

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
18 January 1984

EXAMINER HEARING

IN THE MATTER OF:

Application of Zia Energy, Inc. for CASE
salt water disposal, Lea County, 8044
New Mexico.

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation
Division:

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For the Applicant:

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I N D E X

FARRIS NELSON

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Cross Examination by Mr. Stogner 19

E X H I B I T S

Zia Exhibit A 4

with attachments 1 through 11

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MR. STOGNER: We'll call next Case Number 8044.

MR. PEARCE: That case is on the application of Zia Energy, Inc., for salt water disposal, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, Zia Energy, Inc., and I have one witness to be sworn.

MR. PEARCE: Are there other appearances in this matter?

(Witness sworn.)

MR. KELLAHIN: Mr. Examiner, pursuant to Form C-108 we have presented prior to the hearing a complete set of the applicant's exhibits and would propose to follow those during the course of Mr. Nelson's testimony.

I believe the first set that has the Examiner's stamp on it is a complete package in the right chronological order.

The second set in your file, I am not certain is in the proper order in which we will present it for you.

FARRIS NELSON,

1
2 being called as a witness and being duly sworn upon his
3 oath, testified as follows, to-wit:

4
5 DIRECT EXAMINATION

6 BY MR. KELLAHIN:

7 Q Mr. Nelson, for the record would you
8 please state your name and your occupation?

9 A Farris Nelson. I am a petroleum engineer
10 for Zia Energy.

11 Q Mr. Nelson, you have testified before the
12 Oil Conservation Division on numerous occasions as a petro-
13 leum engineer, have you not, sir?

14 A Yes, I have.

15 Q And you have prepared the exhibits and
16 testimony on behalf of the applicant here today for the salt
17 water disposal case.

18 A They were either prepared by me or under
19 my supervision.

20 Q All right, sir.

21 MR. KELLAHIN: If the Examiner
22 please, we tender Mr. Nelson as an expert petroleum
23 engineer.

24 MR. STOGNER: Mr. Nelson is so
25 qualified.

26 Q Mr. Nelson, let me direct your attention
27 to the first -- in fact it's the cover letter to which all
28 the subsequent exhibits are appended. It's a letter dated

1
2 December 30th, 1983. Is this a letter that you prepared?

3 A Yes, it is.

4 Q And it simply provides a brief summary in
5 a written fashion of what Zia Energy, Inc., proposes to ac-
6 complish with this disposal well.

7 A That's correct.

8 Q All right, sir. Let's skip that one for
9 a moment and come back to it.

10 The pages, I believe, are numbered in
11 your package of information, Mr. Nelson.

12 I'm referring now to page four. This is
13 the application filed in this case?

14 A Yes.

15 Q All right, sir, and let's go past that
16 one.

17 Page six is the signed Form C-108 that
18 you prepared for this well, is that not true, number six?

19 A I seem to have mine out of order, but
20 number four, this is what I have here.

21 Q All right, sir. Let me then turn to the
22 first plat so that we can orient ourselves on what you pro-
23 pose to do, and that is numbered as page number seven.

24 Mr. Nelson, let me direct your attention
25 to page seven and this the half mile radius plat. Would you
identify that for us?

A Yes. That's the proposed salt water dis-
posal well is the Zia Energy Clauson No. 6, located in the

1 southwest of the northwest of Section 20, Township 22
2 South, Range 36 East, in Lea County.
3

4 And from that well there has been a
5 circle drawn half mile radius and information has been sub-
6 mitted on all wells that fall within that half mile radius
7 circle, which is the area of review.

8 Q All right, sir, tell me something about
9 the current status of the proposed disposal well.

10 A The Clauson No. 6 is presently plugged
11 and abandoned. This well was produced originally by Cities
12 Service as an oil and gas producer and was plugged and aban-
13 doned -- I'm looking for the date -- I can't find that date.

14 Q All right, we can come back --
15 MR. STOGNER: 1941, I believe,
16 isn't it?

17 A I -- no, it was dated later than that,
18 1968 sticks in my mind but I'm -- it has been plugged and
19 abandoned for a number of years.

20 Q Okay, from what formations did it produce
21 when it was a producer?

22 A It produced from the Yates and Seven
23 Rivers formations.

24 Q All right, and what do you propose to do
25 with that well now?

A We propose to re-enter the well. If you
refer to sheet -- page number nine, that gives the present
status of the well in its plugged and abandoned condition.

1
2 You'll note that Cities Service shot off
3 the 5-1/2 casing and recovered casing down to 2022.

4 We propose to re-enter the well, drill
5 out plugs and clean out the well down to the top of the 5-
6 1/2 casing stub. We'll -- you might refer to page number
7 ten, which is the proposed plan for equipping the well as a
8 salt water disposal well.

9 At that top of the stub, 5-1/2 stub at
10 2020 we propose to run 5-1/2 casing with some type of over-
11 shot, depending on the -- whatever the well conditions indi-
12 cate. Then we will propose to circulate cement from that
13 point back to the surface.

14 Then we'll continue to clean out and
15 drill out plugs down to the total depth of 3805 feet.

16 Q What will be your injection interval?

17 A The injection interval will be in the
18 open hole section between the base of the 5-1/2 casing at
19 3750 to TD at 3805.

20 Q All right, and what formations correspond
21 to that injection interval?

22 A That is in the Seven Rivers formation.

23 Q What is the anticipated source of the
24 water that will be disposed of in this well?

25 A Initially it will be water just from our
own lease in the Yates and Seven Rivers formations with a
possibility of some of the offset operators who are
producing from the Queen may want to add water at a later

1
2 time.

3 Q All right, sir, let's talk about what you
4 anticipate to be the average daily injection or disposal
5 rates, Mr. Nelson.

6 A We initially think that 1500 barrels a
7 day will be our average daily and we anticipate a maximum of
8 3000 barrels a day.

9 Q All right, sir, do you propose that this
10 system will require you to have a surface injection pressure
11 that will exceed the Oil Conservation Division guidelines of
12 0.2 psi per foot of depth?

13 A No, we do not.

14 Q All right, sir.

15 A We might just enter into the record, this
16 particular well on its initial potential produced 960 bar-
17 rels of fluid per day from this proposed injection interval,
18 flowing, so we feel like that our injection pressures will
19 definitely be below the 0.2 of a psi per foot.

20 Q Okay, and your plan to recomplete this
21 well for disposal will include recompletion in such a way
22 that you case and cement across any fresh water sands that
23 may or may not -- may be present in the area?

24 A Yes, that's correct

25 Q Let's talk about fresh water sources
while we're on that subject.

Looking at page seven in the half mile
radius circle, do you find any fresh water sources within

1
2 that area of review?

3 A We conducted a visual search of the area
4 and we found no wells within one mile of the proposed water
5 disposal well.

6 Then we've checked with the New Mexico
7 Water Rights Department in Roswell and we found two wells
8 that are almost -- one of them is almost two miles away and
9 the other is over two miles away.

10 Q Do you know from what water sands those
11 wells produce from?

12 A From the Water Rights Department we
13 couldn't tell what the total depth of those wells were, but
14 we suspect that they are from the Santa Rosa formation.

15 Q Is the Santa Rosa formation in this two
16 mile area water of a sufficient quality that it requires
17 protection by the Oil Conservation Division?

18 A Yes, it is. There's a water analysis
19 submitted on the Santa Rosa formation. It will be page 24
20 in your exhibits.

21 This formation will occur in the 600 to
22 800 foot depth in this particular area.

23 Q With regards to the disposal well in the
24 6-800 depth in the disposal well, you'll be casing and
25 cementing across that sand?

A Yes, we propose to circulate cement from
2050 back to the surface.

Q All right. Let's look at the area of re-

1
2 view again, the half mile radius circle. Within that area
3 have you prepared wellbore schematics of each plugged and
4 abandoned well and each producing well that penetrated the
5 Seven Rivers Queen disposal formation?

6 A Yes, we have.

7 Q All right, sir, let's go through those,
8 then, commencing with page number ten, which is the Zia
9 Energy No. 6. This is your disposal well.

10 A That's correct.

11 Q And we go to page eleven, which is Cities
12 Service No. 2.

13 A That is a plugged and abandoned well and
14 it has a total of six cement plugs placed when the well was
15 plugged, beginning with 35 sacks of cement being placed at
16 TD of 3820. 25 sacks was placed at the top of the 5-1/2
17 casing stub at 2597 feet. 10 sacks has been placed at the
18 base of the surface casing at 1552. A second plug was
19 placed 40 sacks at 1525. The next plug was 25 sacks at 340
20 feet and a final plug of 20 sacks at the surface.

21 Q Are you satisfied that that well has
22 been abandoned in such a way that it won't serve as a source
23 of possible water migration out of the disposal formation
24 into some other formation?

25 A I believe that it is.

Q Let me have you go through the package of
exhibits and pick out for us any other plugged and abandoned
wells.

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A All right, the Cities Service No. 4.

Q That's what page number?

A Page number twelve.

Q All right.

A Is also a plugged and abandoned well. This one actually falls slightly outside of the half mile area of review, but we included it just because it is so slightly outside of the area.

There was a 40-sack plug of cement placed at TD of 3810. Then the 5-1/2 casing was shot off and recovered from 2590 to the surface and a 25-sack plug was placed across the top of the 5-1/2 casing. Then a 40-sack plug was placed at the base of the 8-5/8ths surface casing and a 20-sack plug then was placed at the surface.

Q Do you also have an opinion with regards to the way that well is plugged and abandoned to insure that water disposed of in the disposal formation doesn't migrate into some other formation?

A This would seem adequate to protect all formations.

Q All right, sir.

A The next plugged and abandoned well is your sheet number fourteen, the Continental Oil State E No. 6. This well had a 200-sack plug placed at -- from 3200 to 3400 feet.

The 5-1/2 casing was shot off and recovered from 1565 to the surface. A 20-sack plug of

1
2 cement was placed at the top of the 5-1/2 casing. Then a
3 20-sack plug was placed at the base of the 8-5 -- excuse me,
4 7-7/8ths casing at 1460, and then a 10-sack plug placed at
5 the surface.

6 Q In your opinion is that well adequately
7 plugged and abandoned?

8 A Yes, it is.

9 Q Okay.

10 A I believe that's all of the plugged and
11 abandoned wells. The rest --

12 Q The rest of the well schematics indicated
13 in the package of exhibits are schematics of producing
14 wells?

15 A I believe that's correct.

16 Q And you have made schematics of producing
17 wells as opposed to making a tabular summary of the status
18 of those wells?

19 A Yes, that's correct.

20 Q Are you aware of any of the producing
21 wells that may have been drilled and completed in such a way
22 that they pose a hazard to fresh water sources by being in
23 an area involved in where you want to dispose of water?

24 A I'm not aware of any.

25 Q What's the reason, Mr. Nelson, for your
desire to have a disposal well at this location?

A We have two producing wells on this
lease. Both are producing sizeable quantities of water and

1 the trucking cost for handling that produced water would
2 make the wells prohibitive to produce.
3

4 So we need to provide a means for dis-
5 posing of our own water, first of all.

6 Q Okay, can you give me some approximations
7 of the amount of water involved in the production of those
8 two wells?

9 A Yes. We have from 4-to-500 barrels of
10 water per day being produced at this time.

11 Q For both wells or for each well?

12 A For both wells.

13 Q All right, sir, and what does it cost you
14 to truck that water?

15 A It costs from 80 cents to a Dollar a bar-
16 rel to truck that water.

17 Q If the salt water disposal well is ap-
18 proved, it, in your opinion, will prolong the economic life
19 of these two producing wells?

20 A It definitely will.

21 Q Those producing wells produce from what
22 formation again?

23 A These two wells are producing from the
24 Yates formation.

25 Q Let's go to the water analysis on page
26 23, which I believe is the producing water analysis.

27 A Yes. The number, column number two there
28 is water taken from one of our own producing wells, the

1
2 Cities Federal No. 2, which is located in the southwest of
3 the southwest of Section 20. And then we have two other
4 waters which were taken from nearby wells. I believe both
5 are within the one-half mile area of review.

6 Those two wells produce from the Seven
7 Rivers and the Queen formations.

8 The water from -- in column number one is
9 from a deep well, which is producing from the Devonian and
10 Elleburger formations.

11 The analysis on these waters was run by
12 Martin Water Labs and their conclusion is there'll be no
13 evidence of incompatibility from the mixing of these waters
14 in any combination.

15 Q Let me see if I understand what you've
16 done. You've simply taken water samples from various wells
17 in the area that will produce from formations that you pro-
18 pose to dispose of in the disposal well.

19 A Yes, that's correct.

20 Q And you've had those analyzed to see
21 whether they were incompatible if they were mixed, and you
22 find that there is no evidence of incompatibility.

23 A Correct.

24 Q If they're combined and then injected
25 into your disposal well.

A That is correct.

Q Tell me briefly how you propose to equip
your disposal well with regards to detection of casing leaks.

1 or problems on the surface, that kind of thing.

2 A The well will be equipped with plastic
3 lined -- there will be PVC plastic liners inside of the
4 tubing.

5 Tubing will be run and a packer set at
6 approximately 3700 feet. Then the annular space between the
7 tubing and the casing will be filled with an inert fluid and
8 a pressure -- pressure gauge will be placed at the surface
9 so that we can detect if there is any leakage from the
10 tubing into the annular space.

11 Q All right, sir. With regards to your
12 notifications, Mr. Nelson, within the half mile radius, have
13 you notified offset operators that might be affected by your
14 disposal well and have you notified the owner of the surface
at the disposal well location?

15 A Yes, we have. Your page number 25, I be-
16 lieve it is, is receipts for certified mailing to all of the
17 offset operators and to the Bureau of Land Management, who
18 is the surface ownership.

19 And pages 26 and 27 are return receipts
20 received, showing that these various individuals or
companies did receive the certified mailing.

21 Q All right, sir, would you identify for us
22 what are pages 28, 29, and 30?

23 A Pages 28, 29, and 30 are waivers of ob-
24 jection that we have received from Cities Service, from Con-
25 tinental Oil, and from Martindale Productions.

1
2 Q Let's go to your cross sections, Mr.
3 Nelson, and have you discuss those for us.

4 A Okay, the cross section was prepared --

5 Q You're looking at the north/south cross
6 section now, aren't you?

7 A This the southwest/northeast. Is that --
8 that's correct, isn't it, Tom?

9 Q Yes, sir, we're all looking at the same
10 one.

11 A Okay. All right. The green line is
12 drawn on the base of the salt. The blue line is drawn on
13 the top of the Yates. The red line is drawn on the top of
14 the Seven Rivers formation, and then the yellow line is the
15 line indicating the TD on the proposed salt water disposal
16 well.

17 Q All right, show us the disposal well?
18 Which log is that?

19 A The disposal well is the Cities Service
20 Clauson No. 6, which is pretty much in -- it's number four
21 from the left.

22 Q All right, sir.

23 A You'll notice that this log does not note
24 a TD. We will log that as part of our recompletion process,
25 but based on calculations, we have drawn in the correlative
points on the offsetting wells here, indicating where the
TD, which will be the base of our injection interval, will
fall on these offsetting wells.

1
2 But you'll see, you'll notice that we're
3 above all of the zones that are currently being produced in
4 any of the offsetting wells.

5 Q What is the distance, vertical distance,
6 separation between your disposal formation and that forma-
7 tion produced in the offsetting wells?

8 A Two of the closest wells are the Penroc
9 Federal No. 2 and that zone, we're over 100 feet, looks like
10 120 or 30 feet above the zone that they're producing.

11 On the Sun Boren No. 4 it looks like that
12 our proposed injection interval will come to just about the
13 top of their perforated interval.

14 Then the Penroc No. 1 Well, proceeding to
15 the right, is about 100 feet above their producing interval.

16 The Sun Boren No. 3, again we're very
17 close to 100 feet above -- we're really more than 100 feet
18 above the zone they're producing.

19 Those four wells are, aside from our own
20 two producing wells, are the only -- the closest producing
21 wells to the proposed injection well.

22 Q This is a gravity disposal system, is it
23 not, Mr. Nelson?

24 A Yes, we propose it to be that.

25 Q As a result of your proposal and your
analysis of the various logs of the wells in the area, do
you have an opinion as to whether disposal in this formation
at the rates you propose will serve as a source of

1 interference or damage to any offset producing well?

2 A We haven't been able to see any damage is
3 possible to any producing well or to any fresh water.

4 Q All right, sir, let's look briefly, then,
5 at the last cross section, which runs a different direction.

6 A This cross section was prepared on the
7 east/west line, again crossing through the Clausen No. 6,
8 which is the proposed disposal well. It's the center well
9 here in the five wells that's included.

10 Again the same, the base of the salt is
11 the green line. The Yates is indicated -- the top of the
12 Yates is indicated by the blue. The top of the Seven Rivers
13 is indicated by the red, and again the yellow indicates the
14 depth of our proposed water disposal interval.

15 Q Based upon your study of the engineering
16 and geology of the area, Mr. Nelson, do you have an opinion
17 as to whether or not there are any open faults or other
18 hydrologic connections between the disposal formation and
19 any fresh water sources?

20 A No, there are none, as far as our study
21 has indicated.

22 Q All right, sir.
23 Let me direct your attention to the 2-
24 mile radius map and have you identify that for us. I be-
25 lieve it's page number eight.

A This plat was prepared to indicate all of
the producing wells within a 2-mile radius of the proposed

1 disposal well.

2 The wells circled in blue indicate wells
3 that are produced in the Jalmat Field, which is producing
4 from the Yates and Seven Rivers.

5 The red circles indicate wells that are
6 produced in the South Eunice Field, which produce from the
7 lower 100 feet of the Seven Rivers, and the Queen formation.

8 Q Mr. Nelson, in your opinion will approval
9 of this application be in the best interests of conserva-
10 tion, the prevention of waste, and the protection of correl-
11 ative rights?

12 A Yes, it will.

13 Q I believe that you've indicated in your
14 testimony already that these exhibits were either prepared
15 by you directly or compiled under your direction and super-
16 vision.

17 A That is correct.

18 MR. KELLAHIN: Mr. Examiner,
19 that concludes our direct examination of Mr. Nelson, and we
20 move the introduction of Exhibit A and all the page attach-
21 ments to that exhibit.

22 MR. STOGNER: Exhibit A with
23 all the attachments will be admitted into evidence.

24 CROSS EXAMINATION

25 BY MR. STOGNER:

Q Mr. Nelson, on your 2-mile circle, page

A: Yes, sir.

A Yes, there is one. No, excuse me, there are several.

And there are a number of wells in there, let's see, beginning in Section 20, the northeast northeast, No. 1 is an injector.

Q Where other than that are there --

Now, there is one other salt water disposal well in the immediate area, located in Section 19. It's the southwest of the southwest. That well has been serving as a salt water disposal well since 1968.

A Yes, that will be the Seven Rivers, also.

I might add still further, still further

1
2 to the west is another waterflood unit. Actually this, this
3 whole area is between two waterflood units. You'll see the
4 J. R. Cone-operated Jal Yates Unit covering Sections 13,
5 24, and 25 in Township 22 South, Range 35 East. That is
6 another waterflood.

7 Q Thank you, Mr. Nelson. On -- refer back
8 to page one and two of your exhibit, which is the letter to
9 us dated December 30th, 1983.

10 On page two you give a brief -- brief
11 history of this well. It was drilled in '41, open hole com-
12 pleted, and then in 1947 it was plugged back and then it was
13 plugged and abandoned in 1977.

14 Between '47 and '77 this well had been
15 perforated several times and plugged back.

16 I'm curious about your recompletion below
17 the 2020 foot level. How do you propose to check the dif-
18 ferent perforations or would you elaborate on that, please?

19 A Yes, we propose after -- after we have 5-
20 1/2 casing tied back in at 2020 feet, that we'll go ahead
21 and drill out and as we pass each of these zones that have
22 been perforated, if they have not already -- some of them
23 have already been squeezed off, but if they have not been
24 squeezed, those will be squeezed and then continued to drill
25 ahead until we've squeezed and tested all zones that have
been produced previously.

MR. STOGNER: I have no further

1 questions of Mr. Nelson.

2
3 Are there any other questions
4 of this witness at this time?

5 If not, he may be excused.

6 Mr. Kellahin, do you have any-
7 thing further in Case Number 8044?

8 MR. KELLAHIN: No, sir.

9 MR. STOGNER: Does anybody else
10 have anything further in Case Number 8044 this morning?

11 If not, this case will be taken
12 under advisement.

13 (Hearing concluded.)
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C E R T I F I C A T E

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

Sally W. Boyd CSR

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 8044
heard by me on January 18 1984.

Michael E. Stogner, Examiner
Oil Conservation Division