

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:

COPY

APPLICATION OF ENERGEN RESOURCES
CORPORATION FOR APPROVAL OF A PILOT
PROJECT, UNORTHODOX WELL LOCATIONS,
AND EXCEPTIONS FROM RULE 19.15.15.11
TO DETERMINE PROPER WELL DENSITIES
FOR THE PICTURED CLIFFS FORMATION
WELLS IN PORTIONS OF THE GAVILAN,
TAPACITO AND SOUTH BLANCO PICTURED
CLIFFS POOLS, RIO ARRIBA COUNTY,
NEW MEXICO.

CASE NO. 14539 ✓

APPLICATION OF BURLINGTON RESOURCES
OIL AND GAS COMPANY, LP, BP, AMOCO
AND ENERGEN RESOURCES CORPORATION
FOR APPROVAL OF THE PILOT PROJECT
INCLUDING UNORTHODOX WELL LOCATIONS
AND EXCEPTION FROM DIVISION
RULE 104.D.3 (19.15.15.11) FOR PURPOSES
OF ESTABLISHING A PILOT PROGRAM IN
THE PICTURED CLIFFS FORMATION TO
DETERMINE PROPER WELL DENSITY
REQUIREMENTS FOR PICTURED CLIFFS
WELLS IN SAN JUAN, SANDOVAL AND
RIO ARRIBA COUNTIES, NEW MEXICO.

CASE NO. 12857

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TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

September 2, 2010 2:11 p.m.

Santa Fe, New Mexico

BEFORE: TERRY WARNELL, Hearing Examiner
DAVID K. BROOKS, Legal Advisor

1 This matter came on for hearing before the New
2 Mexico Oil Conservation Division, TERRY WARNELL,
3 Hearing Examiner, and DAVID K. BROOKS, Legal
4 Advisor, on Thursday, September 2, 2010, at the New
5 Mexico Energy, Minerals and Natural resources
6 Department, 1220 South St. Francis drive, Room 102,
7 Santa Fe, New Mexico.

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1 THE EXAMINER: Okay, let's go back on the
2 record then. We're going to consolidate these two
3 cases. So we will consolidate Case No. 14539,
4 application of Energen Resources Corporation for
5 approval of a pilot project, unorthodox well
6 locations, and exceptions from Rule 19.15.15.11 to
7 determine proper well densities for the Pictured
8 Cliffs formation wells in portions of the Gavilan,
9 Tapacito and South Blanco Pictured Cliffs pools, Rio
10 Arriba County, New Mexico.

11 Mr. Hall. What formations do we have
12 here?

13 MR. HALL: It's all Pictured Cliffs
14 formation.

15 THE EXAMINER: All Pictured Cliffs
16 formations, Rio Arriba County, New Mexico.

17 And Case No. 12857, application of
18 Burlington Resources Oil and Gas Company, LP; BP
19 Amoco; and Energen Resources Corporation for
20 approval of the pilot project including unorthodox
21 well locations and exception from Division
22 Rule 104.D.3 (19.15.15.11) for purposes of
23 establishing a pilot program in the Pictured Cliffs
24 Formation to determine proper well density
25 requirements for Pictured Cliffs wells in San Juan,

1 Sandoval and Rio Arriba Counties, New Mexico.

2 Call for appearances, please.

3 MR. HALL: Mr. Examiner, Scott Hall and
4 Seth McMillan, with Montgomery and Andrews Law Firm,
5 Santa Fe, on behalf of Energen Resources
6 Corporation, with three witnesses this afternoon.

7 MS. DE LA TORRE: Mr. Examiner, Kelly de
8 la Torre, with Beatty & Wozniak, representing BP
9 this afternoon, and I have one witness.

10 MR. KELLAHIN: Mr. Examiner, I'm Tom
11 Kellahin, of the Santa Fe law firm of Kellahin &
12 Kellahin, appearing this afternoon on behalf of
13 Burlington Resources, an affiliate company of
14 ConocoPhillips. I have one witness.

15 THE EXAMINER: So unfortunately, we don't
16 have tables for everyone, do we?

17 Would the witnesses please stand and be
18 sworn.

19 (Donald Lehman, David Poage, Zachary
20 Van Voast, Paul Marusak and Linda Htein were duly
21 sworn by the court reporter.)

22 MR. HALL: Mr. Examiner, with these
23 consolidated cases, what we would propose to do is
24 this: The older case, Case 12857, is a reopened
25 case. It is a report back to the agency pursuant to

1 Order No. R-11848 issued in October of 2002, which
2 authorized three operators, Energen, BP and
3 Burlington, to conduct a pilot project study in the
4 Pictured Cliffs formation.

5 The order itself did not call for a report
6 back to the agency on the results of the pilot
7 project, but discussion in the transcript from that
8 hearing certainly reflects that that was the
9 intention of the parties and the agency at that
10 time. We would present our witnesses in that case
11 first.

12 The second case, Case 14539; is related.
13 It's a proposal by Energen to establish a new pilot
14 project study area in what it calls its Jicarilla
15 East area in Rio Arriba County, New Mexico.

16 There is substantial overlap in the
17 testimony between the two cases. We would have, in
18 any event, asked the Hearing Examiner to take
19 administrative notice of the geologic and
20 engineering testimony in the reopened case and apply
21 it to the new case.

22 Rather than repeat testimony, we think it
23 would be more efficient for us to present our
24 witnesses on direct in both cases first and then
25 allow questioning by the other parties and the

1 Hearing Examiners.

2 It's my understanding that Burlington is
3 entering an appearance in both cases. BP's entry of
4 appearance is only in Case 12857, just so the record
5 is clear on that.

6 THE EXAMINER: Is that just the one case?

7 MS. DE LA TORRE: Yes.

8 MR. HALL: If that's agreeable to the
9 Examiner, we'll proceed that way.

10 THE EXAMINER: All right. So the older
11 case, Case No. 12857, that was heard back in --

12 MR. HALL: 2002.

13 MR. BROOKS: We can do that, I believe.

14 Did you get the BP case counsel's
15 acknowledgment, Mr. Reporter?

16 THE REPORTER: Yes, sir.

17 MS. DE LA TORRE: Mr. Examiner, I just
18 want to clarify that we're here just on the
19 reporting back, and we're not taking any position on
20 the Energen case or the additional infill wells.

21 MR. BROOKS: Okay. Thank you for
22 clarifying that.

23 THE EXAMINER: Okay. We'll proceed with
24 your witnesses.

25 MR. HALL: So Mr. Examiner, we provided

1 you with hard copies of our exhibits in both cases.
2 We've also given you a copy of the original order
3 from Case 12857 so that you can refer to that if you
4 wish.

5 And with that, we would call our first
6 witness, Mr. Don Lehman.

7 MR. BROOKS: Mr. Hall, since I'm not very
8 well informed, I'm not really asking for an opening
9 statement. But could you just briefly summarize
10 what you're doing here, what this case is about?

11 MR. HALL: Yes. Case 12857 was originally
12 presented to the OCD in 2002. And the purpose of it
13 was to determine whether it was appropriate to
14 increase the well densities for Pictured Cliffs
15 formation wells in three counties in the San Juan
16 Basin.

17 To get to that point, three operators of
18 an industry committee took the lead, BP, Energen and
19 Burlington, and determined that the best way to
20 gather data to make that determination was through
21 the conduct of pilot projects on acreage owned and
22 operated by each of those companies respectively.

23 MR. BROOKS: So they were authorized to
24 drill additional wells over and above the normal
25 spacing pattern?

1 MR. HALL: That's correct. The current
2 rules don't provide for infill wells in the Pictured
3 Cliffs. This order authorized that for the pilot
4 study area.

5 ~~There were recompletions, there were new~~
6 ~~drills.~~ Data was gathered over a period of time,
7 but no report back to the agency was ever made.

8 It's my understanding that the Aztec
9 Division District Office staff had requested that
10 the operators provide some sort of a report back to
11 the agency.

12 MR. BROOKS: The current rules on Pictured
13 Cliffs is 160-acre spacing, with one well per unit;
14 is that it?

15 MR. HALL: That's right.

16 MR. BROOKS: Okay, thank you. And I
17 apologize for not having read the application prior
18 to the hearing.

19 MR. HALL: And we might also take the
20 opportunity to discuss whether you want to issue one
21 order for both cases. I would recommend you issue
22 separate orders.

23 If you look at the application in Case
24 12857, it doesn't do much more than provide a report
25 back. There is no specific request for relief to

1 the agency.

2 MR. BROOKS: Well, perhaps that's a
3 decision that we will appropriately make after we've
4 heard the testimony.

5 MR. HALL: All right. At this point,
6 we'll call Mr. Don Lehman to the stand.

7 DONALD LEHMAN, >
8 having been previously duly sworn, testified as
9 follows:

10 DIRECT EXAMINATION

11 BY MR. HALL:

12 Q. For the record, please state your name.

13 A. Donald Lehman.

14 Q. Mr. Lehman, where do you live, and where
15 are you employed?

16 A. I live in Birmingham, Alabama. I'm
17 employed by Energen Resources Corp.

18 Q. In what capacity?

19 A. As a petroleum geologist.

20 Q. And have you previously testified before
21 the OCD?

22 A. No, I have not.

23 Q. Would you give the Hearing Examiner a
24 brief summary of your educational background and
25 work experience?

1 A. Okay. I have Bachelor's and Master's
2 degree from the University of Iowa. I started my
3 career with Mobil Oil some years back, approximately
4 30. I've worked for smaller independents after I
5 left Mobil Oil's employment.

6 I worked for Rocky Mountain Pertatious
7 Sandstone for 20-plus years. For the last three
8 years I've been an employee of Energen Resources,
9 specifically working the San Juan Basin on coal
10 reservoirs.

11 I'm an APG Certified Petroleum Geologist.

12 Q. Now, you're familiar with the applications
13 that Energen has filed in both of these cases?

14 A. Yes, I am.

15 Q. And are you also familiar with the
16 Pictured Cliffs formation pools that are the subject
17 of both of those applications?

18 A. Yes, I am.

19 Q. Let me ask you some additional questions.
20 Are you also familiar with the general provisions of
21 Order No. R-11848 that was entered by the Division
22 in 2002?

23 A. Yes, I am.

24 MR. HALL: At this point, Mr. Examiner, we
25 would offer Mr. Lehman as an expert petroleum

1 geologist.

2 THE EXAMINER: So recognized.

3 Q. (By Mr. Hall) Mr. Lehman if you would, for
4 the Hearing Examiners, could you just briefly
5 summarize the circumstances surrounding the issuance
6 of the original pilot project study order?

7 A. Yes. In 2002, the three companies,
8 Burlington Resources, BP and Energen, entered a case
9 to ask for additional 80-acre pilot wells in,
10 Pictured Cliffs in the San Juan Basin in order to
11 gather information to see if basin-wide downspacing
12 may be warranted. X

13 In that proposal, we were authorized to
14 drill six additional pilot wells, Burlington 16 and)
15 BP 3, I believe.

16 Q. All right. Let's look at the exhibits you
17 prepared for Case 12857. You have both hard copies
18 and projected versions of those; is that correct?

19 A. Correct.

20 Q. If you'd look at the first slide.

21 MR. HALL: And Mr. Examiner, we've marked
22 those in the hard copies as exhibits. So that would
23 be Exhibit No. 1.

24 Q. (By Mr. Hall) Would you identify that
25 exhibit for us, please?

1 A. Certainly. This is the slide that's on
2 the screen, indicating the specific pilot wells that
3 were drilled by each company and also pools on
4 Pictured Cliffs that are identified, state pools on
5 Pictured Cliffs.

6 Q. Okay. And what does the bounded area in
7 red show?

8 A. That's the four-township area that
9 Burlington had proposed to do some additional
10 petrographic or a petrophysical model and possibly
11 drilled a couple of cores in the pilot program.

12 I'm not familiar with that, whether that
13 was accomplished or not.

14 Q. All right. And are all of the new drills
15 and recompleted wells done by all of the operators
16 for that pilot project shown on Exhibit 1?

17 A. Yes, they have been. There were several
18 that are not on this that were proposed, but were
19 not drilled for one reason or another.

20 Q. All right. Let's turn to your next
21 exhibit. Would you explain that, please?

22 A. This is a log of Pictured Cliffs in our
23 operating area, which is more in the southeast part
24 of the basin.

25 I failed to note on the last slide our

1 Energen pilots were in the southeast part of the
2 basin later. The squares are Energen pilots. The
3 red ones are new drills. I'm sorry. The red
4 squares are pay adds, and the black are new drills.

5 Q. All right. And for the record, you're
6 referring to Exhibit 5 now, the typed log?

7 A. That's correct.

8 Q. Let me turn to that.

9 A. Okay. This is a Pictured Cliffs type log
10 in Energen's operating area. We basically have one
11 producing zone in our area, which is about a 50- to
12 70-foot continuous zone.

13 We do see the Upper Pictured Cliffs
14 developed in the northern part of Gavilan Field, but
15 do not deem it commercially producible.

16 So this type log shows the shaley sand
17 character of the Pictured Cliffs, the kamery colored
18 in yellow, the low resistivity colored in red, and
19 the density porosity colored in green.

20 Q. All right. Now, let's go back to
21 Exhibit 2, the previous slide. Let's look at your
22 hard copy of Exhibit 2.

23 A. Okay.

24 Q. Can you give us an overview of the
25 original project? What were the operators trying to

1 do?

2 A. I gather they were trying to establish
3 criteria for potentially downspacing from 160s to
4 80 acres with the Pictured Cliffs formation in the
5 San Juan Basin.

6 Seventeen pay adds and 8 new drills were
7 completed. Data was acquired on pressure
8 information, logs on new drilled wells.

9 And since that time, of course, we've had
10 an extensive production history that will be covered
11 by the reservoir engineer's testimony.

12 Q. Can you tell us what criteria were
13 developed for operators to select spacing units for
14 the conduct of the pilot project wells?

15 A. Yes. The criteria we used were a well
16 that was in an area that wasn't a high-productive
17 area, but offset wells produced between .7 and
18 1.5 bcf for gas.

19 Distance from the parent well was
20 important. We tried to stay at least 900 feet away
21 from the parent wells.

22 Azimuth from the parent well. We tried to
23 avoid depositional strike, again to avoid drainage.

24 We also tried to avoid what we thought
25 might be fracture trends or frac wings generated in

17
+8
—
25

1 the fracking of the parent wells, which we believed
2 to be generally north/south in Energen's operating
3 area.

4 And the parent well needed to be in good
5 producing condition, so we could compare production
6 rates from the pilot well to the parent well.

7 Offset wells seemed to have optimum
8 completions, again so we could monitor production of
9 the offsets versus the pilot well.

10 And wells were drilled in a variety of the
11 Pictured Cliffs pool. As you can see on this map,
12 there's at least one Pictured Cliffs well for most
13 of the Pictured Cliffs pools in the state.

14 And again, a combination of new drills and
15 pay adds, trying to obtain additional information.

16 Q. All right. And if we turn to your
17 Exhibit 3, do you discuss these collection criteria
18 on that exhibit?

19 A. The numbered 3?

20 Q. Yes. Do you have that?

21 A. Yes.

22 Q. And also I've provided you with a copy of
23 Order No. 11848.

24 Are the criteria that you've described
25 also articulated in paragraphs 17 and 18 of that

1 order?

2 A. Yes, they are.

3 Q. All right. Looking again at your
4 Exhibits 3 and 4, your hard copies, would you give
5 us an overview of the geologic setting for the
6 project and the quality of data the operators had to
7 work with at that time?

8 A. Okay. The Pictured Cliffs sand trends,
9 nearshore/offshore sands, were mapped utilizing
10 cumulative production.

11 Q. And for the record, you're referring to
12 Exhibit 6 now?

13 A. That's correct. So the geologic setting
14 is nearshore sands. The accepted way to map these
15 sands is to map cumulative production.

16 This map that you're looking at,
17 Exhibit 6, the bright pink color was cut off at
18 1 Bcf cumulative production. That way, we can see
19 the productive sand trends better.

20 As we move off the flanks and as we get
21 poorer production, we have poor-quality reservoir
22 sand. So that's the way that we've most reliably
23 mapped the sands in the Pictured Cliffs plain.

24 The Energen pilots were down here, in the
25 southeast part of the basin, which we'll get into, a

1 little bit more deeper and original higher pressure,
2 which is typical for the Pictured Cliffs plain, as
3 far as the Pictured Cliffs has, you know, a higher
4 clay content and, of course, a low permeability
5 reservoir, low porosity. And we felt that they may
6 have a potential for 80-acre downspacing.

7 Q. All right, let's look at Exhibit 7. What
8 is that?

9 A. Exhibit 7 is a land map of Energen's
10 acreages outlined in yellow, with the original pilot
11 wells the red squares. The brown dots are
12 Energen-operated Pictured Cliffs wells.

13 Q. And Exhibit 8, what does that show us?

14 MR. BROOKS: I'm sorry. The brown dots
15 are Energen-operated wells. And the squares are
16 pilot wells?

17 THE WITNESS: Those were pilot wells,
18 right.

19 MR. BROOKS: Excuse me. Go ahead.

20 THE WITNESS: All Pictured Cliffs.

21 Q. (By Mr. Hall) Let's look at Exhibit 8.
22 What does Exhibit 8 show us?

23 A. Exhibit 8 is a blowup of the basin cum map
24 we looked at earlier, showing a blowup of where the
25 Energen pilot wells were at.

1 You can see some of them were in the
2 higher-productive area in the pink, one here and one
3 down here. The remaining four pilot wells were
4 located along the flanks and margins of higher to
5 less-productive areas of what we think to be a
6 lower-permeability porosity reservoir.

7 Q. And Exhibit 9?

8 A. Exhibit 9 is a depth map. This map just
9 shows the relationship of Energen pilots to the
10 Burlington and BP pilots. The BP pilots are lime
11 green on this map; the Burlington pilots are purple.

12 It's a depth map, 500-foot contour. This
13 heavy contour here is 4,000 feet depth. The next
14 high heavy contour is 3,000, and the last contour on
15 the left is a 2000-foot depth.

16 So you can see that the Energen pilots
17 were between 3,500 and 4,000 feet in depth, compared
18 to the pilots by BP and Burlington that were less
19 than 2,000 to 3,000 feet. One was a little deeper
20 over here, near our operating area. But most of
21 them were less than 3,000 feet in depth.

22 Q. Now, with respect to the pilot project
23 study units operated by Energen, was there any new
24 meaningful geologic data derived from the conduct of
25 the study?

1 A. We did acquire -- first was our four
2 new-drilled wells, additional stratigraphic data.
3 On those four wells, we ran modern logs.

} logs

4 Typically out here, you don't have the
5 luxury of modern logs with the wells drilled in the
6 Mesa Verde. And you're lucky if you have cased hole
7 logs in the Pictured Cliffs. So we were able to
8 acquire some modern logs.

9 And we also acquired shut-in pressures and
10 extensive production history, which will be reviewed
11 by the reservoir engineer's testimony.

12 Q. From the additional data that Energen was
13 able to derive from its pilots, was there sufficient
14 additional data to warrant the recommendation of
15 infill development in the Pictured Cliffs,
16 basin-wide?

17 A. No, there was not.

18 Q. If you look back at your hard copy of
19 Exhibit 4, it discusses your geologic conclusions.

20 A. Okay.

21 Q. What are those?

22 A. A quick review of the geologic
23 conclusions: We do not have enough data to
24 determine a good geologic methodology to locate
25 80-acre infill wells.

} X X X

1 We believe that more pilots may be needed
2 to determine if our geologic assumptions are valid.
3 In addition, we don't think we have enough
4 information to recommend downspacing at this time.

5 Now, a larger statistical model may be a
6 way to deem whether downspacing in a portion of the
7 basin may be warranted.

8 Q. All right. Let's talk about what Energen
9 is proposing for its new pilots project.

10 If you turn to the exhibits for Case
11 14539. So in the exhibits for Case 14539, let's
12 turn to Exhibit 2.

13 A. Okay.

14 Q. Tell us what you're recommending for the
15 new pilot project.

16 A. Energen is recommending that we drill
17 eight additional 80-acre Pictured Cliffs wells as
18 pay adds to existing Mesa Verde wells in order to
19 determine the economic feasibility of 80-acre
20 downspacing in Energen's operating area.

21 And with that, we have two proposed pilot
22 wells on the Gavilan pool, four on the Tapacito
23 pool, and two in South Blanco. These again will all
24 be pay adds to existing Mesa Verde wells.

25 Q. All right. Now, let's refer to Exhibit 9,

1 your text exhibit.

2 A. Okay.

3 Q. And if you would, tell the Hearing Officer
4 about the criteria you were utilizing for selecting
5 these pilot project spacing units.

6 A. It's basically the same criteria we used
7 for the original pilots, where we looked for
8 different positions on a productive trend,
9 higher-producing areas, lower-producing,
10 moderate-producing areas, a minimum of 900 feet from
11 the parent well.

12 And these eight cases were from 950 to
13 1,850 feet from the parent well. Again taking into
14 account the azimuth from the parent well, trying to
15 avoid depositional strike, which is
16 northwest/southeast. And also trying to avoid
17 north/south fractures and potential frac wings from
18 parent wells.

19 And our preferred offset direction then
20 would be either east/west or northeast/southeast
21 from the parent well.

22 We looked for the parent wells again to be
23 in good producing condition, with optimum
24 completions on the offsets, and looking for wellbore
25 integrity in an existing Mesa Verde and/or Dakota

1 well that's producing less than 100 Mcf a day.

2 PC cum, our offset cums, we like to see
3 them between .51 and .5 Bcf.

4 And one thing that I failed to mention in
5 the previous testimony, no Fruitland coal well
6 quarter sections, which that is the case in all of
7 our pilots. There are no Fruitland coal well
8 quarter sections for these proposed pilots.

9 Q. Would you tell the Hearing Examiner what
10 you mean by "pay add"? What does that term mean?

11 A. Pay add or recompletion is moving uphole
12 and producing the Pictured Cliffs in an existing ^{well}
13 wellbore that's producing from the Mesa Verde and/or
14 Dakota.

15 Q. And if we refer to your text Exhibit 10,
16 is that what Energen is recommending for all of the
17 pilot wells in the new area?

18 A. Yes, it is.

19 Q. And explain to us why. What are the
20 benefits of that approach?

21 A. There are a number of benefits to ~~_____~~
22 utilizing existing boreholes. No new surface
23 disturbance. We believe we'll show that we can
24 produce additional gas with increased recovery for a
25 160-acre drilling space unit. No additional lease

1 operating expense.

2 We believe we have good economics, with
3 low risk. And Energen operates 51 existing Mesa
4 Verde boreholes in our operator area, with an
5 additional 27 potential Mesa Verde wells that could
6 be drilled that would have potential for either
7 80-acre or 160-acre Pictured Cliffs pay adds. PC-211
8 Pictured Cliffs enhances the Mesa Verde economics.

9 THE EXAMINER: And do you downhole
10 commingle?

11 THE WITNESS: Yes, they would be. We're
12 recommending commingling.

13 Q. (By Mr. Hall) Mr. Lehman, in Case
14 No. 12857, were Exhibits 1 through 9 prepared by
15 you?

16 A. Yes, they were.

17 Q. And in Case 14539, were Exhibits 2, 9 and
18 10 prepared by you?

19 A. Yes, they were.

20 MR. HALL: That concludes our direct
21 examination of Mr. Lehman.

22 We move the admission of those exhibits.

23 THE EXAMINER: Those exhibits are
24 admitted.

25 Is there anyone who wishes to cross?

1 MR. KELLAHIN: Just a moment,
2 Mr. Examiner? Can I have a second?

3 THE EXAMINER: Yes, sir.

4 (Energen Exhibits 1 through 9, inclusive,
5 in Case No. 12857 were admitted.)

6 (Energen Exhibits 2, 9 and 10 in Case No.
7 14539 were admitted.)

8 CROSS-EXAMINATION

9 BY MR. KELLAHIN:

10 Q. Mr. Lehman, I'll try not to confuse either
11 one of us here. If you'll turn back to your
12 original slide set and look at the map which I think
13 is Exhibit 2 --

14 A. Correct.

15 Q. I think it's page 2.

16 A. Okay. The text page, the project
17 overview?

18 Q. On the opened case, on the old project.

19 A. Yeah, the old project.

20 Q. The question is simple, if we can get to
21 the right map.

22 A. Yeah, I've got it.

23 Q. The first map is the existing project?

24 A. That's correct.

25 Q. And it shows the area of the pools in

1 color, and then it types the new drills and the
2 recompletions in the original project?

3 A. Right.

4 Q. And of the original 30 that were approved
5 by Mr. Stogner in '02, there was the population that
6 were actually drilled that are shown on this
7 display?

8 A. That's correct, 25 on that map.

9 Q. So when we look at the map with the
10 original 25, I want to compare the Energen wells to
11 where you're proposing to put the eight new pilot
12 projects.

13 A. Okay.

14 Q. Can you help me do that?

15 A. I don't have it on a slide, but I have it
16 on a hard copy.

17 Q. Let's do the hard copy, because I think
18 it's easier.

19 A. Sure. It's 11 by 17.

20 Q. So if you'll open your hard copy --

21 A. Well, no. I have a hard copy, but it's
22 not in the book.

23 Q. My question for you is: When you look at
24 the original pilot project and the location of the
25 Energen wells --

1 A. Okay.

2 Q. -- there are three of them in Gavilan?

3 A. Right.

4 Q. There looks to be two in Tapacito?

5 A. Correct.

6 Q. And then you have one more in South

7 Blanco?

8 A. That's correct.

9 Q. And the new pilot project will have a
10 total of eight?

11 A. That's correct.

12 Q. Of the eight, how many of those are new
13 drills?

14 A. None.

15 Q. None? These are all recompletions?

16 A. That's correct.

17 Q. At this point in time, have you reached
18 the conclusion that it is not economic to drill new
19 drills to recover the incremental reserves out of
20 the Pictured Cliffs?

21 A. Yes. But that testimony will be expanded
22 on by our reservoir engineer.

23 Q. Was that the collective judgment of all
24 three companies that participated in the original
25 project?

1 A. No, it was just for our --

2 Q. Just for you?

3 A. -- pilots.

4 Q. So when we look at the eight new ones, the
5 recompletions, what are you hoping to gain with this
6 data that you didn't gain with the original project
7 data?

8 A. I think we're hoping to get a better
9 statistical understanding. We were encouraged with
10 our original pilot program, but we don't think we
11 have enough information to be able to recommend
12 downspacing.

13 So we would like to request additional
14 pilots and a better statistical base to come up with
15 reliable conclusions as far as downspacing.

16 Q. Do you anticipate any of that project area
17 that you're working on would be subject to reservoir
18 simulation?

19 A. I'll have to defer that question to our
20 reservoir engineer.

21 Q. Looking back at Mr. Stogner's order from
22 '02, which is the R-11848 order, there are
23 components of that order that set forth a protocol,
24 and it talks about various criteria for selecting
25 wells in areas and what to do?

1 A. Correct.

2 Q. Is there anything in Mr. Stogner's order
3 that needs to be modified by the Examiner when he
4 considers approving Energen's request for the new
5 pilot area?

6 A. The only thing I'd modify slightly is
7 offset Pictured Cliffs wells cumulative recovery
8 should be between .7 and 1.5 Bcf. I'm using .5 to
9 1.5 Bcf. That's the only change in criteria.

10 Q. If you'll turn to the hard copy book with
11 the exhibits for the pilot project, the new pilot
12 project?

13 A. Okay.

14 Q. If you will turn with me to page 10 of
15 that --

16 MR. BROOKS: Which book is this?

17 MR. HALL: 14539.

18 MR. BROOKS: Thank you.

19 Q. (By Mr. Kellahin) So if you would turn to
20 No. 10, it talks about some project status plans for
21 2011?

22 A. Okay.

23 Q. You talked about there's eight wells. And
24 these are all the pay adds, which were existing
25 wells that would be recompleted?

1 A. Correct.

2 Q. Are there logs for these wells?

3 A. Cased hole logs only.

4 Q. Only?

5 A. Right.

6 Q. So that's what you plan to do, because
7 these are existing wells then?

8 A. Correct, yeah. We may run a dual space
9 neutron. But right now we have cased hole gamma ray
10 neutrons with the Pictured Cliffs.

11 Q. The pressure component data of this, do
12 you plan to obtain any prefrac data?

13 A. Again, I'll defer that answer to our
14 reservoir engineer for his testimony.

15 Q. You wouldn't participate, as a geologist,
16 in making the decisions about the pressure?

17 A. Certainly.

18 Q. You would?

19 A. Yes. We operate as a team, but I'll defer
20 that to our engineer.

21 MR. KELLAHIN: Thank you.

22 THE EXAMINER: Could you tell me again the
23 exhibits that we're about to admit?

24 MR. HALL: Yes. In Case 12857, the
25 reopened case, it's 1 through 9. And in Case 14539

1 it's Exhibits 2, 9 and 10.

2 There are some duplications between the
3 two sets, so we won't be admitting the same ones
4 twice. For instance, the maps are similar.

5 MR. BROOKS: I have clearly in mind what
6 you said about the cumulative production criterion.
7 Basically, I was getting confused between 1 Bcf and
8 .1 Bcf.

9 What were your criteria originally, and
10 what are they now?

11 THE WITNESS: The original criteria in the
12 downspace order was .7 to 1.5 Bcf. That was just a
13 general -- you know, we don't want to pick a pilot
14 in a highly-produced area because of potential
15 drainage.

16 You don't want to propose a pilot in a
17 really bad area because you're probably going to
18 have lack of reservoir quality sand.

19 MR. BROOKS: What is it that you now
20 propose?

21 THE WITNESS: .5 to 1.5.

22 MR. BROOKS: Okay. Now .5 --

23 THE WITNESS: Yeah.

24 MR. BROOKS: -- so you're reducing it a
25 little bit on the low end by --

1 THE WITNESS: Yeah. I'm dropping off the
2 edge a little bit on some of these sand trends that
3 we'd like to test.

4 MR. BROOKS: Okay. On your map, on
5 Exhibit 6 --

6 THE WITNESS: Are you on the new case?

7 MR. BROOKS: On the old case.

8 THE WITNESS: Old case, okay.

9 MR. BROOKS: -- did you say the pink
10 represented 1 Bcf?

11 THE WITNESS: Right. We clipped the
12 contour color off at 1 Bcf.

13 MR. BROOKS: Okay. When it says down
14 there, "C.1 equal .1 BCFG," what does that mean.

15 THE WITNESS: The contour interval is
16 .1 Bcf, so we actually started at .2 Bcf. Contours
17 are from .2 Bcf to .1 Bcf.

18 MR. BROOKS: And I was reading it that
19 Color No. 1 means .1, basically.

20 THE WITNESS: Yeah, .1 Bcf.

21 MR. BROOKS: Okay, thank you. That's all
22 I have.

23 THE EXAMINER: Okay, thank you.
24 We're ready for our next witness.

25 MR. HALL: Counsel for BP.

1 MS. DE LA TORRE: I don't have any
2 questions.

3 MR. HALL: That conclude our examination
4 of Mr. Lehman, and we request a break opportunity at
5 this time.

6 THE EXAMINER: I think we're done with the
7 witness. It would probably be a good time to take a
8 break.

9 (A recess was taken from 2:51 to 3:04.)

10 THE EXAMINER: All right, let's go back on
11 the record.

12 MR. HALL: At this time, Mr. Examiner, we
13 would call Dave Poage.

14 DAVID POAGE,
15 having been previously duly sworn, testified as
16 follows:

17 DIRECT EXAMINATION

18 BY MR. HALL:

19 Q. For the record, please state your name.

20 A. David Poage.

21 Q. Mr. Poage, where do you live, and by whom
22 are you employed?

23 A. I live in Farmington, New Mexico. I'm
24 employed by Energen Resources Corporation.

25 Q. And what do you do for Energen?

1 A. I'm a district land man.

2 Q. And you previously testified before the
3 Division a number of times?

4 A. Yes.

5 Q. And have your credentials been
6 established?

7 A. Yes, they have.

8 Q. And you're familiar with the application
9 that's been filed in Case No. 14539 for Energen's
10 new pilot project study area?

11 A. Yes.

12 Q. You're familiar with the Pictured Cliffs
13 pools that are the subject of that application?

14 A. Yes.

15 MR. HALL: We again offer Mr. Poage as an
16 expert petroleum land man.

17 THE EXAMINER: No objections. So
18 recognized.

19 Q. (By Mr. Hall) Mr. Poage, let's turn to the
20 exhibit notebook for Case 14539. Would you turn to
21 Exhibit 1 and explain to the Examiners what that
22 exhibit shows us?

23 A. This is a map of most of the San Juan
24 Basin, and it shows the Pictured Cliffs pools in
25 different colors.

1 It also shows the proposed pilot projects
2 that Energen is proposing with the two recompletions
3 in the Gavilan pool, four in the Tapacito pool and
4 two more in the South Blanco PC pool.

5 Q. All right. Let's turn to Exhibit 3.

6 A. Exhibit 3 is a land map of the area we're
7 proposing these recompletions in. The red triangles
8 indicate the proposed pilot wells, and the ones that
9 are also requiring nonstandard locations are
10 indicated on that as well.

11 The brown dots are existing PC wells
12 operated by Energen.

13 Q. And Energen's leasehold is bounded with
14 the yellow coloring; is that right?

15 A. That's correct.

16 Q. And in each of the 160-acre units where
17 the pilots are proposed, does Energen own all of the
18 Pictured Cliffs and Mesa Verde formation?

19 A. Yes, that's correct. Each of these leases
20 that these proposals are in are Jicarilla-owned gas
21 spaces. Energen is a 100 percent interest owner in
22 both the Pictured Cliffs and the Mesa Verde, and the
23 ownership is identical between the two formations.

24 Q. Okay. Let's look at some of the
25 individual units. Turn to Exhibit 4.

1 A. Exhibit 4 indicates the 94 5C pilot well
2 that's proposed. It's also one of the wells that
3 would need an NSL.

4 Also indicated on the map is Energen's
5 leasehold outline, as well as all of the offset
6 operators to the proposed pilot project.

7 Q. And in this case, does Energen operate the
8 offsetting unit towards which the NSL encroaches?

9 A. That's correct.

10 Q. Let's turn to Exhibit 5.

11 A. Exhibit 5 is another map showing the 96 5A
12 well. And also, the offset operators are shown on
13 that. And Energen is the offset operator in every
14 case.

15 Q. Exhibit 6?

16 A. Exhibit 6 shows the two pilot project
17 proposed wells, the 98 2B and the 98 3B, and it also
18 shows the offset operators to those spacing units.

19 Q. And the 3B well, as well as the 2B well,
20 they're NSLs; is that right?

21 A. Both of those will be proposed NSLs, yes.

22 Q. And again, is Energen the operator of each
23 of those offsetting units to those NSLs?

24 A. Yes.

25 Q. Exhibit 7.

1 A. Exhibit 7 shows the two pilot project
2 wells, the Jicarilla 117E lease, the number 3B well,
3 as well as the number 9B well. That 9B is also NSL.

4 Q. The 9B is currently completed in the Mesa
5 Verde?

6 A. That's correct.

7 Q. Is that a nonstandard location, as to the
8 Mesa Verde?

9 A. As to the Mesa Verde, this is the only one
10 of eight pilot projects that's not a standard legal
11 spacing unit for our legal spot for the Mesa Verde
12 formation.

13 This one is on Jicarilla lands, as well as
14 Jicarilla surface. At the time the well was staked
15 in a legal location, the Jicarilla had that moved to
16 this nonstandard location in the Mesa Verde. And it
17 was for wildlife and terrain ridge issues.

18 Q. And that NSL for the Mesa Verde has been
19 previously approved by the OCD?

20 A. Yes. It's NSL 5336-0.

21 Q. And who is the operator of the offsetting
22 unit towards which that location encroaches?

23 A. ConocoPhillips.

24 Q. Let's look at Exhibit 8, please. What
25 does that show?

1 A. Exhibit 8 shows the 152W lease and also
2 the Jicarilla West leases, two more pilot projects
3 and the Jicarilla West 9M and the Jicarilla 152W 2M.

4 Q. In each case, Mr. Poage, for all of the
5 proposed pilot project units, were all of the
6 offsetting operators notified of Energen's
7 application?

8 A. Yes, they were.

9 Q. Let's refer back to Exhibit 1, which
10 identifies the pools for us. Now, the South Blanco
11 and then the Tapacito Pictured Cliffs pools, are
12 those pools preapproved for downhole commingling?

13 A. Yes, they are.

14 Q. And what about the Gavilan?

15 A. The Gavilan is not.

16 Q. All right. And again in the case of each
17 of the pilot project units within the Gavilan pool,
18 is ownership in the PC and the Mesa Verde identical
19 in each of those units?

20 A. Yes, they are.

21 Q. Mr. Poage, were Exhibits 1, 3, 4, 5, 6, 7
22 and 8 prepared by you?

23 A. They weren't prepared by me. They were
24 under my direction.

25 MR. HALL: We'd move the admission of

1 Exhibits 1, 3, 4, 5, 6, 7 and 8 in Case 14539.

2 That concludes our direct evidence with
3 this witness.

4 THE EXAMINER: Any objection to these
5 exhibits?

6 MR. KELLAHIN: No objection.

7 MS. DE LA TORRE: No objections.

8 THE EXAMINER: Exhibits 1, 3, 4, 5, 6, 7
9 and 8 in Case 14539 will be admitted.

10 (Exhibits 1, 3, 4, 5, 6, 7 and 8 in Case
11 No. 14539 were admitted.)

12 MR. KELLAHIN: No questions, Mr. Examiner.

13 MS. DE LA TORRE: No questions,
14 Mr. Examiner.

15 MR. BROOKS: You want to do some stuff
16 about the NSL and downhole commingling issues. Are
17 you asking for those approvals in this order, or are
18 you going to file separate administrative
19 applications?

20 MR. HALL: Yes, the application expressly
21 requests approval of the NSLs, and those footage
22 locations are set forth in the application.

23 MR. BROOKS: And what about the downhole
24 commingling?>

25 MR. HALL: We will need approval for the

1 Gavilan pool, for those wells.>

2 MR. BROOKS: And you're asking for that in
3 this proceeding?

4 MR. HALL: We are, and we will present
5 additional testimony in that regard.

6 MR. BROOKS: Okay. Then I'll have to
7 clarify with the witness.

8 Mr. Hall asked you if the ownership was
9 identical. I don't think he actually intended to
10 frame the question that way, but that's the way I
11 heard it. He asked if the ownership was -- well,
12 I'm not sure that I remember exactly what he asked,
13 so let me make it clear.

14 In each of these locations, is the
15 ownership in the Pictured Cliffs identical with the
16 ownership in the other formation with which you
17 would be requesting --

18 THE WITNESS: That's correct, yes.

19 MR. BROOKS: And is that the Mesa Verde in
20 each case?

21 THE WITNESS: Yes.>

22 MR. BROOKS: And you're not commingling
23 them with any other formation?

24 THE WITNESS: Not that I know of.

25 MR. BROOKS: Okay, thank you. That's all

1 I have.

2 THE EXAMINER: Mr. Poage, on that No. 1
3 slide there, I'm curious.

4 In the Gavilan you've got two wells there
5 distinctly marked with red squares.

6 THE WITNESS: Yes, sir.

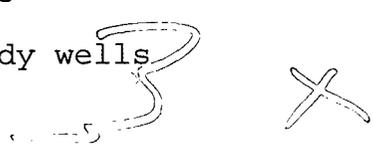
7 THE EXAMINER: I guess that third one down
8 there is not red; is that --

9 THE WITNESS: That's a different color. I
10 don't know what that stands for.

11 THE EXAMINER: Okay. That's not a well?

12 THE WITNESS: I think it's a different PC
13 pool.

14 THE EXAMINER: Okay.

15 MR. HALL: Mr. Examiner, I'm told that
16 that's a Pictured Cliffs oil pool right there.
17 There are only two pilot project study wells
18 proposed for the Gavilan pool. 

19 THE EXAMINER: Yes, the two upper ones.

20 Okay, I have no questions.

21 MR. HALL: At this time, Mr. Examiner, we
22 would call Mr. Zachary Van Voast to the stand.

23

24

25

1 ZACHARY VAN VOST,
2 having been previously duly sworn, testified as
3 follows:

4 DIRECT EXAMINATION

5 BY MR. HALL:

6 Q. For the record, please state your name.

7 A. Zachary Van Voast.

8 Q. Mr. Van Voast, where do you live, and by
9 whom are you employed?

10 A. I live in Birmingham, Alabama. I'm
11 employed by Energen Resources, Corporation.

12 Q. And in what capacity are you employed by
13 Energen?

14 A. I'm a reservoir engineer.

15 Q. You've not previously testified before the
16 Division or Examiners, have you?

17 A. That is correct. I have not testified.

18 Q. All right. Why don't you give the
19 Examiners a brief summary of your educational
20 background and work experience?

21 A. I graduated with a mechanical engineering
22 degree in 1975. I've been a petroleum engineer for
23 26 years. I worked for both majors and
24 independents. I started with Amoco Production,
25 actually.

1 My last three years, I've been working in
2 the San Juan Basin in the tight gas sands, primarily
3 Pictured Cliffs. And my experience is probably
4 considered general reservoir engineering and
5 production engineering.

6 Q. Are you familiar with the applications
7 that have been filed in both of these cases?

8 A. I am.

9 Q. And are you familiar with the Pictured
10 Cliffs formation pools that are affected by these
11 applications?

12 A. Yes.

13 MR. HALL: At this point, Mr. Examiner, we
14 offer Mr. Van Voast as a qualified expert petroleum
15 reservoir engineer.

16 THE EXAMINER: Any objection?

17 So qualified.

18 Q. (By Mr. Hall) Mr. Van Voast, let's turn
19 back to the exhibit set for the reopened case,
20 12857, and go to your text exhibit. It's marked as
21 Exhibit 11.

22 Would you summarize for the Examiners the
23 engineering review of the data that Energen derived
24 from its parent infill wells in the pilot project
25 study area?

1 A. All right. Basically we drilled four
2 wells, and they were completed as duals. And we
3 recompleted two of them, and they were also
4 recompleted as duals.

Well

5 We gathered -- I'm going to report on the
6 basic completion data that was used. We got 30-day
7 bottom hole pressure buildup tests on five of those
8 wells.

9 I'm going to go into quite a bit of detail
10 on the production trends for both the parent and
11 pilot wells and also give you the estimated ultimate
12 recoveries from the parent and pilot wells.

13 And finally, we're going to review the
14 economics of the pilot and parent wells. In this
15 case, it will be incremental economics that I'll be
16 talking about.

17 Q. Now, when Energen identified the units as
18 candidates for inclusion in it pilot project study,
19 did Energen follow the criteria set forth in the
20 original order, Order R-11848?

21 A. Yes, I believe so. One thing that wasn't
22 mentioned before, I believe, was the wellbore
23 integrity. And we looked at the wellbore integrity
24 in the parents and the pilots -- well, for the
25 recompletions; excuse me -- for the parent and the

1 recompletion.

2 And there was one thing that will come up
3 a little later on. I guess it happens. But in one
4 case, we had to literally shut a well in before the
5 pilot was drilled. So we got no interference
6 information on that.

7 Apparently it developed a casing leak just
8 about that time, three months prior. That will come
9 up in the pictures. I'm just being entirely honest
10 about it.

11 Q. Let's turn to your Exhibit 12. And if you
12 would, give the Examiners an overview of the
13 completions of the wells.

14 A. Okay. Again, four wells were drilled with
15 dual strings, put in duals, and two were pay adds or
16 recompletions. The PC added to Mesa Verde. They
17 were drilling completed, all of them, in 2003. We
18 used limited entry perforating.

19 Q. What does that mean?

20 A. That's a half-inch diameter hole,
21 generally a large hole, and about 20 to 30 in the PC
22 interval. Maybe one hole per 2 to 3 feet, as
23 opposed to three or four or six guess shots per
24 foot.

25 They were all fracture stimulated with

1 anywhere from 60,000 pounds of 20/40 sand up to
2 140,000. We used nitrogen foam as a carrier.

3 The parent wells were all drilled in the
4 '60s, and they were fracture stimulated with
5 35,000 pounds 20/40 sand up to 120,000.

6 So it was similar in how they were
7 stimulated and fracked, although some of the parents
8 were a little on the lower side.

9 Q. Let's turn to Exhibit 12. And if you
10 would discuss the bottom hole pressure and initial
11 production data that you obtained.

12 A. We ran the bottom hole pressures after the
13 initial flow period, which generally ranged from two
14 to four hours. Then we ran the bottom hole
15 pressures for a 30-day buildup.

16 In five out of six of these wells, data
17 was analyzed and initial reservoir pressures were
18 computed. I am going to go into more detail on that
19 later.

20 But basically the bottom hole pressures
21 ranged from 201 psi minimum to 569 psi max. The
22 average bottom hole pressure was 477.

23 The original bottom hole pressure -- and
24 this was taken from the bottom hole pressure map
25 that our geologist showed earlier -- was taken to be

1 1,232 psi. That's an estimate taken right off the
2 map in our area of the wells.

3 So therefore, we had an estimated average
4 pressure depletion of 61 percent, or 39 percent of
5 the pressure remaining.

6 Jicarilla West 8B had the highest EUR, and
7 its bottom hole pressure was 491 psia. And the
8 reason I mention that is you might expect it to have
9 the highest pressure also.

10 The lowest bottom hole pressure of
11 201 psia did poorly with the worse producer, which
12 was the Florence Federal 7B, and it only came on at
13 20 Mcf per day. And that was a definitely an
14 uneconomic case.

15 Peak production, usually the first month,
16 varied from 20 mcf per day for the Florence
17 Federal 7B up to 400 mcfde for the Jicarilla
18 West 8B, which was our best pilot well.

19 Q. Now, after you had gathered all the data
20 from the pilot project study, tell the Hearing
21 Examiner what methodology you used to evaluate that.

22 A. Okay. Basically, I prepared 3 forecasts.
23 One for the parent well, as if the pilot had never
24 occurred. And let me just preface that a little
25 bit.

1 Most of these wells showed interference.
2 And so I had to prepare a curve for the -- as you
3 can see here on this exhibit --

4 Q. Is this Exhibit 14?

5 A. The red line represents -- this represents
6 the parent well. This forecast represents what I
7 assume would have happened, the forecast without
8 this pilot ever being drilled.

9 The pilot well up here -- actually, the
10 blue line represents the pilot production plus the
11 parent production. So this line here represents
12 this line down here, this part of the graph, plus
13 the pilot production.

14 The idea here is if you look at this one
15 chart, a combination chart, and this is production
16 coming from the 160-acre spacing unit now, this is
17 producing from the 160, these two wells together now
18 producing from the 160, it's clear, very clear, that
19 the production has increased from the 160, and the
20 forecast is also going to be considerably higher for
21 that 160.

22 So in this case, there's no doubt that two
23 wells are doing better than the one by itself.

24 Q. Is there an inflection on the curve for
25 the parent well that indicates to you that some

1 interference occurred?

2 A. Well, I'm going to go into more detail on
3 how these charts came about. But right there is
4 where the pilot came on. And as you can see, this
5 well starts trending down right here pretty sharply.

6 Let me show you another chart here that
7 shows us in more detail.

8 Q. Turn to Exhibit 15. What is this?

9 A. This is the pilot well of the same thing
10 you saw before, except that this is actually a curve
11 out of aries, and that is my forecast line.

12 The well came on at 400 Mcf per day max,
13 as was the monthly rate there. It's currently
14 producing at 130 after seven days. This is the
15 forecast line.

16 Q. So we understand, this shows data before
17 the pilot came on; is that correct?

18 A. This is the pilot well. This is the pilot
19 well, period. Okay? We haven't gone to the parent
20 yet.

21 Q. All right.

22 A. The next line. This is the parent well.
23 As you see, it came on in 1960. Also a little bit
24 more than 400 Mcf per day. It was coming down the
25 hyperbolic decline.

1 And through here, it looks to me like we
2 were having a lot of curtailment in the '70s, '80s,
3 I guess more in the '80s.

4 And then we get back on trend here. And
5 right about here, where I have that arrow, is where
6 the pilot was put on production. And again, you can
7 see the parent takes a nosedive.

8 This is my forecast as if the pilot had
9 never been drilled, and it was declining at
10 1.5 percent per year.

11 Q. What productive life did that project out
12 to?

13 A. I believe that's 140 years. In my
14 analysis, I assumed or estimated a maximum life of
15 25 years, rather than going all the way out to 140.

16 Q. Now, why did you do that?

17 A. Well, the parent well has been on
18 production already 45 years. These wellbores don't
19 last for an infinite period of time.

20 It's likely that occasionally we're going
21 to have some sort of mechanical problem. It's
22 possible that it's fixable, but it enters into a
23 whole other set of economics.

24 And I'm trying to do an apples-to-apples
25 comparable economic analysis incrementally as to

1 whether or not these pilots really were economic.

2 So actually in aries, when I used my
3 wellhead gas, I came up with considerably less gas
4 than the 1.9 EUR. I came up with 850 MMF as EUR for
5 this well.

6 I said something in here just then. I
7 came up with a parent EUR of 1,455 -- excuse me,
8 correct that -- as opposed to 1.9 Bcf EUR on the
9 chart itself.

10 Q. So did you take this same methodology and
11 apply it to the data from the other one that goes
12 through --

13 A. There's one more chart I want to go
14 through. Okay?

15 Q. Okay, go ahead.

16 A. Which is the next one?

17 Q. This is a Exhibit 17.

18 A. Yeah. This is a blowup of what happened
19 to the parent well at the time of the pilot well
20 coming on, and this is when the pilot came on. The
21 parent had been shut in for about three months.

22 You'll see actually there's a surge in
23 production here, due to the shut-in period. And
24 normally what you'd expect this thing to do is come
25 right back down on trend. This is the trend line,

1 and it didn't do that. It just continued to
2 nosedive.

3 So I'm estimating that this interference
4 happened very quickly. And this is by trend line,
5 new trend line, coming down through here. We
6 actually went on a hyperbolic trend. And I'm
7 terminating this at a 5 percent minimum decline
8 rate.

9 Q. How did you derive that 5 percent decline
10 rate?

11 A. The average decline rate for our parent
12 wells was 2.7 percent annually. And we're now
13 talking about two wells. It's an estimate. I'm
14 assuming two wells. Obviously, it's going to
15 decline faster, so I'm using a 5 percent decline.

16 Q. Now, let's turn to Exhibit 18. And can
17 you demonstrate to us how you applied this
18 methodology to individual well units?

19 A. We're going to show you a series of slides
20 now, five that look exact like this, for the
21 remainder of the wells.

22 Rather than going through this, there's
23 three curves that I just showed you. This is
24 exactly how these were built. Using those three
25 curves, it would just require that many more slides

1 to go through it.

2 But basically this particular slide
3 illustrates a case where we had no interference.
4 This is when the pilot came on. And maybe it's not
5 quite as clear here.

6 But in my individual curves it's very
7 clear there's no interference through here. This is
8 right on trend. In my estimate, nothing has really
9 changed.

10 This is the parent plus the pilot. And
11 we're obviously getting very good incremental
12 production, and incremental EUR increased to the
13 160-acre basin spacing unit.

14 Q. So when the Hearing Examiner refers back
15 to the transcript, let's refer to the well pairs
16 we're talking about for each slide.

17 Is this the Jicarilla 98 7 and the
18 Jicarilla 98 12A?

19 A. Yes, it is.

20 Q. Okay. Anything further with respect to
21 those wells?

22 A. No.

23 Q. All right, let's look at Exhibit 19.
24 Identify that well pair.

25 A. This is the Florence Federal 3, parent,

1 and the Florence Federal 7B, pilot.

2 This is the case I was talking about
3 earlier where we found that we had probably what we
4 thought was a casing failure or a leak in the
5 casing. And the parent was shut in just prior to
6 putting on the pilot.

7 That well was actually P&Aed about two
8 years later, and we did confirm that it had a casing
9 leak.

10 So in this case, we got no data from this
11 well as to interference. And really, the pilot just
12 incrementally adds production.

13 It is an interesting slide from the
14 standpoint that it does point out that pilots or
15 80-acre infills are also going to be necessary as a
16 potential in a lot of cases where we lose the parent
17 well as another take point, another well, a
18 replacement well, as you might call it.

19 This is the real world. Some of these
20 parents are going to fail on us. But this was a
21 noneconomic case, and that's my forecast.

22 Q. Let's turn to Exhibit 20. Can you
23 identify that well pair?

24 A. That is the Jicarilla 99 13, parent, and
25 the Jicarilla 99 18, pilot. Again we're seeing, you

1 know, a considerable amount of curtailment through
2 here.

3 It looks like this is a fairly good well.
4 It came on at about 700 Mcf per day, and it looks
5 like it's wanting to get back on trend through here.
6 And then the pilot came on, and we had interference.

7 This is my forecast for the combination of
8 the parent plus the pilot, and this is my forecast
9 for the parent as if the pilot had never been
10 drilled.

11 This is incrementally positive production
12 or EUR, and this would be negative. Although these
13 areas look similar, keep in mind you're looking at a
14 simulog paper here.

15 And the difference here is only like
16 8 Mcf, whereas the difference here is 150 or more.
17 So this is a much bigger segment of production than
18 it actually appears graphically.

19 Q. I want to make sure I understand how to
20 read this. Where you do your projection for the
21 parent and the pilot and the blue curve intersects
22 and descends below the projection for the parent
23 only, does that indicate a net loss of EUR? Is that
24 a negative EUR?

25 A. Yeah. At this point, it would appear that

1 way. Of course when you add it all up, this
2 positive up here is obviously a big increase, this
3 area here. This exceeds what's happening here.

4 But you're right. At this point, my
5 projection is had you just done nothing, you're
6 actually producing less than had you done nothing at
7 all and just left the pilot on.

8 So all of this production has been
9 accelerated up to this point here.

10 Q. Let's look at Exhibit 21. Identify those
11 well pairs, please.

12 A. This was a pay add, or recompletion. This
13 is the parent well. Again, you see this
14 curtailment.

15 And this is my projection for the parent
16 well, and this is my projection for the parent/pilot
17 combination.

18 Again, if you look at this, what actually
19 happened here, we got considerably more up front,
20 and we're losing back here. But the net result was
21 a positive EUR again for the 160-acre spacing unit.

22 Q. All right. Turn to Exhibit 22 and
23 identify those wells.

24 A. Jicarilla 95, No. 10, parent; Jicarilla 95
25 8B, pilot. Again, this is my projection for the

1 parent before the pilot came on. The pilot comes on
2 here, and the parent sees interference. And this is
3 the projection for the parent and pilot together.

4 This also had a positive EUR. Not much,
5 but it is positive.

6 Q. Now let's look at Exhibit 23. Explain
7 that, please.

8 A. The first line is -- let's just look at
9 the Jicarilla lease 8B. The first line shows that
10 the EUR for the pilot was 848. The EUR for the --
11 did I say "pilot"? Correct, okay.

12 The parent EUR before the pilot was 1,455.
13 The parent EUR after the pilot was 1,277. That
14 means we lost 178 EUR for the parent well.

15 However, the EUR for the pilot was 878.
16 So the net EUR increase for this spacing unit was
17 670.

18 The yellow line, yellow highlighted area,
19 represents the net EUR increases in which all six of
20 our pilots show an EUR increase. An average of
21 187 MMF for the six pilots.

22 Q. For the EUR data, is some component of
23 that attributable to acceleration? And how do you
24 account for that?

25 A. This is what I would call the

1 acceleration. The loss in EUR from the parent,
2 which was picked up by the pilot. The average was
3 148.

4 And you divide 148 by this 335, which was
5 the average EURs to the pilots, and you come up with
6 44 percent rate acceleration, leaving 56 percent for
7 incremental reserve increase.

8 Q. Let's turn to Exhibit 24, your summary
9 table for project economics. Could you explain the
10 methodology that you are utilizing here?

11 A. Well, it's important to recognize that we
12 did have interference. We obviously just could not
13 take the pilot economics by itself at face value.
14 We had to factor in the fact that the parent lost
15 production.

16 So incrementally, in the aries program, we
17 built three cases. And I would add the pilot and
18 the parent cash flows together and then subtract the
19 parent cash flow as if the pilot had never been
20 completed. That's a little bit hard to understand.

21 But if you think about it, if there was no
22 interference, then the parent cash flow before the
23 pilot was completed would be identical to the parent
24 cash flow after the pilot, if there was no
25 interference.

1 Those two would cancel each other out, and
2 you'd just be left with the pilot cash flow. So any
3 negative effect will be seen by that as the ...

4 Q. So across the board, you've shown a
5 capital cost of 150,000; is that right?

6 A. That's correct.

7 Q. And is that representative of the cost
8 for --

9 A. That would be today's cost.

10 Q. All right. And that's the cost for adding
11 on the PC --

12 A. That would be for a pay-add-recompletion
13 commingled?

14 Q. And when you apply this set of
15 econometrics to each of your well projections, are
16 those summarized on Exhibit 25?

17 A. Yeah. Let me just stick with the other
18 one for just a second.

19 Q. Sure.

20 A. These are all positive economics, with the
21 exception of the Florence Federal, which, as you
22 see, had a negative PV 10 value, and the others were
23 positive.

24 I mean I can't say exactly. We have
25 another metric we use, which is return on

1 investment. But that's something that's proprietary
2 information. But basically if it's got a positive
3 PV 10, it's an economic case.

4 Q. This is Exhibit 25?

5 A. Yes.

6 Q. What does that show us?

7 A. That's just an overall summary, all the
8 data summarized in this one table, everything we've
9 talked about. Five of these pilots were economic.
10 And one was uneconomic, which is the Florence
11 Federal.

12 Q. Now, is commingling necessary to make
13 these projects work?

14 A. In today's environment, pricing
15 environment, it is.

16 Q. And what is the cost of a dual completion
17 due to individual project economics?

18 A. We estimate that a dual will run us
19 \$75,000 more than the 150 for a pay add. And
20 basically in this particular example right here, it
21 would make all of them uneconomic, except for the
22 very first well, which would be the Jicarilla
23 West 8B.

24 Q. And economics precludes new drills in all
25 cases; does it not?

1 A. Absolutely. A new drill -- I did run the
2 economics on them. The PC part of a new drill would
3 be approximately \$650,000.

4 Q. Anything further with respect to
5 Exhibit 25, economic development evaluation?

6 A. No, I don't believe so.

7 Q. Let's talk briefly about commingling. Are
8 the gases and fluids from the Pictured Cliffs and
9 Mesa Verde formations compatible?

10 A. Yes, they are. To my knowledge, this has
11 not been a problem with the pilots or other PC Mesa
12 Verde wells in the field.

13 Q. And to your knowledge, does commingling
14 present a risk of reservoir damage at all?

15 A. No. The only the principal risk here
16 would actually be during the frac job itself. But
17 that would be the same as if they were set up as
18 dual wells.

19 Q. Now, in the wells that you're proposing
20 specifically for the Gavilan pool, is the bottom
21 perforation in the lower zone within 150 percent of
22 the depth of the top perforation in the upper zone,
23 based on your type log?

24 A. No, it isn't. The type log, we used 96
25 No. 5B. And 150 percent of the top perforation of

1 PC comes out to 5,595, and the bottom perforation in
2 the Mesa Verde, we figured would be at 5,958. So
3 350 feet.

4 Q. Close?

5 A. Close.

6 Q. Now, is the lower zone at or below normal
7 pressure calculated at .433 psi?

8 A. Yes, I believe it is. The Mesa Verde is
9 pressure depleted. The original pressure gradient
10 was about .3, and it's pressure depleted further
11 than that.

12 So the normal gradient would be .433.
13 It's obviously way below a normal pressure gradient.

14 Q. So in your view, is there any risk that
15 shut-in or flowing well pressures will exceed any
16 commingled formations fracture parting pressure?

17 A. No, there isn't.

18 Q. And will commingling reduce the value of
19 production?

20 A. No, it would not.

21 Q. And will Energen be providing the Division
22 with an allocation formula, once you've acquired
23 initial test data and BHP data for the two wells?

24 A. That's the standard allocation formula
25 that we use any time we commingle wells. I mean we

1 always test it, and there's an allocation formula we
2 apply.

3 Q. And how many other commingled wells does
4 Energen operate in the Gavilan pool?

5 A. Fifty-six.

6 Q. And has Energen ever experienced a problem
7 with the commingling?

8 A. Not to my knowledge.

9 Q. Okay. Let's turn to Exhibit 26, your
10 summary. Would you wrap this up for us? What do
11 you conclude?

12 A. Well, the EUR in all six of the 160-acre
13 spacings units or the parent/pilot pairs was
14 increased. Five out of six of the pilot wells would
15 be economic at today's prices if they were completed
16 as pay adds to a deeper formation. In this case,
17 the Mesa Verde, which is already producing.

18 The lowest initial reservoir pressure in a
19 pilot, which is the Florence Federal 2B, correlated
20 with an initial production of 20 Mcf per day. And
21 this was a noneconomic case.

22 Four out of the six parent wells had their
23 profiles negatively impacted or they experienced
24 interference, but the increase in pilot production
25 more than offset the loss.

1 Q. Was it among the objectives of the
2 original pilot project study to try to identify a
3 methodology that operators could use to identify
4 candidate spacing units for infill development?

5 A. Yes.

6 Q. And do you feel that that objective was
7 accomplished by the original pilot project study?

8 A. No.

9 Q. And is that why you're recommending the
10 conduct of the additional pilot project in the
11 Jicarilla East area?

12 A. That would be correct.

13 Q. What do you hope to achieve by that?

14 A. Well, I think clearly one enigma here
15 is -- I mean if you just look at the Florence
16 Federal Well, which had a good reservoir pressure,
17 and it's almost the same as the best pilot we had.

18 And the Florence Federal turned out to be
19 the worst producing well post-EUR in Florence, and
20 the other one, the Jicarilla 8B, the highest
21 performing well.

22 We just don't have enough data to
23 really -- you know, we don't have, I'd like to say,
24 a recipe yet to say, "This is the place to put a
25 pilot and be sure that we're going to be

1 successful."

2 Three out of the six wells only really had
3 a marginal EUR increase. They were still economic
4 because of the rate acceleration part. We'd like to
5 do better now.

6 Q. Based on the results from the original
7 pilot project, in your opinion, is basin-wide infill
8 development for the Pictured Cliffs formation
9 warranted at this time?

10 A. Well, I mean our areas over in the
11 southeast corner are in tighter rock, and it's just
12 really a completely different world from basin-wide.
13 I couldn't recommend basin-wide.

14 Q. Now, if the Division approves Energen's
15 proposed pilot project at the Jicarilla East, do you
16 have a recommendation for the time allowed to gather
17 data and then analyze it and then report back to the
18 Division on the results?

19 A. We would recommend annual written reports.
20 And at the end of three years, a report such as
21 this, a study, a postappraisal report.

22 Q. Anything further you wish to add to your
23 testimony?

24 A. No.

25 Q. Were Exhibits 11 through 26 prepared by

1 you or at your direction?

2 A. Yes.

3 MR. HALL: I move the admission of
4 Exhibits 11 through 26, and we will pass the
5 witness.

6 We need to excuse Mr. McMillan for his
7 physical therapy appointment.

8 THE EXAMINER: Exhibits 11 through 26 are
9 admitted.

10 (Exhibits 11 through 26, inclusive, were
11 admitted in Case No 12857.)

12 MR. KELLAHIN: Mr. Van Voast, a couple of
13 questions, sir.

14 CROSS-EXAMINATION

15 BY MR. KELLAHIN:

16 Q. I want to direct your attention to the
17 questions I was asking Mr. Lehman.

18 When you look at Mr. Stogner's order from
19 '02, the criteria for selecting the pilot wells, he
20 went through that list with me.

21 Of that list on the order, there was only
22 one of the criteria that he was going to adjust, and
23 that was to lower the cumulative production total
24 from 0.7 to 0.5. Do you remember that?

25 A. Yes.

1 Q. Were you involved in the selection of the
2 eight pilot wells for the new project?

3 A. Yes, I was.

4 Q. Do all eight of these wells satisfy the
5 criteria for selection, including having a
6 cumulative recovery of between 0.5 and 1.5 Bcf?

7 A. They do.

8 Q. Do they?

9 A. Yes.

10 Q. Do you have a copy of Mr. Lehman's
11 presentation?

12 A. I do.

13 Q. Would you turn to page 12 in that exhibit
14 book for me? This is in the new exhibit book.

15 These numbers are too small for my eyes.
16 Maybe you can help me out. I'm looking at page 12
17 on the exhibit Mr. Lehman prepared, and it shows the
18 cumulative production through June of '08.

19 And let's find one for example and have
20 you show me how to read this. If I look in
21 Township 26 North 3 West, there's four wells in
22 Tapacito that are marked with red triangles.

23 Do you see those?

24 A. Twenty-six North 3 West. Yes, I see it.

25 Q. In the township there's four red triangles

1 that are located in the western portion --

2 A. I see them.

3 Q. All those are in Tapacito, right?

4 A. Correct.

5 Q. If you look at the one on the north side
6 farthest west, I think that number is 0.13; is it
7 not?

8 A. I'm seeing a .6 contour. It looks like .5
9 might be the average right there.

10 Q. Maybe that's the trouble I'm having. I
11 just can't see these numbers. They're too small.

12 A. I think .13 is the data. Is that correct?

13 Q. I don't know. I'm asking you to help me
14 read the map.

15 A. I believe that is the data, .13. And the
16 way it's contoured, I see it about a .5.

17 Q. That answers my question, because I was
18 misreading this map.

19 So when you follow these contours -- and I
20 may have to scale this up to read it -- you're
21 representing that all eight of these new project
22 wells are going to meet the minimum criteria of
23 cumulative production of greater than 0.5?

24 A. I'm just taking another look here. Yes.

25 MR. KELLAHIN: Very good. Thanks.

1 MS. DE LA TORRE: We have no questions.

2 MR. BROOKS: No questions.

3 THE EXAMINER: I have no questions.

4 MR. HALL: Mr. Examiner, we'll provide you
5 with a CD with all of the exhibits on it so you can
6 scale them up and look at them better than they're
7 portrayed in the hard copies.

8 A housekeeping matter. In terms of
9 notice, I looked at the rules and didn't feel that
10 renotification in Case No. 12857 was warranted.

11 I called the Division, and I talked to the
12 Chief Engineer. He told me otherwise.

13 So we provided notice to the same list of
14 interest owners and operators who Mr. Kellahin
15 provided notice to in 2002, the best I was able to
16 do at the time.

17 And so we would offer that in Case 12857.
18 That will be our Exhibit 27. And we'll provide you
19 with our affidavit. We have the list of owners and
20 operators who received notice, copies of the green
21 cards and receipts. And we've also indicated those
22 to whom notice letters were undeliverable and
23 returned to us.

24 In Case No. 14539, we provided notice to
25 all the offsetting operators. That will be our

1 Exhibit 28.

2 Exhibit 28 is our affidavit, and there is
3 attached that the list of offset operators,
4 including those notified for the nonstandard
5 location relief, and copies of our letter and
6 certified receipts.

7 So we would offer those into the record at
8 this time, Exhibits 28 and 27.

9 THE EXAMINER: Exhibit 27 for Case 12857
10 and Exhibit 28 for Case 14539 are admitted.

11 (Exhibit 27 was admitted for Case 12857.)

12 (Exhibit 27 was admitted for Case 14539.)

13 Who wishes to go next?

14 MR. KELLAHIN: Mr. Examiner, at this time,
15 with your permission, we call Mr. Paul Marusak.

16 PAUL MARUSAK,
17 having been previously duly sworn, testified as
18 follows:

19 DIRECT EXAMINATION

20 BY MR. KELLAHIN:

21 Q. Mr. Marusak, would you please state your
22 name and occupation?

23 A. Paul Marusak, reservoir engineer.

24 Q. Where do you reside, sir?

25 A. In Farmington, New Mexico.

1 Q. And by whom are you employed?

2 A. ConocoPhillips.

3 Q. In what capacity, sir?

4 A. As a reservoir engineer.

5 Q. On prior occasions, have you qualified as
6 a petroleum engineer before the Division?

7 A. No.

8 Q. Would you summarize for us your education?

9 A. I graduated in 2007 with a mechanical
10 engineering degree from Kansas State University.
11 I've been employed as a petroleum engineer with
12 ConocoPhillips for the past three years,
13 specifically as a reservoir engineer in the San Juan
14 Basin for the past year and a half.

15 Q. Are you pursuing advanced studies in your
16 degree?

17 A. Yes, sir. I'm working on my Master's
18 degree in petroleum engineering from Texas A&M.

19 Q. As part of your responsibilities for
20 Burlington/ConocoPhillips, what are your areas of
21 assignment for that company?

22 A. I primarily concentrate on the Pictured
23 Cliffs and Fruitland Coal.

24 Q. Have you reviewed the order that was
25 issued by Mr. Stogner back in '02?

1 It was Order No. R-11484.

2 A. Yes, sir, I have.

3 Q. And have you reviewed Burlington's records
4 with regards to the pilot project and their study
5 wells?

6 A. Yes, sir, I have.

7 Q. And based upon that review, have you
8 compiled certain exhibits and reached certain
9 conclusions to present to the Examiner this
10 afternoon?

11 A. Yes, I have.

12 MR. KELLAHIN: We tender Mr. Marusak as an
13 expert in petroleum engineering.

14 MR. HALL: No objection.

15 MS. DE LA TORRE: No objection.

16 THE EXAMINER: So acknowledged.

17 MR. KELLAHIN: Mr. Examiner, I'm sorry
18 that the displays were printed front to back. But
19 if you'll bear with me as we turn through the
20 slides, Mr. Marusak's displays, the first exhibit
21 will be a list of the pilot wells. And then you'll
22 have to flip it over to see the other exhibits as we
23 work through the exhibits.

24 Q. (By Mr. Kellahin) Let's turn, sir, if you
25 will, to what's been marked as -- it says,

1 "ConocoPhillips Exhibit No. 1." Do you see that,
2 sir?

3 Can you set the stage for us and describe
4 for us what at that time Burlington Resources did
5 about the original pilot project?

6 A. Okay. Between 2002 and 2003, Burlington
7 Resources completed 16 pilot wells. Three of them
8 were new drills, and the other 13 were
9 recompletions.

10 Q. When we look at Exhibit No. 1, before we
11 look at the details of it, show us how it's
12 organized.

13 A. The first column shows the year that that
14 well was completed, and then the well's name and
15 number, along with the API, and whether or not it
16 was a new drill or a recompletion, the specific
17 location of that well, and then the parent well for
18 that location, along with its API and which pool
19 that infill well was completed in.

20 Q. If memory serves me right, Mr. Stogner's
21 original order had a population of 30 pilot wells
22 approved for this project. Is that not true?

23 A. Yes.

24 Q. And out of those, how many do you have
25 represented in your report to the Examiner?

1 A. Sixteen.

2 Q. Some of the wells that were not drilled
3 are part of this set?

4 A. Yes, sir.

5 Q. When we take this list from Exhibit No. 1,
6 do you have a locator map or something to show us
7 where those wells are actually located?

8 A. Yes.

9 Q. Would you turn to Exhibit 2? Can you take
10 a moment on Exhibit 2 and explain to us how it's
11 organized? And then we'll talk about the details.

12 A. Yes. This map shows the Pictured Cliffs
13 pools in the basin. And the infill wells from
14 Burlington, Energen and BP are all plotted on this
15 map.

16 The circles represent Burlington's
17 infills, the squares represent Energen's, and the
18 triangles represent BP's. Then they're color coded
19 by whether or not they were a new drill or a
20 recompletion and which year they were completed in.

21 Q. To the best of your knowledge, did
22 Burlington follow the protocol in the criteria
23 approved by Mr. Stogner in the '02 order?

24 A. Yes, sir.

25 Q. As part of that pilot study then, there

1 was a component with regards to layer pressure; was
2 there not?

3 A. Yes, sir.

4 Q. What is your understanding of the reason
5 to have layer pressure? What were they thinking
6 about?

7 A. To determine how effectively the 160-acre
8 spaced parent wells were vertically draining the
9 Pictured Cliffs.

10 Q. Can you give us a verbal picture of what
11 you're trying to describe?

12 A. Yeah. In the Pictured Cliffs, I guess
13 Energen showed a log earlier. But you can see that
14 there's a coarsening upward where the upper portions
15 of the Pictured Cliffs are generally thought to be
16 of higher quality and higher porosity and
17 permeability.

18 So we were trying to investigate whether
19 or not the parent wells were effectively draining
20 both the upper portions of the Pictured Cliffs and
21 the lower portions of the Pictured Cliffs.

22 Q. From a reservoir engineering sense, as you
23 go from the Upper Pictured Cliffs down lower, what's
24 happening to the quality of your reservoir?

25 A. It's getting lower, lower permeability and

1 porosity.

2 Q. And what was the hypothesis that they had
3 back in '02 about the reason to have layer pressures
4 for those infills?

5 A. That perhaps you were ineffectively
6 draining your lower portions of your Pictured Cliffs
7 with your 160-acre parent wells.

8 Q. And how did the engineers and geologists
9 back then propose to study that issue?

10 A. By using layer pressure tests or
11 performing layer pressure tests on the infill wells.

12 Q. And was that done?

13 A. Yes, sir.

14 Q. Does Exhibit No. 3 represent a graph and a
15 depiction of those test results?

16 A. Yes, it does.

17 Q. Before we read it, describe for us how
18 Exhibit 3 is organized.

19 A. It is a cross-plot of the lower layers'
20 pressure and the upper layers' pressure from each
21 specific well's layer pressure tests. Six points
22 represent each of those pressures.

23 So if you look at the highest point, that
24 represents the lower pressure of 450. You can draw
25 a line across and then see that the Upper Pictured

1 Cliffs was measured as 400 pounds.

2 Q. Okay, walk me through this now. In the X
3 axis on the bottom of the scale --

4 A. Yes, sir.

5 Q. -- you've got the Upper Pictured Cliffs
6 layer pressures?

7 A. Yes.

8 Q. How were all these pressures taken?

9 A. By setting a pressure bomb and a plug and
10 allowing the pressure to build up and doing it for
11 two separate intervals, perforation intervals.

12 Q. So in that same wellbore, then there's a
13 pressure bomb and a specific targeted test for the
14 upper PC?

15 A. Yes.

16 Q. And that's plotted on the X axis?

17 A. Yes, sir.

18 Q. Now, when you go over to the Y axis,
19 you're looking at the lower pressures?

20 A. Uh-huh.

21 Q. So in that wellbore, the test pool is
22 taken to the lower PC and run again?

23 A. They're both done at the same time.

24 Q. They're done concurrently?

25 A. Yes.

1 Q. And for example, if you take the six
2 datapoints and look at the one that's farthest to
3 the upper right corner, there's a datapoint there?

4 A. Yeah.

5 Q. How do you put it on the scale?

6 A. That would show you a Lower Pictured
7 Cliffs pressure of 440 pounds or so and a an Upper
8 Pictured Cliffs pressure of 400 to 450 pounds.

9 Q. And that methodology then was used to put
10 the six datapoints?

11 A. Yes.

12 Q. How do you construct the lower green line?
13 What does that represent?

14 A. That would show -- every point that lies
15 on that line would mean that the pressure in the
16 Upper Pictured Cliffs is the exact same as the
17 pressure in the Lower Pictured Cliffs.

18 Q. And what's the purpose of drawing the blue
19 dashed line?

20 A. It shows where there is a 20 percent
21 difference or greater between the upper and lower
22 portions of the Pictured Cliffs.

23 Q. And what's the conclusion from the test
24 results?

25 A. That there is an insignificant amount of

1 differential depletion, at least vertically. What
2 you're draining from your 160-acre parent wells,
3 you're draining in both the upper and the lower
4 parts of the Pictured Cliffs.

5 Q. Based upon that analysis and those
6 results, what did Burlington conclude about the
7 infill density problem in the PC?

8 A. That the 160-acre wells were effectively
9 draining both the upper and lower portion of the
10 Pictured Cliffs.

11 Q. So an existing well in the Upper PC had
12 the equal and same opportunity to get gas from the
13 Lower PC, and additional force was not needed to do
14 that?

15 A. Yeah.

16 Q. Were the pilot wells subject to any other
17 pressure analysis or pressure comparisons?

18 A. Yes, they were.

19 Q. Let's turn to Exhibit No. 4. Tell me what
20 conclusions you're reaching from this data. What is
21 it you're showing?

22 A. In all of the infill pilot wells, we did
23 pressure buildup tests and compared those to the
24 original pressures of the reservoir and found that
25 the reservoir is currently at an average of

1 25 percent of the original pressure, which is due to
2 the depletion of the 160-acre parent well.

3 Q. Let's see how the display is organized.
4 The bottom scale is showing me what, sir?

5 A. Each bar represents one of the pressure
6 buildup tests. And the lighter green outlined with
7 a dashed line represents the original reservoir
8 pressure in that location, and the smaller green
9 bars represent the actual measured pressure.

10 Q. For example, if we start with Well No. 1
11 in the lower left, do you see the "1"? It's got a
12 dark shade of green and then it changes to the light
13 dashed green. Interpret that for me.

14 A. So in that location, that infill well,
15 before the parent wells were drilled, had a pressure
16 of between 500 and 600 pounds. And then at the time
17 that the infill was drilled, in 2002 or 2003, the
18 measured pressure was around 75 pounds.

19 Q. So your conclusions then are in the bold
20 points on the display?

21 A. Yes.

22 Q. And the first one is what, sir?

23 A. The average measured pressures were
24 25 percent of the original reservoir pressure in ~~those~~
25 those locations.

1 Q. What does that mean to a layman like me?

2 A. That the parent 160s are effectively
3 draining those specific locations down to at least
4 25 percent of what their original pressure was.

5 Q. And then finally, the last bold point?

6 A. And then secondly, the parent wells for
7 all the fill locations were also shown at the same
8 time, and measured pressures were taken on those
9 wells.

10 And they found that the pressures in the
11 parent wells were almost identical to that of what
12 the original shut-in pressure was of the infill
13 wells, meaning that you're getting equivalent
14 depletion across your 160-acre spacing.

15 Q. Are these all postfrac pressure
16 datapoints?

17 A. Not all of them. Some are and some
18 aren't.

19 Q. Is that anything of significance to you?

20 A. It could be. It would need to be analyzed
21 further.

22 There's some conclusions that were drawn
23 by someone before me that the pressures that were
24 found from the postfrac data were lower. And I
25 would think that we would want to look to those as

1 being more accurate measured pressures.

2 So the significance would be that these
3 numbers could be conservative and that you could
4 actually have lower reservoir pressures where the
5 infill wells are.

6 Q. Do you have an approximate point in time
7 since '02 at which Burlington was able to draw
8 conclusions from the dataset derived from its share
9 of the pilot wells?

10 A. Yes, 2005.

11 Q. By 2005 then, what had Burlington
12 concluded about the necessity of increased well
13 densities for the Pictured Cliffs pools?

14 A. We believe that there wasn't a desire of
15 ConocoPhillips to pursue 80-acre infill wells. }

16 Q. Let's turn now to Slide No. 5, your last
17 exhibit. Again go through your conclusions for us.

18 A. First, from the layer pressure tests, they
19 showed that there was insignificant depletion, at
20 least vertically; that the upper and lower portions
21 of the Pictured Cliffs were being drained to the
22 same extent.

23 The shut-in pressures from those infill
24 wells showed that the parent wells had drained the
25 infill locations to at least 25 percent of their

1 original pressure and found that the parent wells
2 had also uniformly drained the 160-acre spacing due
3 to the fact that the pressures in the parents and
4 the infills were very similar.

5 We also concluded that the majority of the
6 reserves that were recovered from these parent wells
7 can be attributed to acceleration.

8 Also, the engineers for Energen pointed
9 out that there's significant interference on our
10 parent wells.

11 So we concluded at the time now that
12 80-acre infilling is not justified economically for
13 ConocoPhillips, but that future geological reservoir
14 data could potentially change that in the areas that
15 we've studied.

16 MR. KELLAHIN: That concludes my
17 examination of this witness, and we will move the
18 introduction of Exhibits 1 through 5.

19 MR. HALL: No objection.

20 THE EXAMINER: Exhibits 1 through 5 are
21 admitted.

22 (ConocoPhillips Exhibits 1 through 5,
23 inclusive, Case No. 14539, were admitted.)

24 THE EXAMINER: Does anyone care to cross?

25 MR. HALL: Very briefly.

CROSS-EXAMINATION

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BY MR. HALL:

Q. Mr. Marusak, if you'll turn to Exhibit 3 of your pools map, we go from the area where Burlington conducted its studies and then move to the eastern portion of the basin, where Energen's pilot projects were located. Do you know if that dual PC zone is existent in the eastern portion of the area where Energen did its study?

A. Yeah, yes.

Q. Okay. How do you know that?

A. From logs, the log that you showed that there was a difference between the upper and lower portions of the Pictured Cliffs.

Q. Are they both producible?

A. Yes.

MR. HALL: Nothing further, Mr. Examiner.

MS. DE LA TORRE: We have no questions.

THE EXAMINER: Mr. Brooks.

MR. BROOKS: No questions.

THE EXAMINER: You did have 16 wells, right?

THE WITNESS: And there's only 15 on that.

THE EXAMINER: Yeah. What happened to --

THE WITNESS: I honestly don't know. If

1 you care, I could investigate it further. But I
2 would assume it's a bad datapoint.

3 THE EXAMINER: Your conclusion is that
4 80-acre spacing is not justified at this time.
5 However, down the road, perhaps? Is that what I
6 heard?

7 THE WITNESS: Perhaps.

8 THE EXAMINER: On your map -- a long, long
9 time ago I worked up in Farmington. And I remember
10 going up into Colorado and logging perforated
11 Pictured Cliffs wells.

12 Is there production up into Colorado?

13 THE WITNESS: Yes.

14 THE EXAMINER: What's their Pictured
15 Cliffs spacing in Colorado; do you know?

16 THE WITNESS: I am pretty sure it's 160s.

17 THE EXAMINER: Does anyone know?

18 THE WITNESS: There's so little production
19 up there.

20 MR. KELLAHIN: We certainly can find out
21 for you, Mr. Examiner.

22 THE EXAMINER: I was thinking it was less
23 than 160. It was 40 or 80, but I'm not sure.

24 MR. KELLAHIN: They do things differently
25 there.

1 THE EXAMINER: All right, I have no
2 further questions. Thank you.

3 Ms. de la Torre?

4 MS. DE LA TORRE: Mr. Examiner, Kelly de
5 la Torre, Beatty & Wozniak. And we call Linda
6 Htein, of BP.

7 Mr. Examiner, we wanted to emphasize that
8 Linda Htein is here on behalf of BP to report back
9 and is not taking any position with respect to the
10 Energen application for additional infill pilot wells
11 projects.

12 LINDA HTEIN,
13 having been previously duly sworn, testified as
14 follows:

15 DIRECT EXAMINATION

16 BY MS. DE LA TORRE:

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

19 A. Linda Htein.

20 Q. Who do you work for?

21 A. I work for BP.

22 Q. What do you do for BP?

23 A. I'm a reservoir engineer.

24 Q. Would you please describe your education
25 and training for that position?

1 A. Certainly. I graduated from the
2 University of Texas in 2007 with a Bachelor of
3 Science degree in Petroleum Engineering.

4 For the last three years, I've been
5 working for BP. I spent about a year working on a
6 Gulf of Mexico appraisal project, where I mainly
7 focused on reservoir simulation. And over the last
8 two years, I've been providing reservoir engineering
9 support to the BP operations in the San Juan Basin.

10 Q. So then you've had substantial experience
11 working with BP's properties in Northwest New
12 Mexico?

13 A. That's correct.

14 Q. Do you have in front of you a copy of the
15 prehearing statement filed on behalf of BP in this
16 matter?

17 A. Yes, I do.

18 Q. Directing your attention to the affidavit
19 attached to the prehearing statement, I want to ask
20 you: Is that your affidavit?

21 A. Yes, it is.

22 Q. With respect to Figure 2, is it necessary
23 to make a correction?

24 A. Yes, it is necessary to make a correction.

25 MS. DE LA TORRE: And we have passed out

1 the corrected exhibit. It was mislabeled on
2 Figure 2, and we have corrected that.

3 And at this time I move that we admit the
4 affidavit and Exhibits 1 through 7 into the record.

5 MR. HALL: No objection.

6 THE EXAMINER: Okay, the affidavit and
7 Exhibits 1 through 7 are admitted.

8 Now, this is correcting the typo.

9 MS. DE LA TORRE: Correct.

10 (BP Exhibits 1 through 7, inclusive, and
11 the Affidavit of Linda Htein were admitted.)

12 Q. (By Ms. De La Torre) Would you tell us
13 what you did to prepare the information contained in
14 your affidavit?

15 A. Yes. This project was previously worked
16 by another reservoir engineer back in 2002 and 2003,
17 and he since retired from BP. So I basically looked
18 through his files and compiled this short report.

19 Q. Could we turn to Figure 1, which is BP
20 Exhibit 2?

21 A. (Witness complies.)

22 Q. Could you describe what's shown there in
23 that figure?

24 A. Yes. In Exhibit 1 there are three tables.
25 The first table is just general information on the

1 three pilot wells that were completed by BP as part
2 of this project. It provides the well name, API
3 number, location, completion date. And it also
4 provides the names of the offset parent wells in
5 those quarter sections.

6 Table 2 is a summary of the pressure data
7 that we reported in our pilot wells and our parent
8 wells. It provides the shut-in periods for both the
9 pilot and parent wells, as well as the pressure
10 measurement that was taken in both the pilot and
11 parent wells.

12 Table 3 is a summary of the production
13 performance that we observed in the pilot wells. It
14 includes the start-of-production month, the
15 cumulative gas production to date, the peak rate,
16 the current rate and whether or not the well is
17 compressed.

18 Q. And in Figure 1, BP Exhibit 2, could you
19 describe that figure?

20 A. Sure. Exhibit 2 is showing a map of the
21 San Juan Basin. The area shaded in green are
22 BP-operated leases in New Mexico, and the three
23 orange dots represent the locations of the three
24 pilot wells.

25 Q. And Figure 2, BP Exhibit 3, what does that

1 figure show?

2 A. Exhibit 3, on the Y axis, shows the
3 shut-in pressure measured at the pilot well
4 locations versus, on the X axis, the shut-in
5 pressure measured in the parent wells.

6 There's a diagonal line across the graph
7 that represents the point at which the parent and
8 pilot wells are exhibiting the same pressures. And
9 you'll see that two of the three wells show slightly
10 higher pressures in the pilot wells versus the
11 parent wells, and one of the three shows a slight
12 lower pressure in the pilot well versus the parent
13 well of.

14 Q. And turning to Figure 3, BP Exhibit 4,
15 what's shown this figure?

16 A. Exhibit 4 is a bar graph showing the 2003
17 shut-in pressure measured from the pilot wells
18 relative to the approximate original reservoir
19 pressure at those locations.

20 So in all three cases, the shut-in
21 pressures measured from the pilot wells were no more
22 than 33 percent of the original pressure.

23 Q. And Figures 4, 5 and 6 corresponding to BP
24 Exhibits 5, 6 and 7, could you explain these
25 exhibits?

1 A. Yes. Exhibits 5, 6 and 7 are basically
2 production plots showing the Pictured Cliffs
3 production history from the three pilot wells and
4 their corresponding parent wells.

5 Q. Did you work with anyone else at BP?

6 A. Yes. My statement was reviewed by a
7 senior reservoir engineer, a senior geologist, and
8 my supervisor.

9 Q. And did you and the others determine the
10 position of BP as stated in the affidavit?

11 A. Yes, we did.

12 Q. And what is that position?

13 A. Our position is that based on the pressure
14 and production data that we recorded in these pilot
15 wells, and based upon current economic conditions,
16 infill completion of the Pictured Cliffs in the
17 areas in which we operate is not appropriate at this
18 time, and we will not be requesting an infill order
19 on this date.

20 Q. Have you heard anything in today's hearing
21 or in the prehearing statements of the other parties
22 that prompts you to change your recommendation to
23 the Oil Conservation Division?

24 A. No, I have not.

25 MS. DE LA TORRE: I have nothing further.

1 MR. HALL: I have no questions.

2 MR. KELLAHIN: No questions.

3 MR. BROOKS: No questions.

4 THE EXAMINER: Have you heard anything
5 today that you would disagree with?

6 THE WITNESS: Perhaps.

7 THE EXAMINER: I won't put you on the spot
8 and ask you what that is.

9 But I have a daughter that graduated from
10 UT in petroleum engineering. And in her class --
11 it's been a few years back -- she was the only
12 petroleum engineer graduating.

13 THE WITNESS: That's not true for me. I
14 think our graduating class was about 80 people. So
15 it was a pretty good-sized class.

16 THE EXAMINER: How many girls?

17 THE WITNESS: I would say maybe 20 percent
18 were girls.

19 THE EXAMINER: Any closing comments?

20 MR. HALL: Nothing further of Ms. Htein.

21 We would like to briefly call
22 Mr. Van Voast in the nature of rebuttal testimony.

23 FURTHER DIRECT EXAMINATION

24 BY MR. HALL:

25 Q. When Energen participated in the original

1 pilot project study, did it attempt to obtain layer
2 pressure data?

3 A. No, we didn't.

4 Q. And why not?

5 A. We only had one zone that we considered
6 commercially productive.

7 MR. HALL: That's all I have. Thank you.
8 That concludes our case, Mr. Examiner.

9 THE EXAMINER: Anything else?

10 Okay. With that, then we'll take both
11 cases under advisement. Case No. 12857 --

12 MR. BROOKS: I'm not sure I understood
13 what your client's position was, Mr. Kellahin.

14 Do you have a position in this case?

15 MR. KELLAHIN: In the second case for the
16 new project, we don't take a position for or against
17 at this point. Our prehearing statement had to do
18 with following the criteria of the original pilot.

19 MR. BROOKS: Okay, very good. So your
20 position is the same as BP's position?

21 MR. KELLAHIN: Yes, Mr. Brooks.

22 MR. BROOKS: Thank you.

23 THE EXAMINER: So with that, we are
24 adjourned.

25 (The hearing adjourned at 4:32 p.m.)
I do hereby certify that the foregoing is
a complete and correct report of the proceedings
heard by me on _____

1 STATE OF NEW MEXICO
2 COUNTY OF SANTA FE

3

4

5 REPORTER'S CERTIFICATE

6 I, Paul Baca, New Mexico Certified Court
7 Reporter No. 112, do hereby certify that I reported
8 the foregoing proceedings in stenographic shorthand,
9 that I did administer the oath to the witness, and
10 that the foregoing pages are a true and correct
11 transcript of those proceedings and was reduced to
12 printed form under my direct supervision.

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

17

18

19



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