another.



There shall never be any retroactive allocation or adjustment of operating expenses or of interest in the Unitized Substances produced (or the proceeds of the sale thereof) by reason of an expansion of the Unit Area; provided, however, this limitation shall not prevent any adjustment of investment necessitated by such expansion.

SECTION 5. UNITIZED LAND AND UNITIZED SUBSTANCES: All land committed to this agreement as provided in Section 13, Tracts Qualified for Unit Participation, as to the Unitized Formation defined in Section 2, Definitions, shall constitute land referred to herein as "Unitized Land" or "land subject to this agreement". All oil and gas in the Unitized Formation in the Unitized Land are unitized under the terms of this agreement and herein are called "Unitized Substances".

SECTION 6. UNIT OPERATOR: Seely Oil Company is hereby designated as Unit Operator, and by signing this instrument as Unit Operator it agrees and consents to accept the duties and obligations of Unit Operator for the operation, development and production of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as an owner of interest in Unitized Substances, and the term "Working Interest Owner" when used herein shall include or refer to Unit Operator as the owner of a Working Interest when such an interest is owned by it.

SECTION 7. RESIGNATION OR REMOVAL OF UNIT OPERATOR: Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights as such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners and the Commissioner and Division unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

The Unit Operator shall, upon default or failure in the performance of its duties and obligations hereunder, be subject to removal only by unanimous vote of all Working Interest Owners other than Unit Operator. Such removal shall be effective upon notice thereof to the Commissioner and Division.

In all such instances of resignation or removal, until a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal becomes effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this agreement shall not terminate its right, title or interest as the owner of a Working Interest or other interest in Unitized Substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all equipment, books and records, materials,

appurtenances and other assets used in conducting the Unit operations and owned by the Working Interest Owners (including any and all data and information which it might have gained or assembled by reason of its operation of the Unit Area) to the new duly qualified successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected, to be used for the purpose of conducting Unit Operations hereunder. Nothing herein shall be construed as authorizing removal of any material, equipment or appurtenances needed for the preservation of any wells. Nothing herein contained shall be construed to relieve or discharge any Unit Operator who resigns or is removed hereunder from any liability or duties accruing to or performable by it prior to the effective date of such resignation or removal.

SECTION 8. SUCCESSOR UNIT OPERATOR: Whenever Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners, voting in the manner provided in the Unit Operating Agreement, shall select a successor Unit Operator; provided, however, that the voting interest of the outgoing Unit Operator shall not be considered for any purpose if such outgoing Unit Operator fails to vote or votes only to succeed itself. Such selection of a successor Unit Operator shall not become effective until: (a) a Unit Operator so selected shall accept in writing the duties and responsibilities of Unit Operator, and (b) the selection shall have been approved by the Commissioner and Division. If no successor Unit Operator is selected as herein provided, the Commissioner may declare this agreement terminated.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT: Costs and expenses incurred by Unit Operator in conducting Unit Operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement. Such Unit Operating Agreement shall also provide the manner in which the Working Interest Owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereunder in conformity with their underlying operating agreements, leases or other independent contracts and such other rights and obligations as between Unit Operator and the Working Interest Owners as may be agreed upon by the Unit Operator and the Working Interest Owners; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Unit Agreement or to relieve the Unit Operator of any right or obligation established under this agreement, and in case of any inconsistency or conflict between this agreement and the Unit Operating Agreement, this agreement shall prevail. One true copy of any Unit Operating Agreement executed Pursuant to this Section shall be filed with the Commissioner.

SECTION 10. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR: Except as otherwise specifically provided herein, the exclusive right, privilege and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting for, producing, storing, allocating, and distributing the Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Upon request therefor, acceptable evidence of title to said rights shall be deposited with said Unit Operator, and together with this agreement shall

constitute and define the rights, privileges and obligations of Unit Operator. Nothing herein, however, shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that under this agreement the Unit Operator, in its capacity as Unit Operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified.

SECTION 11. PLAN OF OPERATIONS: It is recognized and agreed by the parties hereto that all of the land subject to this agreement has been reasonably proven to be productive of Unitized Substances in paying quantities or is necessary for Unit Operations and that the object and purpose of this agreement is to formulate and to put into effect a secondary enhanced oil recovery project in order to effect a greater recovery of Unitized Substances, prevent waste and conserve natural resources. The parties hereto agree that the Unit Operator may, subject to the consent and approval of a plan of operation by the Working Interest Owners, the Division and the Commissioner, inject into the Unitized Formation, through any well or wells completed therein, brine, water, air, gas, oil, liquefied petroleum gas, steam and any other substances or a combination of any said substances, whether produced from the Unitized Formation or not, and that the location of input wells and the rates of injection therein and the rate of production shall be governed by standards of good geological and petroleum engineering practices and conservation methods. Reasonable diligence shall be exercised by Unit Operator in complying with the obligations of any approved plan of operation. The parties hereto, to the extent they have the right so to do, hereby grant Unit Operator the right to use brine or water (or both) produced from any formation underlying the Unit Area for injection into the Unitized Formation; provided, however, that this grant of said right shall not preclude the use of brine or water (or both) produced from any formation other than the Unitized Formation for injection into formations other than the Unitized Formation. After commencement of secondary and or enhanced oil recovery operations, Unit Operator shall furnish the Commissioner and the Division monthly injection and production reports for each well in the Unit. The Working Interest Owners, the Commissioner and the Division shall be furnished periodic reports on the progress of the plan of operation and any revisions or changes thereto necessary to meet changed conditions or to protect the interests of all parties to this agreement; provided, however, that any major revisions of the plan of operation involving a basic deviation from the initial plan of operation shall be subject to the consent and approval of the Working Interest Owners, the Commissioner and Division.

The initial plan of operation shall be filed with the Division and the Commissioner concurrently with the filing of this Unit Agreement for final approval. Reasonable diligence shall be exercised in complying with the obligations of said plan of operation.

Notwithstanding anything to the contrary herein contained, the Unit Operator shall commence, if not already having done so, secondary recovery operations and/or enhanced oil recovery operations on the Unit Area not later than six (6) months after the effective date of this Agreement, or any extension thereof approved by the Commissioner and Division or this Agreement, shall terminate automatically in which latter

event the Unit Operator shall notify all interested parties. After such operations are commenced, Unit Operator shall carry on such operations as would a reasonably prudent operator under the same or similar circumstances.

SECTION 12. TRACT PARTICIPATION: The percentages of Tract Participation set forth in Exhibit "C" for each Tract within the Unit Area have been calculated and determined in accordance with the following formula:

TRACT PARTICIPATION

$$\text{Percentage} = 90\% \text{ A/B} + 10\% \text{ C/D}$$

- A = the Tract Cumulative Oil Production from the Unitized Formation as of December 31, 1990, plus an additional 5000 barrels credit for each usable Queen Well on the Tract.
- B = the Unit Total Cumulative Oil Production from the Unitized Formation as of December 31, 1990 plus an additional 5000 barrels credit for each usable Queen Well in the Unit Area.
- C = the acreage under each Tract.
- D = the Total Acreage in the Unit Area.

Such percentages of Tract Participation have been calculated upon the basis of all of said Tracts within the Unit Area being committed to this agreement as of the effective date hereof, and such Tract Participation shall govern the allocation of all Unitized Substances produced after the effective date hereof, subject, however, to any revision or revisions of the Unit Area and Exhibit "C" in accordance with the provisions hereof.

In the event less than all of the Tracts are committed hereto as of the effective date hereof Unit Operator shall promptly file with the Commissioner and Division at least two copies of revised Exhibits "B" and "C" setting forth on Exhibit "C" the revised Tract Participations opposite each of the qualified tracts, which shall be calculated by using the tract factors and formula set forth hereinabove, but applying the same only to the qualified Tracts. The revised Exhibits "B" and "C" shall, effective as of the effective date of this agreement, supersede the original Exhibits "B" and "C" attached hereto and shall thereafter govern the allocation of Unitized Substances unless disapproved by the Commissioner and Division with 30 days after filing.

If, subsequent to the effective date of this agreement, any additional tract becomes committed hereto under the provisions of Section 3, Unit Area, or Section 28, Non-joinder and Subsequent Joinder, or any committed tract is excluded herefrom under the provisions of Section 27, Loss of Title, Unit Operator shall revise said Exhibits "B" and "C" or the latest revision thereof to show the new percentage participations of the then committed tracts, which revised exhibit shall, upon its approval by the Commissioner and the Division supersede, as of its effective date, the last previously effective Exhibits "B" and "C". In any such revision of Exhibit "C" the revised percentage participations of the respective tracts

listed in the last previously effective Exhibit "C" shall remain in the same ratio one to another..

SECTION 13. TRACTS QUALIFIED FOR UNIT PARTICIPATION: On and after the effective date hereof, the Tracts within the Unit Area that shall be entitled to participate in the production of Unitized Substances therefrom shall be the Tracts within the Unit Area that are qualified as follows:

(a) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest therein have become parties hereto and as to which Royalty Owners owning seventy-five percent (75%) or more of the Royalty Interest therein have become parties hereto.

(b) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest therein have become parties hereto and as to which Royalty Owners owning less than seventy-five percent (75%) of the Royalty Interest therein have become parties hereto and, further, as to which:

(i) All Working Interest Owners in any such Tract have joined in a request for the commitment of such Tract to this agreement, and

(ii) Seventy-five percent (75%) of the combined voting interest of Working Interest Owners in all Tracts meeting the requirements of Section 13 (a) hereof have voted in favor of the commitment of such Tract.

For the purposes of this Section 13 (b), a Working Interest Owner's "voting interest" shall be equal to the ratio (expressed in percent) which its aggregate Unit Participation in all tracts qualifying under Section 13 (a) bears to the total Unit Participation of all Working Interest Owners in all Tracts qualifying under Section 13 (a), as such Unit Participation is determined from the Tract Participation set out in Exhibit "C".

(c) Each Tract as to which Working Interest Owners owning less than one hundred percent (100%) of the Working Interest therein have become parties hereto, regardless of the percentage of Royalty Interest therein which is committed hereto and, further, as to which:

(i) The Working Interest Owner operating any such Tract and all of the other Working Interest Owners in such Tract who have become parties hereto have joined in a request for the commitment of such Tract to this agreement and have executed and delivered an indemnity agreement indemnifying and agreeing to hold harmless the other Working Interest Owners in the Unit Area, their successors and assigns, against all claims and

demands which may be made by the owners of working interest in such Tract who are not parties hereto and which arise out of the commitment of such Tract to this agreement, and

(ii) Seventy-five percent (75%) of the combined voting interests of Working Interest Owners in all Tracts meeting the requirements of Section 13 (a) and (b) have voted in favor of the commitment of such Tract and acceptance of the indemnity agreement.

For the purpose of this Section 13 (c), a Working Interest Owner's "voting interest" shall be equal to the ratio (expressed in percent) which its aggregate Unit Participation in all Tracts qualifying under Section 13 (a) and 13 (b) bears to the total Unit Participation of all Working Interest Owners in all Tracts qualifying under Section 13 (a) and (b) as such Unit Participation is determined from the Tract Participations set out in Exhibit "C". Upon the commitment of such a Tract to this agreement, the Unit Participation that would have been attributed to the nonsubscribing owners of the Working Interest in such Tract, had they become parties to this agreement and the Unit Operating Agreement, shall be attributed to the Working Interest Owners in such Tract who have become parties to such agreements in proportion to their respective Working Interests in the Tract.

SECTION 14. ALLOCATION OF UNITIZED SUBSTANCES: All Unitized Substances produced and saved from the committed Tracts within the Unit Area (less, save and except any part of such Unitized Substances which is used in conformity with good operating practices on the Unit Area for drilling, operating, camp and other production, development and pressure maintenance purposes, or which is unavoidably lost) shall be apportioned among and allocated to the committed Tracts within the Unit Area in accordance with the Tract Participation effective hereunder as such Tract Participation is shown in Exhibit "C" or any revision thereof. The amount of Unitized Substances so allocated to each Tract, and only that amount (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such Tract), shall, for all intents, uses and purposes, be deemed to have been produced from such Tract.

The Unitized Substances allocated to each Tract shall be distributed among or accounted for to the parties hereto entitled to share in the production from such Tract in the same manner, in the same proportions, and upon the same conditions, as they would have participated and shared in the production from such Tract, or in the proceeds thereof, had this agreement not been entered into, and with the same legal force and effect. No Tract committed to this Agreement and qualified for participation as heretofore provided shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances from such Tract.

If the Working Interest or the Royalty Interest in any Tract is, on or after the effective date hereof, divided with respect to separate parcels or portions of such Tract and owned severally by different persons, the Tract Participations assigned to such Tract shall, in the absence of a recordable instrument executed by all owners and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

The Unitized Substances allocated to each Tract shall be delivered in kind to the respective Working Interest Owners and parties entitled thereto by virtue of the ownership of oil and gas rights therein or by purchase from such owners. Each Working Interest Owner and the parties entitled thereto shall have the continuing right to receive such production in kind at a common point within the Unit Area and to sell or dispose of the same as it sees fit. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose on the Unit Area, provided the same are so constructed, maintained and operated as not to interfere with operations carried on pursuant hereto or with operations upon or with regard to formations other than the Unitized Formation conducted within the Unit Area. Subject to Section 16, Royalty Settlement, hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party (excepting the State of New Mexico) receiving the same in kind.

If any party fails to take in kind or separately dispose of its proportionate share of Unitized Substances, Unit Operator shall have the right, for the time being and subject to revocation at will by the party owning the share, to purchase for its own account or sell to others such share at not less than the prevailing market price in the area for like production; provided that, all contracts of sale by Unit Operator of any other party's share of Unitized Substances shall be only for such reasonable periods of time as are consistent with the minimum needs of the industry under the circumstances, but in no event shall any such contract be for a period in excess of one year. The proceeds of the Unitized Substances so disposed of by Unit Operator shall be paid to the party entitled thereto.

Any party receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any Tract or receiving the proceeds therefrom shall be responsible for making payment of all royalty to the parties entitled thereto, and shall indemnify all parties hereto, including Unit Operator, against any liability for all royalties, overriding royalties, production payments, and all other payments chargeable against or payable out of such Unitized Substances or the proceeds therefrom.

SECTION 15. OIL IN LEASE TANKAGE ON EFFECTIVE DATE: Unit Operator shall make a proper and timely gauge of all lease and other tanks within the Unit Area in order to ascertain the amount of merchantable oil

above the pipeline connection in such tanks as of 7:00 A.M. on the effective date hereof. All such oil which has then been produced legally shall be and remain the property of the Working Interest Owner entitled thereto the same as if the Unit had not been formed; and such Working Interest Owner shall promptly remove said oil from the Unit Area. Any such oil not so removed shall be sold by Unit Operator for the account of such Working Interest Owner, subject to the payment of all royalty to Royalty Owners under the terms and provisions of the Unit Agreement and any applicable lease or leases and other contracts. All such oil as is in excess of the prior allowable of the well or wells from which the same was produced shall be regarded and treated the same as Unitized Substances produced after the effective date hereof. If, as of the effective date, hereof, any Tract is overproduced with respect to the allowable of the well or wells on the Tract and the amount of such overproduction has been sold or otherwise disposed of, such overproduction shall be regarded and included as a part of the Unitized Substances produced after the effective date hereof and the amount thereof charged to such Tract as having been delivered to the persons entitled to Unitized Substances allocated to such Tract.

SECTION 16. ROYALTY SETTLEMENT: The State of New Mexico and all Royalty Owners who, under existing contracts, are entitled to take in kind a share of the substances produced from any Tract unitized hereunder, shall hereafter be entitled to take in kind their share of the Unitized Substances allocated to such Tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable contracts, laws and regulations. Settlement for Royalty Interests not taken in kind shall be made by Working Interest Owners responsible therefore under existing contracts, laws and regulations, on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under their leases, except that such Royalty shall be computed in accordance with the terms of this Unit Agreement.

If gas obtained from lands not subject to this Agreement is introduced into the Unitized Formation for use in pressure maintenance, stimulation of production, or increasing ultimate recovery, which shall be in conformity with a plan first approved by the Commissioner and the Division a like amount of gas, less appropriate deductions for loss from any cause may be withdrawn from the formation into which the gas was introduced, royalty free as to dry gas, but not to the products extracted therefrom; provided that such withdrawal shall be pursuant to such conditions and formula as may be prescribed or approved by the Commissioner; and Division provided further, that such right of withdrawal shall terminate on the termination of this agreement. If liquefied petroleum gases obtained from lands or formations not subject to this agreement be injected into the Unitized Formation for the purpose of increasing ultimate recovery, which shall be in conformance with a plan first approved by the Commissioner and Division; part or all of such liquefied petroleum



gases may be withdrawn royalty free pursuant to such conditions and formula as may be prescribed or approved by the Commissioner and Division.

Royalty due on account of State lands shall be computed and paid on the basis of all Unitized Substances allocated to such lands.

SECTION 17. RENTAL SETTLEMENT: Rentals or minimum royalties due on leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations, provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for payment of any rental or minimum royalty in lieu thereof due under their leases. Rental for lands of the State of New Mexico subject to this agreement shall be paid at the rate specified in the respective leases from the State of New Mexico, or may be paid at the rate specified in the respective leases from the State of New Mexico, or may be reduced or suspended under order of the Commissioner pursuant to applicable laws and regulations.

SECTION 18. CONSERVATION: Operations hereunder and production of Unitized Substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by State laws and regulations. The use of fresh water in waterflood operations is prohibited unless expressly approved by the Commissioner of Public Lands on the basis of excessive technological or financial burden.

SECTION 19. DRAINAGE: The unit Operator shall take appropriate and adequate measures to prevent drainage of Unitized Substances from unitized lands by wells on land not subject to this agreement, or, with consent of the Commissioner and pursuant to applicable regulations, pay a fair and reasonable compensatory royalty as determined by the Commissioner.

SECTION 20: LEASES AND CONTRACTS CONFORMED AND EXTENDED: The terms, conditions and provision of all leases, subleases and other contracts relating to exploration, drilling, development or operation for oil or gas on lands committed to this agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect, and the parties hereto hereby consent that the Commissioner, as to State leases, shall by his approval hereof or by the approval hereof by his duly authorized representative, does hereby establish, alter, change or revoke the drilling, producing, rental minimum royalty and royalty requirements of State leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this agreement. Without limiting the generality of the foregoing, all leases, subleases and contracts are particularly modified in accordance with the following:

- (a) The development and operation of lands subject to this agreement under the terms hereof shall be deemed full performance of all obligations for development and operation with respect to each and every part or

separately owned Tract subject to this agreement, regardless of whether there is any development of any particular part or Tract of the Unit Area, notwithstanding anything to the contrary in the lease, operating agreement or other contract by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling, producing secondary recovery or enhanced oil operations performed hereunder upon any Tract of unitized lands shall be accepted and deemed to be performed upon and for the benefit of each and every Tract of unitized land, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on land therein embraced.

(c) Suspension of drilling or producing operations on all unitized land pursuant to direction or consent of the Division and Commissioner or their duly authorized representatives, shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every Tract of unitized lands.

(d) Each lease, sublease, or contract relating to the exploration, drilling, development or operation for oil and gas which by its term might expire prior to the termination of this agreement, is hereby extended beyond any such term so provided therein, so that it shall be continued in full force and effect for and during the terms of this agreement.

(e) Termination of this agreement shall not affect any lease which, pursuant to the terms thereof or of any applicable laws shall continue in force and effect thereafter.

(f) Any lease which is made subject to this agreement shall continue in force beyond the term provided therein as to the lands committed hereto as long as such lands remain subject hereto.

(g) Any lease embracing lands of the State of New Mexico having only a portion of its land committed hereto, shall be segregated as to that portion committed and that not committed, and the terms of such lease shall apply separately to each segregated portions commencing as of the effective date hereof; provided, however that notwithstanding any of the provisions of this agreement to the contrary, such lease shall continue in full force and effect beyond the term provided therein as to all lands embraced in such lease if oil or gas is, or has heretofore been discovered in paying quantities on some part of the lands embraced in such lease committed to this agreement, or so long as a portion of the Unitized Substances produced from the Unit Area is, under the terms of this

agreement, allocated to the portion of the lands covered by such lease committed to this agreement, or at any time during the term hereof, as to any lease that is then valid and subsisting and upon which the lessee or the Unit Operator is then engaged in bonafide drilling, reworking, or secondary recovery operations on any part of the lands embraced in such lease, then the same as to all lands embraced therein shall remain in full force and effect so long as such operations are diligently prosecuted, and if they result in the production of oil or gas, said lease shall continue in full force and effect as to all lands embraced therein, so long thereafter as oil or gas in paying quantities is being produced from any portion of said lands.

SECTION 21. COVENANTS RUN WITH LAND: The covenants herein shall be construed to be covenants running with the land with respect to the interests of the parties hereto and their successors in interest until this agreement terminates, and any grant, transfer or conveyance of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by he grantee, transferee, or other successor in interest. No assignment or transfer of any Working Interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer; and no assignment or transfer or any Royalty Interest subject hereto shall be binding upon the Working Interest Owner responsible therefor until the first day of the calendar month after said Working Interest Owner is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer.

SECTION 22 EFFECTIVE DATE AND TERM: This agreement shall become binding upon each party who executes or ratified it as of the date of execution or ratification by such party and shall become effective as of 7:00 A.M. of the first day of the month next following:

(a) The execution or ratification of this agreement and the Unit Operating Agreement by Working Interest Owners having a combined Unit participation of at lease eighty-five percent (85%), and the execution or ratification of this agreement by Royalty Owners owning a combined interest of at least seventy percent (70%) of the Royalty Interest in said Unit Area; and

(b) The approval of this agreement by the Commissioner and the Commission; and

(c) The filing of at least one counterpart of this agreement for record in the office of the County Clerk of Lea County, New Mexico, by the Unit Operator; and

(d) The filing in the office of the County Clerk of Lea County, New Mexico, of a certificate by Unit Operator to the effect that (a), (b) and (c) above have been accomplished, and stating the effective date hereof;

and provided, further, that if (a), (b), (c) and (d) above are not accomplished on or before October 1, 1993, this agreement shall terminate ipso facto on said date (hereinafter called "termination date") and thereafter be of no further force or effect, unless prior thereto this agreement has been executed or ratified by Working Interest Owners having a combined Unit Participation of at least sixty-five percent (65%) and the Working Interest Owners having a combined Unit Participation of at least eighty percent (80%) committed to this agreement have decided to extend said termination date for a period not to exceed one (1) year (hereinafter called "extended termination date"). If said termination date is so extended and (a), (b), (c) and (d) above are not accomplished on or before said extended termination date this agreement shall terminate ipso facto on said extended termination date and thereafter be of no further force or effect.

The term of this agreement shall be for and during the time that Unitized Substances are produced in paying quantities from the Unit Area and as long thereafter as diligent drilling, reworking or other operations (including secondary recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days, and as long thereafter as Unitized Substances are produced as aforesaid, unless sooner terminated by Working Interest Owners in the manner hereinafter provided.

This agreement may be terminated at any time with the approval of the Commissioner by Working Interest Owners having at least ninety percent (90%) Unit Participation, as determined from Exhibit "C". Notice of such termination shall be given by Unit Operator to all parties hereto.

Unit Operator shall within thirty (30) days after the termination date of this agreement, file for record in the office where a counterpart of this agreement is recorded, a certificate to the effect that this agreement has terminated according to its terms and stating further the termination date.

If not otherwise covered by the leases unitized under this agreement, Royalty Owners hereby grant Working Interest Owners a period of six (6) months after termination of this agreement in which to salvage, sell, distribute or otherwise dispose of the personal property and facilities used in connection with Unit Operations.

SECTION 23. APPEARANCES: Unit Operator shall have the right to appear for or on behalf of any and all interests affected hereby before the Commissioner and the Commission and to appeal from any order issued under the rules and regulations of the Commissioner or the Commission or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Commissioner or the Commission, or any other legally constituted

authority; provided, however, that any other interested party shall also have the right at his or its own expense to be heard in any such proceedings.

SECTION 24. NOTICES: All notices, demands, objections or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if made in writing and personally delivered to the party or parties or sent by postpaid certified mail addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party or parties may have furnished in writing to the party sending the notice, demand or statement.

SECTION 25. NO WAIVER OF CERTAIN RIGHTS: Nothing in this agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as the validity or invalidity of any law of the State wherein said unitized lands are located, or rules or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waive; provided, however, that each party hereto covenants that during the existence of this agreement such party will not resort to any action at law or in equity to partition the Unit Area or the facilities used in the development or operation hereof and to that extent waives the benefits of all laws authorizing such partition.

SECTION 26. LOSS OF TITLE: In the event that any Tract ceases to have sufficient Working Interest Owners committed to this agreement to meet the conditions of Section 13, Tracts Qualified for Unit Participation, because of failure of title of any party hereto, such Tract shall be automatically regarded as not committed to this agreement effective as of 7:00 A.M. on the first day of the calendar month in which the failure of title is finally determined; provided, however, that such Tract shall not be so regarded if said Tract can be requalified for admission under Section 13 within ninety (90) days after the date on which such title failure was finally determined.

If any such Tract cannot be so requalified, Unit Operator shall revise the schedule previously filed with the Commissioner setting forth the Tracts committed hereto, and Unit Operator shall revise Exhibit "C" to show the tracts in the Unit Area that remain committed hereto and the Tract Participation of each of said Tracts, which revised Tract Participation shall be calculated and determined on the basis that the Tract Participation of each of said Tracts shall remain in the same ratio one to the other. Copies of the revised schedule and exhibit shall be filed with the Commissioner and same shall be effective as of 7:00 A.M. on the first day of the calendar month in which such failure of title is finally determined.

If title to a Working Interest fails, the rights and obligations of Working Interest Owners by reason of such failure shall be governed by the Unit Operating Agreement. If title to a Royalty Interest fails, but the Tract to which it relates remains committed to

this agreement, the party whose title failed shall not be entitled to participate hereunder insofar as its participation is based on such lost Royalty Interest.

In the event of a dispute as to the title to any Working Interest or Royalty Interest subject hereto, payment or delivery on account thereof may be withheld without liability or interest until the dispute is finally settled; provided, that as to the State land or leases, no payments of funds due the State of New Mexico shall be withheld, but such funds shall be deposited as directed by the Commissioner to be held as unearned money pending final settlement of title dispute, and then applied as earned or returned in accordance with such final settlement.

Unit Operator, as such, is relieved from any responsibility for any defect or failure of any title hereunder.

SECTION 27. NONJOINDER AND SUBSEQUENT JOINDER: As the objective of this Unit Agreement is to have lands in the Unit Area operated and entitled to participation under the terms hereof, it is agreed that, notwithstanding anything else herein, no joinder shall be considered a commitment to this Unit Agreement unless the Tract involved is qualified under Section 13 hereof, Tracts Qualified for Unit Participation. Joinder in the Unit Agreement by a Working Interest Owner, at any time must be accompanied by appropriate joinder to the Unit Operating Agreement in order for the interest to be regarded as effectively committed to this Unit Agreement. Joinder by any owner of a Royalty Interest, at any time must be accompanied by appropriate joinder by the owner of the corresponding Working Interest in order for the interest to be regarded as committed hereto.

Any oil or gas interest in the Unitized Formation in lands within the Unit Area not committed hereto prior to final approval of this agreement by the Commissioner may thereafter be committed hereto upon compliance with the applicable provisions of Section 13, Tracts Qualified for Unit Participation, hereof, within a period of two (2) months thereafter, on the same basis of participation as provided for in Section 12, Tract Participation, and set forth in Exhibit "C", by the owners or owners thereof subscribing or consenting in writing to this agreement and, if the interest is a Working Interest, by the owner of such interest subscribing also to the Unit Operating Agreement.

It is understood and agreed, however, that after two (2) months from the effective date hereof, the right of subsequent joinder as provided in this Section shall be subject to such requirements or approvals and on such basis as may be agreed upon by Working Interest Owners having a combined Unit Participation of not less than ninety percent (90%), provided that the Tract Participation of each previously committed Tract shall remain in the same ratio one to the other. Such joinder by a Working Interest Owner must be evidenced by its execution or ratification of this Unit Agreement and the Unit Operating Agreement. Such joinder by a Royalty Owner must be evidenced by its execution or ratification of this Unit Agreement and must be consented to in writing by the Working Interest Owner responsible for the payment

of any benefits that may accrue hereunder in behalf of such Royalty Owner. Except as may be otherwise herein provided, subsequent joinders shall be effective at 7:00 A.M. of the first day of the month following the filing with the Commissioner, of duly executed documents necessary to establish effective commitment unless reasonable objection to such joinder by the Commissioner is duly made within sixty (60) days after such filing. Notwithstanding any of the provisions to the contrary, all commitments of State of New Mexico land must be approved by the Commissioner.

SECTION 28. COUNTERPARTS: This agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties and may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification, or consent hereto with the same force and effect as if all parties had signed the same document, and regardless of whether or not it is executed by all parties owning or claiming an interest in the lands within the above described Unit Area.

SECTION 29. JOINDER COMMITMENT: Execution as herein provided by any party either as a Working Interest Owner or as a Royalty Owner shall commit all interests that may be owned or controlled by such party.

SECTION 30. TAXES: Each party hereto shall, for its own account, render and pay its share of any taxes levied against or measured by the amount or value of the Unitized Substances produced from the unitized land; provided, however, that if it is required or if it be determined that the Unit Operator or the several Working Interest Owners must pay or advance said taxes for the account of the parties hereto, it is hereby expressly agreed that the parties so paying or advancing said taxes shall be reimbursed therefor by the parties hereto, including Royalty Owners, who may be responsible for taxes on their respective allocated share of said Unitized Substances. No such taxes shall be charged to the State of New Mexico, or to any lessor who has a contract with a lessee which requires his lessee to pay such taxes.

SECTION 31. PERSONAL PROPERTY EXCEPTED: All lease and well equipment, materials and other facilities heretofore or hereafter placed by any of the Working Interest Owners on the lands covered hereby shall be deemed to be and shall remain personal property belonging to and may be removed by the Working Interest Owners. The rights and interest therein as among Working Interest Owners are covered by the Unit Operating Agreement.

SECTION 32. NO PARTNERSHIP: The duties, obligations and liabilities of the parties hereto are intended to be several and not joint or collective. This agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the parties hereto. Each party hereto shall be individually responsible for its own obligations as herein provided.

SECTION 33. CORRECTION OF ERRORS: It is hereby agreed by all parties to this agreement that Unit Operator is empowered to correct any mathematical or clerical errors which may exist in the pertinent exhibits to this agreement; provided, however, that correction of any error other than mathematical or clerical shall be made by Unit Operator only after first having obtained approval of Working Interest Owners having a combined Unit Participation of fifty percent (50%) or more and the Commissioner.

IN WITNESS WHEREOF, the undersigned have executed this agreement on the dates evidenced by their respective certificates of acknowledgement hereof.

UNIT OPERATOR AND WORKING INTEREST OWNER

SEELY OIL COMPANY

By: \_\_\_\_\_

STATE OF

COUNTY OF

This instrument was acknowledged before me on \_\_\_\_\_  
\_\_\_\_\_ by \_\_\_\_\_,  
\_\_\_\_\_, a \_\_\_\_\_ corporation, on behalf of said  
corporation.

My Commission Expires:

\_\_\_\_\_

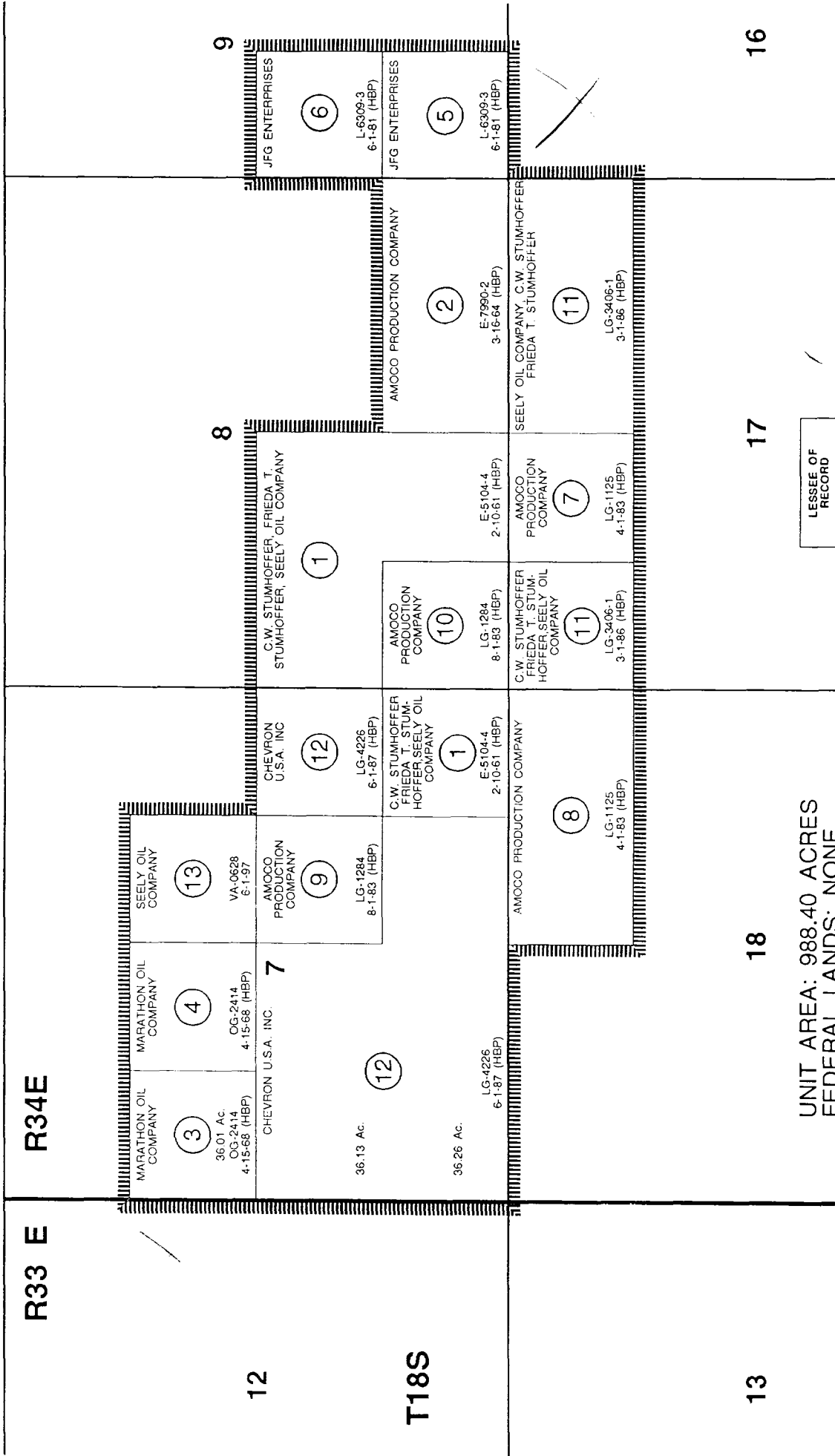
\_\_\_\_\_  
Notary Public in and for said  
County and State



EXHIBIT "A" TO UNIT AGREEMENT

CENTRAL EK QUEEN UNIT  
LEA COUNTY, NEW MEXICO

MAP OF UNIT AREA



LESSEE OF RECORD  
TRACT  
NUMBER  
LEASE NUMBER  
LEASE EXPIRATION

UNIT AREA: 988.40 ACRES  
FEDERAL LANDS: NONE  
STATE LANDS: 988.40 ACRES  
FEE LANDS: NONE  
TRACT NUMBER: THIRTEEN (13)  
UNIT OUTLINE: |||||

EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL EX QUEEN UNIT  
LEA COUNTY, NEW MEXICO

SCHEDULE SHOWING ALL LANDS AND LEASES

TRACT	DESCRIPTION OF LAND	NUMBER OF ACRES	LEASE NUMBER & EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	LESSEE OF RECORD	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNERSHIP AND PERCENTAGE
1	SE/4 SE/4 Section 7 & SE/4 SW/4, N/2 SW/4 Section 8, T18S, R34E	160.00	E-5014-4 2-10-61 (HBP)	State of New Mexico 12.5%	C. W. Stumhoffer Frieda T. Stumhoffer Seely Oil Company	Appendix Note 1	Appendix Note 2
2	S/2 SE/4 Section 8, T18S, R34E	80.00	E-7990-2 3-16-64 (HBP)	State of New Mexico 12.5%	Amoco Production Company	Appendix Note 3	Appendix Note 4
3	Lot 2 (SW/4 NW/4) Section 7, T18S, R34E	36.01	OG-2414 4-15-68 (HBP)	State of New Mexico 12.5%	Marathon Oil Co.	Appendix Note 5	Appendix Note 6
4	SE/4 NW/4 Section 7, T18S, R34E	40.00	OG-2414 4-15-68 (HBP)	State of New Mexico 12.5%	Marathon Oil Co.	Appendix Note 7	Appendix Note 8
5	SW/4 SW/4 Section 9, T18S, R34E	40.00	L-6309-3 6-01-81 (HBP)	State of New Mexico 12.5%	JFG Enterprise	Appendix Note 9	Appendix Note 10
6	NW/4 SW/4 Section 9, T18S, R34E	40.00	L-6309-3 6-01-81 (HBP)	State of New Mexico 12.5%	JFG Enterprise	Appendix Note 11	Appendix Note 12
7	NE/4 NW/4 Section 17, T18S, R34E	40.00	LG-1125 4-01-83 (HBP)	State of New Mexico 12.5%	Amoco Production Company	Appendix Note 13	Appendix Note 14
8	N/2 NE/4 Section 18, T18S, R34E	80.00	LG-1125 4-01-83 (HBP)	State of New Mexico 12.5%	Amoco Production Company	Appendix Note 15	Appendix Note 16

EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL EK QUEEN UNIT  
LEA COUNTY, NEW MEXICO

SCHEDULE SHOWING ALL LANDS AND LEASES

TRACT	DESCRIPTION OF LAND	NUMBER OF ACRES	LEASE NUMBER & EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	LESSEE OF RECORD	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNERSHIP AND PERCENTAGE
9	NW/4 SE/4 Section 7, T18S, R34E	40.00	LG-1284 8-01-83 (HBP)	State of New Mexico 12.5%	Amoco Production Company	Appendix Note 17	Appendix Note 18
10	SW/4 SW/4 Section 8, T18S, R34E	40.00	LG-1284 8-01-83 (HBP)	State of New Mexico 12.5%	Amoco Production Company	Appendix Note 19	Appendix Note 20
11	NW/4 NW/4 & N/2 NE/4 Section 17, T18S, R34E	120.00	LG-3406-1 3-01-86 (HBP)	State of New Mexico 12.5%	Seely Oil Company C. W. Stumhoffer Frieda T. Stumhoffer	Appendix Note 21	Appendix Note 22
12	Lots 3 & 4 (W/2 SW/4), E/2 SW/4, NE/4 SE/4 & SW/4 SE/4 Section 7, T18S, R34E	232.39	LG-4226 6-01-87 (HBP)	State of New Mexico 12.5%	Chevron USA Inc.	Appendix Note 23	Appendix Note 24
13	SW/4 NE/4 Section 7, T18S, R34E	40.00	VA-0628 6-01-97	State of New Mexico 12.5%	Seely Oil Company	Appendix Note 25	Appendix Note 26
TOTALS			0 Federal Tracts 13 State of New Mexico Tracts 0 Fee Tracts 13 Tracts		0.00 Acres 988.40 Acres 0.00 Acres 988.40 Acres	0.00% of Unit Area 100.00% of Unit Area 0.00% of Unit Area 100.00% of Unit Area	

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 1 - OVERRIDING ROYALTY OWNERS UNDER TRACT 1

Marc H. Lowrance, Jr.	0.931500%
Bill M. Scales	0.157407%
* C. W. Seely	2.794200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 2 - WORKING INTEREST OWNERS UNDER TRACT 1

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%

\*Subject to a 25% reversionary working interest at payout.

\*\*Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.

\*\*\*Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 3 - OVERRIDING ROYALTY OWNERS UNDER TRACT 2

Windell A. Thomason	7.500000%
Marc H. Lowrance, Jr.	0.931500%
Bill M. Scales	0.143440%
* C. W. Seely	2.794200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 4 - WORKING INTEREST OWNERS UNDER TRACT 2

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%

\*Subject to a 25% reversionary working interest at payout.

\*\*Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.

\*\*\*Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 5 - OVERRIDING ROYALTY OWNERS UNDER TRACT 3

Marathon Oil Company	12.500000%
Dwight A. Free, Jr.	2.343750%
John E. Casey	1.171880%
Bradley A. Pomeroy	0.328130%
Hamon Operating Company	6.156250%
Marc H. Lowrance, Jr.	0.937500%
Bill M. Scales	0.121082%

NOTE 6 - WORKING INTEREST OWNERS UNDER TRACT 3

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%

\* Subject to a 25% reversionary working interest at payout.  
\*\* Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.  
\*\*\* Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 7 - OVERRIDING ROYALTY OWNERS UNDER TRACT 4

None

NOTE 8 - WORKING INTEREST OWNERS UNDER TRACT 4

Marathon Oil Company

100.00%

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 9 - OVERRIDING ROYALTY OWNERS UNDER TRACT 5

Windell A. Thomason	12.500000%
David S. Googins, Jr.	1.000000%
George Weis	1.000000%
Bobby Hicks	1.000000%
Marc H. Lowrance, Jr.	0.931500%
Bill M. Scales	0.134122%

NOTE 10 - WORKING INTEREST OWNERS UNDER TRACT 5

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%

\*Subject to a 25% reversionary working interest at payout.

\*\*Subject to prorata share of the Marc H. Lowrance, Jr. CRRRI.

\*\*Subject to the Bill M. Scales ORRI.



APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 11 - OVERRIDING ROYALTY OWNERS UNDER TRACT 6

Marc H. Lowrance, Jr.	0.937500%
Bill M. Scales	0.153681%

NOTE 12 - WORKING INTEREST OWNERS UNDER TRACT 6

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%
* Subject to a 25% reversionary working interest at payout.	
** Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.	
*** Subject to the Bill M. Scales ORRI.	

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 13 - OVERRIDING ROYALTY OWNERS UNDER TRACT 7

Amoco Production Company	10.500000%
Thomas R. Smith	0.750000%
John Saleh	0.250000%
Linda W. Smith	0.500000%
Santa Fe Exploration Co.	0.500000%
Marc H. Lowrance, Jr.	0.931500%
Bill M. Scales	0.134122%
* C. W. Seely	2.794200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 14 - WORKING INTEREST OWNERS UNDER TRACT 7

*J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company **	2.790%
* C.E.B. Oil Company **	2.790%
* E.A.B. Oil Company **	2.800%
* P.V.B. Oil Company **	2.800%
* Houston & Emma Hill Trust Estate ***	9.314%
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%

\*Subject to a 25% reversionary working interest at payout.  
\*\*Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.  
\*\*\*Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 15 - OVERRIDING ROYALTY OWNERS UNDER TRACT 8

Amoco Production Company	10.500000%
Thomas R. Smith	0.750000%
John Saleh	0.250000%
Linda W. Smith	0.500000%
Marc H. Lowrance, Jr.	0.727500%
Bill M. Scales	0.092365%
* C. W. Seely	1.910610%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 16 - WORKING INTEREST OWNERS UNDER TRACT 8

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	17.6830%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	5.6648%
** John P. Oil Company	2.1215%
** C.E.B. Oil Company	2.1215%
** E.A.B. Oil Company	2.1215%
** P.V.B. Oil Company	2.1215%
*** Houston & Emma Hill Trust Estate	7.0754%
* Express Air Drilling, Inc.	4.4208%
* Wes-Tex Drilling Company	4.4208%
* Northbrook Business Center	4.4208%
* Burnett Oil Company	7.0754%
* Merlyn W. Dahlin	1.4106%
* Charles P. Davis	1.4106%
David L. Henderson	0.7087%
Michael J. Havel	0.7087%
C. W. Stumhoffer & Frieda T. Stumhoffer	7.6197%
C. W. Seely	7.2542%
Frances Buckler	4.3750%
Roger W. Moore	4.3750%
J. C. Maddux	2.7340%
Thomas J. Maddux	5.4690%
Armstrong Energy Corp.	1.87500%
Judy Harris	1.40625%
Laurelind Corp	1.40625%

\* Subject to a 25% reversionary working interest at payout.

\*\* Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.

\*\*\* Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 17 - OVERRIDING ROYALTY OWNERS UNDER TRACT 9

Amoco Production Company	10.500000%
Thomas R. Smith	0.750000%
John Saleh	0.250000%
Linda W. Smith	0.500000%
Santa Fe Exploration Co.	0.500000%
Marc H. Lowrance, Jr.	0.806500%
Bill M. Scales	0.116930%
* C. W. Seely	2.419200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 18 - WORKING INTEREST OWNERS UNDER TRACT 9

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.040%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.370%
* John P. Oil Company	2.760%
**	
* C.E.B. Oil Company	2.760%
**	
* E.A.B. Oil Company	2.760%
**	
* P.V.B. Oil Company	2.760%
**	
* Houston & Emma Hill Trust Estate	9.220%
***	
* Express Air Drilling, Inc.	5.760%
* Wes-Tex Drilling Company	5.760%
* Northbrook Business Center	5.760%
* Burnett Oil Company	9.220%
* Merlyn W. Dahlin	1.840%
* Charles P. Davis	1.840%
David L. Henderson	0.921%
Michael J. Havel	0.921%
C. W. Stumhoffer & Frieda T. Stumhoffer	7.840%
C. W. Seely	9.468%

\* Subject to a 25% reversionary working interest at payout.

\*\*Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.

\*\*\*Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 19 - OVERRIDING ROYALTY OWNERS UNDER TRACT 10

Amoco Production Company	10.500000%
Thomas R. Smith	0.750000%
John Saleh	0.250000%
Linda W. Smith	0.500000%
Marc H. Lowrance, Jr.	0.806500%
Bill M. Scales	0.116930%
* C. W. Seely	2.419200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 20 - WORKING INTEREST OWNERS UNDER TRACT 10

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.040%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.371%
** John P. Oil Company	2.766%
** C.E.B. Oil Company	2.766%
** E.A.B. Oil Company	2.766%
* P.V.B. Oil Company	2.766%
** Houston & Emma Hill Trust Estate	9.216%
*** Express Air Drilling, Inc.	5.760%
* Wes-Tex Drilling Company	5.760%
* Northbrook Business Center	5.760%
* Burnett Oil Company	9.216%
* Merlyn W. Dahlin	1.840%
* Charles P. Davis	1.840%
David L. Henderson	0.921%
Michael J. Havel	0.921%
C. W. Stumhoffer & Frieda T. Stumhoffer	7.840%
C. W. Seely	9.451%

\* Subject to a 25% reversionary working interest at payout.  
\*\* Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.  
\*\*\* Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 21 - OVERRIDING ROYALTY OWNERS UNDER TRACT 11

Marc H. Lowrance, Jr.	0.907500%
Bill M. Scales	0.147260%
C. W. Seely	2.614200%

\* ORRI converts to 25% reversionary WI at payout.

NOTE 22 - WORKING INTEREST OWNERS UNDER TRACT 11

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	21.790%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	6.970%
* John P. Oil Company **	2.610%
* C.E.B. Oil Company **	2.610%
* E.A.B. Oil Company **	2.620%
* P.V.B. Oil Company **	2.620%
* Houston & Emma Hill Trust Estate ***	8.714%
* Express Air Drilling, Inc.	5.450%
* Wes-Tex Drilling Company	5.450%
* Northbrook Business Center	5.450%
* Burnett Oil Company	8.714%
* Merlyn W. Dahlin	1.740%
* Charles P. Davis	1.740%
David L. Henderson	0.871%
Michael J. Havel	0.871%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	8.920%
Mary F. Buckler	3.000%
Roger W. Moore	3.000%

\* Subject to a 25% reversionary working interest at payout.

\*\* Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.

\*\*\* Subject to the Bill M. Scales ORRI.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 23 - OVERRIDING ROYALTY OWNERS UNDER TRACT 12

Marc H. Lowrance, Jr.	0.937500%
Bill M. Scales	0.162995%

NOTE 24 - WORKING INTEREST OWNERS UNDER TRACT 12

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable ** Trust Agreement dated June 13, 1988	7.450%
* John P. Oil Company	2.790%
**	
* C.E.B. Oil Company	2.790%
**	
* E.A.B. Oil Company	2.800%
**	
* P.V.B. Oil Company	2.800%
**	
* Houston & Emma Hill Trust Estate	9.314%
***	
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%
* Subject to a 25% reversionary working interest at payout.	
** Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.	
*** Subject to the Bill M. Scales ORRI.	

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT  
CENTRAL E.K. QUEEN UNIT  
LEA COUNTY, NEW MEXICO

NOTE 25 - OVERRIDING ROYALTY OWNERS UNDER TRACT 13

Marc H. Lowrance, Jr.	0.937500%
Bill M. Scales	0.162995%

NOTE 26 - WORKING INTEREST OWNERS UNDER TRACT 13

* J. Cleo Thompson & James Cleo Thompson, Jr., a partnership	23.290%
* Patricia Dean Boswell, Trustee under Revocable	7.450%
** Trust Agreement dated June 13, 1988	
* John P. Oil Company	2.790%
**	
* C.E.B. Oil Company	2.790%
**	
* E.A.B. Oil Company	2.800%
**	
* P.V.B. Oil Company	2.800%
**	
* Houston & Emma Hill Trust Estate	9.314%
***	
* Express Air Drilling, Inc.	5.820%
* Wes-Tex Drilling Company	5.820%
* Northbrook Business Center	5.820%
* Burnett Oil Company	9.314%
* Merlyn W. Dahlin	1.860%
* Charles P. Davis	1.860%
David L. Henderson	0.931%
Michael J. Havel	0.931%
C. W. Stumhoffer & Frieda T. Stumhoffer	6.860%
C. W. Seely	9.550%
* Subject to a 25% reversionary working interest at payout.	
** Subject to prorata share of the Marc H. Lowrance, Jr. ORRI.	
*** Subject to the Bill M. Scales ORRI.	



EXHIBIT "C" TO UNIT AGREEMENT  
CENTRAL EK QUEEN UNIT  
LEA COUNTY, NEW MEXICO

SCHEDULE OF TRACT PARTICIPATION

<u>TRACT NUMBER</u>	<u>PERCENTAGE TRACT PARTICIPATION</u>
1	20.371336
2	19.876862
3	0.364326
4	2.661486
5	1.553865
6	1.323883
7	4.095055
8	10.700966
9	0.404694
10	10.847601
11	8.121972
12	16.729864
13	2.948090
TOTALS 13 TRACTS	<u>100.000000</u>