

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

IN THE MATTER OF THE HEARING CALLED
BY THE OIL CONSERVATION DIVISION FOR
THE PURPOSE OF CONSIDERING:

CASE NOS: 20964

APPLICATION OF OVERFLOW ENERGY,
LLC, FOR APPROVAL OF A SALTWATER
DISPOSAL WELL,
EDDY COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF VIRTUAL PROCEEDINGS

EXAMINER HEARING

DECEMBER 18, 2020

SANTA FE, NEW MEXICO

This matter came on for virtual hearing before
the New Mexico Oil Conservation Division, HEARING OFFICER
FELICIA ORTH and TECHNICAL EXAMINERS DYLAN ROSE-COSS on
Friday, December 18, 2020, through the Webex Platform.

Reported by: Irene Delgado, NMCCR 253
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I N D E X

CASE CALLED
TAKEN UNDER ADVISEMENT
REPORTER CERTIFICATE

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E X H I B I T I N D E X

Admitted

1 HEARING EXAMINER ORTH: Good morning to all of
2 you. My name is Felicia Orth. I'm the Hearing Officer
3 appointed by the Oil Conservation Division to conduct a
4 hearing this morning in Case Number 20964. This is the
5 application of Overflow Energy, for approval of a saltwater
6 disposal well in Eddy County.

7 It's 8:30. We have Division staff in this
8 session. Mr. Dylan Rose-Coss is our technical examiner for
9 this hearing. The hearing will be conducted under 19.15.4
10 of the Oil Conservation regulations, and the hearing is
11 being recorded and transcribed by Irene Delgado of the Paul
12 Baca Court Reporter service. The testimony is taken under
13 oath and subject to cross-examine.

14 Ms. Shaheen, I believe you are here for the
15 applicant.

16 MS. SHAHEEN: Good morning, Madam Examiner, yes,
17 I am, I'm here on behalf of Overflow Energy LLC.

18 HEARING EXAMINER ORTH: Thank you very much.
19 Good morning. Are there any other appearances this morning?

20 (No audible response.)

21 HEARING EXAMINER ORTH: I hear none. I do have
22 the screen for the waiting room up permanently on my screen
23 in the event anyone else joins the session, I will admit
24 them immediately.

25 Ms. Shaheen, I believe I see some of your

1 witnesses joining us. I would like to swear them all in, if
2 you would identify them, please.

3 MS. SHAHEEN: Yes, Madam Examiner. First I will
4 note that we will be presenting the case by affidavit, but I
5 do have three witnesses who are available if the Division
6 has any questions.

7 As you may -- as I'm sure you know, in light of
8 the prehearing statements filed by the -- Marathon no longer
9 objects to this case going forward by affidavit and neither
10 does NGL. I do note that I believe Ms. Bennett was going to
11 join us this morning to make a statement on behalf of NGL.
12 I don't know if we want to wait for a few minutes or if you
13 would like for me to proceed.

14 HEARING EXAMINER ORTH: Let's get your witnesses
15 sworn in. Again, I do have the waiting room screen in front
16 of me, so if Ms. Bennett tries to check in, I will see that
17 right away. So Mr. Alleman, Mr. Davis and Mr. Tomastik, if
18 you would, please, raise your right hands. Do you and each
19 of you swear or affirm that the testimony you are about to
20 give will be the truth, the whole truth and nothing but the
21 truth?

22 MR. TOMASTIK: Tom Tomastik, and I do.

23 HEARING EXAMINER ORTH: Thank you.

24 MR. ALLEMAN: Nate Alleman, and I do.

25 HEARING EXAMINER ORTH: Thank you. Mr. Davis?

1 MR. DAVIS: Sorry about that. This is Mr. Davis,
2 and I do.

3 HEARING EXAMINER ORTH: Thank you very much.
4 That was all three of your witnesses. Ms. Shaheen.

5 MS. SHAHEEN: Thank you. Yesterday I circulated
6 an amended exhibit to include Mr. Tomastik's notarized
7 signature, and I also circulated an image file as Exhibit 1
8 to Mr. Tomastik's affidavit.

9 So this is a case that involves a proposed Rita
10 SWD Number 1, API Number 30-015-45719. It's supposed to be
11 drilled in Eddy County, the SW/4 of the NW/4 of Section 27,
12 Range 22 South -- Township 22 South, Range 27 East. The
13 proposed disposal well is 12,900 feet to 14,000 feet, and
14 that is in the Devonian formation.

15 This case was previously heard in December of
16 2019, and this continued hearing is solely about the fault
17 slip potential analysis resulting from a protest by Marathon
18 relating to the original analysis. Since that time Overflow
19 engaged ALL Consulting who has redone the analysis in light
20 of additional data and more recent data.

21 So today the affidavits that I will be presenting
22 are concerning only the fault slip potential analysis, and
23 we'll be relying on the previous exhibits and testimony for
24 other information relating to the application.

25 So we can start behind Tab 1 at PDF Page 4, and

1 we have the geophysicist, Mr. Davis' affidavit. He has not
2 previously testified before the Division, but on PDF Page 4,
3 I believe -- excuse me -- PDF Page -- bottom of Page 5 is a
4 summary of his experience and education. And we also have
5 attached his resume. He has been working at ALL Consulting
6 since 2017, and his primary focus is evaluating the
7 relationship between oil and gas activities and seismicity.

8 His resume is about five or six pages long and
9 details all of the specific projects that he's worked and
10 includes many projects that are in Southeast New Mexico and
11 were in support of other witnesses before the Division,
12 including Mr. Arthur.

13 So I would ask that Mr. Davis, in light of his
14 education and experience, be allowed to testify as an expert
15 witness in this matter.

16 HEARING EXAMINER ORTH: Thank you, Ms. Shaheen.
17 Mr. Rose-Coss, do you have any questions about Mr. Davis'
18 expertise?

19 TECHNICAL EXAMINER COSS: No, Ms. Orth, but
20 thanks for asking. I don't have any questions regarding
21 Mr. Reed's -- Mr. Davis' expertise -- sorry about that --
22 and do not oppose him being recognized as an expert witness.

23 HEARING EXAMINER ORTH: All right. Thank you.
24 Ms. Shaheen, he is recognized and may offer opinion
25 testimony.

1 MS. SHAHEEN: Thank you. So I thought I would
2 run, run through his testimony here with the high points in
3 noting that they pertain to Exhibit 2 to his affidavit which
4 is a PowerPoint beginning on PDF Page 18. And if I'm going
5 into too much detail, please let me know, I don't want to be
6 tedious, but I thought it might be helpful for the Technical
7 Examiners if I did review his testimony in light of the
8 PowerPoint. But again, feel free to tell me to move it
9 along.

10 So in Mr. Davis' Exhibit 2, Slide 2 begins with
11 the methodology that was employed in the fault slip
12 potential analysis. It provides a probabilistic estimate of
13 fault slip due to nearby fluid injection.

14 It calculates probability of a fault exceeding
15 the Mohr-Coulomb slip criteria with the failure point
16 between normal and shear stresses, utilizing the Monte Carlo
17 simulation to account for potential errors in input, and
18 that is represented on Slide 2, which is at PDF Page 19.

19 Turning to Slide 3 on the next PDF page depicts
20 the parameters that are used in the model, the values for
21 each parameter and the source of the values. And there are
22 specific ones here, if the Division has any questions about
23 those, I'm sure that Mr. Davis will be able to answer them.

24 With respect to the sources that were used, those
25 are identified on Slide 15 at Page -- PDF Page 32. ALL

1 Consulting obtained information from the Lund Snee 2020
2 publication for the horizontal stress direction and the
3 friction coefficient, as used in nearby stress report
4 provided by Overflow to obtain values for the stress and
5 pore pressure gradient.

6 Mr. Tomastik reviewed nearby geophysical logs
7 that were obtained for the injection interval thickness,
8 porosity and permeability and the values for the fluid
9 density dynamic viscosity, fluid compressibility and rock
10 compressibility were obtained through previous research
11 conducted by ALL Consulting and from Reynolds, a 2020
12 publication.

13 Some of the information that was provided to ALL
14 by Overflow is contained in Overflow's C-108 which was
15 submitted as Exhibit 1 in the December 2019 hearing. Our
16 remaining values were obtained from Overflow -- by Overflow
17 from the Post Treatment Report that it received from Devon
18 for the Sito 27 Fee Number 1 Well, which is located about
19 3050 feet northwest of the proposed location for the Rita
20 Saltwater Disposal Number 1.

21 And I misspoke. Mewbourne actually provided that
22 report, which we call the Sito Report, to Overflow. That
23 report is attached to Mr. Davis' testimony as Exhibit 3.
24 This report is better -- the information in this report is
25 better than that previously used by Overflow in their

1 respect -- and by Marathon -- in their respective analyses
2 because the data was acquired from a well that is much
3 closer than the well that was used by Marathon and Overflow
4 previously which was more than ten miles from the proposed
5 saltwater disposal well.

6 So the current amount differs with respect to
7 four parameters which is reflected in Slide 4 of Exhibit 2.
8 The first parameter is the horizontal stress direction, and
9 and Mr. Davis affidavit speaks specifically to what those
10 differences are. I don't really pretend to know what they
11 mean, and I don't know that it would be helpful for me to go
12 through each one of them, but you can find it there in
13 Paragraph 9, PDF Page 4 of 7, and on Slide 4, PDF Page 21.

14 So the four parameters that did change were
15 horizontal stress direction, minimal -- minimum horizontal
16 stress gradient, the true location of the fault that was
17 modeled and the injection interval thickness.

18 Moving along to Slide 5 of the PowerPoint, which
19 is at PDF Page -- it looks like -- I believe it's Page 23,
20 there is a graphic depiction of the fault at approximately
21 3800 feet east of the proposed well.

22 Moving to Slide 6 is a map illustrating the
23 stress orientation data points as they relate to the
24 proposed location of the Rita SWD Number 1 and the faults.
25 There is seven other Devonian Silurian Class II Injection

1 wells located within the 100 square mile area which were
2 included in the model. Five of the wells are active, two
3 are not.

4 Of the two that are not currently active, one is
5 permitted, but not yet drilled. Another is an existing well
6 in the process of being permitted.

7 The injection rates were modeled at 25,000
8 barrels of water per day based on the maximum injection rate
9 included in the C-108 for the proposed well. The active
10 wells were also modeled at 25,000 barrels of water per day
11 in light of the actual injection volumes that were reviewed
12 to those SWDs, none of which recorded values greater than
13 25,000 barrels of water per day in a single month.

14 The inactive wells were modeled at 30,000 to
15 35,000 barrels of water per day based on the maximum
16 injection rate included in their C-108.

17 Each saltwater disposal well was modeled at the
18 foregoing constant rate from 2020 to 2045. This assumption
19 is a very conservative methodology (unclear) continuous
20 maximum daily rate of injection for 25 years.

21 Moving to Slide 8, this a map depicting the 100
22 square mile area of review including the fault and the
23 active and inactive saltwater disposal well.

24 Slide 9 illustrates the geomechanics probability
25 analysis, which uses a Monte Carlo Simulation to estimate

1 the amount of pore pressure increase a given fault would be
2 able to sustain before slipping.

3 On Slide 9 you will see the relationship between
4 the pore pressure increase and the probability that a given
5 amount of pore pressure increase will lead to a fault slip.
6 In this case the fault is estimated to have a 10 percent
7 slip probability at 2007 PSI, 50 percent at 2560 PSI and 90
8 percent at 2974 PSI.

9 Moving to Paragraph 17 and Slide 11, ALL
10 Consulting ran two scenarios. The first included only the
11 impact of the proposed Rita Well, which can be seen in Slide
12 11. The model estimates that after 25 years the Rita SWD
13 Number 1 will have contributed 166 PSI pore pressure
14 increase at the fault location. This pore pressure increase
15 is far below the values which would be expected to lead to
16 fault slip. The modeling for Scenario 1 reveals a 0.00
17 fault slip potential after 25 years.

18 Slides 12 and 13 reflect Scenario 2. I believe
19 these are at PDF Pages 28 and 29. Slide 12 identifies each
20 of the saltwater disposal wells within the 100 square mile
21 area.

22 The cumulative model impact of these wells, along
23 with the proposed SWD Rita Well is illustrated in Slide 13.
24 The model estimates that the cumulative injection from all
25 of these SWDs would increase pore pressure at the fault by

1 1619 PSI after 25 years. Again, modeling for Scenario 2
2 also reveals a 0.00 fault slip potential after 25 years.

3 Mr. Davis, after reviewing this analysis and
4 conducting in the analysis reached the following conclusion:

5 There is only one known Precambrian fault in 100
6 square mile area of review. That known fault does not align
7 with the horizontal stress field and therefore is not likely
8 to slip.

9 The modeling was conducted with injection rates
10 that are likely overestimated, and that modeling shows no
11 risk of potential fault slip in the area, and thus, no risk
12 for injection induced seismicity. And that concludes
13 Mr. Davidson's affidavit.

14 HEARING EXAMINER ORTH: All right. Thank you,
15 Ms. Shaheen. If you would, please, ask Mr. Davis to adopt
16 his written testimony now that he is under oath, and I will
17 ask Mr. Rose-Coss if he has any questions.

18 MS. SHAHEEN: Thank you. Mr. Davis, do you adopt
19 your written testimony in this affidavit today?

20 MR. DAVIS: I'm sorry, can I ask you to repeat
21 that? I'm getting a little bit of choppiness over here.

22 MS. SHAHEEN: Yes, absolutely. Do you adopt this
23 affidavit as your testimony today?

24 MR. DAVIS: I do.

25 MS. SHAHEEN: Thank you.

1 HEARING EXAMINER ORTH: Thank you, Mr. Davis and
2 Ms. Shaheen. Mr. Rose-Coss, do you have any questions of
3 Mr. Davis based on his testimony?

4 TECHNICAL EXAMINER COSS: Thank you, Ms. Orth.
5 Thank you, Ms. Shaheen. Thank you for your testimony here.
6 I appreciate the fault slip potential analysis that you put
7 together. It's much more fully laid out, and I appreciate
8 that description of the variables and how you changed them.

9 I think I do have a few questions about those
10 points, though. What was well that you used to determine
11 the porosity and permeability measurements and fee zones
12 injection intervals for, for your analysis?

13 MR. DAVIS: The primary well we used to do
14 physical logs from for the geological analysis was the -- I
15 believe it's called Alpha SWD Number 2. It's API 1544530,
16 and we used available resistivity in neutron density logs to
17 estimate the A zone and porosity values.

18 TECHNICAL EXAMINER COSS: Perfect. And how many
19 barrels per day is that well injecting?

20 MR. DAVIS: On average we are seeing about 10- to
21 12,000 barrels a month.

22 TECHNICAL EXAMINER COSS: Okay, perfect. And
23 what, what were the values that you ascertained from those
24 well logs again?

25 MR. DAVIS: We estimated the permeability to be

1 35 millidarcies and the porosity to be about 5 percent.

2 TECHNICAL EXAMINER COSS: And over what's the net
3 and gross injection interval then?

4 MR. DAVIS: Approximately 304 feet net and a
5 little over 1,000 in gross.

6 TECHNICAL EXAMINER COSS: And other intervals
7 found, where within the overall Devonian are they found?
8 Are they kind of lumped or are they discrete beds and how
9 thick are they?

10 MR. DAVIS: It varies greatly. Some of the beds
11 are rather thin, less than 10 feet, while others are more in
12 the 50 to 100 foot range. The majority of the pay zone, I
13 would say, is made up of the thinner beds separated by
14 thinner shell layers and such in permeable zones.

15 Mr. Tomastik can probably speak more to the
16 specifics of the pay zones if necessary.

17 TECHNICAL EXAMINER COSS: Well, I guess that I
18 would ask that you supplement the testimony with the log and
19 the analysis, kind of a log analysis summary of the pay
20 zone. I would ask that Overflow give that additional
21 testimony.

22 And I guess I would also ask, why was that well
23 used over say the Rose SWD, which is a little closer, I know
24 it's an Overflow well.

25 MR. DAVIS: The alpha SWD had the only logs that

1 we could get our hands on that were both deep enough to show
2 the whole injection interval and were legible to do the
3 analysis. Some of these logs when they are uploaded lose a
4 lot of quality and it's hard to really read the specific
5 values on resistivity logs, for example. The Alpha was the
6 best compromise for proximity to the rehabilitation while
7 still having quality logs.

8 TECHNICAL EXAMINER COSS: I see. So the Rose
9 doesn't have good logging that was made available to do the
10 analysis?

11 MR. DAVIS: From what I recall, the logs for the
12 Rose SWD did not extend all the way through the Devonian-
13 Silurian interval. It was only a partial logging of the
14 Devonian-Silurian.

15 TECHNICAL EXAMINER COSS: Well, that's good to
16 know. Appreciate that. What was the other question I had
17 along those lines? And so the -- and then you testified
18 there is only one known fault in this kind of area of review
19 here. And could you tell me a little bit more about that
20 fault, what you know of it?

21 MR. DAVIS: Sure. We believe it to be a high
22 angle fault, which is fairly typical in this region. It
23 extends approximately 25 kilometers to the southwest of the
24 Rita location. The closest point of the fault to the Rita
25 is approximately 3800 feet, oriented southeast of the Rita

1 well.

2 The orientation of the fault is approximately 45
3 degrees Azimuth, or due northeast. We believe it extends
4 upward into the overlying layers above the targeted
5 injection interval here, which in this case would be
6 overlying shale. So it penetrates the injection interval
7 entirely, which is an assumption we are making to be
8 conservative based on the data available.

9 TECHNICAL EXAMINER COSS: Okay. And would you --
10 I asked this question the last time this case was heard.
11 Would you estimate the (unclear) on this fault?

12 MR. DAVIS: I'm not sure that I can accurately do
13 so with the data that I have seen.

14 TECHNICAL EXAMINER COSS: Sure. Does it seem, in
15 your opinion to be large, medium or small, and would you
16 classify -- based on that, would you classify it as a
17 (unclear) or is it going to be a conductive fault?

18 MR. DAVIS: Well, that would be relative to what
19 faults you compare it to. I would say in this area this
20 would be a medium, pretty normal-sized fault based on the
21 known faults. And as to whether or not it is conductive, we
22 do not have any data so say one way or the other.

23 TECHNICAL EXAMINER COSS: Okay. But I guess in
24 your model, does the SFP simulations pre (unclear) a fault?

25 MR. DAVIS: It would. It will assume that the

1 pressure will transpose across the fault.

2 TECHNICAL EXAMINER COSS: Well, that's the
3 worst-case scenario, I suppose, or would you agree that's
4 the worst-case scenario, or would it --

5 MR. DAVIS: I would agree.

6 TECHNICAL EXAMINER COSS: You would agree, okay.
7 And do you also agree that, that there are probably
8 additional fracture networks connected to this medium size
9 fault?

10 MR. DAVIS: Most likely, yes.

11 TECHNICAL EXAMINER COSS: I guess it's safe to
12 say that if there is one known fault, that there is probably
13 more faults associated with this medium one?

14 MR. DAVIS: It's very possible. I'm hesitant to
15 say one way or the other without something to base it off
16 of.

17 TECHNICAL EXAMINER COSS: I guess it would be
18 based off of normal fault behavior?

19 MR. DAVIS: Right.

20 TECHNICAL EXAMINER COSS: I will continue. And
21 so I'm curious in the FSP analysis, it's something that
22 unfortunately the Division can't seem to get a (unclear) to
23 have, but how does it treat -- I imagine that in the model
24 it's treating -- everything is treated kind of radial flow
25 emanating through a uniform porosity and permeability

1 through the interval that you model. How does the FSP model
2 treat differently injection into a fractured reservoir?

3 MR. DAVIS: Unfortunately FSP does not have any
4 way to account for any heterogeneity or any isotropic, for
5 that matter, within the model. It treats everything as a
6 single layer, and like you said, the radial (unclear)
7 pressure flow.

8 TECHNICAL EXAMINER COSS: Okay. And can --
9 would you be willing to venture a guess on how, how the
10 results might differ and how the pressure might change
11 (unclear) standard medium fracture flow?

12 MR. DAVIS: Sure. I would like to say this is
13 speculation at this point. But I would expect if you were
14 able to account for that heterogeneity, for one, you would
15 see radial flow, you would likely see linear flow. I can't
16 say what direction. That would depend on where the
17 specifics, the specific fractures were located. And it's
18 entirely possible that this fault is non-transmissive and
19 the pressure would primarily migrate away from the fault due
20 to that barrier.

21 On the other hand it's possible that there are
22 fractures crossing that fault that would take the pressure
23 and fluid flow past that fault without making meaningful
24 pore pressure contributions at that fault surface.

25 So because this is a heterogeneous model, we are

1 assuming the worst case where the vast majority of the
2 pressure is going to reach that fault surface and going to
3 stay at that fault surface and build there. So I do believe
4 we are able to account for additional fractures and off-
5 shoot faults, et cetera, you would see a, a smaller overall
6 pore pressure increase at the fault surface.

7 TECHNICAL EXAMINER COSS: Okay. Well, thanks for
8 that explanation, and it's speculation based on expert
9 opinion. I would also ask about, could you comment on
10 Zoback's 2020 paper -- I haven't had to time review it
11 myself -- but what changes and conclusions do they come to,
12 and did you -- they change your horizontal stress gradient?

13 MR. DAVIS: Yeah, sure. So the guys over at
14 Stanford, Zoback and Lund Snee, primarily have been doing
15 this stress data investigation for many years now, and
16 recently Jens Lund Snee produced an updated stress map under
17 the guidance of Zoback, and one of the details that was
18 included in this update was a shape file with all of their
19 stress data points that we were able to plug into GIS.

20 So previously we were reliant on the publication
21 and the publication's supporting materials from, I believe,
22 2018, when Zoback first released the stress data. And what
23 he did in that paper was generalize areas, very large areas,
24 I think they were 250 square kilometers each, and he
25 provided average stress values for each of these large

1 areas.

2 Because this update provided us the individual
3 data points rather than the average values, we are able to
4 go and look at our specific area of interest and pick the
5 data points that are closest and most relevant to our
6 location instead of relying on that larger regional average.

7 So this case, the larger regional average for
8 where the Rita is located would suggest your stress field is
9 at approximately 40 degrees. However, if you go look at the
10 individual data points, there are three data points within a
11 mile of the Rita location that all show a more vertical
12 stress field. So the stress field shown by the individual
13 data points is between ten and 20 degrees near the Rita.

14 So the updated 2020 data, I don't believe these
15 data points are recent. I believe that they were included
16 in the previous analysis, but now we can look at the site-
17 specific data rather than the general regional values.

18 TECHNICAL EXAMINER COSS: I see. Thanks for that
19 clarification. So I'm curious in the FSP model, I know it's
20 a Monte Carlo situation, so it's kind of varies, the values,
21 right, but how sensitive is the analysis to that maximum
22 horizontal stress gradient that you input and how might that
23 change your model?

24 MR. DAVIS: It is quite sensitive to the stress
25 orientation. It might be the single-most impactful

1 parameter based on my experience running these. The impact
2 it has on the model results is -- previously Sharon
3 mentioned that there were approximate pore pressure values
4 which you would expect to see fault slip that, and that, the
5 closer the fault orientation is to the horizontal stress
6 orientation, the smaller that necessary pore pressure value
7 is going -- pore pressure value is going to be before the
8 fault, before the fault potentially slips.

9 So if your fault is in line with the horizontal
10 stress values, it will take significantly less pore pressure
11 increase at that location to possibly cause slip when
12 compared to a different fault that was not oriented within
13 the stress field.

14 TECHNICAL EXAMINER COSS: So that's the most
15 sensitive variable. And in this case updates codified the
16 results from being very susceptible to less susceptible. Is
17 that right?

18 MR. DAVIS: Correct.

19 TECHNICAL EXAMINER COSS: And does the model vary
20 those parameters in between several degrees, or what would
21 it look like if you were to run the model where the fault is
22 ultimately oriented?

23 MR. DAVIS: I can't say for sure what the results
24 would look like without running it. I'm hesitant to throw
25 any numbers out. It probably depends on how much that

1 stress field varies. The model does allow for variability
2 in the stress field input. In this case I did not include
3 variability in the stress value simply because we had such
4 good data. We had multiple stress values within a mile to
5 rely on. Because of that, I chose not to add any variance
6 to that value.

7 TECHNICAL EXAMINER COSS: And how confident are
8 you in the orientation of the fault?

9 MR. DAVIS: I'm quite confident based on the
10 available seismic data.

11 TECHNICAL EXAMINER COSS: Okay. And I guess I
12 would like to see -- the only -- do you have any supporting
13 data on the fault besides from the one image on PDF Page 22?
14 I'm not able to independently verify that fault angle just
15 on this slide data.

16 MR. DAVIS: I don't have additional hard data to
17 verify the orientation beyond what is shown here. I
18 could -- actually somewhat relevant, the Zoback article we
19 were just talking about, this fault is mapped within his
20 article. And the alignment that he has this fault mapped at
21 is in agreement with what we have used in our analysis here.
22 We used that as sort of a double checking.

23 TECHNICAL EXAMINER COSS: Okay. Would you submit
24 supplemental information to this, to the affidavit
25 describing some of that --

1 MR. DAVIS: Sure.

2 TECHNICAL EXAMINER COSS: -- we just discussed,
3 that would be helpful. And I suppose I would venture a
4 guess -- or not venture a guess, but along these lines of
5 thinking of there being just one fault in the area, there
6 was a, a 3.9 magnitude event on 11-28-1974.

7 Your exhibits here, if it's not necessarily on a
8 fault, how might that earthquake occur then?

9 MR. DAVIS: Well, likely the fault is unknown if
10 there is a fault directly beneath that earthquake, but more
11 than likely, in my opinion, that earthquake is located
12 inaccurately.

13 I'm not familiar with the specifics of what the
14 seismic network in the area looked like in 1978, but I would
15 be willing to wager there were rather large error margins in
16 the accuracy, because, generally speaking, in the US our
17 seismometer spacing is rather poor for resolution, even in
18 recent years.

19 TECHNICAL EXAMINER COSS: So your conclusion then
20 is that it's either an unknown fault or just -- or
21 potentially on the fault that's of concern here?

22 MR. DAVIS: Yes, that is possible.

23 TECHNICAL EXAMINER COSS: And is it -- I don't
24 see in this affidavit any other -- an address -- is other
25 historic seismicity in the area? Has there been additional

1 seismicity in this area of review, and how far away from the
2 historic standard (unclear).

3 MR. DAVIS: The event that was previously
4 referenced was the only historic (unclear) within the square
5 mile area. How far it is from these (unclear) off the top
6 of my head.

7 TECHNICAL EXAMINER COSS: In the previous
8 testimony, Overflow Energy had mentioned willingness to
9 install a seismic, microseismic array. Is that still
10 Overflow Energy's intention? I imagine you might have to
11 (unclear).

12 MR. DAVIS: Yeah, I would to have to direct that
13 to (unclear).

14 TECHNICAL EXAMINER COSS: Is it, do you have any
15 knowledge of whether or not Overflow Energy has had any
16 correspondence with the City of Carlsbad regarding the
17 (unclear).

18 MR. DAVIS: I don't have any knowledge of that.

19 TECHNICAL EXAMINER COSS: Okay. Lastly, I think
20 the last point I wanted to touch on, I appreciate you adding
21 the additional active and permitted well water, Devonian
22 saltwater disposal wells, but I have, on my records, I have
23 a few additional wells that, that you didn't include in the
24 model.

25 And so I guess I would ask to see kind of like a,

1 an outline map or a map showing all of the wells that you
2 used in the model and for the model to be run using the
3 wells that I have in OCD's files that are in proximity to
4 the Rita that weren't used in the this model. Those include
5 the Buckner SWD application, the Gillock and Brown, and the
6 (unclear).

7 (Reporter asking for clarification.)

8 TECHNICAL EXAMINER COSS: So it's the Plainer SWD
9 application by Mewbourne Oil, the Gillock and Brown SWD
10 application by 3Bear, and the Quintana application by NGL, I
11 have all within close proximity. And I believe I have there
12 is potentially a few more in not such close proximity to
13 those the ones I just mentioned, but again, I don't have a
14 map showing what wells were used in relationship to all
15 this, other than the one in the FSP model, and I do
16 appreciate that, but I could cross verify that data a little
17 easier.

18 MR. DAVIS: Yes, sure. Can I ask if these SWDs,
19 are they active wells?

20 TECHNICAL EXAMINER COSS: Oh, so these, the ones
21 that you have, are using are just the active and not the
22 applied for?

23 MR. DAVIS: We did include one not permitted well
24 and one well that was not yet drilled.

25 TECHNICAL EXAMINER COSS: Okay. Well that

1 explains it then. Then I would ask that the applied for
2 wells be run in the model. And I would also ask that when
3 the model is rerun, that there is a greater amount of
4 variability put into both the fault angle and a maximum
5 stress, just for my curiosity.

6 MR. DAVIS: Okay.

7 TECHNICAL EXAMINER COSS: I would also ask, why
8 was -- is 25 years, has that been standard OCD practice, or
9 at times models have been run longer?

10 MR. DAVIS: 25 years is actually the longest time
11 period I've seen these run for. It's generally either been
12 20 or 25 in the State of New Mexico, in my experience.

13 TECHNICAL EXAMINER COSS: Okay. And I suppose
14 that -- I won't ask that question, excuse me.

15 So with that, I ran through all of my notes, and
16 I appreciate you answering my questions, Mr. Davis. But I
17 think in summary, do I need to repeat kind of what I'm
18 asking for, or would you like to ask me any questions about
19 what I'm asking for or repeat what --

20 MR. DAVIS: I would like to repeat back your
21 requests to clarify, just to make sure I have everything
22 here. You would like the three, approximately, additional
23 applied-for SWDs to be included. You would like some
24 additional details on the fault, particularly orientation.

25 And I will go ahead and say here, I do not know

1 whether that information is proprietary, but I will see what
2 we have that we are able to utilize. And you would like to
3 see variability in the stress field orientation in the fault
4 orientation within the model.

5 TECHNICAL EXAMINER COSS: Yes, and the analysis
6 of the lots that you ascertained that data.

7 MR. DAVIS: Can I ask you to e-mail us
8 information on those SWDs that you would like added to the
9 model?

10 TECHNICAL EXAMINER COSS: Of course. And I'm
11 going to have to bounce it back to Felicia here and ask how
12 this is handled at this point in the hearing process.

13 HEARING EXAMINER ORTH: All right. Thank you
14 both, gentlemen. I think the best way to handle this would
15 be with a supplemental affidavit responsive to
16 Mr. Rose-Coss's questions.

17 Then you can continue marking that, Ms. Shaheen,
18 consistent with your marking system, if you would like.

19 Two things; one, during Mr. Rose-Coss's
20 questioning of Mr. Davis, Ms. Bennett joined us. Ms.
21 Bennett, if you would please enter your appearance and also
22 let me know if you have any questions of Mr. Davis.

23 MS. BENNETT: Thank you very much. I certainly
24 apologize for being late. Totally inexcusable, and I throw
25 myself on the mercy of the Hearing Examiner and the parties

1 not be too irritated with me. And I appreciate the fact
2 that you went along without me, so I thank you, and again I
3 apologize.

4 This is Deana Bennett of Modrall Sperling and I'm
5 here on behalf of Marathon Oil Permian LLC and NGL Water
6 Solutions Permian LLC. And I do not have any questions of
7 the witness, I appreciate his testimony. And I would
8 specifically ask that any supplemental information be shared
9 with me both as counsel for Marathon and as counsel for NGL.
10 Thank you.

11 HEARING EXAMINER ORTH: Yes, thank you.
12 Certainly the supplemental information would be shared with
13 everyone involved the way the original affidavits were.

14 The other thing I would like to mention is that
15 there were times when it was hard to hear all of
16 Mr. Rose-Coss' complete questions because of the ambient
17 noise coming from Mr. Davis' environment, I think.

18 And so I will just ask, if you can, please, I
19 know it's an extra -- it's an extra step, but to mute
20 yourself unless you're actually speaking. For some reason
21 some people's ambient noise becomes louder than someone else
22 talking.

23 Let's see, so, Ms. Shaheen, would you move on to
24 your next witness? And it would certainly be appropriate --
25 I don't want to change your MO here, but it would certainly

1 be appropriate for you to introduce them, ask them if they
2 adopt their testimony under oath, give a high-level summary
3 of what the points of their testimony is, and then we can
4 turn to Mr. Rose-Coss's questions.

5 MS. SHAHEEN: Thank you, Madam Examiner. Our
6 next witness is geologist Thomas Tomastik. His affidavit
7 can be found at PDF Page 48. I will ask Mr. Tomastik now to
8 adopt his affidavit as his written testimony today.

9 Mr. Tomastik, do you adopt your affidavit today
10 as your written testimony -- excuse me -- as your testimony
11 today?

12 MR. TOMASTIK: Yes, I do.

13 MS. SHAHEEN: Thank you. So turning to PDF Page
14 48, and -- and Mr. Tomastik has previously testified before
15 the Division and had his credentials accepted as an expert.
16 Nonetheless, we have provided his education and experience
17 in Paragraph 3, and I would ask that his testimony be
18 admitted today as that of an expert witness.

19 HEARING EXAMINER ORTH: Let me pause for a moment
20 to see if Mr. Rose-Coss or Ms. Bennett have questions about
21 his expertise. Please speak up if you do.

22 TECHNICAL EXAMINER COSS: No objection.

23 MS. BENNETT: This is Deana Bennett. No
24 objection.

25 HEARING EXAMINER ORTH: All right. He is so

1 recognized.

2 MS. SHAHEEN: Thank you. Mr. Tomastik assisted
3 in the preparation of the FSP model. He provided general
4 oversight for the process, and specifically reviewed the
5 values and source of the parameters that were used in the
6 previous model prepared by Overflow and Marathon to make
7 sure they were in line with industry standards and the
8 geologic characteristics that had been seen in the region.

9 The values and sources of the parameters are
10 included on Slide 3 of Mr. Davis' Exhibit 2. He revised the
11 following parameters, and he revised the injection interval
12 thickness to more accurately reflect the expected injection
13 interval thickness at the proposed location. He did this by
14 evaluating and assessing multiple Devonian Silurian open
15 hole geophysical logs, and analyzed average porosity values
16 and estimated permeability.

17 Based on his evaluation and assessment of the
18 open hole geophysical logs, he opines that there is
19 approximately 304 feet of viable injection interval for the
20 purposes of the evaluation, 40 ohms of resistivity was used
21 as a cutoff threshold.

22 Exhibit 1, which I circulated as an image file
23 yesterday, includes an annotated snip of the geophysical
24 logs for NGL's Alpha SWD Number 2. I believe Mr. Coss was
25 referring to that previously. That well is located

1 approximately five miles southeast of the Rita SWD proposed
2 location. And than concludes Mr. Tomastik's written
3 testimony today.

4 HEARING EXAMINER ORTH: Thank you very much.

5 Ms. Bennett, let me ask you first. Do you have
6 questions of Mr. Tomastik?

7 MS. BENNETT: Thank you very much, Madam
8 Examiner. I don't have any questions for Mr. Tomastik.
9 Thank you.

10 HEARING EXAMINER ORTH: Mr. Rose-Coss, do you
11 questions of Mr. Tomastik at this time?

12 TECHNICAL EXAMINER COSS: You know what, I'm
13 feeling -- I clearly hadn't scrolled to the bottom of the
14 document and seen some of the information I requested in
15 terms of the log analysis.

16 I suppose I would just ask Mr. Tomastik, could
17 you explain the rationales used in the 40 ohms resistivity
18 as the cutoff and why you used that and the kind of
19 significance thereof?

20 MR. TOMASTIK: Yeah. Based on my expertise and
21 experience doing Class II injection wells for the last 38
22 years, one of the criteria that I use, a lot of people rely
23 totally on porosity, well, porosity itself is not an
24 indicator of formation that can take fluid, so I also look
25 independently upon the resistivity values for the open hole

1 geophysical log.

2 And based on using a cutoff of about 40 ohms,
3 typically in carbonate rocks such as Devonian and Silurian
4 formations, it's going to indicate that you most likely have
5 some presence of native Brine within the formation, which in
6 itself indicates that you have porosity permeability
7 development.

8 In carbonate rocks, porosity values in the 5 to 6
9 percent range is pretty standard. And that's usually a
10 pretty good indication that you have got a zone that's going
11 to take fluid. The evaluation of the open hole log on the
12 alpha well as Mr. Davis had previously testified to was the
13 best physical log in the area of the Devonian Silurian rocks
14 to evaluate.

15 As you're aware, carbonate rocks, your primary
16 porosity development is going to be in your secondary
17 porosity features such as voids and fractures and bugs
18 within the rocks, so you are going to get, as Mr. Davis
19 testified, more of a linear flow versus radial flow.
20 Although the Stanford model is not set up for that, it's the
21 best software package out there to use for this at this
22 time.

23 But that's typically the criteria that I use for
24 selecting an injection interval, and that's what I used on
25 the Alpha Well to evaluate that geophysical log. I know

1 typically in past hearings that I have attended, I have seen
2 other experts testifying that, you know, the entire
3 formation is going to take fluid, and that's the incorrect.

4 So ALL's assumptions is that we are doing a very
5 conservative approach to what we feel is a realistic
6 injection interval where fluids are going to enter the
7 formations.

8 TECHNICAL EXAMINER COSS: Thank you,
9 Mr. Tomastik. I guess what I'm looking at right now is the
10 logs, and it seems as if the values really are toward the
11 bottom of the interval, and this is mostly academic. Would
12 you, would you put the context of the Montoya there where
13 the values fall off? I can see a little hint of gamma ray
14 as well. Could you speak to that?

15 MR. TOMASTIK: I didn't look at the actual
16 context of that. Again mostly what I was evaluating for was
17 particular secondary porosity zones that are going to
18 probably be your viable injection interval in that well. So
19 I didn't really look at what the top of the Montoya was. I
20 didn't evaluate for that on that log.

21 TECHNICAL EXAMINER COSS: And it seems, do you --
22 I'm having trouble looking at with the scale a little bit.
23 It seems like many of these porous zones or higher
24 resistivity zones are fairly thin zones. Is that a correct
25 assessment?

1 MR. TOMASTIK: That's typical of what you are
2 going to see in carbonate rocks, limestones and dolomites,
3 because your porosity permeability development is in
4 secondary porosity features such as voids or fractures or
5 bugs, this solution features -- and those typically aren't
6 going to be, you know, fairly continuous over a large
7 section of the rocks.

8 So, yeah it's going to be -- but, I mean, I have
9 seen, my experience, you may have a four foot zone that
10 takes the majority of your fluid. That's the way it's set
11 up in carbonate rocks. Like I say, you will end up with
12 maybe a connection to a fracture network that's going to
13 give you preferential flow direction along a linear trend.

14 So, again, you may get some minor secondary
15 injection into the matrix, but it's not like typically you
16 will see in rock like sandstones silt stones that are more
17 viable in the matrix than secondary features.

18 TECHNICAL EXAMINER COSS: Sure, sure. And I'm
19 curious, too, in terms of the heterogeneity of the rock, if
20 it's pretty vertically variable, it's probably horizontally
21 variable as well in terms of those porosity features. Or
22 could you -- like the model probably takes, you know, that 4
23 foot, 40 foot zone above the porosity and extends that
24 infinitely away from the wellbore.

25 MR. TOMASTIK: Yeah, the model would not be

1 capable of doing that kind of an analysis. I mean, there
2 are fracture-oriented software programs that are out there
3 on the shelf. Obviously, the major well companies have
4 proprietary software modeling that they can do on fractured
5 carbonate rocks, but typically the model that Stanford has
6 developed just assumes homogeneous and isotropic reservoir,
7 which obviously, you know, is not characteristic of these
8 rocks, but that's what is being used at this point.

9 TECHNICAL EXAMINER COSS: I see. Thank you,
10 Mr. Tomastik. Those are really all my questions for
11 Mr. Tomastik. Thank you for including the analysis in your
12 report.

13 MR. TOMASTIK: Sure, no problem.

14 MS. SHAHEEN: Thank you. Ms. Shaheen, any follow
15 up from those questions?

16 MS. SHAHEEN: Not at this time.

17 TECHNICAL EXAMINER COSS: Ms. Shaheen, I would
18 ask, because I haven't seen it on review of the file, but I
19 didn't see exhibits filed from the previous hearing that was
20 done on 12-7 of 2019. And I was curious to know if the, if
21 the application Overflow submitted initially, if that was
22 just used as the exhibits that were presented at the
23 hearing, or if there is an exhibit packet that the case file
24 is missing.

25 And the other documents that I couldn't quite

1 find, and I'm not sure if they just are not -- but I saw
2 sort of a rebuttal by you to Marathon's inclusion of a FSP
3 model, but then I didn't -- I didn't see your kind of
4 initial kind rebuttal of their model. I saw like their
5 rebuttal to your statement, but I didn't see your initial
6 statement, and this would have been in the springtime last
7 year. So I don't know if that's another document, I don't
8 know if it exists or if the case file is just lacking.

9 MS. SHAHEEN: I will take a look and make sure
10 you have everything. If you don't mind, I can e-mail you
11 the hearing exhibits from the first hearing without the
12 green cards, because the green cards make it too large to
13 e-mail. If you want the green cards I will upload it to the
14 serve file.

15 TECHNICAL EXAMINER COSS: I saw the green cards
16 and see there's an application, but trying to read through
17 the last transcripts I couldn't necessarily follow what was
18 what was being referred to.

19 MS. SHAHEEN: I will take a look at what's on the
20 website and make sure you have everything.

21 TECHNICAL EXAMINER COSS: I appreciate that.

22 HEARING EXAMINER ORTH: Thank you, Mr. Rose-Coss
23 and Ms. Shaheen, if you would call your third witness.

24 MS. SHAHEEN: Mr. Alleman was here in the event
25 that Mr. Tomastik and Mr. Davis were unable to answer any

1 questions. I believe -- we did not submit written testimony
2 for Mr. Alleman, so if there are any other questions that,
3 that the Division has outside of the scope of the testimony
4 of Mr. Davis and Mr. Tomastik, then Mr. Alleman may be able
5 to help there.

6 HEARING EXAMINER ORTH: Thank you very much. Ms.
7 Bennett, in the Division's consideration of Case 20694, are
8 there any questions that you would pose to Mr. Alleman?

9 MS. BENNETT: No questions from me. Thank you
10 very much.

11 HEARING EXAMINER ORTH: Thank you.
12 Mr. Rose-Coss, any questions?

13 TECHNICAL EXAMINER COSS: No questions for me.

14 HEARING EXAMINER ORTH: Thank you. Ms. Shaheen,
15 is there anything we need to do before we adjourn this
16 session. We can talk certainly about expected time lines
17 for the submittal of the supplemental affidavit. We can
18 talk about a post-hearing submittal in which you would
19 propose the findings and conclusions you would like the
20 Division to adopt. Are there any other topics we need to
21 talk about?

22 MS. SHAHEEN: Not that I'm aware of. We can talk
23 about a time line for the submission. For me, I appreciate
24 all of Mr. Coss' questions, to me it's fascinating, but
25 frankly a lot of it goes over my head, and so I think it

1 might be helpful if we had the benefit of the transcript
2 before we actually make the supplemental submission. If
3 that's okay.

4 HEARING EXAMINER ORTH: I agree with you. I
5 think transcripts are very helpful. Typically the
6 transcript is received in two weeks after the hearing. That
7 would, notwithstanding the various holidays between now and
8 then, put it on January 1, 2021, so let's instead say
9 January 4, on or about January 4.

10 If you had the transcript in hands on the 4th,
11 how long would you guess -- and you don't need to cut
12 yourself short -- but how long do you think it would take to
13 prepare the supplemental affidavits and the proposed
14 findings of fact.

15 MS. SHAHEEN: Well, I would defer to the
16 witnesses. For myself, I would like at least two weeks to
17 get to that point. But I would ask the witnesses what their
18 schedule is like in January, and I'm sure they have other
19 projects that they are working on.

20 HEARING EXAMINER ORTH: Witnesses, what is your
21 proposal?

22 MR. DAVIS: Two weeks is reasonable.

23 HEARING EXAMINER ORTH: All right. That would
24 put us on January 18. Any objections to January 18? That's
25 a Monday?

1 MS. SHAHEEN: That should be fine. That's a day
2 before all my other exhibits are due before the January 21.

3 HEARING EXAMINER ORTH: That may be -- my
4 calendar isn't showing it because I haven't switched
5 calendars yet, that may be Martin Luther King Day. So if it
6 is, let's, let's say the 19th.

7 MS. SHAHEEN: You got it.

8 HEARING EXAMINER ORTH: Okay. Terrific. Is
9 there anything else we can do while on the zoom together?

10 MS. BENNETT: Madam Examiner, this is Deana
11 Bennett, could I make one brief statement on behalf of NGL?

12 HEARING EXAMINER ORTH: Yes, please go ahead.

13 MS. BENNETT: Thank you. NGL, as I mentioned in
14 our prehearing statement, was a party to this case
15 initially, and is still a party to the case. And NGL, at
16 the hearing I asked some questions of the Overflow witnesses
17 designed to identify some issues in terms of proximity to
18 the City of Carlsbad and the Brine well. And NGL remains
19 concerned about the proposed well in proximity to the Brine
20 well and remains opposed to the application, notwithstanding
21 the revised FSP, for reasons discussed at the earlier
22 hearing. Thank you very much.

23 HEARING EXAMINER ORTH: Thank you, Ms. Bennett.
24 Let me extend the same invitation to you it. It's not a
25 requirement, if however, you would like to propose findings

1 and conclusions, for example, on behalf of NGL, you may
2 certainly do that by January 19, the same as the applicant.

3 MS. BENNETT: Thank you very much.

4 HEARING EXAMINER ORTH: All right. At this point
5 is there anything else we need to do?

6 MS. SHAHEEN: Actually, Madam Examiner, may I ask
7 a clarifying question?

8 HEARING EXAMINER ORTH: Yes.

9 MS. BENNETT: So what I understood the process to
10 be was that Ms. Shaheen would be coordinating with her
11 witnesses and those witnesses would be submitting their
12 supplemental testimony on the 19th. And I suppose that
13 doesn't impact my findings and conclusions for NGL, those
14 will be fairly straightforward, but I'm wondering -- and I
15 probably spoke too soon because I did immediately start
16 talking.

17 So I will defer to Ms. Shaheen about whether the
18 19th works for her to get in proposed conclusions of law and
19 findings of fact given that will be the same time that
20 she'll be submitting her testimony. Apologies for jumping.

21 HEARING EXAMINER ORTH: All right. That's fine.
22 And if as you reflect on the transcript you would like to
23 propose something different, just reach out by e-mail if you
24 would, please. Okay. Now is there anything else we need to
25 do while we're together.

1 TECHNICAL EXAMINER COSS: Thank you for teaching
2 about the space bar to unmute myself.

3 HEARING EXAMINER ORTH: Thank you, Mr. Rose-Coss.
4 Anything else?

5 (No audible response.)

6 HEARING EXAMINER ORTH: No? Thank you all for
7 participating this morning and have a wonderful holiday.

8 MS. SHAHEEN: Thank you. Same to you, and
9 everyone else.

10 TECHNICAL EXAMINER COSS: Happy holidays,
11 everyone.

12 (Concluded.)

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1 STATE OF NEW MEXICO
2 COUNTY OF BERNALILLO

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REPORTER'S CERTIFICATE

I, IRENE DELGADO, New Mexico Certified Court Reporter, CCR 253, do hereby certify that I reported the foregoing virtual proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings to the best of my ability.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case and that I have no interest in the final disposition of this case.

I FURTHER CERTIFY that the Virtual Proceeding was of poor to good quality.

Dated this 29th day of December 2020.

/s/ Irene Delgado

Irene Delgado, NMCCR 253
License Expires: 12-31-21