

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3 SCOUT ENERGY MANAGEMENT,)
4 LLC, and CHEVRON U.S.A. INC.,)
5 Petitioners,)
6 VS.) Case IPR2024-00385
7 PILOT INTELLECTUAL PROPERTY,) Patent 8,505,332 B1
8 LLC,)
9 Patent Owner.)

10 *****

11 ORAL DEPOSITION OF

12 DR. DAVID ROCKSTRAW

13 OCTOBER 18, 2024

14 *****

15 ORAL DEPOSITION OF DR. DAVID ROCKSTRAW, produced as
16 a witness at the instance of the Patent Owner, and duly
17 sworn, was taken in the above-styled and numbered cause
18 on October 18, 2024, from 10:07 a.m. to 5:19 p.m.,
19 before Donna Wright, CSR in and for the State of Texas,
20 reported by machine shorthand, at the law offices of
21 MCDERMOTT WILL & EMERY LLP, 300 Colorado Street,
22 Suite 2200, Austin, Texas, pursuant to Title 37 of the
23 Code of Federal Regulations and the provisions stated
24 on the record or attached hereto.
25

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40	The exhibits tendered during this deposition were		
41	not provided to the reporter prior to the completion		
42	of the final transcript. Exhibits may be produced by		
43	Counsel at a later date.		

1 DR. DAVID ROCKSTRAW,
2 having been first duly sworn, testified as follows:

3 EXAMINATION

4 BY MR. ROGERS:

5 Q. Good morning.

6 A. Good morning.

7 Q. This deposition is taken pursuant to patent
8 owner's notice of deposition of Dr. David Rockstraw.
9 It's confirmed you are Dr. David Rockstraw?

10 A. I am.

11 Q. Thank you.

12 And my name is Charles Rogers and I
13 represent the patent owner in this case. And I'll just
14 let you know who we have here today.

15 There is our technical expert, patent
16 owner's technical expert, Trevor Bors, and the named
17 inventor on the patent, Eric Prim.

18 MR. PIALA: Alexander Piala for Scout
19 with Brian Oaks.

20 MR. WOLFE: Michael Wolfe for Chevron
21 USA.

22 THE REPORTER: Sorry, I didn't ask for
23 the appearances. Thank you for doing that.

24 (Exhibits 1002 and 1015 marked)

25 Q. (BY MR. ROGERS) So I have for the first

1 exhibits that I want to ask you questions about is your
2 declaration, Exhibit 1002, and your CV, Exhibit 1015.

3 Do you already have them? I see you have
4 a notebook in front of you. What do you have?

5 A. This is my declaration. I do not have my CV
6 in front of me.

7 Q. Okay. So let me give you a copy of your CV so
8 you have it handy. And I'm going to start with your CV
9 to ask you questions about your background. You've got
10 your experience and publications listed on there,
11 correct?

12 A. I do.

13 Q. And what's your educational experience?

14 A. I completed a Bachelor of Science in chemical
15 engineering at Purdue University in 1986 and a PhD in
16 chemical engineering at Oklahoma University in 1989.

17 Q. And your professional experience is listed on
18 there as well?

19 A. It is.

20 Q. And you go back -- back to 1981; is that
21 correct?

22 A. 1981.

23 Q. All the way through today?

24 A. Correct.

25 Q. Of your professional experience, have you held

1 any positions related to the gas processing industry?

2 A. I worked at Conoco for a period, but I did not
3 work in the area of gas processing while I was there.

4 Q. What is your understanding of the gas
5 processing area?

6 MR. PIALA: Objection --

7 THE WITNESS: I'm not sure I understand
8 the question.

9 MR. PIALA: Objection, form.

10 Q. (BY MR. ROGERS) You said you worked at Conoco
11 for a period, but you did not work in the area of gas
12 processing while you were there.

13 A. That's correct.

14 Q. So then I'm asking you, trying to understand
15 your answers, what is your understanding of the area of
16 gas processing that you refer to?

17 A. At Conoco, we called that upstream and that
18 was the group that brought the petrochemicals out of
19 the ground and did the initial processing.

20 Q. And when you say the initial processing, what
21 do you mean by that?

22 A. The first unit operations when the gas first
23 came out of the ground.

24 Q. And so to be more specific, did you work in
25 any areas where that processing of gas that you're

1 referring to involved the reinjection of CO2 for
2 enhanced oil recovery?

3 A. I did not work in those areas.

4 Q. Okay. So let me know if I'm correct, then.

5 That would also mean that you have not
6 worked in any areas where NGL recovery was a process
7 used for the CO2 being reinjected in an enhanced oil
8 recovery operation?

9 MR. PIALA: Objection, form.

10 THE WITNESS: Could you restate it,
11 please?

12 Q. (BY MR. ROGERS) Yes.

13 So my question is -- and I'll just
14 restate it. Let me know if I'm correct, then, that
15 that would also mean that you have not worked in any
16 areas where NGL recovery was a process used for the CO2
17 being reinjected in an enhanced oil recovery operation?

18 MR. PIALA: Objection, form.

19 THE WITNESS: I would say I did not work
20 in that area. That's correct.

21 Q. (BY MR. ROGERS) So let's turn to your CV,
22 Exhibit 1015, with your list of publications and
23 presentations as well. So we're talking page 4 all the
24 way through page 11. Well, that includes your
25 testimony as well. So let's just stick with your

1 publications and presentations.

2 Are any of the publications that you list
3 on here related to the gas processing industry?

4 A. They are not.

5 Q. Are any of the presentations you list on here
6 related to the gas processing industry?

7 A. They are not also.

8 Q. Is any of the testimony listed on page --
9 pages 10 and 11, including depositions,
10 trial/arbitration, is any of that aspect of your
11 experience related to the gas processing industry?

12 MR. PIALA: Objection to the scope.

13 The witness probably should not reveal
14 confidential information between those parties and --
15 and Dr. Rockstraw.

16 THE WITNESS: I don't believe any of the
17 testimony that I have given is in the area of gas
18 processing.

19 Q. (BY MR. ROGERS) So this is your first case to
20 render opinions and testify as an expert in the area of
21 gas processing?

22 A. I believe that's correct.

23 Q. So I want to turn to your declaration in this
24 case, Exhibit 1002. If we go to the last page, that's
25 your signature; is that correct?

1 A. That is my signature.

2 Q. It's dated January 22, 2024; is that correct?

3 A. That is correct.

4 Q. Have there been any changes in your opinions
5 related to your assertions that the challenged claims
6 of the patent in this case are unpatentable since the
7 signing of your declaration?

8 A. There have not been such changes.

9 Q. Have you developed any new opinions related to
10 this case since the signing of your declaration?

11 A. I have not.

12 Q. As far as you know, have there been any
13 changes in your understanding of the facts that are the
14 basis for your opinions in your declaration?

15 A. Not as far as I know.

16 Q. So let's turn to page 23, the claim
17 construction section of your declaration.

18 What is the definition of "project
19 conditions" that you used for your opinions in this
20 case? Have you made it to your paragraph 111 yet in
21 your search?

22 A. I'm there.

23 I applied the National Institute of
24 Standards and Technology's definition of "cryogenic" as
25 negative 153 degrees C or negative 240 degrees

1 Fahrenheit.

2 Q. Why did you apply that interpretation?

3 A. Please say that again.

4 Q. Why did you apply that interpretation?

5 A. National Institute of Standards and Technology
6 is an organization that is esteemed in the industry,
7 the chemical processing industry.

8 Q. So in your paragraph 111 that goes from
9 page 50 to 51, after you cite this NIST definition, you
10 say, "I understand that the petitioners also do not
11 necessarily endorse patent owner's understanding, but I
12 am applying the patent owner's interpretation for
13 purposes of this petition."

14 Did I read that correctly?

15 A. You did.

16 Q. So are you using this NIST definition for the
17 term "cryogenic" because that's your opinion as to what
18 the term means or because you're applying someone
19 else's interpretation?

20 A. It's both. I accepted the definition of the
21 patent owner and I understand that NIST to be a place
22 that I seek standards and information.

23 Q. And when you say you accepted the definition
24 of the patent owner, that definition you're accepting
25 from the patent owner is from -- not from this case,

1 but from related litigation; is that correct?

2 A. Say that again.

3 Q. You said you're accepting the definition of
4 the patent owner. Where are you getting that
5 definition of the patent owner that you're referring
6 to?

7 A. In one of the initial briefs that I read, it
8 was specified that this was the definition that was
9 being applied.

10 Q. Okay. And that's not from this inter partes
11 review, correct, the brief you are referring to?

12 A. It was my understanding that it was.

13 Q. Okay. Are you aware that it was not, that
14 this was the -- what you're referring to, the NIST
15 definition, was from federal court litigation and not
16 this inter partes review in the patent office?

17 A. I don't recall that detail.

18 Q. Are you aware of the patent owner's asserted
19 interpretation of the term "cryogenic conditions" in
20 this inter partes review in the patent owner's
21 preliminary response in this case?

22 A. Say that again.

23 Q. Are you aware of the patent owner's asserted
24 interpretation of the term "cryogenic conditions" in
25 this inter partes review in the patent owner's

1 preliminary response in this case?

2 A. I am aware.

3 Q. What is your understanding of the patent
4 owner's asserted interpretation of the term "cryogenic
5 conditions" in this inter partes review?

6 A. I understand the patent owner has adopted that
7 definition from the Gas Processors Association.

8 Q. And have you been -- changed your opinion to
9 adopt the patent owner's interpretation specific to the
10 gas processing industry?

11 A. It has not caused me to change my opinion.

12 Q. Why not?

13 A. I found numerous definitions of cryogenic and
14 regardless of which one I apply, it doesn't affect my
15 opinions.

16 Q. So is it correct, then, that you are using,
17 for your opinion in this case, an interpretation of the
18 term "cryogenic conditions" that is different from what
19 the patent owner submitted in this inter partes review
20 and its preliminary response?

21 A. I would say the definition I have adopted is
22 different, but regardless, even if I adopt the patent
23 owner's interpretation, it doesn't affect my opinions.

24 Q. So turning back to section 111 of your
25 declaration that spans pages 50 to page 51, if you look

1 at page 51 and go down five lines, the sentence that --
2 in which you state, "I understand that the petitioners
3 also do not necessarily endorse patent owner's
4 understanding, but I am applying the patent owner's
5 interpretation for purposes of this petition."

6 What is your understanding, then, of the
7 petitioners' definition of "cryogenic conditions"?

8 MR. PIALA: Objection, form.

9 THE WITNESS: It's my understanding that
10 the petitioner has adopted the NIST definition and
11 that's why I note it subsequently.

12 Q. (BY MR. ROGERS) But you say that petitioners
13 do not endorse patent owner's understanding; is that
14 correct?

15 A. I do.

16 Q. Are you familiar with the petitioners'
17 assertion and the related federal court litigation that
18 propane refrigeration for the reflux of their Chevron
19 Mabee distillation column at 5.7 degrees Fahrenheit is
20 cryogenic conditions?

21 MR. PIALA: Objection, scope.

22 THE WITNESS: I don't know that I recall
23 that.

24 Q. (BY MR. ROGERS) Do you agree that 5.7 degrees
25 Fahrenheit could be considered cryogenic conditions in

1 the distillation column described in the '332 patent?

2 A. Say that again.

3 Q. Do you agree that 5.7 degrees Fahrenheit could
4 be considered cryogenic conditions in the distillation
5 column described in the '332 patent?

6 A. Well, that depends upon the definition of
7 "cryogenic" that -- what it does.

8 Q. Well, I'm asking whether you agree. So
9 it's -- it's using the definition that you have
10 asserted?

11 A. I'm going to need you to repeat the question.

12 Q. Let me rephrase it.

13 Using your definition of "cryogenic
14 conditions" in this case, do you agree that 5.7 degrees
15 Fahrenheit would be considered cryogenic conditions in
16 the distillation column described in the '332 patent?

17 MR. PIALA: Objection, form.

18 THE WITNESS: I disagree. I don't see
19 how 5.7 degrees can be cryogenic using the definition I
20 have adopted.

21 Q. (BY MR. ROGERS) I'm going to ask you to turn
22 to paragraph -- or section 31 of your declaration.
23 It's at page 10 -- page 16 of 1002, numbered page 10,
24 section 31.

25 You state that hydrogen sulfide is

1 considered an acid gas because when exposed to water,
2 it lowers the pH of water. Doesn't carbon dioxide,
3 when exposed to water, also lower the pH of the water
4 in a similar fashion?

5 MR. PIALA: Objection, scope.

6 THE WITNESS: Yes, it will.

7 Q. (BY MR. ROGERS) So, therefore, by your
8 definition, wouldn't carbon dioxide also be considered
9 an acid gas?

10 MR. PIALA: Objection, scope.

11 THE WITNESS: Yes, by my definition,
12 carbon dioxide can also be considered an acid gas.

13 Q. (BY MR. ROGERS) Let's turn to your
14 section 35. In section 35 you state that NGLs, natural
15 gas liquids, are defined as compounds that exist as a
16 vapor at standard conditions, but become liquids when
17 exposed to pressure at room temperature.

18 Is this your definition of "natural gas
19 liquids"?

20 MR. PIALA: Objection, mischaracterizes
21 the document.

22 THE WITNESS: It's a definition I have
23 found to be prevalent in the literature.

24 Q. (BY MR. ROGERS) Is your understanding of the
25 definition of "natural gas liquids" different?

1 A. Different than what?

2 Q. From the literature you are referring to.

3 A. It is not.

4 Q. So is your definition of "natural gas liquids"
5 those defined as compounds that exist as a vapor at
6 standard conditions, but become liquids when exposed to
7 pressure at room temperature?

8 A. That is correct.

9 Q. Do you agree that ethane condenses at 525 PSI
10 at room temperature conditions, 68 degrees Fahrenheit,
11 20 degrees Celsius?

12 A. I don't recall that fact.

13 Q. How would you confirm whether you could agree
14 with that fact?

15 A. I would seek out a source of physical
16 properties.

17 Q. All right. For the purpose of this next
18 question, I'm going to ask it as a hypothetical. And
19 for that hypothetical, I'm going to ask you to assume
20 that ethane condenses at 525 PSI at room temperature
21 conditions of 68 degrees Fahrenheit.

22 With that assumption and using that
23 assumption, therefore, by your definition of "natural
24 gas liquids," would you agree that ethane is a natural
25 gas liquid?

1 A. I would agree that ethane can be found in
2 natural gas liquids under those conditions.

3 Q. When you say ethane can be found in natural
4 gas liquids, are you saying that ethane is a natural
5 gas liquid?

6 A. I'm still not classifying ethane as a
7 component of the natural -- natural gas liquids.

8 Q. When you say you would not classify ethane as
9 a component of natural gas liquids, are you saying
10 that, in your opinion, ethane is not a natural gas
11 liquid?

12 A. That's what I'm saying, yes. I'm saying
13 natural gas liquids are C3 through C8.

14 Q. And when you say that natural gas liquids are
15 C3 through C8, is that different from where you say
16 that natural gas liquids include C3 through C8?

17 A. It is not different.

18 Q. Considering your statement that natural gas
19 liquids include C3 through C8, does your understanding
20 of natural gas liquids include anything other than C3
21 through C8?

22 A. Natural gas liquids may include components
23 other than C3 through C8, but C3 through C8
24 characterize a natural gas liquid.

25 Q. Are C3 through C8, in your opinion, the only

1 natural gas liquids?

2 A. Natural gas liquids can contain things other
3 than C3 through C8. Separations are not perfect, so it
4 would be expected you would have some lighter
5 components and some heavier components in the
6 condensation of natural gas liquids.

7 Q. When you say natural gas liquids can contain
8 things other than C3 through C8, are you referring to
9 natural gas liquids containing something that is not a
10 natural gas liquid?

11 A. Yes, natural gas liquids can contain things
12 that are not a natural gas liquid.

13 (Exhibit 1004 marked)

14 Q. I'm handing you a copy of Exhibit 1004, the
15 Arand patent. And I have all of these copies to give
16 to you. Do you -- I'm assuming you need them. Do you
17 just have in front of you your declaration only and --

18 A. That's correct.

19 Q. Okay. So --

20 MR. PIALA: Counsel, I have a copy on the
21 computer right now.

22 MR. ROGERS: Okay.

23 Q. (BY MR. ROGERS) So let's turn to page 17 of
24 Exhibit 1002, your declaration, section 34 to 36. And
25 this is where you refer to what you describe as three

1 categories of hydrocarbons; is that correct?

2 A. That is correct.

3 Q. And what is the first category that you refer
4 to?

5 A. The first category I refer to is natural gas.

6 Q. Then you say that natural gas typically refers
7 to methane, C1, and ethane, C2; is that correct?

8 A. That is correct.

9 Q. Is that because, as you say, those two
10 compounds exist as a gas at atmospheric conditions?

11 A. I do say that.

12 MR. PIALA: Counsel, just so the record
13 is clear, you mentioned page 17. It's numbered page 11
14 of the declaration, it's 17 on the PDF. Just -- just
15 so we're all on the same page.

16 Q. (BY MR. ROGERS) So there's two sets of page
17 numberings, but to be consistent, it's probably best to
18 just refer to your -- your paragraph numbering or
19 section numbering.

20 A. That's fine.

21 Q. Are these paragraph numbers? Do you have any
22 numbers that are -- it looks like paragraph numbers.

23 A. They are.

24 Q. They are, okay. I was calling them sections
25 because I thought you might have some that have more

1 than one paragraph, but paragraph numbers.

2 A. I understood what you were referring to.

3 Q. I'm going to refer to them as paragraph
4 numbers now.

5 A. Thank you.

6 Q. So back to your declaration, paragraphs 34
7 through 36 where you are describing what you refer to
8 as three categories of hydrocarbons, we've gone through
9 the first category.

10 Now, what's the second category you refer
11 to?

12 A. The second category that I refer to is natural
13 gas liquids, or NGLs.

14 Q. And what is your understanding of the second
15 category of natural gas liquids?

16 A. My understanding is that NGLs are found as a
17 vapor with natural gas at standard temperature and
18 pressure, but they can be liquified at room temperature
19 when placed under pressure.

20 Q. And by that assertion, you're saying that
21 natural gas liquids exclude ethane; is that correct?

22 A. It's my assertion that NGLs are predominantly
23 C3 through C8 hydrocarbons. As I mentioned earlier,
24 separations are not perfect and there will be
25 components of both a lighter and heavy variety --

1 heavier variety in a natural gas separation, natural
2 gas liquid separation.

3 Q. Are you saying that crude oil can be found in
4 natural gas?

5 A. I am not.

6 Q. Are you saying that methane can be found in
7 natural gas liquids?

8 A. I would not expect to see methane in natural
9 gas liquids.

10 Q. I'm going to rephrase my question where I
11 asked whether you're saying that crude oil can be found
12 in natural gas.

13 What I meant to say is -- and I'll re-ask
14 it, then -- are you saying that crude oil can be found
15 in natural gas liquids?

16 A. I would not expect to see crude oil in natural
17 gas liquids.

18 Q. So what would you expect to see in natural gas
19 liquids, other than C3 through C8, considering that I
20 believe you're saying that C9 is not found in natural
21 gas liquids?

22 A. Well, again, the separations are not perfect.
23 So depending upon the processing conditions, you may
24 see some C2 and some C9 in the natural gas liquids.
25 But C3 through C8 is what is classified as a natural

1 gas liquid because they comprise the majority of the
2 liquid.

3 Q. So if C2, ethane, in your view, is not a
4 natural gas liquid, then why does Arand -- the Arand
5 patent, Exhibit 1004 at column 5, starting at line 46,
6 say, quote, "As used herein, the term 'natural gas
7 liquids components' will be used to refer to any or all
8 of C2 through about C8 hydrocarbons or higher which are
9 included in natural gas liquids streams."

10 A. Prior to that statement, Arand defines natural
11 gas liquids as C3 through C8 and then he modifies that
12 definition by acting as his own lexicographer to
13 include C2.

14 Q. What do you mean when you say Arand is acting
15 as his own lexicographer?

16 A. Arand is defining NGLs based on the definition
17 he wishes to use for the purpose of this patent.

18 Q. Would you define "natural gas liquids" as
19 condensable hydrocarbons that can ordinarily be
20 collected and stored in liquid form?

21 A. Please say that definition again.

22 Q. Would you define "natural gas liquids" as
23 condensable hydrocarbons that can ordinarily be
24 collected and stored in liquid form?

25 A. I don't believe that's the definition I have

1 used, no.

2 Q. Have you seen that definition used by others?

3 A. I don't recall encountering that definition.

4 Q. Let's turn to section 37 of your declaration.

5 And in section 37, you refer to DePriester charts. Am
6 I pronouncing that correctly?

7 A. You are.

8 Q. What is this DePriester chart that you are
9 referring to?

10 A. The DePriester charts are a generalized
11 correlation in a graphical format that permit one to
12 very rapidly understand distribution of a hydrocarbon
13 between the liquid and vapor phases by drawing a line
14 connecting a pressure on the left side of the nomograph
15 to a temperature on the right side of the nomograph.

16 Q. Let's turn back a couple pages to your
17 definition at paragraph 32. In paragraph 32, you list
18 what you refer to as exemplary alkane hydrocarbons, C1
19 to C9; is that correct?

20 A. That is correct.

21 Q. And I see C2 ethane on there; is that correct?

22 A. That is correct.

23 Q. Would ethylene be an example as well that
24 could be included on the chart?

25 A. The chart was exemplary alkanes and ethylene

1 would not be an alkane.

2 Q. What is ethylene?

3 A. Ethylene would be an alkene.

4 Q. So turning back to your section 37, regarding
5 DePriester charts, you describe how to use a DePriester
6 chart. And in your example, you chose to describe the
7 vapor liquid ratio of ethylene rather than ethane,
8 which is included in your table in section 32.

9 Why is that?

10 A. I didn't really think it mattered which
11 component I used to demonstrate how the DePriester
12 charts are used. There is a lot of space between
13 methane and ethylene to put an arrow. So it was simply
14 done to demonstrate how to use the DePriester charts to
15 get a result.

16 Q. Okay. So let's take a look at your example.
17 And if we -- if we look at the line you have drawn in
18 using ethylene as an example, if we -- if we take a
19 look at ethane, we get the intersection at 10.

20 Do you agree?

21 A. Yes.

22 Q. And from your description in section 38, would
23 that imply that there is a 10-to-1 ratio of vapor to
24 liquid for ethane?

25 A. That is correct, at the conditions represented

1 by the two endpoints of the line.

2 Q. Okay. So let's -- let's take a look at your
3 example and we can -- I guess we can move back to the
4 beginning of your paragraph 37.

5 And you say, "The art describes several
6 different ways to separate oils in natural gases. Two
7 of the most common are phase separation and
8 distillation."

9 And so you start out -- you're describing
10 these two most common examples, correct, and you start
11 out with phase separation?

12 MR. PIALA: Objection, form.

13 THE WITNESS: Please repeat the question.

14 Q. (BY MR. ROGERS) I'll rephrase it.

15 What are you describing in your
16 paragraph 37?

17 A. I'm introducing two of the most common methods
18 to separate the components of a feed stream.

19 Q. And what are those two most common methods
20 that you're referring to?

21 A. Phase separation and distillation.

22 Q. And you first start out by describing phase
23 separation, correct?

24 A. That's correct.

25 Q. And you say that's the simplest; is that

1 correct?

2 A. That's correct.

3 Q. How do you describe this phase separation
4 process?

5 A. The hydrocarbon stream is fed into a
6 separator, it is allowed to reside under the influence
7 of gravity, liquids coalesce at the bottom of the
8 separator while gases rise to the top.

9 Q. And how do you further describe it?

10 A. This method of separation takes advantage of
11 the different vapor pressure of each hydrocarbon at a
12 given temperature and pressure. More volatile
13 components preferentially leave the top of the phase
14 separators, gases, and/or vapors and less volatile
15 components leave the bottom as liquid.

16 Q. How is this phase separation process that
17 you're describing related to the challenged claims of
18 the '332 claim for which you're asserting an opinion of
19 unpatentability?

20 A. Please repeat the question.

21 Q. How is this phase separation process that
22 you're describing related to the challenged claims of
23 the '332 patent that you're asserting an opinion of
24 unpatentability?

25 THE REPORTER: Unpatentability, okay.

1 MR. ROGERS: Not patentable is what it
2 means.

3 THE REPORTER: Right.

4 THE WITNESS: I believe the DePriester
5 charts help a person of skill in the art understand the
6 lines of demarcation between the natural gas and
7 natural gas liquid and a heavy hydrocarbon.

8 Q. (BY MR. ROGERS) But is this phase separation
9 process that you're referring to, is the reason that
10 you're describing it because it relates to the first
11 separation step in Claim 1 of the '332 patent?

12 A. May I see a copy of the '332 patent, please?

13 Q. Yes.

14 MR. PIALA: I don't need a copy. I've
15 got it.

16 THE WITNESS: And so by first step, I
17 assume you're talking about the statement, "Separating
18 the hydrocarbon feed stream into," and the rest of that
19 paragraph. And my response would therefore be yes.

20 Q. (BY MR. ROGERS) And my answer to your
21 question is yes.

22 So if we're using your example of phase
23 separation relevant to the first separating step of
24 Claim 1 of the '332 patent, would you then be able to
25 use this DePriester chart that you described to

1 determine the ratio -- the vapor liquid ratio to
2 determine where the ethane ends up in the separation
3 process?

4 A. Please say that one more time.

5 Q. So if we're using your example of phase
6 separation relevant to the first separating step of
7 Claim 1 of the '332 patent, would you then be able to
8 use this DePriester chart that you described to
9 determine the vapor liquid ratio to figure out where
10 the ethane ends up in the separation process?

11 A. I could use the DePriester chart to give me an
12 estimate of the distribution between liquid and vapor
13 phase for the ethane or any other of the components
14 that are in the hydrocarbon feed stream.

15 Q. So using the DePriester chart, as you
16 described, to get an estimate of the distribution
17 between the liquid and vapor phase for ethane, let's
18 look at your example in your paragraph 37.

19 And where you draw the line that you were
20 using as an example for ethylene, when we look at
21 ethane and the line on your chart we get the
22 intersection at 10; is that correct?

23 A. That's correct.

24 Q. And does that apply that there is a 10-to-1
25 ratio of vapor to liquid for ethane in the -- in the

1 phase separation process that you're describing?

2 MR. PIALA: Objection, form.

3 THE WITNESS: Was there a question there
4 or was that a statement?

5 Q. (BY MR. ROGERS) Yes.

6 A. Could you say it again?

7 Q. If we look at the ethane line in your chart,
8 we get the intersection at 10, correct?

9 A. Yes, the intersection with the ethane line on
10 a nomograph is at 10 for a temperature of 78 degrees
11 and a pressure of what looks to be about -- I'm sorry,
12 a temperature of 170 degrees and a pressure of what
13 looks to be 78 PSIA.

14 Q. So with this 10-to-1 ratio of vapor to liquid
15 in this phase separation, doesn't that mean that
16 there's a significant amount of ethane in the vapor,
17 90 percent of it goes in -- would then go into the CO2
18 recycle stream in the phase separation process, for
19 example, in the separation -- first separation step in
20 Claim 1 of the '332 patent?

21 MR. PIALA: Objection, form.

22 THE WITNESS: Well, that statement
23 presumes that the phase separator is operated at 170
24 or 172 degrees Fahrenheit and 78 PSIA.

25 Q. (BY MR. ROGERS) Does the DePriester chart

1 work for pure components, for example, a pure ethane
2 stream?

3 A. It does.

4 Q. Does the DePriester chart work for mixtures?

5 A. To an extent, yes.

6 Q. So when we have a mixture of components, and
7 let's continue using a mixture including ethane, if the
8 composition of components in the mixture, other than
9 ethane, change significantly, would the vapor liquid
10 ratio change?

11 A. Please say that one more time.

12 Q. So when we have a mixture of components, and
13 let's continue using a mixture including ethane, if the
14 composition of components in the mixture, other than
15 the ethane, change significantly, would the vapor
16 liquid ratio change?

17 MR. PIALA: Objection, form.

18 THE WITNESS: There are some
19 non-idealities for mixtures that the DePriester charts
20 does not account for.

21 But for these particular components, the
22 impact is relatively minor.

23 MR. PIALA: When you're done with this
24 line of questioning, it's been about an hour. Do you
25 want to take a break?

1 MR. ROGERS: Let's see if I can get it
2 done and we will take a break.

3 Q. (BY MR. ROGERS) So let's continue using this
4 example of your DePriester chart where you draw the
5 line, in your example, the intersection at 10.

6 You agree that that implies there's a
7 10-to-1 ratio of vapor for liquid to ethane, correct?

8 A. Correct, there's 10 moles of ethane in the
9 vapor for each mole of ethane in the liquid.

10 Q. And that's a -- for a pure ethane stream,
11 correct?

12 A. Correct.

13 Q. Okay. So let's continue that example and
14 consider a mixture, let's say a mixture that includes
15 ethane and butane, what would be the effect on this
16 vapor to liquid ratio that you refer to in the
17 DePriester chart if the amount of butane in this
18 ethane/butane mixture we're referring to, the amount of
19 butane in the stream were to increase by a factor
20 of 100?

21 MR. PIALA: Objection, scope. Incomplete
22 hypothetical.

23 THE WITNESS: You're asking me to assume
24 the amount of butane increases by a factor of 10, but
25 you did not tell me what the initial composition of

1 butane relative to ethane was.

2 Q. (BY MR. ROGERS) Let's use a 1-to-1
3 composition of butane relative to ethane. And please
4 answer my question.

5 MR. PIALA: Objection, incomplete
6 hypothetical.

7 MR. ROGERS: I think you mean objection
8 to form, not a more detailed tipping-off objection,
9 correct?

10 MR. PIALA: The objections are my
11 objections.

12 MR. ROGERS: I object to your objection.

13 Q. (BY MR. ROGERS) Please answer the question.

14 A. I'm trying to understand it still. So I'm
15 starting with an equimolar composition of ethane and
16 butane?

17 Q. Yes.

18 A. And I'm flashing it or phase separating it?

19 Q. Yes.

20 A. And then I'm doing a second one with a larger
21 amount, 10 times the amount of butane?

22 Q. 100 times.

23 A. 100 times?

24 Q. Yes.

25 A. I don't know that I could quantify that, as we

1 sit here, without putting pencil to paper. But I would
2 expect that as you increase the amount of butane by a
3 factor of 100, there is a small effect on the amount of
4 ethane relative -- in the vapor relative to liquid
5 because of that increase in butane.

6 Q. What is that effect that you're referring to?

7 A. An interaction effect between the two
8 components.

9 Q. And does that interaction effect or any effect
10 that you're referring to include a change in the
11 vapor/liquid ratio?

12 MR. PIALA: Objection, form.

13 THE WITNESS: As I said previously, I
14 would expect it would have a small change. But for
15 these particular components, I would expect that change
16 to be minor.

17 Q. (BY MR. ROGERS) Why?

18 A. Because these components act very close to an
19 ideal gas.

20 Q. What does that mean?

21 A. That means the interaction effect between the
22 components is very minor.

23 Q. And by the interaction effect, are you
24 referring to the vapor/liquid ratio in the separation?

25 A. I'm referring to the interaction between

1 ethane and butane in the liquid and vapor phases.

2 Q. In the phase separation process, correct?

3 A. Correct.

4 MR. ROGERS: I think we can take the
5 break you requested.

6 MR. PIALA: Perfect.

7 THE REPORTER: Okay. Off the record.

8 (Recess from 11:18 a.m. to 11:35 a.m.)

9 Q. (BY MR. ROGERS) Dr. Rockstraw, what would you
10 call a stream made up of C2 through C8?

11 A. I would say it's primarily natural gas
12 liquids.

13 Q. What leads you to use the qualifier
14 "predominantly"?

15 A. Again, the definition that I have seen in the
16 literature that's prevalent is C3 through C8. So the
17 presence of C2, they call it a contaminant, but it's
18 not what's typically classified as natural gas liquids.

19 Q. Have you ever done a Google search on the term
20 "natural gas liquids"?

21 A. I don't know that I have done a Google search.
22 I did library searches.

23 Q. Would it surprise you to learn that when I
24 tried to do a Google search on it, every definition
25 that comes up includes ethane as a natural gas liquid.

1 How would that be?

2 A. I don't know.

3 Q. They just got it wrong? Every search result,
4 ethane.

5 A. Yeah, I don't know.

6 Q. So when you use the term "prevalent
7 literature," what do you mean by that?

8 A. What I mean is that articles that I have read
9 that classify natural gas, natural gas liquids, and
10 heavy hydrocarbons classify C1, C2 as natural gas,
11 C3 -- C3 through C8 as natural gas liquids, and C9 or
12 higher as heavy hydrocarbons.

13 Q. Does that mean you haven't seen any literature
14 that defines "natural gas liquids" with ethane, as the
15 first example?

16 A. Well, I said predominantly.

17 Q. What does "predominantly" mean?

18 A. That means the majority of the definitions I
19 have seen for natural gas liquids use the range of C3
20 through C8 in the definition.

21 Q. So what is an example of the literatures that
22 you have seen that is in the minority that does define
23 methane as a natural gas liquid?

24 A. I don't know that I sorted them and stacked
25 them as either C3 through C8 or C2 through C8. I just

1 recall seeing both with the majority of them being C3
2 through C8.

3 Q. You said "predominantly." Does that mean a
4 vast majority, like maybe -- is it like close to a
5 50/50 split or is it just like 1 percent defines ethane
6 as a natural gas liquid?

7 A. It was definitely above a 50/50 split, but I
8 wouldn't put it at a level of 1 percent.

9 Q. So there is a significant number of literature
10 that does define ethane as a natural gas liquid,
11 correct?

12 A. I use the word "significant," but I would say
13 that those were to a lesser degree as compared to the
14 definition of natural gas liquids being C3 through C8.

15 Q. So is this something where experts just
16 disagree?

17 A. I don't know that I can tell you that.

18 Q. Well, let's take the definition of natural gas
19 liquids specific to the gas processing industry. What
20 is your understanding as to whether ethane is defined
21 as a natural gas liquid in the gas processing industry?

22 A. It's my understanding that it is generally C3
23 through C8, as I have seen in a number of the documents
24 that I have cited in my declaration, including the
25 patent.

1 Q. But not in the Arand patent, Exhibit 1004,
2 correct?

3 MR. PIALA: Objection, form.

4 THE WITNESS: What do you mean, it does
5 not?

6 Q. (BY MR. ROGERS) Isn't it correct that the
7 Arand patent uses, as its definition for natural gas
8 liquids, the definition that includes ethane?

9 THE REPORTER: Is it methane? Ethane?

10 MR. ROGERS: Ethane.

11 THE WITNESS: Well, in column 5, row 45,
12 Arand starts by defining natural gas liquids as C3
13 through C8. He then modifies that definition for the
14 purposes of the patent to include C2.

15 Q. (BY MR. ROGERS) Well, let's take a look at
16 Table 1B in the Arand patent, Exhibit 1004 at
17 column 11, Table 1B classifies ethane as a natural gas
18 liquid, correct?

19 A. It does, and that occurrence in column 11
20 occurs after the location in column 5 where he says,
21 "As used herein, the term 'natural gas liquid
22 components' will be used to refer to any or all C2
23 through C8 hydrocarbons."

24 Q. Are you familiar with what's referred as the
25 Pastor '666 patent?

1 A. I'm not recalling it as I sit here, no.

2 Q. Well, what would you call a stream made up of
3 C4 through C8?

4 MR. PIALA: Objection, form.

5 THE WITNESS: I don't know that a stream
6 containing C4 through C8 has a separate name. Again,
7 it is composed of components of natural gas liquids.

8 Q. (BY MR. ROGERS) What would you call a stream
9 made up of C9+?

10 A. C9+ is typically referred to as the
11 heavy condensate or the heavy hydrocarbons.

12 Q. Would you call it crude oil?

13 A. I wouldn't necessarily call it crude oil.

14 Q. Why not?

15 A. Because it's no longer crude. It's been
16 processed to an extent.

17 Q. Processed in what way?

18 A. Well, if it just contains C9 and higher, that
19 means something has been done to the stream to remove
20 anything lighter than C9.

21 Q. Well, let's turn to your declaration, 1002,
22 paragraph 63. And this -- this is your overview of
23 Exhibit 1005; is that correct?

24 A. That is correct.

25 Q. How do you pronounce the name of Exhibit 1005?

1 A. I was hoping you could tell me.

2 MR. PIALA: We had the same problem.

3 Q. (BY MR. ROGERS) Aycaguer?

4 A. Aycaguer.

5 Q. I said Aycaguer. We can change to Aycaguer if
6 that -- I'm asking you.

7 A. I think we have been calling it something like
8 Aycaguer.

9 Q. Okay.

10 THE REPORTER: How do you spell that?

11 THE WITNESS: A-Y-C-A-G-U-E-R.

12 THE REPORTER: Thanks.

13 Q. (BY MR. ROGERS) So I'm probably going to have
14 a hard time shifting to your pronunciation. So you can
15 stick with yours and I'll call it Aycaguer.

16 A. I'll understand what you're referring to.

17 Q. You don't have to use my pronunciation.

18 A. My tongue may not permit me to do it that way
19 anyway.

20 Q. So I have handed you a copy of Exhibit 1005.

21 (Exhibit 1005 marked)

22 Q. (BY MR. ROGERS) And in your overview of
23 Aycaguer, as well as on the grounds for obviousness
24 that you assert, you rely heavily on Aycaguer for
25 Figure 1, correct?

1 MR. PIALA: Objection, form.

2 THE WITNESS: I do incorporate Figure 1
3 into my analysis, that is correct.

4 Q. (BY MR. ROGERS) And you refer to Figure 1
5 quite a bit in your analysis, correct?

6 MR. PIALA: Objection, form.

7 THE WITNESS: You will find multiple
8 references to Figure 1 in my declaration.

9 Q. (BY MR. ROGERS) Well, in your analysis of
10 Aycaguer, did you notice that a reference to methane
11 was missing from this figure?

12 THE REPORTER: Now that was methane?

13 MR. ROGERS: Uh-huh.

14 THE REPORTER: Okay. I wanted to make
15 sure.

16 THE WITNESS: You're correct, Figure 1
17 does not explicitly call out methane in the figure
18 itself.

19 Q. (BY MR. ROGERS) But the text of Aycaguer,
20 Exhibit 1005, does have some references to methane,
21 correct?

22 A. That's correct.

23 Q. What references are those?

24 MR. PIALA: Objection, form.

25 Q. (BY MR. ROGERS) What are the references to

1 methane in Aycaguer that you were referring to?

2 A. Are you wanting me to point out everywhere
3 where Aycaguer refers to methane?

4 Q. No, just if you recall.

5 A. I guess I don't understand the question.

6 Q. Well, do you recall methane being referred to
7 in Aycaguer even though it's not listed in Figure 1?

8 A. I do.

9 Q. And do you recall that methane is mentioned a
10 few times, including as a reason for dehydration to
11 avoid pipeline corrosion?

12 A. I do.

13 THE REPORTER: To avoid?

14 MR. ROGERS: Pipeline corrosion.

15 Q. (BY MR. ROGERS) And does that lead you to an
16 understanding that methane is being recovered in this
17 process described in Aycaguer?

18 A. What do you mean by "recovered"?

19 Q. Separated.

20 A. Are you asking if it's separated as a pure
21 component?

22 Q. Well, let's start with that, yes.

23 A. Okay. Aycaguer does not separate methane as a
24 pure component.

25 Q. How does the process described in Aycaguer

1 separate methane, if not as a pure component?

2 A. It separates it with other components of the
3 recycle stream that are returned to the reservoir.

4 Q. Do you assert in your opinion that one of
5 ordinary skill in the art reviewing the Aycaguer
6 reference would understand that Aycaguer is describing
7 a three-column Ryan/Holmes process?

8 A. Say that again.

9 Q. Do you assert in your opinion that one of
10 ordinary skill in the art would understand that
11 Aycaguer is describing a three-column Ryan/Holmes
12 process?

13 A. I don't believe Aycaguer specifies which
14 Ryan/Holmes from the family of Ryan/Holmes processes
15 should be used.

16 Q. Well, when you describe in your declaration
17 what one of ordinary skill in the art in reviewing
18 Aycaguer would understand, you chose to reference
19 Figure 2 of Exhibit 1007, which is a three-column
20 Ryan/Holmes process, correct?

21 A. Can you direct me to where in my declaration
22 you're --

23 Q. So let's take a look at Aycaguer,
24 Exhibit 1005, page 6. It's -- Aycaguer is page 305.
25 And if you look at the left-hand column, almost all the

1 way toward bottom, the second to the last paragraph, do
2 you see that reference there that says the sales
3 fuel -- it's the last sentence of the second to the
4 last paragraph in the left-hand column, do you see
5 where it says the sales fuel gas whose main component
6 was methane?

7 THE REPORTER: Main?

8 MR. ROGERS: Main component.

9 THE WITNESS: I see it.

10 Q. (BY MR. ROGERS) Does that -- would that lead
11 you to want to change the answer to your prior question
12 where you said that the methane is reinjected?

13 A. I believe --

14 MR. PIALA: Sorry, is that the full
15 question?

16 MR. ROGERS: Yeah.

17 MR. PIALA: Okay.

18 THE WITNESS: I believe I --

19 MR. PIALA: Objection, form.

20 Sorry.

21 THE WITNESS: I believe I misspoke
22 earlier.

23 Q. (BY MR. ROGERS) How did you misspeak?

24 A. Repeat that.

25 Q. How did you misspeak?

1 A. Oh, I didn't mean to say that it was
2 reinjected.

3 Q. Okay. So let's go back to my original
4 question.

5 Is methane recovered in the process
6 described in Aycaguer?

7 A. Aycaguer does not describe directly the
8 recovery of methane, but it refers the reader to other
9 literature to determine how to do that. And that would
10 be the Ryan/Holmes process as one of the methods for
11 doing that.

12 Q. Can you answer my question, is methane
13 recovered in the process described in Aycaguer?

14 A. It would be, yes.

15 Q. And considering that it's your understanding
16 that methane is recovered in the process described in
17 Aycaguer, where would you identify in Figure 1 the flow
18 of methane to the process?

19 A. Well, the source of methane is the oil and gas
20 reservoir. The first separation, the first flash
21 separates the heavy hydrocarbons and then the methane
22 is collected from the produced gas recycling plant.
23 The figure simply does not show a separate stream of
24 methane coming from that box.

25 Q. Where does the methane go following the

1 produced gas recycling plant box?

2 A. It's collected as a product.

3 THE REPORTER: Collected as a?

4 THE WITNESS: Product.

5 THE REPORTER: Thanks.

6 Q. (BY MR. ROGERS) Would you refer to that
7 product as fuel gas?

8 A. It could be referred as a fuel gas, yes.

9 Q. All right. So in Figure 1, coming out of
10 produced recycling plant, you have got lines with
11 arrows and you -- and there's three places that it
12 shows streams flowing: Sulfur, natural gas liquids, and
13 the CO2 stream.

14 Is the methane recovered that you are
15 referring to going to any of those three places?

16 A. It is not.

17 Q. Then where is the methane flowing to,
18 according to your understanding?

19 A. My understanding is that the methane is
20 removed during the produced gas recycling plant step.

21 Q. And then it flows somewhere other than the
22 sulfur, natural gas liquids, or the CO2 stream?

23 A. That's correct.

24 Q. So to specify where this methane is flowing
25 to, would you add another line coming out of the

1 produced gas recycling plant?

2 A. Aycaguer did not include the details of the
3 produced gas recycling plant or the streams that come
4 from it, other than the final stream that is separated
5 into CO₂, natural gas liquids, and sulfur.

6 Q. So you agree, then, that this Aycaguer
7 reference is just missing some information regarding
8 the process described?

9 MR. PIALA: Objection, form.

10 THE WITNESS: I wouldn't say it's
11 missing. The details are buried in that box and he
12 provides references to get those details.

13 Q. (BY MR. ROGERS) And based upon the experience
14 of one of ordinary skill in the art, the POSITA you
15 refer to in this case, P-O-S-I-T-A, is it your
16 understanding that a POSITA would understand that
17 Aycaguer is referring to an NGL recovery process known
18 as the Ryan/Holmes process?

19 A. Repeat the question.

20 Q. And based upon the experience of one of
21 ordinary skill in the art, the POSITA that you refer to
22 in this case, would the -- would the POSITA understand
23 that the process described in Aycaguer, Exhibit 1005,
24 is an NGL recovery process known as the Ryan/Holmes
25 process?

1 MR. PIALA: Objection, form.

2 THE WITNESS: Aycaguer directs a POSITA
3 to the family of Ryan/Holmes separation processes as a
4 potential solution to achieve the separation that he
5 graphically illustrates in Figure 1.

6 Q. (BY MR. ROGERS) Well, in the references, the
7 footnotes, 21 and 22, in Aycaguer, are those directing
8 a POSITA to understand that the process described in
9 Aycaguer is an NGL recovery process known as the
10 Ryan/Holmes process?

11 MR. PIALA: Objection, form.

12 THE WITNESS: Again, Aycaguer is
13 directing a POSITA to the family of Ryan/Holmes
14 processes as a potential solution to achieving that
15 separation. I don't believe Aycaguer in any way limits
16 it to the Ryan/Holmes process.

17 Q. (BY MR. ROGERS) Let's take a further look at
18 Aycaguer, Exhibit 1005. Let's take a look at
19 Exhibit 1005, page 6, the left-hand column in the very
20 top, the second sentence.

21 Are you there?

22 A. Yes.

23 Q. So Aycaguer describes the inlet to the
24 processing plant, listing the components as water,
25 hydrogen sulfide -- H₂S, hydrogen sulfide -- carbon

1 dioxide, methane, and natural gas liquids.

2 So there's -- they are listing five
3 categories of components; is that correct?

4 MR. PIALA: Objection, form.

5 THE WITNESS: Four of the five are
6 specific components. Only one of them is a category.

7 Q. (BY MR. ROGERS) Okay. So the specific
8 components of water, hydrogen sulfide, carbon dioxide,
9 and methane?

10 MR. PIALA: Objection, form.

11 Q. (BY MR. ROGERS) Correct, those are the four
12 specific components you're referring to?

13 A. That's correct.

14 Q. And then the category is natural gas liquids,
15 correct?

16 A. Correct.

17 Q. And you would agree that this inlet, they are
18 referring to the inlet to the processing plant, one of
19 the specific components in that inlet is ethane,
20 correct?

21 MR. PIALA: Objection, form.

22 THE WITNESS: But Aycaguer does not refer
23 to ethane as a specific component, but he groups it in
24 with natural gas liquids.

25 MR. PIALA: Just for the record, Aycaguer

1 is a she.

2 Q. (BY MR. ROGERS) So is it your understanding,
3 then, in Figure 1 of Aycaguer, that the box designated
4 as natural gas liquids includes ethane?

5 A. It's my understanding that that box will
6 contain some of the ethane that's in the feed stream,
7 yes.

8 Q. Well, is it your understanding that that box
9 designated as natural gas liquids includes most of the
10 ethane from the inlet?

11 A. I don't believe Aycaguer gives a material
12 balance of the distribution of the various components.
13 Where he does talk about ethane, it's in reference to
14 some of the ethane being contained in the C02 recycle
15 stream.

16 Q. Where is that reference you are referring to?

17 A. It's page 306, the first full paragraph that
18 recites, "The separation of the produced gas stream
19 does not isolate all compounds perfectly and the C02
20 stream destined for reinjection also contains some
21 methane and C2 hydrocarbons with two carbons."

22 MR. PIALA: For the record, it's
23 page 305.

24 THE WITNESS: It's what?

25 MR. PIALA: Page 305.

1 THE REPORTER: That's what I thought I
2 said.

3 Q. (BY MR. ROGERS) Is it your understanding that
4 most of the methane -- methane from the inlet does not
5 end up in the reinjection stream?

6 A. Again, Aycaguer does not provide a material
7 balance for the process, but he does state that the --
8 I'm sorry, amount of methane reinjected is assumed to
9 be 10 mole percent, so that's a significant portion of
10 methane going with the CO₂.

11 Q. Does that lead to your understanding that
12 90 percent of the methane is not going in the
13 reinjection?

14 MR. PIALA: Objection, form.

15 THE WITNESS: Well, the 10 mole percent
16 that Aycaguer sites is not a percentage of the methane
17 that was in the feed stream. It's relative to the
18 composition of the CO₂ stream.

19 And so it doesn't tell a person of skill
20 in the art that 90 percent of the methane is recovered
21 and 10 percent is recycled to the reservoir.

22 Q. (BY MR. ROGERS) Well, let's go to the next
23 sentence where it says, "Finally, the injection step
24 consists of sending the gas phase under supercritical
25 conditions," carbon dioxide in this case, "down the

1 injection well to the reservoir."

2 Do you understand what that means?

3 A. I understand that they send the CO₂ under
4 supercritical conditions back to the reservoir, yes.

5 Q. What is your understanding of the
6 supercritical conditions they are referring to there?

7 A. That means the thermodynamic conditions of the
8 CO₂ are above supercritical point for CO₂.

9 Q. Do you believe that what's recited in this
10 sentence is actually possible?

11 A. Which part of it are you asking is possible?

12 Q. Is it possible that the injection step could
13 consist of sending the gas phase under supercritical
14 condition, the carbon dioxide, down the injection well
15 to the reservoir?

16 A. I think Aycaguer has made a common mistake of
17 referring to the supercritical state as a gas, a very
18 common error that I have seen amongst my students and
19 in the literature. It's possible to put supercritical
20 CO₂ down the well.

21 Q. So let's go back to the first column on this
22 page 6 of Exhibit 1005. The specific components listed
23 in the inlet gas: water, hydrogen sulfide, carbon
24 dioxide, and methane.

25 Do you recall us discussing that before?

1 A. I do.

2 Q. And do you agree, then, that the category,
3 natural gas liquids, is where the ethane in the process
4 is being categorized by Aycaguer?

5 A. In his list, that's the only place to find the
6 ethane, that's correct.

7 Q. And based upon your experience in reading
8 this, you understand that there's ethane in the natural
9 gas liquids described in Aycaguer, correct?

10 A. In the way Aycaguer lists the components,
11 that's the only way to interpret it, yes.

12 Q. So let's turn to your declaration,
13 paragraph 82 and moving down to your paragraph 83, the
14 first sentence, you state, "Aycaguer confirms that its
15 hydrocarbon feed stream includes at least C3 through
16 C9+ hydrocarbons, carbon dioxide, and hydrogen
17 sulfide."

18 Why do you leave out references to -- any
19 reference to C2 ethane?

20 A. 83 continues from paragraph 82 where -- 82,
21 I'm explaining -- actually, Aycaguer explains that
22 natural gas comprises different hydrocarbons in varying
23 amounts, plus varying amounts of nitrogen, carbon
24 dioxide, and sometimes hydrogen sulfide. And the
25 natural gas liquids refers to hydrocarbons from C3

1 through C8 and heavy condensate refers to hydrocarbon
2 from C9+.

3 And so Aycaguer is indicating that
4 natural gas comprises these other things. So methane
5 and ethane are inherent to that definition.

6 Q. Let's continue on to your paragraph 85. You
7 say, "Based upon their background and understanding of
8 the technology, a POSITA would understand that 'natural
9 gas liquids' is a term that includes C3 through C8
10 hydrocarbons. A POSITA reading Aycaguer would have
11 best understood, and at the very least found it obvious
12 that natural gas liquids disclosed by Aycaguer include
13 the entire range of C3 through C8."

14 But didn't you agree that Aycaguer
15 includes ethane in the natural gas liquids?

16 MR. PIALA: Is that the question?

17 MR. ROGERS: Yes.

18 MR. PIALA: Objection, form.

19 THE WITNESS: I agree the way that
20 Aycaguer states it there, he is lumping ethane in with
21 the natural gas liquids.

22 Q. (BY MR. ROGERS) If you took paragraph 85, the
23 first two sentences, in the two references that you
24 include in those first two sentences, C3 through C8, if
25 you were to change your reference from C3 through C8 to

1 C2 through C8, would that be correct?

2 MR. PIALA: Objection, form.

3 THE WITNESS: Could you repeat the
4 question?

5 Q. (BY MR. ROGERS) If you took paragraph 85, the
6 first two sentences, in the two references that you
7 include in those first two sentences, C3 through C8, if
8 you were to change your reference from C3 through C8 to
9 C2 through C8, would that be correct?

10 MR. PIALA: Object to form.

11 THE WITNESS: I don't know that I could
12 change the C3 to a C2 and get the same meaning out of
13 that paragraph because the separation of the C3 through
14 C8 natural gas liquids is a relatively clean
15 separation. You get the majority of those components,
16 whereas the ethane, the majority of the ethane does not
17 necessarily end up in natural gas liquids. It goes
18 other places in the process.

19 Q. (BY MR. ROGERS) Well, let's take your first
20 sentence in paragraph 85 where you say, "Based on their
21 background and understanding of the technology, a
22 POSITA would understand that 'natural gas liquids' is a
23 term that includes C3 through C8."

24 And you say, "A POSITA reading Aycaguer
25 would have understood, and at the very least found it

1 obvious that the natural gas liquids disclosed by
2 Aycaguer include the entire range of C3 through C8."

3 Are you --

4 MR. PIALA: Objection, form.

5 Oh, sorry.

6 Q. (BY MR. ROGERS) Are you implying in this
7 sentence, "A POSITA reading Aycaguer would have
8 understood, and at the very least found it obvious that
9 the natural gas disclosed by Aycaguer would include the
10 entire range of C3 through C8," are you saying in this
11 sentence that the natural gas liquids disclosed by
12 Aycaguer do not include C2 ethane?

13 MR. PIALA: Objection, form.

14 THE WITNESS: I'm not saying that the
15 natural gas liquids disclosed by Aycaguer exclude C2.

16 Q. (BY MR. ROGERS) Well, let's go to the next
17 sentence, maybe two sentences down, where you say,
18 "Because Aycaguer discloses a hydrocarbon feed stream
19 from an oil and natural gas reservoir that contains
20 methane (C1), natural gas liquids, and crude oil (C9+),
21 and because Aycaguer does not explicitly state whether
22 that its feed stream only contains a subset of C3
23 through C8, a POSITA reading Aycaguer would have
24 understood, and at the very least found it obvious that
25 the hydrocarbon feed stream of Aycaguer includes C3

1 through C8."

2 If you were to change your reference to
3 C3 through C8 to C2 through C8, would your sentence and
4 your assertion in that sentence still be correct?

5 MR. PIALA: Objection, form.

6 THE WITNESS: I believe that making that
7 change has a subtle change on the context of the
8 sentence and that the range of C3 through C8, the
9 majority of what's in the feed are collected in that
10 NGL stream, and that cannot be said about the ethane.

11 Q. (BY MR. ROGERS) Well, your sentence that
12 we're referring to, the second to the last sentence of
13 your paragraph 85, is referring to the hydrocarbon feed
14 stream.

15 So with that understanding, if you were
16 to change your references -- your reference to C3
17 through C8 to C2 through C8, wouldn't your assertion in
18 that sentence be correct?

19 A. We may not be in the right place. You said in
20 the second to last sentence of paragraph 85?

21 Q. Yes.

22 A. Which is on document page 38?

23 Q. Yes.

24 A. I'm sorry, I was on the wrong page.

25 Q. It's the one I read. That's the basis for my

1 question.

2 A. Just to be clear that we're reading from the
3 same page, page 38, "Because Aycaguer discloses a
4 hydrocarbon feed stream from an oil and natural gas
5 reservoir that contains methane (C1), natural gas
6 liquids, and crude oil (C9+), and because Aycaguer does
7 not explicitly state that its feed stream only contains
8 a subset of C3 through C8, a POSITA reading Aycaguer
9 would have understood, and at the very least found it
10 obvious that the hydrocarbon feed stream of Aycaguer
11 includes C3 through C8."

12 And you're asking me to change C3 to C2
13 and confirm that the statement remains accurate?

14 Q. Yes.

15 A. I believe I can do that.

16 Q. So do you, therefore, agree, then, that a
17 POSITA reading Aycaguer would have understood, and at
18 the very least found it obvious that the hydrocarbon
19 feed stream of Aycaguer includes C2 through C8?

20 A. Yes, a POSITA would recognize that the
21 hydrocarbon feed stream contains C2 through C8.

22 Q. Aycaguer also mentions the use of additives
23 twice. The article doesn't really say what they are
24 for, just that they are there.

25 When you reviewed the references,

1 footnotes 21 and 22 in Aycaguer, did you notice that
2 those articles mentioned additives as well?

3 A. I did.

4 (Exhibit 1007 marked)

5 Q. Are you aware that Exhibit 1007, one of those
6 two references in footnotes 21 and 22, which is four
7 pages -- four pages long, including tables and figures,
8 mentions additives 42 times?

9 A. I did not count them.

10 Q. Would you be surprised to learn that
11 Exhibit 1007 mentions additives 42 times?

12 A. Can I have Exhibit 1007 to refresh?

13 MR. PIALA: Counsel, when would be a good
14 time for a break for lunch?

15 MR. ROGERS: Let me get through this
16 topic and then we can take a break.

17 MR. PIALA: Okay.

18 Q. (BY MR. ROGERS) I'm not expecting you to
19 count 42 references, so let me just --

20 A. It would not surprise me.

21 Q. Okay. Are you aware that your declaration,
22 Exhibit 1002, does not mention additives even once?

23 MR. PIALA: Objection, form.

24 THE WITNESS: I was not aware, no.

25 Q. (BY MR. ROGERS) Did you mention additives

1 even one time in your declaration?

2 A. You're telling me that I didn't. It's likely
3 I referred to that stream as a recycle stream.

4 Q. What else did you refer to the additives as in
5 addition to possibly recycle stream?

6 MR. PIALA: Objection, form.

7 THE WITNESS: I don't recall what other
8 language I may have used besides recycle.

9 Q. (BY MR. ROGERS) In your declaration, did you
10 give any description or explanation of the additives,
11 or as you might have referred to it as, the recycle
12 stream?

13 MR. PIALA: Objection, form.

14 THE WITNESS: I don't understand the
15 question.

16 Q. (BY MR. ROGERS) I'm sorry?

17 A. I don't understand the question.

18 Q. Have you provided an explanation in your
19 declaration of the purpose of what you just referred to
20 as the recycle stream?

21 A. I don't recall trying to describe the purpose
22 of it, no.

23 Q. What is your understanding of the purpose of
24 the recycle stream in the Ryan/Holmes process?

25 Let me rephrase that. What is your

1 understanding the purpose of -- what is your
2 understanding of the purpose of the additives in the
3 Ryan/Holmes process?

4 MR. PIALA: Objection, form.

5 Q. (BY MR. ROGERS) Let me lay a foundation for
6 that question.

7 Do you understand that the Exhibit 1007
8 that you are reviewing now is a description of an NGL
9 recovery process known as the Ryan/Holmes process?

10 A. It's my understanding that this document
11 refers to the family of Ryan/Holmes processes and
12 describes essentially more than one process for
13 separating the NGLs.

14 Q. When you say "more than one process," are you
15 referring to the differences between the number of
16 columns until the Ryan/Holmes process?

17 A. We typically call that topology and the
18 article offers two different topologies or
19 configurations of equipment pieces, as well as a range
20 of operating conditions for each of those topologies.

21 Q. And would you refer to those two topologies as
22 a three-column Ryan/Holmes process and a four-column
23 Ryan/Holmes process?

24 A. That's how the article refers to them, yes.

25 Q. And what is your understanding of the purpose

1 of the additives in the three-column Ryan/Holmes
2 process?

3 A. The recycle stream where additive has two
4 effects on the column that it's being returned to, it
5 affects the extent of separation and it affects the
6 temperature profile across the column. So it impacts
7 the condenser temperature that you need to have in
8 order to achieve a specification and the separation
9 that you are trying -- you are trying to complete.

10 Q. Would it be fair to say that in the
11 Ryan/Holmes process, the use of additives makes
12 possible the separation of methane from CO₂, which
13 would otherwise not be possible?

14 A. When you say "possible," are you referring to
15 economics or are you referring to simply performing the
16 separation?

17 Q. I'm referring to the performance of the
18 separation in the Ryan/Holmes process.

19 MR. PIALA: Objection, form.

20 THE WITNESS: The recycle stream permits
21 one to avoid operating conditions that can shut your
22 column down, specifically freezing, and it permits you
23 to control the temperature at which the separation
24 occurs.

25 And so the recycle stream is -- is

1 necessary to run smoothly without having to take
2 shutdowns and you can adjust your energy input based on
3 the size of that recirculation stream.

4 Q. Do you have Exhibit 2008?

5 A. No.

6 MR. PIALA: Did you say eight?

7 MR. ROGERS: 2008.

8 (Exhibit 2008 marked)

9 Q. (BY MR. ROGERS) I'm handing you what's marked
10 as Exhibit 2008. It's a hydrocarbon processing
11 article. The title is Process Improves Acid Gas
12 Separation.

13 Do you understand this to be a
14 description of the Ryan/Holmes cryogenic processes?

15 MR. PIALA: Objection, form.

16 Q. (BY MR. ROGERS) I'm reading from the title.

17 A. Yeah, again, you're using the term cryogenic,
18 which we haven't agreed upon the definition of
19 cryogenic. I would agree that this describes, again,
20 the family of Ryan/Holmes separation processes.

21 Q. And if you see the first paragraph where it
22 says, "Carbon dioxide separates cleanly from
23 troublesome systems when distillation additives are
24 strategically used."

25 A. I see that.

1 Q. "This technique is used in patented
2 Ryan/Holmes processes for three otherwise now
3 impossible distillations."

4 Do you see that?

5 A. I do.

6 Q. So would you agree -- well, and these
7 otherwise -- these three otherwise now impossible
8 distillations are, one, methane from carbon dioxide;
9 two, carbon dioxide from methane and heavier liquids;
10 and, three, carbon dioxide from hydrogen sulfide
11 mixtures.

12 And your understanding of the statements
13 here, by Ryan Holmes -- Ryan and Holmes about their own
14 Ryan/Holmes process, would you agree that the additives
15 make possible the separation of methane from carbon
16 dioxide that would otherwise not be possible?

17 MR. PIALA: Objection, form.

18 THE WITNESS: I agree that the recycle
19 stream where use of additives permits the separation to
20 occur. I don't necessarily agree that the separations
21 are otherwise impossible, but there may be other ways
22 to achieve that separation.

23 For instance, the second one, carbon
24 dioxide methane is azeotropic system, but there's other
25 ways to break an azeotrope besides adding another

1 component to the blend.

2 Q. And do those other ways you're referring to
3 include distillation?

4 A. It could involve a form of distillation.
5 Quite often, an azeotrope can be broken using two
6 columns that operate at different pressures.

7 Q. Could that be done back in May of 1982 when
8 this article was written, published?

9 A. In 1982, I was operating an azeotropic
10 distillation system in Melrose, Minnesota for
11 separating ethanol from water. So I know that a POSITA
12 had the skill to break an azeotrope by multiple methods
13 as of that timeframe.

14 Q. All right. And the breaking of the azeotrope,
15 that's referring to the process of separation of carbon
16 dioxide and ethane, correct?

17 A. That's the example I use, yes.

18 Q. But my question is referring to the separation
19 of methane from carbon dioxide. I can ask the question
20 again.

21 A. Please.

22 Q. In the Ryan/Holmes process, would you agree
23 that the additives make possible the separation of
24 methane from carbon dioxide that would otherwise not be
25 possible?

1 A. Please say that one more time.

2 Q. In the Ryan/Holmes process, would you agree
3 that the additives make possible the separation of
4 methane from carbon dioxide that would otherwise not be
5 possible?

6 A. When you say "the Ryan/Holmes process," are
7 you referring to specifically one of the processes that
8 are illustrated in these publications?

9 Q. Well, we can start with that, yes.

10 A. Which one?

11 Q. The three-column Ryan/Holmes process and the
12 four-column Ryan/Holmes process.

13 A. Well, to begin with, I don't necessarily
14 believe that the separations are impossible without the
15 Ryan/Holmes process, unless we're talking about the
16 economics of the process.

17 Q. Okay. So you can qualify my question, then,
18 referring to the economics of the process. Please
19 answer the question.

20 A. The use of the recycle stream to raise the
21 temperature of the column operation permits the
22 separation to be done in a favorable -- favorable
23 economic condition. In other words, you can make money
24 doing it that way.

25 Q. Would the three-column Ryan/Holmes process

1 work without the use of additives?

2 A. And so you're asking me if I disconnected the
3 recycle stream that links the bottoms of the third
4 column back to the rectifying section of the first or
5 second column, would the process continue to function.
6 And the answer to that is no.

7 Q. Why?

8 A. Well, because you're changing the nature of
9 the vapor-liquid equilibria in the rectifying section
10 of the column and you would encounter extremely low
11 temperatures that would lead to freezing and you would
12 not be able to reach spec at the condenser for your
13 product anymore.

14 Q. Are you referring to the methane recovery
15 portion of the process?

16 A. I am. The overhead of the first column is
17 where the methane comes off.

18 Q. And what would be the effect, then, on the
19 ethane recovery in the three-column Ryan/Holmes process
20 without the use of additives?

21 A. Well, it's not really an analysis I have done
22 to be able to provide a response.

23 Q. Isn't it true, then, without the use of
24 additives in the ethane recovery process that ethane
25 recovery would not be possible because there would be

1 no breaking of the C02 ethane azeotrope?

2 A. And so your hypothetical, you're telling me to
3 assume that everything else about the plant remains
4 unchanged accept that recycle stream is disconnected?

5 Q. Yes.

6 A. Yeah, the process will fail under those
7 conditions.

8 Q. And it would fail in the recovery of ethane
9 because the additives that would have been used to
10 break the ethane C02 azeotrope would not break the
11 azeotrope, and therefore ethane recovery would not
12 occur, correct?

13 A. Again, I haven't done an analysis of how
14 disconnect in that recycle stream would propagate
15 downstream in the process. That was not what I was
16 tasked with doing.

17 Q. Isn't the purpose of the additives in the
18 three-column Ryan/Holmes process in the ethane recovery
19 distillation column to break the C02 ethane azeotrope
20 to make possible recovery of ethane?

21 A. As noted before, the recycle stream has
22 multiple effects. One of them is to avoid freezing;
23 one of them is affect the VLE so that you can break the
24 azeotrope; and one of them is to promote operation at
25 higher temperatures.

1 Q. Is that a yes?

2 A. Is that what?

3 Q. Is that a yes as an answer to my question?

4 A. I don't recall the question now.

5 Q. Isn't the purpose of the additives in the
6 three-column Ryan/Holmes process in the ethane recovery
7 distillation column to break the CO₂ ethane and make
8 possible the recovery of ethane?

9 MR. PIALA: Objection, form.

10 THE WITNESS: I don't know that that's
11 its sole purpose, but that is the effect that the
12 recycle stream has.

13 Q. (BY MR. ROGERS) Well, my question didn't say
14 sole purpose, but I can modify the question to be
15 primary purpose. Please answer.

16 MR. PIALA: Objection, form.

17 Q. (BY MR. ROGERS) I can restate it if you need
18 me to.

19 A. Please.

20 Q. Isn't the primary purpose of additives in the
21 three-column Ryan/Holmes process in the ethane recovery
22 distillation column to break the CO₂ ethane azeotrope
23 to make possible the recovery of ethane?

24 A. I don't know that that's its primary purpose.
25 The primary purpose could be to avoid freezing, it

1 could be to permit operation at a lower temperature. I
2 mean, that's a result of the recycle stream. Those
3 things are true.

4 Q. Well, we're not talking about methane, so you
5 can -- so you can set aside the freezing. We're
6 talking about ethane and separation of ethane and CO₂.
7 So I'll restate the question again.

8 Isn't the primary purpose of the
9 additives in the three-column Ryan/Holmes process in
10 the ethane recovery distillation column to break the
11 CO₂ ethane azeotrope to make possible the recovery of
12 ethane?

13 MR. PIALA: Objection, form.

14 THE WITNESS: I don't -- I don't think I
15 can agree that that's the primary purpose because even
16 the article suggests that the NGL additives are to
17 raise operating temperature, lower refrigeration
18 requirements, increase relative volatility, permit
19 higher operating pressure.

20 Q. (BY MR. ROGERS) And break the CO₂ ethane
21 azeotrope, correct?

22 A. That's another bulleted item you could add to
23 the list. I don't see that as the primary one because
24 if you take one away, you take all of them away. The
25 benefits are, I guess, cumulative.

1 MR. ROGERS: I can follow up with this
2 after the lunch break you requested. So I think --

3 MR. PIALA: We're off the record.

4 THE REPORTER: Okay. Off the record.

5 (Lunch recess from 1:04 p.m. to
6 2:00 p.m.)

7 Q. (BY MR. ROGERS) Dr. Rockstraw, would you
8 agree that the additives are an important part of the
9 Ryan/Holmes process?

10 MR. PIALA: Objection, form.

11 THE WITNESS: Again, there is multiple
12 Ryan/Holmes processes, but all of them include a
13 recycle stream, and I believe the recycle stream is a
14 necessary element to make the process work the way they
15 designed it.

16 Q. (BY MR. ROGERS) Where does this term "recycle
17 stream" come from?

18 A. Recycle stream is a term of art in chemical
19 engineering that means you take a process stream from
20 downstream and return it somewhere earlier in the
21 process.

22 Q. Why don't you call it the additives like
23 Ryan/Holmes did?

24 A. Ryan/Holmes, in its diagrams, calls it
25 additive recycle.

1 Q. Why don't you call it additive recycle?

2 A. I can call it additive recycle. I'm just used
3 to calling a stream of that nature a recycle, period.

4 Q. Would you agree that the additives are not
5 used in the '332 patent Prim process?

6 MR. PIALA: Objection, form.

7 THE REPORTER: Patent -- what was --

8 MR. ROGERS: Process.

9 THE REPORTER: What was the word?

10 MR. ROGERS: '332 patent Prim process.

11 P-R-I-M. That's Mr. Prim over here.

12 THE REPORTER: Oh, okay, there we go.

13 THE WITNESS: It's my understanding from
14 the patent that they are not necessary so, therefore,
15 they are not used.

16 Q. (BY MR. ROGERS) Would you agree that the use
17 of additives in the Ryan/Holmes process and the nonuse
18 of additives in the Prim process, there's a significant
19 difference between the two processes?

20 MR. PIALA: Objection, form.

21 THE WITNESS: I would definitely call it
22 a difference. I don't know how I would classify it as
23 significant or otherwise. The processes are seeking to
24 achieve different product streams, and therefore in one
25 it's necessary and in one it's not.

1 Q. (BY MR. ROGERS) What do you mean when you say
2 the processes are seeking to achieve different product
3 streams? And, once again, these two processes are the
4 Ryan/Holmes process, on the one hand, and the '332
5 patent Prim process.

6 MR. PIALA: Objection, form.

7 THE WITNESS: Well, the processes
8 described by the '332 patent do not attempt to isolate
9 the natural gas elements in any pure form.

10 Q. (BY MR. ROGERS) And, on the other hand, the
11 Ryan/Holmes process is attempting to isolate the
12 natural gas elements, C1 methane and C2 ethane, in a
13 pure form?

14 MR. PIALA: Objection, form.

15 THE WITNESS: The family of Ryan/Holmes
16 process looks to isolate methane separately, correct.

17 Q. (BY MR. ROGERS) And the Ryan/Holmes process
18 looks to isolate methane in a relatively pure form,
19 correct?

20 MR. PIALA: Objection, form.

21 THE WITNESS: But in the family of
22 Ryan/Holmes processes, the methane is an energy stream
23 that is isolated for the purposes of sale, and so there
24 is a specification as to how pure and what contaminants
25 and how much can be present. And so the Ryan/Holmes

1 process is operated such that it achieves that
2 specification.

3 Q. (BY MR. ROGERS) So while the Ryan/Holmes
4 process is operating to achieve recovery of methane to
5 meet the required specifications, then the Ryan/Holmes
6 process is operating to achieve recovery of C2 ethane
7 as part of the natural gas liquids, correct?

8 MR. PIALA: Objection, form.

9 THE WITNESS: It's my understanding that
10 in the family of Ryan/Holmes processes, the ethane, or
11 C2, is primarily separated from the additives or NGLs
12 and in the additive recovery column and ends up going
13 to the amine process. And so it's not really recovered
14 with the NGLs.

15 Q. (BY MR. ROGERS) What exhibit are you
16 referring to? What exhibit are you reviewing to answer
17 that question?

18 A. I'm looking at Exhibit 1007.

19 Q. So when you say that it's your understanding
20 that in the Ryan/Holmes process, the C2 ethane is
21 separated from the additives or NGLs in the additive
22 recovery column and it ends up going to the amine
23 process, so it's not really recovered with the NGLs,
24 are you referring to Exhibit 1007, page 5, Figure 2,
25 the three-column Ryan/Holmes process?

1 A. Well, the figure shows it graphically, but the
2 text on that page says, "Typically the C2 through some
3 of the C4 is taken overhead, including any H2S if,
4 present in the inlet gas."

5 THE REPORTER: If present --

6 THE WITNESS: In the inlet gas.

7 Q. (BY MR. ROGERS) So you are referring to
8 Exhibit 1007, page 5, Figure 2, the three-column
9 Ryan/Holmes process and the associated text, which you
10 described from, correct, where it says, "Typically C2
11 through some of the C4 is taken overhead, including any
12 H2S, if present, in the inlet gas"?

13 A. That's what I read from, yes.

14 Q. Well, so that text that you read tells you
15 that the ethane is not being recovered as part of the
16 NGLs?

17 A. That's the way I interpret it, yes.

18 Q. Well, let's just take a look at that Figure 2,
19 the additive recovery column, that's -- that's the
20 column you're talking about, right, when it's referring
21 to taking the C2 through some of the C4 is taking it
22 overhead, that's the column you're referring to, right?

23 A. It is.

24 Q. Okay. And if you look at the overhead of the
25 additive recovery column, look at the line with the

1 pointed arrow coming out the top going to the amine
2 Claus box, once again, that's what you're referring to
3 when this text says C2 -- C2 is taken overhead,
4 correct?

5 A. It is.

6 Q. And then following along that amine Claus box
7 has two lines coming out of it and it says -- and it's
8 got sulfur as one of the lines, but the other line says
9 NGL C2, correct?

10 A. That's correct.

11 Q. So why would you say that the C2 is not being
12 recovered as part of the NGL when Ryan and Holmes
13 themselves designate the C2 being recovered and
14 referring to that recovery as NGL?

15 MR. PIALA: Objection, form.

16 THE WITNESS: It was my understanding we
17 were talking about the additives, the additive recycle
18 as NGLs. And the ethane does not end up in that stream
19 that represents the additives or the recycle.

20 Q. (BY MR. ROGERS) Okay. Well, then, is it
21 correct, then, that in the Ryan/Holmes process, the C2
22 ethane is recovered as part of the NGL stream?

23 MR. PIALA: Objection, form.

24 THE WITNESS: When you say "the NGL
25 stream," I see two streams labeled NGL. And the author

1 refers to one of them as a light NGL and the other one
2 as a heavy NGL. And it's my understanding that the
3 heavy NGL, the bottoms, which is the additive, it is --
4 represents the complete range of NGL components, C3,
5 through C8.

6 (Discussion off the record)

7 Q. (BY MR. ROGERS) So, Dr. Rockstraw, you agree
8 that the Ryan/Holmes process, at least the three-column
9 and the four-column, one of the purposes is to recover
10 methane to sell, correct?

11 A. One of the product streams of the various
12 Ryan/Holmes process is a methane stream that meets
13 specification for sale.

14 Q. And another stream produced by the Ryan/Holmes
15 process for sale is NGLs, correct?

16 A. NGLs are another product of the family of
17 Ryan/Holmes processes.

18 Q. That's one of the purposes of the Ryan/Holmes
19 process, is to recover NGLs for sale, correct?

20 A. I struggle with the word "purposes." It is a
21 product of the various Ryan/Holmes processes.

22 Q. You agree that one of the products of the
23 Ryan/Holmes process is natural gas liquids, correct?

24 A. I agree with that.

25 Q. And included in that NGL product of the

1 Ryan/Holmes process is C2 ethane, correct?

2 A. It's my understanding that is considered a
3 light NGL stream that contains two-thirds to 90 percent
4 of the ethane in the feed stream.

5 Q. So that's a yes?

6 A. Well, that represents another product of
7 these -- these Ryan/Holmes homes processes that we're
8 discussing.

9 Q. So you're answering yes to my question, aren't
10 you? I'll just -- let me ask it again.

11 Do you agree that one of the products of
12 the Ryan/Holmes process is natural gas liquids?

13 A. I agree.

14 Q. And do you also agree that included in that
15 NGL product of the Ryan/Holmes process is C2 ethane?

16 A. Excuse me. The ethane appears in a separate
17 NGL stream that the author refers to as a light NGL.
18 That is the light components and predominantly ethane.

19 Q. Was that a yes or no?

20 A. It's neither a yes or no. I'm qualifying the
21 answer. I'm just not going to classify it as an NGL
22 stream because there's multiple NGL streams.

23 Q. Let me ask it again.

24 Do you agree that C2 ethane is one of the
25 components of the NGL product of the Ryan/Holmes

1 process?

2 A. I agree to the extent that I modify your
3 question to ask instead of "the" NGL product, "an" NGL
4 product, and that NGL product being the light NGLs.

5 Q. Is that because you're asserting that there's
6 two NGL streams? I don't understand why you're
7 qualifying your answer.

8 A. Well, there's two product streams that the
9 author adds the label NGL to, but these streams are
10 different in terms of their composition.

11 Q. So are you referring -- are you asserting that
12 there's two NGL product streams and one of them
13 includes ethane and one does not?

14 A. That's a better way of saying it, yes.

15 Q. Do you have Exhibit 1010 in front of you?

16 A. 1010, I do not have that one.

17 (Exhibit 1010 marked)

18 Q. All right. I'm handing you Exhibit 1010,
19 which is titled Pilot Test Prove Ryan/Holmes Cryogenic
20 Acid Gas/Hydrocarbon Separations.

21 Let me ask you to turn to page 5 of
22 Exhibit 1010 and look at Figure 6. And tell me when
23 you're there.

24 A. I'm there.

25 Q. Do you recognize that as the three-column

1 Ryan/Holmes process, the same one I described in
2 Figure 2 in Exhibit 1007?

3 MR. PIALA: Objection, form.

4 THE WITNESS: Yes, Figure 6 in Exhibit 10
5 has the same topography as Figure 2 in Exhibit 1007.

6 Q. (BY MR. ROGERS) All right. So now referring
7 to Figure 6, the three-column Ryan/Holmes process at
8 page 5 of Exhibit 1010, if you take a look at the box
9 referred to as NGL treating and you can see, coming out
10 of that box, what's referred to as the NGL product.

11 Does that help you answer my question
12 without qualification? And I'll just ask it again. Do
13 you agree that C2 ethane is included in the NGL product
14 of the Ryan/Holmes process?

15 MR. PIALA: Objection, form.

16 THE WITNESS: In this particular
17 iteration of the Ryan/Holmes process, they are
18 combining a portion of the additive recycle with the
19 overheads from the additive recovery column, making a
20 single NGL product.

21 In this particular case, the C2 would be
22 present in that NGL product.

23 Q. (BY MR. ROGERS) Do you agree that C2 ethane
24 is one of the components of the NGL product of the
25 Ryan/Holmes process?

1 MR. PIALA: Objection, form.

2 THE WITNESS: Of this particular
3 topography that you're presenting to me, I agree that
4 it is.

5 Q. (BY MR. ROGERS) Do you have Exhibit 1006 in
6 front of you?

7 A. I do not.

8 (Exhibit 1006 marked)

9 Q. I'm handing you a copy of Exhibit 1006, which
10 is the Soldati patent. Let's turn to the portion of
11 your declaration where you address the Soldati patent,
12 Exhibit 1006. We will start with your paragraph 67.

13 And in reading your declaration, you
14 quote to the Soldati process description periodically.
15 Would you agree that the majority of time you're
16 referencing the -- what Soldati refers to as the known
17 art, which is a Ryan/Holmes process?

18 A. I don't believe I qualified them as the
19 Ryan/Holmes process, but I do recognize that Soldati
20 considers that the known art.

21 Q. Well, the -- what Soldati refers to as the
22 known art, Figure 4 of Soldati, that's a four-column
23 Ryan/Holmes process, correct?

24 MR. PIALA: Objection, form.

25 THE WITNESS: I was not tasked with

1 making a comparison of Figure 4 to the Ryan/Holmes
2 process, nor did I believe that was relevant to the
3 opinions I have expressed.

4 Q. (BY MR. ROGERS) So you don't know
5 whether Figure 4 of Soldati is a four-column
6 Ryan/Holmes process?

7 A. I didn't make that assessment in the
8 development of my declaration, no.

9 Q. That's a yes, that means you don't know,
10 correct?

11 A. Yeah, I didn't do that assessment.

12 Q. Okay. Are you familiar with Soldati's
13 reference to Figure 4 -- let me rephrase that.

14 Are you familiar with Soldati's reference
15 to a fractionation process of the known art at
16 column 1, starting at line 21?

17 A. I am familiar with that, yes.

18 Q. And this known art, this fractionation process
19 of the known art that Soldati refers to in column 1,
20 starting at line 21, Soldati specifically refers to
21 this known art as the teachings of Ryan/Holmes,
22 correct?

23 A. Yes, Soldati does reference the Ryan/Holmes
24 patent as an element of the known art.

25 Q. And then this known art patented process that

1 Soldati refers to in column 1, starting at line 21, it
2 then goes on beyond lines 21 to 24, in lines 25 through
3 49, it lists the four steps in one of these Ryan/Holmes
4 patents, listing four distillation columns.

5 Does that lead you to understand that the
6 Figure 4 known art in Soldati is a four-column
7 Ryan/Holmes process?

8 MR. PIALA: Objection, form.

9 Q. (BY MR. ROGERS) Do you need more time
10 Dr. Rockstraw? It's been a while.

11 A. I'm reading the description that you have
12 directed me to and comparing it to the four-column
13 Ryan/Holmes process of Exhibit 1007 to attempt to
14 confirm what it is you're stating.

15 Q. Well, could we speed that up just by referring
16 to your own statement at 69, paragraph 69 of your
17 declaration?

18 MR. PIALA: Objection, form.

19 Q. (BY MR. ROGERS) Yeah, in paragraph 69,
20 your -- you say, "Soldati further describes a prior art
21 version of its method using a more traditional
22 Ryan/Holmes separation of CO₂."

23 MR. PIALA: You're withdrawing the last
24 question, just to confirm?

25 MR. ROGERS: What's that?

1 THE REPORTER: Pardon?

2 MR. PIALA: You're withdrawing the last
3 question, just to confirm?

4 MR. ROGERS: I'm clarifying the last
5 question.

6 MR. PIALA: Okay.

7 MR. ROGERS: I'm trying to assist to try
8 to speed things up. I haven't gotten an answer to this
9 question for several minutes.

10 THE WITNESS: I'm been trying to perform
11 an analysis. Here you directed me to a sentence where
12 I call it a more traditional Ryan/Holmes process, and
13 this leads back to the language that I have been using
14 that Ryan/Holmes is a family of processes. So Soldati
15 is referencing one of the many Ryan/Holmes processes.

16 Q. (BY MR. ROGERS) Okay. Well, Figure 4 has
17 four columns, correct?

18 A. That's correct.

19 Q. And there's four steps listed in Soldati's
20 description of the known art Ryan/Holmes process, four
21 steps, four distillation columns.

22 Doesn't that -- isn't that all you need
23 to know that Figure 4 in Soldati is a four-column
24 Ryan/Holmes process?

25 A. That's not all you need to know.

1 Q. Is it a five-column? There's no way it's a
2 five-column.

3 A. It's not a five-column process.

4 Q. Is it a three-column? No, it has more than
5 three, it's got four.

6 A. But not every process that has four columns is
7 a Ryan/Holmes process.

8 Q. But every Ryan/Holmes process that has four
9 columns is a four-column Ryan/Holmes process, correct?

10 A. If it's a Ryan/Holmes process, one from the
11 family and it has four columns, you can label it a
12 four-column Ryan/Holmes process.

13 Q. Well, just confirm that we can because that's
14 what we've got here. We've got column 1 of Soldati
15 referring to Ryan/Holmes process with four columns,
16 you've got a Figure 4 with four columns.

17 Do you need to know anything else to
18 confirm that Figure 4 in Soldati is a four-column
19 Ryan/Holmes process?

20 MR. PIALA: Objection, form.

21 THE WITNESS: It is a four-column
22 Ryan/Holmes process. It's not "the" because there are
23 multiples, and the one that Soldati presents is not the
24 one that we looked at previously in Exhibit 1007.

25 Q. (BY MR. ROGERS) Okay. Do you agree that

1 Figure 4 in Soldati is a four-column Ryan/Holmes
2 process?

3 A. I agree with that.

4 Q. Thank you.

5 In Paragraph 70 of your declaration,
6 you're referring to Soldati Figure 4, correct?

7 A. That is correct.

8 Q. Do you agree that the Soldati patent presents
9 its invention as an improvement on the Ryan/Holmes
10 process? Let me rephrase that question.

11 In terms of Soldati column 1, line 50,
12 and this is right after Soldati has described what you
13 agree is a four-column Ryan/Holmes process, and then
14 Soldati continues at line 50, saying, "The major
15 drawback of this process," a four-column Ryan/Holmes
16 process, "is its high absorbed power and the
17 considerable heat energy required, due mainly to the
18 large throughputs of the recycled liquid hydrocarbon
19 stream."

20 Did I read that correctly?

21 MR. PIALA: Objection, form.

22 THE WITNESS: You did.

23 Q. (BY MR. ROGERS) And then Soldati goes on to
24 say, "A new process has been found which results in a
25 considerable reduction in energy consumption mainly by

1 recycling smaller liquid hydrocarbon stream throughputs
2 while at the same time increasing percentage of ethane
3 recovery."

4 Did I read that correctly?

5 A. You did.

6 Q. So is it -- is it your understanding that
7 Soldati is presenting its new process as an improvement
8 over a four-column Ryan/Holmes process, which results
9 in reduction of energy consumption by using less
10 additives while increasing the percentage of ethane
11 recovery; is that correct?

12 MR. PIALA: Objection, form.

13 THE WITNESS: You've substituted the word
14 "additive" for "recycling," but essentially I agree
15 with what you're saying.

16 Q. (BY MR. ROGERS) Well, I thought you agreed
17 that additives and recycling are the same thing, you
18 just had a preference as to what you called it, right?

19 A. But with Soldati, I don't see that he refers
20 to it as additive.

21 Q. But you agree that additives and what you
22 refer to as recycle stream and what Soldati refers to
23 as recycled liquid hydrocarbon are the same thing,
24 correct?

25 A. That's what I recognize that as, yes.

1 Q. So then you don't need to qualify your answer
2 to my question, do you?

3 MR. PIALA: Objection, form.

4 Q. (BY MR. ROGERS) Let me ask it again and see
5 if you still need to qualify your answer.

6 Is it your understanding that Soldati is
7 presenting its new process as an improvement over a
8 four-column Ryan/Holmes process, which results in
9 reduction of energy consumption while using less
10 additives while at the same time increasing the
11 percentage of ethane recovery?

12 MR. PIALA: Objection, form. Asked and
13 answered.

14 THE WITNESS: That was, in fact, the same
15 question with the discussion that we've had about the
16 equivalence of the additive stream and the recycle
17 stream. I agree with your statement.

18 Q. (BY MR. ROGERS) Well, I thought we agreed
19 they were the same so you can answer my question
20 without qualifying your answer.

21 A. I just --

22 Q. You can just answer yes, can't you, without
23 qualifying it?

24 MR. PIALA: Objection, argumentative.

25 THE WITNESS: I like to make sure we're

1 talking about the same thing.

2 Q. (BY MR. ROGERS) And we are. I thought we
3 reached that point, so you can just answer yes.

4 A. We are.

5 Q. So is the answer to my question yes?

6 A. I did.

7 MR. PIALA: Objection, form.

8 Q. (BY MR. ROGERS) I think y'all are
9 over-talking each other.

10 A. I'm sorry.

11 Q. Can you answer my question, yes or no?

12 A. I answered your question yes.

13 Q. Thank you.

14 So do you agree that Soldati presents
15 itself as an improvement over a four-column Ryan/Holmes
16 process that increases the percentage of ethane
17 recovery over and above the ethane recovery of the
18 four-column Ryan/Holmes process?

19 A. I agree that Soldati presents itself that way,
20 but I did not do the analysis to confirm that the
21 Soldati patent leads to an increase in the percentage
22 of ethane recovered.

23 What he fails to do is identify which of
24 the Ryan/Holmes processes he's making the comparison
25 to, and the Ryan/Holmes publications state that ethane

1 recovery can vary anywhere from 60 to 90 percent.

2 So I would have to see that Soldati is
3 recovering more than 90 percent of the ethane, which I
4 didn't -- I didn't perform those calculations to
5 confirm that.

6 Q. So you don't know if Soldati is correct in
7 what he's asserting, but you do agree that Soldati is
8 presenting its improvement over a four-column
9 Ryan/Holmes process as Soldati's increasing the
10 percentage of ethane recovery over and above the ethane
11 recovery --

12 MR. PIALA: Objection --

13 Q. (BY MR. ROGERS) -- of a Soldati -- of a
14 Ryan/Holmes four-column process?

15 MR. PIALA: Sorry.

16 Objection, form.

17 THE WITNESS: I agree that Soldati is
18 making that claim.

19 Q. (BY MR. ROGERS) And do you agree that your
20 presentation of the Soldati patent and your
21 descriptions of the disclosure are referring to
22 Figure 4?

23 A. That's correct.

24 Q. And that's -- that Figure 4, you agree, is not
25 Soldati's asserted improvement. Figure 4 is the -- a

1 four-column Ryan/Holmes process known art?

2 MR. PIALA: Objection, form.

3 THE WITNESS: Yeah, it's my understanding
4 that Soldati presents Figure 4 as a version of the
5 Ryan/Holmes prior art.

6 Q. (BY MR. ROGERS) Okay. And Figure 4 is what
7 you're presenting in paragraph 69 as the basis for your
8 opinion of unpatentability for the challenge claim of
9 the '332 patent, correct?

10 MR. PIALA: Objection, form.

11 THE WITNESS: Please repeat that.

12 Q. (BY MR. ROGERS) Figure 4 is what you're
13 presenting in paragraph 69 as the basis for your
14 opinion of unpatentability for the challenged claims of
15 the '332 patent, correct?

16 MR. PIALA: Objection, form.

17 THE WITNESS: I do use Figure 4 as the
18 basis of my opinions, yes.

19 Q. (BY MR. ROGERS) Okay. In paragraph 70, you
20 go on in further referencing Figure 4 and Table 3 in
21 the Soldati patent. So let's look at Table 3.

22 Table 3 is data from a four-column
23 Ryan/Holmes process, what Soldati refers to as known
24 art, correct?

25 A. I would refer to Table 3 as the material

1 balance associated with Figure 4.

2 Q. All right. And Table 2, would you refer to
3 that as the material balance for Soldati's asserted
4 improvement on a four-column Ryan/Holmes process?

5 MR. PIALA: Objection, form.

6 THE WITNESS: Yes, Soldati connects
7 Table 2 to Figure 3, which Figure 3, he refers to as
8 the invention.

9 Q. (BY MR. ROGERS) So in your paragraph 70, you
10 say, "According to Soldati, the initial gaseous
11 hydrocarbon (stream 1) is introduced into column 8 and
12 separated into two different streams."

13 Is that correct?

14 A. That's correct.

15 Q. And so column 8, if you look up above your
16 paragraph 70 description, column 8 is -- it's the first
17 column of a four-column Ryan/Holmes process, right?

18 MR. PIALA: Objection, form.

19 THE WITNESS: It would be the first
20 column, the column that the initial hydrocarbon feed
21 stream is fed to.

22 Q. (BY MR. ROGERS) And that's the ethane
23 recovery column of the four-column Ryan/Holmes process,
24 correct? If it helps, you can look at Figure 3 of
25 Exhibit 1007 to see what Ryan/Holmes themselves called

1 that first column.

2 A. It appears that the first column in Soldati is
3 the equivalent of the ethane recovery column in
4 Exhibit 1007.

5 Q. So for this column 8, Figure 4, ethane
6 recovery column, you describe separations into two
7 different streams, upper stream 9, that contains
8 primarily carbon dioxide, correct?

9 A. Correct.

10 Q. And then you say the lower stream 12 of
11 column 8 includes propane and hydrocarbons, correct?

12 A. Correct.

13 Q. And you're referring to Soldati Exhibit 1006
14 at column 4, lines 30 to 32, and Table 3, correct?

15 A. Say that again, column 4, lines 30 to 32? Can
16 you repeat the question?

17 Q. My question is you say the lower stream 12,
18 that includes propane and hydrocarbons. So let me
19 rephrase that.

20 In paragraph 70 of your declaration, you
21 state that lower stream 12 of column 8 in Figure 4 of
22 Soldati includes propane and hydrocarbons, correct?

23 A. Correct.

24 Q. And you then referenced Soldati, Exhibit 1006,
25 column 4, lines 30 to 32, and Table 3, correct?

1 A. I do.

2 Q. And Table 3, you agree, is the data for what
3 Soldati refers to as known art, a four-column
4 Ryan/Holmes process, correct?

5 A. Yeah, I would call it -- again, I would call
6 it material balance. It's the material balance for
7 Figure 4, which is the known art.

8 Q. But your reference to column 4, lines 30
9 to 32, that's a reference to Soldati's description of
10 Soldati's asserted improvement over a four-column
11 Ryan/Holmes process, correct?

12 MR. PIALA: Objection, form.

13 THE WITNESS: It's not clear that that's
14 necessarily the improved process because there's a lot
15 of commonality between the two figures and there's not
16 a separate description of prior art.

17 So the column numbers are the same, some
18 of the feed streams are the same. In that particular
19 three lines that I cite, I don't see any difference
20 between the process improvement and known art.

21 Q. (BY MR. ROGERS) Well, your reference to lower
22 stream 12 refers to, quote, "propane and higher
23 hydrocarbons."

24 So that would be, once again, your
25 reference to C3 through C8, correct?

1 A. That's correct, propane and higher
2 hydrocarbons are C3 and above.

3 Q. Well, if you had -- rather than referring to
4 Soldati's description of improvement, if you had
5 instead referred to what Figure 4 actually is, which is
6 the known art, you could have quoted Soldati column 2,
7 lines 4 and 5, correct, where it describes the bottom
8 product stream containing ethane and the higher
9 hydrocarbons, C2 through C8?

10 MR. PIALA: Objection, form.

11 Q. (BY MR. ROGERS) Correct?

12 A. I see that is correct.

13 Q. All right. Was that just an oversight or did
14 you leave out ethane on purpose?

15 A. I did not leave it out on purpose.

16 Q. Okay. So just like you did before where we
17 took your statements in your opinions where you're
18 referring to C3 through C8, and you agreed that you
19 could change those assertions to C2 through C8 and
20 still be correct, let's see if we can do that in this
21 case as well.

22 If you take your statement in
23 paragraph 70 describing the lower stream 12 that comes
24 out of column 8, if you change your statement to saying
25 stream 12 includes propane and higher hydrocarbons, C3

1 through C8 and you change that to say ethane and higher
2 hydrocarbons, C2 through C8, would that statement be
3 correct?

4 MR. PIALA: Objection, form.

5 THE WITNESS: That statement would be
6 correct.

7 Q. (BY MR. ROGERS) And would you also agree that
8 considering that column 8 in Figure 4 that you're
9 referring to, you've agreed that that is an ethane
10 recovery column, would it be more accurate to refer to
11 that lower stream 12 as including ethane and higher
12 hydrocarbons rather than what you state to be propane
13 and higher hydrocarbons?

14 MR. PIALA: Objection, form.

15 THE WITNESS: Please repeat your
16 question.

17 Q. (BY MR. ROGERS) Would you also agree that
18 considering column 8 in Figure 4 that you're referring
19 to, you have agreed that that is an ethane recovery
20 column, would it be more accurate to refer to that
21 lower stream 12 as including ethane and higher
22 hydrocarbons rather than what you state to be propane
23 and higher hydrocarbons?

24 MR. PIALA: Objection, form.

25 THE WITNESS: I believe that would be

1 correct.

2 Q. (BY MR. ROGERS) Not only correct, wouldn't it
3 be more accurate, more accurate?

4 MR. PIALA: Objection, form.

5 THE WITNESS: Based on the description in
6 the patent, I would say it would be more accurate.

7 Q. (BY MR. ROGERS) And let's look at Table 3
8 that you reference, column 11 of the Soldati patent,
9 Exhibit 1006, page 11, the third set of component
10 throughputs listed.

11 Stream 12, the composition of that
12 stream, do you see the ethane and propane in there?

13 A. I do.

14 Q. Does that further confirm your agreement that
15 it would be more accurate to refer to lower stream 12
16 as ethane and higher hydrocarbons rather than what you
17 put in your paragraph 70 description as propane and
18 higher hydrocarbons?

19 A. Roughly three-quarters of the ethane in the
20 feed stream comes out in stream 12, so it would've been
21 more accurate to refer to it as ethane and higher
22 hydrocarbons.

23 Q. Let's move over to paragraph 131 in your
24 declaration. If you look at paragraph 131, you're
25 referring to column 21 in Figure 4, correct?

1 A. Yeah, I do recite column 21 in paragraph 131.

2 Q. And column 21 is the additive recovery column
3 of the four-column Ryan/Holmes process, correct?

4 MR. PIALA: Objection, form.

5 THE WITNESS: Yes, column 21 appears to
6 be the equivalent of the additive recovery column
7 described in Figure 3 of Exhibit 1007.

8 Q. (BY MR. ROGERS) Rather than referring to this
9 column as an additive recovery column like Ryan and
10 Holmes do, you refer to this as a sweetening step; is
11 that correct?

12 THE REPORTER: A sweetening?

13 MR. ROGERS: Sweetening, like sugar.

14 THE WITNESS: I do refer to that
15 separation as a sweetening step.

16 Q. (BY MR. ROGERS) But you do agree that it's in
17 the additive recovery column, correct?

18 MR. PIALA: Objection, form.

19 THE WITNESS: I agree that it appears to
20 be the equivalent of the additive recovery column in
21 Exhibit 1007.

22 Q. (BY MR. ROGERS) And in your paragraph 131 of
23 your declaration, you refer to this column 21, additive
24 recovery column, as a sweetening step in which hydrogen
25 sulfide is removed from the natural gas liquid stream

1 through distillation; is that correct?

2 A. That's correct.

3 Q. And you refer to this process -- you refer to
4 Figure 4 of Soldati, Exhibit 1006, and you have a
5 parenthetical where you say column 21 -- it shows --
6 showing column 21, which sweetens the sour NGL
7 stream 17; is that correct?

8 A. That's correct.

9 Q. So you refer to stream 17 as the sour NGL
10 stream?

11 A. I do.

12 Q. And that's the same stream that we talked
13 about earlier as lower stream 12 coming out of
14 column 8, correct?

15 A. Correct.

16 Q. So we know what you refer to as a sour NGL
17 stream is ethane and higher hydrocarbons, correct?

18 MR. PIALA: Objection, form.

19 THE WITNESS: Ethane higher -- higher
20 hydrocarbons in addition to H2S.

21 Q. (BY MR. ROGERS) All right. So you agree that
22 stream 17 that you refer to as a sour NGL stream is
23 ethane and higher hydrocarbons and some hydrogen
24 sulfide, correct?

25 A. Correct.

1 Q. And then you refer to column 21, the additive
2 recovery column, as a sweetening -- sweetening step,
3 correct?

4 A. I do.

5 Q. And so that is -- that sweetening step, when
6 you sweeten a sour NGL stream, you remove the hydrogen
7 sulfide, correct?

8 A. That's my --

9 Q. That's what the sweetening is referring to?

10 A. That's my understanding, yes.

11 Q. And --

12 MR. PIALA: Counsel, after this line, do
13 you want to take a break?

14 MR. ROGERS: Yeah, let me see if I can
15 get through this.

16 Q. (BY MR. ROGERS) So the sweetening step,
17 column 21, the additive recovery that you refer to as a
18 sweetening of the sour NGL stream, what are the outputs
19 of that column 21? You've got a top and a bottom
20 outfit, right?

21 A. Correct.

22 Q. And what's coming out the top?

23 A. Coming out the top is going to be hydrogen
24 sulfide and lighter NGL components.

25 Q. And those lighter NGL components include

1 ethane, correct?

2 A. The overhead stream does contain the ethane,
3 some of the ethane.

4 Q. Most of the ethane, doesn't it?

5 A. It's about three-quarters of it.

6 Q. You think some of the ethane comes out the
7 bottom, one-quarter, is that what you said?

8 A. I was making comparison to the initial feed
9 stream to the process, not to the initial feed stream
10 of the column.

11 Q. Okay. So what percentage of the initial feed
12 stream ethane component is coming out the top of this
13 additive recovery column 21?

14 MR. PIALA: Objection, form.

15 THE WITNESS: Are you referring to the
16 initial feed stream to column 21 or the initial feed
17 stream to process stream 1?

18 Q. (BY MR. ROGERS) I'm referring to what you
19 referred to as the initial feed streams. So you tell
20 me.

21 A. Well, when I said three-quarters of the ethane
22 is recovered in the overhead of column 21, I was saying
23 three-quarters of the initial feed stream to the
24 process in stream 1.

25 Q. All right. So if three-quarters of the

1 initial feed stream ethane component, item 1, is coming
2 out the top of column 21, where's the rest of the
3 ethane going? Let's look at the outputs and go through
4 them one by one. 31 is one of the outputs. None of
5 the ethane is coming out of there, is it?

6 A. That's correct.

7 Q. Do you see Table 3 where it says zero?

8 A. I do.

9 Q. Ethane for stream 31?

10 A. I do.

11 Q. Let's try 57, any ethane coming out of there?

12 MR. PIALA: Objection, form.

13 Q. (BY MR. ROGERS) Zero, right? Look at
14 Table 3.

15 A. That's correct, there's none there.

16 MR. PIALA: Do you want to take that
17 break?

18 MR. ROGERS: I think I need to get an
19 answer to my question.

20 THE WITNESS: Is there a question on the
21 table?

22 MR. PIALA: There's not a question
23 pending.

24 Q. (BY MR. ROGERS) Where is the rest of the
25 ethane coming out? We have identified two places it's

1 not.

2 MR. PIALA: Objection, form.

3 Q. (BY MR. ROGERS) Well, it's not come out of 31
4 or 57. We agreed to that.

5 A. If I look at Table 2, stream 6, that's the
6 feed to the process.

7 Q. Why are you looking at Table 2?

8 A. Well, because neither Table 2 nor Table 3 have
9 stream 1 in them and I would expect that he's making a
10 comparison for the same feed stream. If he's looking
11 at a process of improvement, you have to start with the
12 same feed stream to demonstrate that improvement.

13 So stream 1 in Figure 4 must be the same
14 feed or the same composition as stream 6 in Figure 3.
15 If we look at the composition of the stream 6, it shows
16 41-1/2 kilomoles per hour of ethane. And in stream 27,
17 we account for 32-1/2, so roughly three-quarters of the
18 ethane that's spent.

19 Q. Well, let's just focus on the outputs of
20 Figure 4. We know you've got one coming in, you've
21 got 57, 31, and 27 coming out.

22 A. And 47.

23 Q. Okay. And you can see 47 from 44, right? So
24 there's the rest of the ethane, isn't it, 8.86?

25 MR. PIALA: Objection, form.

1 Q. (B MR. ROGERS) That's got to be all of the
2 ethane, isn't it? All of the ethane coming is coming
3 in -- coming out.

4 MR. PIALA: Objection, form.

5 What is the question?

6 MR. ROGERS: I haven't finished the
7 question.

8 MR. PIALA: Oh.

9 Q. (BY MR. ROGERS) All of the ethane coming in 1
10 is coming out of 47 and 27, correct?

11 A. That's correct.

12 Q. So coming out of 27, what is that, 32.57. And
13 out of 47 you've got 8.86.

14 A. That's correct.

15 Q. Okay. So that's about 80 percent, isn't it,
16 coming out, 80 percent of -- 80 percent of the methane
17 coming out of 27?

18 A. The material balance that you're doing does
19 not close because it does not account for all of the
20 ethane that's fed to the process.

21 Q. Well, there's no other outputs, are there? I
22 mean, you have a specification of each output.

23 A. I'm not sure why his material balance doesn't
24 close.

25 Q. All right. Well, let's see if we can close

1 this out before we take the break your counsel is
2 requesting.

3 I am looking at your description of the
4 additive recovery column 21 as a sweetening step. And
5 if -- if column 21 truly was a sweetening step and you
6 had the sweetened portion coming out the bottom,
7 wouldn't you call what comes out the top the acid gas?

8 MR. PIALA: Objection, form.

9 THE WITNESS: I would, I would call
10 stream 27 acid gas.

11 Q. (BY MR. ROGERS) Okay. So -- so if column 21
12 truly is a sweetening step column, wouldn't you have
13 only acid gas coming out one end and everything else
14 coming out the other?

15 A. No, I wouldn't define it that way. Sweetening
16 means you remove the hydrogen sulfide, and therefore
17 your product is sweeter than when it went in.

18 Q. Okay. But coming out the top you've got
19 ethane and hydrogen sulfide, correct?

20 A. And propane and a little bit of butane.

21 Q. All right.

22 A. And a little bit of carbon dioxide.

23 Q. And then downstream of -- of that -- that flow
24 coming out the top of 21, isn't there another
25 sweetening -- isn't there a sweetening step downstream

1 of there? Isn't there an amine process?

2 A. There can be, but it's not represented by the
3 Soldati patent.

4 Q. Okay. But you know what a four-column
5 Ryan/Holmes process does. You can look at
6 Exhibit 1007, page 5, coming out the top of the
7 additive recovery, and Figure 3 of Exhibit 1007 has the
8 amine clause.

9 That's the sweetening step, isn't it?

10 MR. PIALA: Objection, form.

11 THE WITNESS: Another sweetening occurs
12 there.

13 Q. (BY MR. ROGERS) Why would -- why would you do
14 two sweetening steps in a row?

15 A. Because the first column does not separate the
16 hydrogen sulfide from the light NGLs. It sweetens the
17 heavy NGLs, but it doesn't sweeten the light ones.

18 Q. I don't understand why you're referring to
19 this additive recovery column as a sweetening step.
20 It's a -- it's a separation of heavy hydrocarbons and
21 light hydrocarbons. Let me ask you this.

22 What you refer to as a sweetening step
23 for the additive recovery, have you ever seen Ryan or
24 Holmes or anyone else describing that additive recovery
25 column as a sweetening step?

1 MR. PIALA: Objection, form. Scope.

2 THE WITNESS: I think it's irrelevant
3 what other people refer to it as. It sweetens the
4 bottom product.

5 Q. (BY MR. ROGERS) You just came up with that
6 yourself, didn't you, calling it a sweetening step?
7 Nobody else has ever called it that, especially the
8 guys who designed this, developed this product, Ryan
9 and Holmes?

10 MR. PIALA: Objection, form. Scope.
11 Argumentative.

12 THE WITNESS: I did not make up the
13 definition of the term "sweetening." I applied the
14 definition as I know it.

15 Q. (BY MR. ROGERS) But you agree that
16 Ryan/Holmes refers to their fourth column as an
17 additive recovery column, not a sweetening step,
18 correct?

19 MR. PIALA: Objection, form. Scope.

20 THE WITNESS: Figure 3 of Exhibit 1007
21 that describes the four-column Ryan/Holmes process
22 clearly stamps that column with the label "additive
23 recovery," but that doesn't take away from the fact
24 that the bottom's product is sweetened relative to the
25 feed to that column.

1 Q. (BY MR. ROGERS) And you agree that
2 Ryan/Holmes themselves describing their own process,
3 especially in Exhibit 1007, page 5, Figure 3, that the
4 sweetening step that they are referring to is that
5 amine claus step that's treating the top stream of the
6 additive recovery column, correct?

7 MR. PIALA: Objection, form. Scope.

8 THE WITNESS: And I agree that that is
9 another sweetening step in the process.

10 MR. ROGERS: Let's go ahead and take your
11 requested break.

12 (Recess from 3:32 p.m. to 3:49 p.m.)

13 Q. (BY MR. ROGERS) You still have Exhibit 1007
14 in front of you, right?

15 A. I do.

16 Q. So taking a look at Figure 2, the three-column
17 Ryan/Holmes process, that's what you put in your
18 declaration, right, that Figure 2?

19 A. That figure does appear in my declaration,
20 yes.

21 Q. Okay. And based on Figure 2 of the
22 Ryan/Holmes three-column process from Exhibit 1007,
23 what are the five products that are produced by the
24 three-column Ryan/Holmes process?

25 A. We identify the products by the circles with

1 the arrow in them. Starting from the top and going
2 clockwise, we have the sales gas or fuel, followed by
3 the CO₂ to injection, followed by NGL, and I can't read
4 what's in the parenthesis, but I suspect it's C₂, C₃,
5 sulfur, and NGL, once again, I can't see what's in
6 parenthesis, but I suspect it's C₃+ or C₄+

7 Q. Can we agree it's C₄+

8 A. Excuse me?

9 Q. Can we agree it's C₄+

10 A. I can't see it. It's -- because of the
11 graying on the paper, and I don't know that the split
12 of propane is perfect. Can I see it with the
13 magnifying glass?

14 Q. You've got the same copy I do.

15 A. I know, but --

16 Q. I don't think it's any better.

17 A. It's very small, too.

18 I believe it is C₄+. If you use your
19 little -- the little thing in the magnifying glass, you
20 can see the four.

21 Q. So let's start with the sales gas stream.
22 That's methane C₁, correct?

23 A. Well, it's not pure methane, but it's methane
24 processed to meet a specification necessary for sales.

25 Q. So it's pure enough to be either sold or

1 burned as fuel, correct?

2 A. That is -- yes, that would have to be pure
3 enough for purposes of sale.

4 Q. Does the '332 patent Prim process produce a
5 methane stream?

6 MR. PIALA: Objection, form.

7 THE WITNESS: When you refer to the Prim
8 process, are you talking about the claimed elements of
9 the process, the claimed element?

10 Q. (BY MR. ROGERS) We can start with that.

11 A. Okay. There's not a separate methane stream
12 claimed in Claim 1 of the '332 patent.

13 Q. Well, let's look at the CO2 injection stream
14 in the three-column Ryan/Holmes process.

15 Do you know the purity of that CO2
16 stream?

17 MR. PIALA: Objection, form.

18 THE WITNESS: I do not.

19 Q. (BY MR. ROGERS) Would you agree that it's a
20 very high purity?

21 MR. PIALA: Objection, form.

22 THE WITNESS: Table 1 of Exhibit 1007
23 suggests that the CO2 product was roughly 95 to 96
24 percent pure.

25 Q. (BY MR. ROGERS) So it would be fair to say

1 that the CO₂ stream that's 95 to 96 percent pure would
2 be referred -- be referred to as a pure CO₂ stream?

3 A. If you wish to call it pure for purposes of
4 this discussion, I'm willing to call that pure. But
5 obviously pure in its purest sense means 100 percent.

6 Q. Well, you've already confirmed that it's 95
7 to 96 percent, so we know it's not 100 percent.

8 A. No, we know that, yes.

9 Q. Okay. The -- the NGL stream, C2 and C3, the
10 Ryan/Holmes process recovers essentially all of the
11 propane, correct?

12 A. It recovers all of the what?

13 Q. Propane.

14 A. We're specifically talking about the
15 three-column process at this point?

16 Q. Yes.

17 A. Again, there is no material balance presented
18 into here, but I would suspect that nearly all of the
19 C3 ends up in the overhead of the third column.

20 Q. And for the C2 ethane, it's -- Ryan/Holmes
21 requires a high percentage of the ethane as well,
22 correct?

23 MR. PIALA: Objection, form.

24 THE WITNESS: Table 1 suggests recovery
25 of the ethane is in the range of 90 to 60 percent,

1 depending on process conditions and depending upon feed
2 composition.

3 Q. (BY MR. ROGERS) Okay. So let's -- let's
4 compare that with the Prim '332 patent process.

5 Does the Prim process recover high
6 percentages of propane?

7 MR. PIALA: Objection, form.

8 (Exhibit 1001 marked)

9 Q. (BY MR. ROGERS) If it would help in answering
10 the question, I can direct you to column 4 of the Prim
11 '332 patent, Exhibit 1001, at lines 55 through 60.

12 A. Repeat the question and the citation.

13 Q. Well, the citation is column 4, lines 55
14 through 60. And the question is does the Prim process
15 recover high percentages of propane?

16 MR. PIALA: Objection, form.

17 THE WITNESS: Well, you've got me in the
18 specifications now and you're referring to the Prim
19 process, and I don't believe the specifications recite
20 to a single process. When I read the specifications, I
21 see a whole range of processes.

22 And particularly in this area, it says
23 optionally propane, "... disregarding the recovery of
24 ethane, methane, and optionally propane." And so that
25 would suggest to me that you can or may not recover the

1 propane.

2 Q. Well, let's go to the Prim process as recited
3 in Claim 4 where it recites that the sweet NGL rich
4 stream -- sweet NGL rich stream comprises no more than
5 1 molar percent methane.

6 Does the Prim process, as recited in
7 Claim 4, recover a high percentage of propane?

8 MR. PIALA: Objection, form.

9 THE WITNESS: Claim 4 is silent on the
10 recovery of propane.

11 Q. Yeah, I misstated the question so I'll
12 withdraw that.

13 Does the Prim process, as recited in
14 Claim 4, recover a high percentage of methane?

15 MR. PIALA: Objection, form.

16 THE WITNESS: According to claim 4, the
17 sweet NGL rich stream will contain no more than 1 mole
18 percent methane, but that's -- that's reciting to a
19 single product of the claimed processes.

20 So from Claim 4 alone, I can't determine
21 if or how much methane may be recovered.

22 Q. (BY MR. ROGERS) Well, you stated before that
23 you understand that the Prim process doesn't have a
24 separate methane stream, correct, recovery stream?

25 MR. PIALA: Objection, form.

1 THE WITNESS: The Prim process is recited
2 by the claims. The challenged claims does not include
3 a separate methane stream.

4 Q. (BY MR. ROGERS) Are you familiar with the NGL
5 recovery processes that were used prior to the
6 development of expander plants in the early 1970s?

7 A. I don't believe I am.

8 Q. Are you familiar with the lean oil process?

9 A. Repeat that.

10 Q. Are you familiar with the lean oil process?

11 A. I've heard the term, but I don't recall the
12 details of the process.

13 Q. Let's go back to paragraph 131 of your
14 declaration where you assert that column 21 sweetens
15 what you refer to as a sour NGL stream 17.

16 Are you there?

17 A. I am.

18 Q. Would you then describe the overhead of that
19 column 21 as the acid gas stream?

20 A. The overhead of that column contains the
21 hydrogen sulfide, so it is an acid gas stream.

22 Q. Would it be more accurate to refer to it as a
23 stream with acid gas included as opposed to an acid gas
24 stream?

25 MR. PIALA: Objection, form.

1 THE WITNESS: Say that again.

2 Q. (BY MR. ROGERS) Would it be more accurate to
3 refer to it as a stream with acid gas included as
4 opposed to an acid gas stream?

5 A. I don't -- I don't know that it necessarily
6 improves the accuracy.

7 Q. Let's take a look at Exhibit 1007, page 5,
8 Figure 3, the four-column Ryan/Holmes process. And
9 referring to the fourth column, the additive recovery
10 column, and following the stream coming out the top,
11 which then goes into an amine Claus, which you referred
12 to as a sweetening step, correct?

13 A. Correct.

14 Q. Would you refer to the stream coming out the
15 bottom, identified as sulfur, would you refer to that
16 as the acid gas stream?

17 MR. PIALA: Objection, form. Scope.

18 THE WITNESS: I would refer that to -- to
19 that as an acid gas stream also.

20 Q. (BY MR. ROGERS) So the other stream exiting
21 the amine Claus sweetening step, you have referred to
22 it as -- to that as the light NGL stream; is that
23 correct?

24 A. Yes, I was using the author's language when I
25 referred to it as light NGL.

1 Q. That stream has C2 and C3 ethane and propane;
2 is that correct?

3 A. It's comprised of C2 and C3.

4 Q. Would you then refer to that NGL stream as a
5 light sweet NGL stream?

6 A. I would change the order of the qualifiers and
7 call it a sweet light NGL and keep the light close to
8 the NGL.

9 Q. So taking a look at Exhibit 106, the Soldati
10 patent, Table 3, some of the compositions for the
11 Figure 4, a four-column Ryan/Holmes process. And
12 taking a look at the stream 27, do you understand that
13 that stream 27 contains 94.54 percent of the C2 to C4?

14 MR. PIALA: Objection, form.

15 THE WITNESS: It's not a calculation I've
16 performed. If it's somewhere in the patent, I don't --

17 Q. (BY MR. ROGERS) Let's do it real quick. I
18 can help you. So if you look at the composition of
19 stream 27 -- go ahead and see if you can take notes so
20 that you can make sure, you can confirm my math.

21 A. Do you have some paper and some writing -- do
22 you have something that I can write on?

23 (Discussion off the record)

24 Q. (BY MR. ROGERS) Do you have a calculator
25 handy?

1 A. No. Last time I brought my phone into a
2 deposition, it rang three times. It's not in here with
3 me.

4 Q. Your counsel may be able to help you out here,
5 unless you want to just trust my math. But let's do --

6 A. Explain for me what it is you want me to
7 calculate.

8 Q. We're going to calculate and confirm -- if my
9 numbers are correct, we're going to confirm that
10 Table 3 shows the stream 27 has 94.54 percent of the C2
11 to C4.

12 A. And 94.54 percent of the C2 to C4 from the
13 feed to the process or the feed to the column?

14 Q. No, actually, we're going to confirm that
15 stream 27 is 94.5 percent C2 to C4.

16 A. So you're looking at the composition, not the
17 recovery?

18 Q. Yeah. So the H2S is 0.03 and the CO2 is 3.65,
19 correct?

20 MR. PIALA: Objection, scope.

21 Q. (BY MR. ROGERS) Kilomoles per hour.

22 MR. PIALA: Same objection.

23 THE REPORTER: What is it?

24 MR. ROGERS: Kmol/h.

25 THE WITNESS: Okay. So when I add the C2

1 through C4 molar flow rates, I get 63.75 kilomoles per
2 second of a total of 67.43. So the ratio of those
3 two -- this is where I need a calculator.

4 Q. (BY MR. ROGERS) 63.75 divided by 67.4 --

5 A. 67.43.

6 Q. 95.4 percent?

7 A. I'll take your word for it. It looks to be
8 approximately right.

9 Q. Okay. And it's C2 through C4, not -- you said
10 C2 through C3, I think.

11 A. I'm sorry.

12 Q. There's -- and butane.

13 A. I added all three of them, including the 0.67
14 of butane.

15 Q. Primarily C2 to C3.

16 MR. PIALA: Objection, scope.

17 Q. (BY MR. ROGERS) So this stream 27, it's, you
18 agree, is 94.5 percent C2 through C4 and the remaining
19 5.46 percent is H2S and CO2, correct?

20 MR. PIALA: Objection scope.

21 THE WITNESS: That would be correct.

22 Q. (BY MR. ROGERS) Would you consider a stream
23 such as this that is 94.5 percent C2 through C4 an acid
24 gas stream?

25 MR. PIALA: Objection, form.

1 THE WITNESS: If I'm specifying materials
2 and construction for this process, I'm definitely going
3 to refer to it as an acid gas stream.

4 Q. (BY MR. ROGERS) What if you're not specifying
5 materials for this process?

6 MR. PIALA: Objection, scope.

7 Q. (BY MR. ROGERS) Would you refer to a stream
8 with 94.5 percent C2 through C4 as an acid gas stream?

9 A. I believe I would. It still contains the acid
10 gas.

11 Q. Well, because of that content of acid gas in
12 this stream 27 in Table 3 that is 94.5 percent C2
13 through C4, because it does have some acid gas, would
14 you then refer to that stream 27 as a sour NGL bridge
15 stream?

16 MR. PIALA: Objection, form.

17 THE WITNESS: I think that's an accurate
18 description also. It contains hydrogen sulfide, that
19 makes it sour. It contains C2 through C4, so it
20 contains components of an NGL.

21 Q. (BY MR. ROGERS) Let's take a look at
22 paragraph 75 of your declaration. You're referring to
23 Figure 2 of Exhibit 1007, a three-column Ryan/Holmes
24 process.

25 MR. PIALA: Objection, form.

1 Was that a question?

2 MR. ROGERS: I haven't finished.

3 Q. (BY MR. ROGERS) Let's go through the steps in
4 your paragraph 75. You first say in the first stage
5 the methane is removed from the hydrocarbon stream; is
6 that correct?

7 A. That's correct.

8 Q. And that's one of the first columns in the
9 three-column Ryan/Holmes process identified as a
10 demethanizer; is that correct?

11 MR. PIALA: Objection, form.

12 THE WITNESS: That's why it's labeled a
13 demethanizer, yes.

14 Q. (BY MR. ROGERS) And then in the second stage,
15 the carbon dioxide is removed and it goes out the top
16 of that ethane recovery column, correct?

17 A. That's correct.

18 Q. And the third stage in the third column, the
19 additive recovery column, you say the stream is
20 separated into a sweet NGL rich stream with the C4+
21 hydrocarbons and a sour NGL stream with C2 and C3
22 hydrocarbons; is that correct?

23 A. That's correct.

24 Q. And then you say the sour NGL stream is then
25 sweetened using amine solvent; is that correct?

1 A. That's correct.

2 THE REPORTER: Amine salt?

3 MR. ROGERS: Amine, A-M-I-N-E.

4 THE REPORTER: Yeah. Salt?

5 MR. ROGERS: Solvent, S-O-L-V-E-N-T.

6 THE REPORTER: Oh, solvent, okay.

7 Q. (BY MR. ROGERS) So going back to this
8 additive recovery, the third column, the bottom of the
9 additive recovery column, that's referred to as
10 additive recycle; is that correct?

11 MR. PIALA: Objection, form.

12 THE WITNESS: Well, the bottom stream is
13 split into a product stream and a recycle stream.

14 Q. (BY MR. ROGERS) Well, let's focus on the
15 additive recycle stream. That's being recycled back
16 into the first two columns, correct?

17 A. That's correct.

18 Q. And when the additive recycle stream in the
19 three-column Ryan/Holmes process goes into the first
20 and second column, are those additives being put into
21 the first and second columns, are those additives
22 solvents?

23 MR. PIALA: Objection, form.

24 THE WITNESS: To refer to them as
25 solvents would suggest that they are solvating

1 something and I don't know what they could be
2 solvating. So I wouldn't refer to them as solvents.

3 Q. (BY MR. ROGERS) Well, let's focus on the
4 ethane recovery column, the second column in the
5 three-column Ryan/Holmes process. When the additive
6 recycle puts additives into the ethane recovery column,
7 you have a separation in this distillation column
8 occurring, CO₂ coming out the top, correct?

9 A. Correct.

10 Q. And ethane being recovered at the bottom,
11 correct?

12 A. Correct.

13 Q. In that distillation process of ethane
14 recovery in the second column of the three-column
15 Ryan/Holmes process, are the additives functioning as
16 solvents?

17 MR. PIALA: Objection, form.

18 THE WITNESS: Again, I would not refer to
19 them as solvents. They are being added back to the
20 column to affect the VLE. So they are modifying the
21 composition, and therefore modifying the boiling point
22 of the mixture, but I don't believe that's a solvating
23 effect.

24 Q. (BY MR. ROGERS) Why?

25 A. I don't see what's being solvated by the

1 recycle stream that's being put in the column. It's
2 simply affecting the composition of the stage that it's
3 being added back to.

4 Q. I need to take a quick break. Let's do five
5 minutes.

6 THE REPORTER: Off the record at
7 4:23 p.m.

8 (Recess from 4:23 p.m. to 4:51 p.m.)

9 Q. (BY MR. ROGERS) Dr. Rockstraw, let's take a
10 look at Exhibit 1006, the Soldati patent, turning back
11 to Figure 4 and looking at this stream 27.

12 A. Yes.

13 Q. That is -- comes out at the top of column 21,
14 the additive recovery column?

15 MR. PIALA: Objection, form.

16 Q. (BY MR. ROGERS) Do you see that?

17 A. It's the overhead of column 21, yes, total
18 condensers to liquid stream.

19 Q. And so let's -- let's see if we can refer to
20 Table 3, column 11. Do you see the amount of ethane
21 specified in stream 27 of Table 3?

22 A. I see it as 32.57 kilomoles per hour.

23 Q. And then the total for that stream, the
24 throughput kilomoles per hour, how much is that?

25 A. I see that as 67.43 kilomoles per hour.

1 Q. Okay. So if we do a calculation to see what
2 percentage of ethane is in that stream, what
3 calculation do you do?

4 A. 32.57 divided by 67.43 will give you the mole
5 fraction of ethane in that stream, which looks to be
6 just under half.

7 Q. I come up with 48.3 percent.

8 A. I accept that.

9 Q. So stream 27 in Figure 4 of the Soldati
10 patent, Exhibit 1006, is 48.3 percent ethane; is that
11 correct?

12 MR. PIALA: Objection, form and
13 objection, scope.

14 Q. (BY MR. ROGERS) Well, let me see if I got
15 that question right. Hold on. I'll rephrase it if I
16 have to.

17 Do you agree that stream 27 in Figure 4
18 of the Soldati patent, Exhibit 1006, is 48.3 percent
19 ethane?

20 MR. PIALA: Objection, form and
21 objection, scope.

22 THE WITNESS: I would qualify that to
23 48.3 mole percent.

24 Q. (BY MR. ROGERS) Would you also qualify
25 48.3 percent molar percent ethane?

1 MR. PIALA: Objection, form. Objection,
2 scope.

3 THE WITNESS: I suppose one could call it
4 that, but I have always referred to as mole percent.

5 Q. (BY MR. ROGERS) Well, let's turn to your
6 declaration, Exhibit 1002, paragraph 177. In 177, you
7 state that "stream 28 teaches the sweet NGL rich
8 stream. According to Table 3, stream 28 contains no
9 methane, methane, CO2, or hydrogen sulfide, thus it
10 includes less than 1 percent methane."

11 Did I read that correctly?

12 MR. PIALA: Objection, form.

13 THE WITNESS: You did.

14 Q. (BY MR. ROGERS) Okay. And then you go on to
15 say, "Less than 1 percent ethane."

16 MR. PIALA: Objection, form.

17 Q. (BY MR. ROGERS) Correct?

18 A. That's correct.

19 Q. So in this -- in your paragraph 177 of your
20 declaration, you were making these statements to
21 support your opinion of unpatentability of Claim 4 of
22 the '332 patent, correct?

23 MR. PIALA: Objection, form.

24 THE WITNESS: Correct.

25 Q. (BY MR. ROGERS) So you submitted an opinion

1 through your declaration in this case that Claim 4 of
2 the '332 patent is unpatentable because stream 28
3 contains no ethane, correct?

4 MR. PIALA: Objection, form.

5 THE WITNESS: Please say that again.

6 Q. (BY MR. ROGERS) In paragraph 77 of your
7 declaration, you were making these statements to
8 support your opinion of unpatentability of Claim 4 of
9 the '332 patent, correct?

10 MR. PIALA: Can you repeat that question?

11 THE REPORTER: You want me to?

12 MR. ROGERS: Yeah, when I went to repeat
13 the question, I went two up. Let me start fresh.

14 Q. (BY MR. ROGERS) In paragraph 77 of your
15 declaration, you were making these statements to
16 support your opinion of unpatentability of Claim 4 of
17 the '332 patent, correct?

18 MR. PIALA: Objection, form.

19 THE WITNESS: Please say it one more
20 time.

21 Q. (BY MR. ROGERS) Yeah, I'm going to correct
22 myself because I kept saying 77. It's 177.

23 In paragraph 177 of your declaration you
24 state that stream 28 contains no ethane, correct?

25 A. Among other things, I do say it contains no

1 ethane.

2 Q. And you make these statements in paragraph 177
3 of your declaration to support your opinion that
4 Claim 4 of the '332 patent is unpatentable, correct?

5 A. That's correct.

6 Q. And Claim 4 specifies that the sweet NGL rich
7 stream comprises no more than 1 percent methane, no
8 more than 1 molar percent ethane, and no more than
9 1 molar percent acid gases, correct?

10 A. That is what Claim 4 states, correct.

11 Q. So let's focus on the ethane. Claim 4
12 specifies that the sweet NGL rich stream comprises no
13 more than 1 molar percent ethane, correct?

14 A. Correct.

15 Q. And you state in paragraph 177 that stream 28
16 contains no ethane, and thus it includes less than
17 1 percent ethane.

18 MR. PIALA: Objection, asked and
19 answered.

20 Q. (BY MR. ROGERS) Correct?

21 A. That's correct.

22 Q. If stream 27 rather than stream 28 is
23 considered to be the Claim 4 sweet NGL rich stream, do
24 you agree that the stream 27 sweet NGL rich stream
25 comprises more than 1 percent ethane?

1 MR. PIALA: Objection, form. Objection,
2 scope.

3 THE WITNESS: So you're asking me to
4 accept the premise that stream 27 in Figure 4 is the
5 sweet NGL stream and then perform my analysis of
6 Claim 4 based on that presumption?

7 Q. (BY MR. ROGERS) Yes, we can call it an
8 assumption.

9 A. I can never see how one could call stream 27
10 the sweet NGL stream being that it contains the acid
11 gas.

12 Q. Well, let's consider for this hypothetical
13 that we're referring to claim 27 -- I mean, stream 27
14 after it has been sweetened because you understand that
15 in the four -- in a four-column Ryan/Holmes process
16 that stream 27 is going to be put through an amine
17 process and sweetened, correct?

18 A. I understand that.

19 Q. So let's work from the hypothetical that if
20 stream 27, after being processed through an amine
21 sweetening process, as you understand it's done in a
22 four-column Ryan/Holmes process, if that
23 post-sweetening stream 27 is considered to be the
24 Claim 4 sweet NGL rich stream, would you agree that
25 this sweet NGL rich stream comprises more than

1 1 percent molar -- 1 molar percent ethane?

2 MR. PIALA: Objection, form and
3 objection, scope.

4 THE WITNESS: If I accept your premise
5 that stream 27 is the sweet NGL stream, I see no way
6 that the ethane composition can meet the claim
7 limitation of Claim 4.

8 Q. (BY MR. ROGERS) In fact, the percent ethane
9 would be way more than 1 percent. It would be around
10 48 percent, correct?

11 MR. PIALA: Objection, form.

12 THE WITNESS: After the sweetening to
13 remove the sulfide and the carbon dioxide, I expect it
14 would be probably higher than 50 percent.

15 Q. (BY MR. ROGERS) So that's Claim 4. Let's now
16 do Claim 7, and that is paragraph 189 of your
17 declaration. And your opinion on Claim 7 goes from
18 paragraph 189 all the way to your paragraph 194. And
19 you are still relying upon this stream 28, correct?

20 MR. PIALA: Objection, form.

21 THE WITNESS: Repeat your question.

22 Q. (BY MR. ROGERS) Your -- in paragraphs 189
23 through 94 -- in paragraphs 189 through 194 of your
24 declaration, you assert that stream 28 of Figure 4 of
25 the Soldati patent is the sour NGL rich stream recited

1 in Claim 7, correct?

2 MR. PIALA: Objection, form. Objection,
3 scope. Misstates the document.

4 THE WITNESS: I don't believe I call
5 stream 28 the sour NGL stream.

6 Q. (BY MR. ROGERS) What stream are you referring
7 to, stream 12?

8 A. Yes, the beginning of paragraph 189 recites,
9 "As described in claim element 1.3, stream 12 is a sour
10 NGL stream."

11 Q. All right. So for the percentage of ethane
12 recited in Claim 7, that requires no more than
13 5 percent molar -- that requires no more than 5 molar
14 percent ethane, correct?

15 MR. PIALA: Objection, form.

16 THE WITNESS: In addition to other
17 limitations, the ethane limitation is 5 mole percent.

18 Q. (BY MR. ROGERS) And you, in paragraph 189,
19 assert that stream 12 in Figure 4 of Soldati,
20 Exhibit 1006, corresponds with the sour NGL rich stream
21 of Claim 7, correct?

22 A. Correct.

23 Q. And you assert that stream 12 contains
24 2.1 percent ethane, correct?

25 A. I do.

1 Q. And your assertion that stream 12 corresponds
2 with the recited sour NGL stream and has 2.1 percent
3 ethane is used to support your opinion of
4 unpatentability of Claim 7 of the '332 patent, which
5 requires no more than 5 molar percent ethane, correct?

6 MR. PIALA: Objection, form.

7 THE WITNESS: That is correct.

8 Q. (BY MR. ROGERS) If stream 27 of Figure 4 of
9 the Soldati patent is considered to be the sweet NGL
10 rich stream recited in Claim 7 of the '332 patent, do
11 you agree that this sweet NGL rich stream comprises no
12 more than 5 molar percent ethane?

13 MR. PIALA: Objection, form.

14 THE WITNESS: Could you read that
15 question to me again?

16 Q. (BY MR. ROGERS) Yeah, let me rephrase it.

17 If stream 27 of Figure 4 of the Soldati
18 patent, Exhibit 1006, is considered to be the sweet NGL
19 rich stream recited in Claim 7 of the '332 patent, do
20 you agree that the sweet NGL rich stream comprises more
21 than 5 molar percent ethane?

22 MR. PIALA: Objection, form. Objection,
23 scope.

24 THE WITNESS: I believe the limitation of
25 Claim 7 is referring to the sour NGL rich stream, not

1 the sweet.

2 Q. (BY MR. ROGERS) Yeah, let me try again. If
3 claim 27 -- let me start over.

4 If stream 27 of Figure 4 of the Soldati
5 patent, Exhibit 1006, is considered to be the sour NGL
6 rich stream recited in Claim 7 of the '332 patent, do
7 you agree that the sour NGL rich stream comprises more
8 than 5 molar percent ethane?

9 MR. PIALA: Objection, form. Objection,
10 scope.

11 THE WITNESS: The same calculation. So,
12 again, if I accept your premise that this 27 is the
13 sour NGL rich stream recited in Claim 7, the
14 calculations show that it would have a greater than
15 5 mole percent carbon -- I'm sorry, 5 molar percent
16 ethane.

17 Q. Not only greater, much greater?

18 MR. PIALA: Objection, form.

19 Q. (BY MR. ROGERS) Over 48 percent, correct?

20 A. Yeah, it would be roughly nine to ten times
21 greater.

22 Q. I think I'm done. I want to take a quick
23 break just to make sure.

24 A. Okay.

25 Q. Hope we can get you out of here.

1 THE REPORTER: Off the record.
2 (Recess from 5:14 p.m. to 5:19 p.m.)
3 MR. ROGERS: Pass the witness.
4 MR. PIALA: Pass the witness.
5 (Proceedings concluded at 5:19 p.m.)
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PAGE	LINE	CHANGE	REASON
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[illegible]

1 I, DR. DAVID ROCKSTRAW, have read the foregoing
2 deposition and hereby affix my signature that same is
3 true and correct, except as noted above.

4 _____
5 DR. DAVID ROCKSTRAW

6 THE STATE OF _____)

7 COUNTY OF _____)

8 Before me, _____, on this day personally
9 appeared DR. DAVID ROCKSTRAW, known to me (or proved to
10 me under oath or through _____) (description
11 of identity card or other document) to be the
12 person whose name is subscribed to the foregoing
13 instrument and acknowledged to me that he executed
14 the same for the purposes and consideration therein
15 expressed.

16
17 Given under my hand and seal of office, this
18 _____ day of _____, _____.

19
20 _____
21 NOTARY PUBLIC IN AND FOR
22 THE STATE OF _____

23 My commission expires: _____

24 _____ No Changes Made _____ Amendment Sheet(s) Attached
25

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

SCOUT ENERGY MANAGEMENT,	)	
LLC, and CHEVRON U.S.A. INC.,	)	
Petitioners,	)	
	)	
VS.	)	Case IPR2024-00385
	)	Patent 8,505,332 B1
PILOT INTELLECTUAL PROPERTY,	)	
LLC,	)	
Patent Owner.	)	

REPORTER'S CERTIFICATION OF THE ORAL
DEPOSITION OF DR. DAVID ROCKSTRAW
OCTOBER 18, 2024

I, Donna Wright, a Certified Shorthand
Reporter and Notary Public in and for the State of
Texas, hereby certify to the following:

That the witness, DR. DAVID ROCKSTRAW, was
duly sworn by the officer and that the transcript of
the oral deposition is a true record of the testimony
given by the witness;

That the original deposition was delivered to
Mr. Alex Piala;

That a copy of this certificate was served on
all parties and/or the witness shown herein on
October 25, 2024.

I further certify that pursuant to FRCP Rule
30(3) that the signature of the deponent:

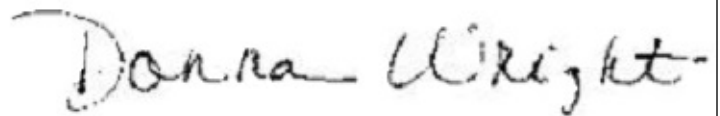
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6 changes and the reasons therefore:

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9 I further certify that I am neither counsel
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13 otherwise interested in the outcome of the action.

14 Certified to by me on this, the 25th day of
15 October, 2024.

16
17
18 

19 DONNA WRIGHT, Texas CSR 1971
20 Expiration Date: 11/30/24
21 LEXITAS
22 13101 N.W. Freeway, Suite 210
23 Houston, Texas 77040
24 Firm Registration No. 549
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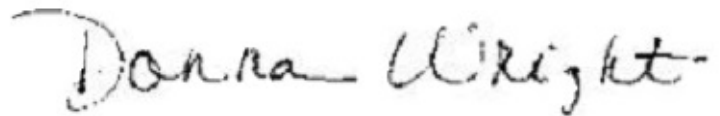
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21 Houston, Texas 77040
22 Firm Registration No. 549
23
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25

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