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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARKEMA FRANCE,

Petitioner

v.

HONEYWELL INTERNATIONAL INC.,

Patent Owner

Case: IPR2015-00915, IPR2015-00916, IPR2015-00917

U.S. Patent No. 8,710,282

Video Deposition of LEO E. MANZER, Ph.D.

(Taken by the Patent Owner)

Durham, North Carolina

Thursday, January 7, 2016

Reported by: Marisa Munoz-Vourakis -
RMR, CRR and Notary Public

1 APPEARANCE OF COUNSEL:

2

3 For the Petitioner:

4 BRUCE J. ROSE, ESQ

5 MIRANDA M. SOOTER, ESQ.

6 CHRISTOPHER TL DOUGLAS, ESQ.

7 Alston & Bird, LLP

8 101 South Tryon Street, Suite 4000

9 Bank of America Plaza

10 Charlotte, NC 28280-4000

11 704-444-1000

12 bruce.rose@alston.com

13 miranda.sooter@alston.com

14 christopher.douglas@alston.com

15

16

17

18

19

20

21

22

23

24

25

1 APPEARANCES (Continued)

2 For the Patent Owner:

3 JON H. BEAUPRÉ, ESQ.

4 ALLEN R. BAUM, ESQ.

5 ALLYN B. ELLIOTT, ESQ.

6 JOSHUA E. NEY, ESQ.

7 Brinks, Gilson & Lione

8 524 South Main Street, Suite 200

9 Ann Arbor, MI 48104-2921

10 734-302-6000

11 jbeaupre@brinksgilson.com

12 abaum@brinksgilson.com

13 aelliott@brinksgilson.com

14 jney@brinksgilson.com

15 Also Present: ROB HAHN, Videographer

16 Video Deposition of LEO E. MANZER, taken
17 by the Petitioner, at Brinks, Gilson & Lione, 4721
18 Emperor Boulevard, Suite 220, Durham, North Carolina,
19 on the 7th day of January, 2016 at 9:09 a.m., before
20 Marisa Munoz-Vourakis, Registered Merit Reporter,
21 Certified Realtime Reporter and Notary Public.

22 I N D E X

23 Examination of: Page

24 LEO E. MANZER

25 EXAMINATION BY MR. ROSE 5

1 P R O C E E D I N G S

2 THE VIDEOGRAPHER: This is the
3 beginning of volume one and media number one
4 in the deposition of Dr. Leo E. Manzer, in
5 the matter of Arkema versus Honeywell
6 International, Incorporated, case number
7 IPR201500915.

8 Today's date is January 7, 2016. The
9 time on the video monitor is 0909.

10 My name is Rob Hahn, I'm the
11 videographer. The court reporter is Marisa
12 Munoz, and we're with Huseby Global
13 Litigation.

14 Counsel, please state your name for
15 the record and whom you represent.

16 MR. BEAUPRE: John Beaupré for
17 petitioner, Arkema France.

18 MR. ROSE: Yes, good morning, Bruce
19 Rose; Alston & Bird for the patent owner
20 Honeywell. With me are my colleagues
21 Miranda Sooter and Christopher Douglas.

22 THE VIDEOGRAPHER: Will the court
23 reporter please swear in the witness and
24 then we can proceed.

25 Whereupon, LEO E. MANZER, having

1 been first duly sworn, was examined
2 and testified as follows:

3 EXAMINATION BY COUNSEL FOR PETITIONER
4 BY MR. ROSE:

5 Q. Good morning, Dr. Manzer.

6 A. Good morning.

7 Q. Could you please state and spell your full
8 name for the record, please.

9 A. Yes, Leo E Manzer, M-A-N-Z-E-R.

10 Q. And Dr. Manzer, have you ever had your
11 deposition taken before?

12 A. Yes, I have.

13 Q. Approximately how many times?

14 A. I believe about three times.

15 Q. When was the last time?

16 A. Let's see, I believe it was 2013.

17 Q. So I expect you are generally familiar with
18 the process, but before we get started, I'd like to
19 just sort of go over some ground rules.

20 Today will be a series of questions and
21 answers. I'll be asking you questions, and you're here
22 to give me answers, and you've taken an oath just as
23 you would in a court of law, you understand that?

24 A. Yes.

25 Q. And if I ask a question today that's

1 unclear or you don't hear it all or you don't
2 understand it, please just let me know and I will do my
3 best to rephrase it or clarify it for you. Can you do
4 that?

5 A. Okay. Thank you, yes.

6 Q. If you don't ask me to clarify a question,
7 we'll understand that you understood the question, fair
8 enough?

9 A. Yes, that's fair.

10 Q. The court reporter has already discussed a
11 little bit with you answering questions with um-hums or
12 shakes of the head, that doesn't help as far as keeping
13 the record.

14 One other sort of ground rule that I will
15 try to play by and I'll ask you to try to play by today
16 is that we don't speak over each other. So I'll ask
17 that you to try to let me finish asking my questions
18 before you start your answers, and I'll do my best to
19 let you finish your answer before I start my next
20 question, fair enough?

21 A. That's fair.

22 Q. If at any point I may think that you're
23 finished with your answer, and so I'll start a
24 question, if that happens and you're not finished with
25 your answer, let me know, and we'll let you finish your

1 answer, okay?

2 A. Okay.

3 Q. As you know, your counsel is here with you.

4 Arkema's counsel is here, and they are here and

5 permitted to object from time to time if they feel

6 there's something improper about my question. However,

7 once they lodge that objection, if you still understand

8 the question, you're still required to answer it,

9 understood?

10 A. Okay.

11 Q. Unless you get an instruction from counsel

12 not to answer the question, you're still required to

13 answer it to the best you can.

14 A. Okay.

15 Q. You prepared for this deposition, correct?

16 A. Yes.

17 Q. What did you do to prepare?

18 A. I did a lot of reading, read all of the

19 declarations, read all of the prior art patents.

20 Q. Okay. And so we'll be looking at your

21 declarations here today. You have a computer monitor

22 with those as well. Do you have paper copies of the

23 declaration?

24 A. I do.

25 Q. Okay. So, and I will be working through

1 paper copies, but feel free to look at whichever one
2 you want to.

3 I'd also like to go over some terminology
4 we may be using today, just it may help the court
5 reporter if we use some abbreviations. For example, we
6 will be talking about hydrofluoroolefins today. If I
7 refer to HFOs, will you understand that that's what I'm
8 referring to?

9 A. Yes.

10 Q. And we'll be talking about
11 chlorofluorocarbons. If I refer to those as CFCs, will
12 you understand that that's what I mean?

13 A. Yes.

14 Q. And we'll also discuss
15 hydrochlorofluorocarbons, will you understand when I
16 say HCFC, that that's what I mean?

17 A. Yes.

18 Q. And we'll be talking about potassium
19 hydroxide, will you understand that when I say KOH, I'm
20 referring to potassium hydroxide?

21 A. Yes.

22 Q. We will be talking about
23 dehydrohalogenating agents today. Will you understand
24 when I say DHA, that that's what I'm referring to?

25 A. Yes.

1 Q. And in the patent that we're here for today
2 or regarding today is often referred to as the '282
3 patent, you understand that is U.S. patent number
4 8,710,282?

5 A. Yes. May I also ask -- make a point?

6 Q. Sure.

7 A. Referring to a haloalkane, such as 236EA,
8 is it okay if we leave off the letters so that 236 I'll
9 use the terms 236 and 245 or 1234 or 1225 without
10 adding on the additional alphabet numbers?

11 Q. Sure. As long as we clarify that up front.
12 So when you say 236, you will mean what?

13 A. 236EA.

14 Q. And 245 will mean?

15 A. That's EB.

16 Q. So when you say 245, you mean 245EB?

17 A. That's correct.

18 Q. Okay. And when you say 1234, what will you
19 mean for that?

20 A. I will have to look up that one. Let's see
21 here, 1234 I'm referring to HF01234YF and 1225 will be
22 HF01225YE, okay.

23 Q. Okay, understood. And you said that you
24 also reviewed some prior art references. Do you recall
25 that one of those is referred to as the Smith

1 reference?

2 A. Yes.

3 Q. Okay. And that is Exhibit number 1003 to
4 your declarations. So when we refer to Smith today,
5 will you understand that I'm referring to Exhibit
6 number 1003 to your declarations?

7 A. Yes.

8 Q. And there's another reference known as
9 Sedat that's been marked in connection with the 915
10 proceeding as Exhibit numbers 1004, which is the French
11 language document, and 1005, which is the English
12 translation. So when I refer to Sedat today, you'll
13 understand that I'm referring to Exhibits 1004 and 5 in
14 the 915 case?

15 A. Yes.

16 Q. There's also a reference known as Masayuki,
17 which was identified in connection with the 916 and 917
18 proceedings as Exhibit number 1005. Will you
19 understand when I refer to Masayuki today, that that's
20 what I'm referring to?

21 A. Yes.

22 Q. There's also a reference known as Harrison,
23 which is identified as Exhibit number 1006 in the 916
24 and 917 cases. So when I refer to Harrison, will you
25 understand that that's what I'm referring to?

1 A. Yes.

2 Q. Fair enough. I'd like to open up your
3 declaration, we can use the one in the 915 case, just
4 because that's the first one, and I'd like to turn to
5 your CV, which begins -- and when I refer to page
6 numbers of documents today, I will do my best to refer
7 to the number on the bottom right, which is printed in
8 bold, black and white. If you need a copy, let me
9 know, because we have extra copies here, but it looks
10 like you have a copy.

11 A. It's included in the copy declaration.

12 MR. BEAUPRE: Sorry to interrupt, by
13 the number in the lower right, sometimes
14 there's two page numbers. You mean the one
15 with lots of zeros and then the number?

16 MR. ROSE: Correct, the one with lots
17 of zeros and then the number and the word
18 page in front of it.

19 MR. BEAUPRE: Thank you.

20 BY MR. ROSE:

21 Q. So your CV begins on page several 0s and
22 then 93?

23 A. Yes.

24 Q. On Exhibit 1002, which is your declaration
25 in the 915 case, can you take a quick look at that and

1 confirm whether this is your most recent CV?

2 A. It's recent with the exception that I have
3 since been issued another patent, so the total patents
4 are 159 instead of 158, but everything else is the
5 same. That was a recently-issued patent, and I have
6 not included it in this copy.

7 Q. Okay.

8 A. It's on my web site, however.

9 Q. Okay. Now, looking through your -- you
10 start out with your career highlights, and you list
11 your various jobs, including your present work at
12 Catalytic Insights proceeded by your work at DuPont,
13 correct?

14 A. That's correct.

15 Q. Can you describe your career highlights or
16 jobs that you have had that dealt with HFOs?

17 A. It would have been the sections labeled
18 1990 to '95 on fluoro monomers and the section 1986 to
19 2000, pleural fluorocarbon alternatives.

20 Q. So it looks like the first one you
21 identified is, at least timing wise, is subsumed within
22 the second one you identified. Can you explain that?
23 It says from 1986 to 2000, you were in the CFC
24 alternatives. In 1990 to 1995 is fluoro monomers. Is
25 that a subset of the CFC?

1 A. It would be a subset.

2 Q. And going back to the prior page, 93, from
3 2005 to the present, you identified as president and
4 founder of Catalytic Insights. What is Catalytic
5 Insights?

6 A. Catalytic Insights is a single-member LLC
7 that I formed when I retired from DuPont in 2005.

8 Q. What kind of work do you do at Catalytic
9 Insights?

10 A. I consult for various companies.

11 Q. Is Arkema one of those?

12 A. No.

13 Q. Is DuPont one of those?

14 A. No.

15 Q. You identified in that paragraph under
16 Catalytic Insights that in 2005, you were an expert
17 witness in a patent lawsuit. Can you tell me who the
18 parties were in that case?

19 A. Where are you reading from?

20 Q. Yes, under 2005 to present, president and
21 founder of Catalytic Insights. The third line from the
22 bottom of that paragraph, it states: In 2008, he was
23 an expert witness in a patent lawsuit.

24 MR. BEAUPRE: Page number?

25

1 BY MR. ROSE:

2 Q. I'm sorry, page 93.

3 A. Oh, 93.

4 Q. I'm sorry.

5 A. And --

6 Q. Yes, under the paragraph that says -- that
7 refers to Catalytic Insights, under your career
8 highlights, the third line from the bottom refers to an
9 expert witness role you played in a patent lawsuit?

10 A. Yes.

11 Q. Can you recall who the parties were in that
12 case?

13 A. Cytochem in China and Ineos, I-N-E-O-S.

14 Q. And you served as an expert for which of
15 those parties?

16 A. Ineos.

17 Q. And in that case, was Ineos the patent
18 owner or was Ineos challenging the patent?

19 A. Ineos was challenging -- no, Ineos was the
20 patent owner.

21 Q. Have you done any other expert witness
22 work, other than the one referenced that we're just
23 talking about now?

24 A. Yes, I was an expert witness in litigation
25 between Butamax, which is a combined company between

1 DuPont and BP, and Gevo, Inc.

2 Q. And you were an expert witness for which
3 party?

4 A. For Gevo.

5 Q. That was a patent case?

6 A. Yes, it involved patents, yes.

7 Q. And was Gevo the patent owner?

8 A. I don't remember. There were many, many
9 patents at issue there. And I don't remember which
10 patent was the main meaning of the deposition or
11 whether it was several patents, quite honestly, because
12 GEVO was suing Butamax. Butamax was suing DuPont, a
13 whole bunch of different ways.

14 Q. And that was during your time with
15 Catalytic Insights when you served as an expert?

16 A. That's correct.

17 Q. Any other cases in which you've served as
18 an expert?

19 A. No.

20 Q. Do you recall in the Butamax vs. Gevo case,
21 did you opine as to whether a patent was valid or
22 invalid?

23 A. I don't recall whether I opined on
24 anything. Basically they were asking me about areas
25 that I knew nothing about. The patents were related to

1 some serious microbiology, and I kept telling them
2 right from the get go I don't know anything about this
3 stuff, but they decided to depose me anyways, and the
4 judge finally -- in Wilmington, Delaware finally said
5 quit badgering Dr. Manzer. He's already said he
6 doesn't know this stuff.

7 Q. And in the Ineos case, did you give
8 opinions regarding patent validity or invalidity?

9 A. I don't recall exactly, but I very likely
10 did.

11 Q. So you don't recall whether you opined a
12 patent was valid or invalid, which side of that coin
13 you opined on?

14 A. I'm pretty sure that I was under the -- was
15 talking about the patent as a valid patent, and as I
16 recall, the other party was infringing on it, so.

17 Q. So you opined on infringement as well?

18 A. Yes.

19 Q. Still on the first page of your CV, page
20 93, from 2000 to 2005, you worked in the area of
21 biomass conversion. Describe what that is?

22 A. Sure. There is great interest in moving
23 away from petroleum feedstocks and deriving chemicals
24 and fuels from petroleum. It's desirable in this
25 country and many countries to base those products,

1 fuels and chemicals on renewable feedstocks, such as
2 corn or wood chips, et cetera.

3 So that's the term, renewable feedstocks is
4 something that can be replaced every few years instead
5 of every several millions of years.

6 Q. And you began that work in 2000, correct?

7 A. Yes, that's correct, when DuPont decided
8 they would like to begin looking at renewable
9 feedstocks to make materials that they were producing.

10 Q. And so in 2000 is when you ceased doing
11 your work regarding HFOs, correct?

12 MR. BEAUPRE: Objection, form.

13 A. No, I wouldn't say that I stopped doing
14 work. At that point in time, I was involved in a large
15 catalysis center. Folks that I had known for many
16 years were doing work in the area of HFOs, for example,
17 and I can't say that I didn't stop by and chat with
18 those guys about how the work was going.

19 Q. What do you mean when you say a large
20 catalysis center? What is that?

21 A. Yeah in 1987, I formed DuPont's corporate
22 catalysis center, and this was at a time when catalysis
23 was perceived as being mature and there was nothing
24 left to do, but for DuPont, it was still an important
25 technology.

1 DuPont operated 169 commercial catalytic
2 processes. So I won't go into the mechanism, but we
3 formed a corporate catalysis center with the objective
4 of having ownership or responsibility for the
5 technologies in those 169 commercial processes and for
6 the more important ones developing new technologies,
7 new more cost efficient and better ways to make the
8 products of interest.

9 So it was recognized around the world as a
10 very important and significant catalysis center.

11 Q. What do you understand or mean by the word
12 catalysis?

13 A. Catalysis is, let's just say it's a process
14 using a catalyst. A catalyst is not consumed in a
15 chemical reaction. So the catalyst is used in a
16 process to facilitate the transformation of starting
17 materials to products by lowering the activation
18 energy, but the catalyst is not consumed in the
19 process.

20 Q. And the name of your current company is
21 Catalytic Insights?

22 A. LLC.

23 Q. LLC. So is that where your work is focused
24 today with that entities?

25 MR. BEAUPRE: Objection, form.

1 A. One hundred percent.

2 Q. I want to talk a little bit about the work
3 that's included in the 1986 to 2000 paragraph on page
4 94. Was that work primarily work done in a laboratory?

5 A. You're talking about the 1986 to 2000
6 section?

7 Q. Correct.

8 A. Yeah, okay. Well, certainly it involved
9 work in a laboratory. I had a number of technicians
10 that worked with me on various fluoro olefin and
11 fluorocarbon processes.

12 In addition, I had other people working
13 with me that had their own laboratories working in this
14 area. So combined, my own work and work of others that
15 I oversight(sic).

16 Q. So the work that you did was primarily in
17 the laboratory, and you also oversaw others working in
18 a laboratory, correct?

19 A. That's correct.

20 Q. And was the laboratory work -- well, strike
21 that.

22 Outside the laboratory work, did you become
23 involved in any work as far as developing a
24 manufacturing process?

25 MR. BEAUPRE: Objection, form.

1 A. Yeah, I'm not sure I understand the
2 question there.

3 Q. Sure. As opposed to, you know, a
4 laboratory experiment, for example, or work in a
5 laboratory, did you also do or not do work as far as
6 implementing on a large scale, for example, in a
7 manufacturing facility?

8 MR. BEAUPRE: Objection, form.

9 A. I did attend many, many, meetings related
10 to the laboratory work and how to scale it up, whether
11 a pilot plant should be run before or after a
12 commercial plant was built.

13 So there were many, many meetings with
14 engineers and design folks outside of the laboratory
15 that assist in this commercial development.

16 Q. So the way the process generally worked
17 then was you and the folks working for you would
18 develop a process in the laboratory, and then there
19 would be meetings with engineers and other folks to
20 discuss if and how to scale it up to a manufacturing
21 level?

22 A. Let me just correct that a little bit.

23 In a laboratory, you don't develop a
24 process. You make initial discoveries. You find a
25 catalyst that carries out an effective transformation

1 that carries high yield, high selectivity, and at that
2 point, if it looks interesting and good, then you start
3 to say, okay, is this the process that we want to scale
4 up, and that's when you get into the development
5 discussions.

6 Q. And then -- so who then would be involved
7 in the, what we've been referring to as the scale up
8 process once you've discovered a -- you make an initial
9 discovery, find a catalyst that carries out an
10 effective transformation, then who gets involved in the
11 scaling up, if you will?

12 A. Sure. Many people; metallurgists,
13 especially when you're working with corrosive
14 materials, such as HF or HF and water and so on. So
15 you have to make sure the final design is not going to
16 corrode away overnight.

17 So you have metallurgists involved. You
18 have separations people involved, that look at how to
19 make a pure product of what comes out of a reactor.
20 You have obviously engineers qualified in developing
21 schematics initially kind of back-of-the-envelope
22 schematics, which turn into real schematics as the data
23 comes in, just to make sure that the process is cost
24 efficient and economically viable.

25 Q. But that was outside of your role? Your

1 role was discovering?

2 A. No, my role -- sorry to interrupt you.

3 Q. Go ahead.

4 A. My role was involved in taking my knowledge
5 of the catalysis and the chemistry and working with
6 those many people in translating what you see in the
7 lab with what might be done with further optimization
8 in the laboratory into a full commercial plant.

9 Q. So at what level did the project get taken
10 out of your control and then handed off to somebody
11 else along that development from laboratory to
12 commercial plant?

13 A. Well, it was never out of our control.
14 There's always -- there was always an interaction
15 between the chemist or engineer in a laboratory sitting
16 down with the process development folks, making sure
17 that any current results were included in the
18 development process.

19 So it's never really taken out. In fact,
20 in some cases when the commercial plant is built, it's
21 not unusual to move a chemist or an engineer who is
22 doing the early work to the plant during startup and
23 initial operation.

24 Q. And you have, just going back to your
25 education, you have an honors degree, a BS in

1 chemistry, correct, from the University of Waterloo?

2 A. That's correct.

3 Q. And then you have a Ph.D. in chemistry from
4 the University of Western Ontario, correct?

5 A. That's correct.

6 Q. You don't hold any degrees in engineering?

7 A. No degrees in engineering.

8 Q. So at some point in the development
9 process, going from your discoveries in the laboratory
10 to scaling up to a manufacturing level, at some point,
11 does an engineer become in charge of that project?

12 MR. BEAUPRE: Objection, form.

13 A. It depends. You know, as you spend time
14 working in processes, you learn an awful lot of
15 engineering. I've taken many engineering courses, but
16 it doesn't necessarily mean that a project manager will
17 be a chemist or an engineer.

18 Q. I want to go back to one of your previous
19 answers. Give me just a second.

20 A. Sure. You referred to when we were talking
21 about what takes place in the lab, you said -- let me
22 correct you a little bit. You said that you come up
23 with ideas, and you said -- referred to high yield and
24 high selectivity. At what level would you consider
25 starting development of a project once you determine it

1 has high enough yield or high enough selectivity?

2 MR. BEAUPRE: Objection, form.

3 A. There's no specific answer to that
4 question. It depends on the process of interest. Some
5 commercial processes operate at 75 percent yield.
6 Other commercial processes operate at 90 plus percent
7 yield. So it determines overall what the bottom line
8 is. Can we economically run this process under this
9 set of conditions.

10 Q. And what do you mean by yield?

11 A. Yield is the combined number by taking
12 conversion times selectivity.

13 Q. The next question, what do you mean by
14 conversion?

15 A. Conversion is the amount of material that
16 is transformed in the process. Let's see, transformed
17 in the process -- yes, the amount of material relative
18 to the amount fed of that material that was
19 transformed, converted.

20 Q. And then you used the term selectivity.
21 What do you mean by selectivity?

22 A. Selectivity, so if you talk about
23 conversion, you're looking at the converted material.
24 It doesn't necessarily always make the product that
25 you're interested in.

1 So selectivity is the amount of product
2 that you're interested in over the total amount
3 converted.

4 So if you had a hundred percent
5 selectivity, it means that everything that was
6 converted goes directly to that one product. If you
7 have 50 percent selectivity, it means that 50 percent
8 of the converted material goes to the product of
9 interest, and the other 50 percent could be one or more
10 other products that you're not particularly interested
11 in or some material that could be recovered and
12 recycled.

13 Q. And were there any sort of guidelines or
14 parameters that you use as a target when working on a
15 process as far as conversion or selectivity?

16 MR. BEAUPRE: Objection, form.

17 A. I could answer that in saying one always
18 would like to see a hundred percent selectivity, no
19 waste, no byproducts and possibly even a hundred
20 percent conversion, but that's not always the case.

21 Q. One hundred percent is not always the case?

22 A. One hundred percent conversion is not
23 always the case. One hundred percent selectivity is
24 nearly always the case.

25 Q. But one hundred percent conversion

1 sometimes is the case, just not always?

2 A. Only if it makes the product that you're
3 interested in in high selectivity yield.

4 Q. I'm not sure I understand. Can you
5 explain?

6 A. Yeah, I know, okay. Let me give you an
7 example.

8 If you were converting methane to
9 formaldehyde, that was your objective, okay, if you
10 converted one hundred percent of the methane to carbon
11 dioxide with no formaldehyde, that would be totally
12 undesirable, because you made no product. But if you
13 had a hundred one percent conversion of methane to one
14 hundred percent of formaldehyde, then you have a
15 desirable situation. So conversion is not the whole
16 story at all.

17 Q. Right. But focusing on conversion,
18 sometimes there is one hundred percent conversion and
19 an acceptable amount of selectivity?

20 A. That could be the case.

21 Q. Just not always the case?

22 A. Not always the case, yes.

23 Q. Okay. So going back to your CV at --
24 starting at page 95, the next section is awards?

25 A. Yes.

1 Q. And just taking a look at those, do any of
2 those awards have to do with your work involving HFOs?

3 A. Well, oftentimes awards are based on one's
4 entire career.

5 Q. Okay.

6 A. Okay. But specifically the 2000 award,
7 which was the National Medal of Technology Award, which
8 means an awful lot to me, was related specifically
9 to -- was awarded to the DuPont Company, and I was one
10 of three people invited to attend that ceremony for
11 specifically the phase out and the replacement of
12 chlorofluorocarbons.

13 Q. Which award are you referring to?

14 A. The one in 2003 called the National Medal
15 of Technology Award, which is presented at the White
16 House by the president, and the DuPont Company was the
17 recipient of that award. But I was asked to be one of
18 the three attendees, because the three of us would play
19 a significant role in that process.

20 The other award is the Philadelphia
21 catalysis -- Catalysis Club of Philadelphia Award in
22 1997, that was -- a significant part of the
23 contribution recognized by that award was my leadership
24 role and personal role in the development of
25 chlorofluorocarbon replacement.

1 Q. Including HFOs?

2 A. HFOs were intermediates in many of those
3 processes, but the HFOs at the time, as you're well
4 aware, the major products were HCFCs and HFCs not HFCOs
5 but HFOs, as they are today.

6 Another valued award is the Hudree(sic)
7 award in 2001, it's given by the North American
8 Catalysis Society, and that was largely in recognition
9 of my efforts to develop replacements from fluoro
10 chloro carbons, and my speech was entirely around that
11 process and many of these other --

12 Q. Again, that was focused on HCFCs as the
13 replacement for CFCs, correct?

14 A. HFCs and HCFCs, both were acceptable at the
15 time.

16 Q. I want to turn next to your issued patents.
17 I believe that list starts on page 97 of your CV.

18 A. Yes.

19 Q. Now, you have them grouped by technology
20 area, is that correct?

21 A. Yes, I have them grouped by technology
22 area, and within that group, I have them organized by
23 the year in which they issued.

24 Q. And the earliest patent you have was issued
25 in 1997(sic), is that right?

1 A. Let me see here, the earliest patent was
2 which year did you say?

3 Q. '77, I believe, looking at the bottom.

4 A. '77, at the bottom of page 101?

5 Q. Right.

6 A. Yes, I believe that was the first one.

7 Q. And then the most recent on here is 2015,
8 but you said earlier you had another one?

9 A. But that was still 2015.

10 Q. And these were all based on your work at
11 DuPont?

12 A. No. No some of these patents are based on
13 my consulting efforts with companies in the -- in
14 various areas, mostly in the area of biomass
15 conversion.

16 Q. With your work that you've done with
17 Catalytic Insights?

18 A. Yes, and obviously the company. I don't do
19 any laboratory work at Catalytic Insights. It's
20 strictly a consulting company.

21 Q. That was my next question.

22 And so the -- so you continued to apply for
23 patents or the companies you worked for applied for
24 patents based on your work?

25 A. Yes, the companies hire me to make a

1 contribution to their business, their profits, and when
2 I make contributions, they're deemed inventive and so
3 on. They will include me as an inventor on the patent.

4 Q. So it's fair to say you've been filing for
5 patents pretty much throughout your whole career?

6 A. I've been involved in the filing of patents
7 throughout my entire career.

8 Q. Can you describe how the decision is made
9 whether to file for a patent of your inventive work?

10 MR. BEAUPRE: Objection, form.

11 A. Yes. Please rephrase that.

12 Q. Yes, so, well, is a patent application
13 filed for everything that you've invented in the
14 laboratory or elsewhere, or is there some selection
15 made?

16 MR. BEAUPRE: Same objection and also
17 foundation.

18 A. Not everything that is worked on is filed
19 as a patent application. Some things may be kept as
20 trade secrets. Some things may be inventive or at
21 least may be done to see if a particular reaction will
22 happen. Lots of times that doesn't happen. There's no
23 patent filed. But where there's a justifiable reason
24 to file a patent, certainly at DuPont, that was done.
25 With other companies, it's an expensive process. They

1 have to make a decision whether they file for a patent
2 or not.

3 Q. When you refer to other companies, is that
4 limited to the work you've done at Catalytic Insights?

5 A. Work that I've done through Catalytic
6 Insights, yes.

7 Q. All the patents done before that were with
8 DuPont, correct?

9 A. Yes.

10 Q. How was the decision made at DuPont whether
11 to file a patent application of something that you came
12 up with?

13 MR. BEAUPRE: Objection, form and
14 foundation.

15 A. It's not an easy question to answer.
16 Usually done by the group in combination with
17 discussions with attorneys or what we call patent
18 liaisons to decide whether or not this was a patentable
19 invention.

20 Q. You used the term justifiable reason in a
21 prior answer. What would be -- what do you mean by a
22 justifiable reason to file for an application?

23 A. Oftentimes it means that there is a
24 business reason for filing the patent.

25 Q. Did you become involved in those decisions,

1 whether there's a business reason?

2 A. Certainly. Certainly.

3 Q. Give me an example of business reasons for
4 filing a patent?

5 MR. BEAUPRE: Objection, form.

6 A. We can go to the CFC replacement section
7 and the number of patents there. I would meet with the
8 lead scientist from the full chemicals business and
9 their vice president monthly. We would discuss the
10 progress of work in the laboratory, and the inventions
11 and then the business, the vice president of the
12 business would say yes, this is an important invention,
13 we should file on it, as an example.

14 Q. So the vice president of business would
15 decide whether it's an important invention?

16 A. He would say that this looks like a pretty
17 significant invention, and then they would bring in
18 their own patent people and other folks to look at it
19 in more detail, make that decision.

20 Q. Looking through the list of the various
21 patents that have issued, is it fair to say that
22 significantly -- a significant majority of your patents
23 have to do with catalysts and catalysis?

24 MR. BEAUPRE: Objection, form.

25 A. A significant do, yes.

1 Q. Significantly more than the number of
2 patents for CFC replacements, correct?

3 MR. BEAUPRE: Same objection.

4 A. Sorry, could you ask that in a different
5 way?

6 Q. Yeah. You have a little over three pages
7 of patents listed under the category catalytic
8 conversion of biomass, and then on page 100, after
9 those three pages, you have other categories involving
10 catalysts, enzyme catalysts, fluoro monomer catalysts,
11 environmentally safer phosgene and thionyl chloride
12 catalysts. So that's four pages of patents related to
13 catalysts. And then a little less than a page, page
14 101 related to CFC replacement. So wouldn't it be fair
15 to characterize it as you having more -- significantly
16 more catalyst-related inventions than CFC replacement
17 patents?

18 MR. BEAUPRE: Objection to form.

19 A. Well, if you add up the numbers, you could
20 say that, yes.

21 Q. And looking at the CFC replacement
22 category, can you tell me which, if any, of those have
23 to do with processes for producing HFOs?

24 A. Well, without reading the patents, I don't
25 believe any of the patents under the section

1 chlorofluorocarbon replacements were specifically
2 directed towards the preparation of fluoro olefins,
3 that would have been the earlier -- let me see, that
4 would have been the section in fluoro monomer
5 catalysis.

6 Q. And there are six patents that name you as
7 an inventor under that category?

8 A. That's correct, where I'm named as an
9 inventor.

10 Q. Do you know whether any of the patents
11 where you were named as an inventor has ever been
12 asserted in any litigation?

13 A. Yes, one of my patents in the
14 chlorofluorocarbon replacements was part of that ITC
15 process.

16 Q. Okay. So that's the one that was
17 referenced in your CV in 2008 with Ineos?

18 A. Yes. Yes, it should have -- yes, it was
19 during that ITC process. One of my patents was a focal
20 point of that process.

21 Q. So did that case involved Cytochem out of
22 China and Ineos?

23 A. Cytochem, yes, and Ineos, that's correct.

24 Q. DuPont was not a party to that case?

25 A. No.

1 Q. Was Ineos asserting one of your patents?

2 A. You know, I don't remember the specifics at
3 this point in time. One of my patents was brought in
4 as a reference, and I don't remember which side did it
5 or in what the context was. Something to do with the
6 reactor configuration in the Ineos process.

7 Q. So your patent wasn't being asserted in the
8 case as being infringed, correct?

9 A. No, that's correct.

10 Q. Okay, right. So getting back to my prior
11 question, are you aware of whether any of your patents
12 listed in your CV has ever been asserted in a
13 litigation? What I mean when I say asserted, meaning
14 that there was an assertion of infringement?

15 A. I don't believe there has been.

16 Q. Okay. Have any of your patents listed in
17 your CV been the subject of an assertion of invalidity?

18 A. Not to my knowledge.

19 Q. Not aware of any proceeding in which the
20 validity of one of your patents has been challenged?

21 A. I can't think of any situation.

22 MR. BEAUPRE: Counsel, we've been
23 going for about an hour, can we take a break
24 at a good stopping point?

25 MR. ROSE: That's fine. I'm starting

1 a new section.

2 THE VIDEOGRAPHER: Going off the
3 record, the time is 0959.

4 (Recess.)

5 THE VIDEOGRAPHER: We're back on the
6 record, the time is 10:12.

7 MR. ROSE: I want to make one note on
8 the record. When the videographer started
9 the tape, he referred to this being matter
10 IPR2015-00915, but this deposition is being
11 taken in connection with also IPR2015-00916
12 and IPR2015-00917. Is that all understood?

13 MR. BEAUPRE: Yes.

14 BY MR. ROSE:

15 Q. Dr. Manzer, welcome back. I want to touch
16 briefly on one of your patents under the category
17 chlorofluorocarbon replacements on page 101 of your
18 declaration in the 915 case. It's U.S. patent number
19 5,008,476, and it's titled process for preparation of
20 1,1,1,2-tetrafluoroethane. Do you see that?

21 A. I do.

22 Q. And 1,1,1,2-tetrafluoroethane is otherwise
23 sometimes known as 134A?

24 A. That's correct.

25 Q. Can you describe just generally what the

1 process was that was the subject of that patent?

2 A. Not without looking at the patent. You
3 know, there's so many processes to make 134A.

4 Q. So we will just mark this --

5 MR. BEAUPRE: Counsel, has this
6 exhibit been submitted to us in advance?

7 MR. ROSE: It was not.

8 MR. BEAUPRE: Then is it being used
9 for impeachment purposes?

10 MR. ROSE: No, I want to get
11 background.

12 MR. BEAUPRE: Then it's not
13 appropriate to introduce for the first time
14 for substantive purposes at the deposition.

15 MR. ROSE: Okay. Well, I won't mark
16 it, but I will certainly let you take a look
17 at it, if it will help you to refresh your
18 recollection.

19 MR. BEAUPRE: No, that's the same
20 thing. I mean, there's no difference
21 between introducing it and then showing it
22 to him and asking him questions about it.

23 If you'd like to ask him questions,
24 that's fine, but I don't think it's
25 appropriate to use it as an exhibit or show

1 it to him.

2 BY MR. ROSE:

3 Q. Dr. Manzer, do you recall developing a
4 process for the manufacture of 134A involving the
5 reaction of trichloroethylene with hydrogen fluoride?

6 A. I remember working on several processes
7 starting with trichloroethylene and HF.

8 Q. And resulting in 134A?

9 A. Eventually resulting in 134A.

10 Q. Okay. Are there any other products of that
11 reaction?

12 MR. BEAUPRE: Objection, form and
13 relevance.

14 A. The reaction of tetrachloroethylene and HF.

15 Q. And HF to result in 134A, in other words,
16 is hydrochloric acid also a result of that reaction?

17 MR. BEAUPRE: Same objections.

18 A. I'd have to look at the specific process
19 that you're interested in. There are many ways over
20 the years. I gave a number of talks, so I know all the
21 multiple methods of making 134A from various starting
22 materials. Certainly one can start from
23 tetrachloroethylene and go quite different pathways to
24 134A, but it's been a long time since I looked at that
25 roadmap.

1 Q. Are there any other resulting products from
2 that reaction?

3 MR. BEAUPRE: Objection, form and
4 relevance, and also I had should note, we're
5 getting -- we're afar from the declaration.
6 I've been giving some leeway, because I
7 assume this is background information.

8 MR. ROSE: That's what this is.

9 MR. BEAUPRE: But we're not going to
10 go on this long tangent of talking about 134
11 and different processes that are not
12 described in Dr. Manzer's declaration.

13 MR. ROSE: I just want to get his
14 general understanding of how reactions work.

15 Q. Do you recall that the resultant product of
16 a reaction between tetrachloroethylene and HF resulting
17 in 134A also gives other resultant products such as
18 hydrochloric acid?

19 MR. BEAUPRE: Objection, form and
20 relevance.

21 A. I wasn't sure whether you said
22 tetrachloroethylene or tetrafluoro. I assume you meant
23 tetrachloro. I didn't understand it totally, but
24 that's fine.

25 Q. If I said tetrafluoro, I apologize. I

1 meant tetrachloro.

2 A. Either way, it's a complicated pathway to
3 get from two carbons with four chlorines to two carbons
4 with four fluorines in the right location and two
5 hydrogens. So there are many intermediates along the
6 way.

7 Q. And is hydrochloric acid one of those?

8 MR. BEAUPRE: Same objections.

9 A. Not be considered an intermediate.

10 Q. But it comes out as a result of the
11 reaction, doesn't it?

12 MR. BEAUPRE: Objection form and
13 relevance.

14 A. Yes, if you look at the balanced equation,
15 HCL is a byproduct or co-product.

16 Q. Chlorine has to come out somewhere, doesn't
17 it?

18 A. It's got to go somewhere.

19 MR. BEAUPRE: Same objections.

20 BY MR. ROSE:

21 Q. You use the terms byproduct and co-product.
22 What do you mean by byproduct?

23 A. Those terms are often intertwined. A
24 co-product is something that is produced necessarily as
25 a result of making a product.

1 A byproduct I often -- this is not written
2 anywhere, but a byproduct is usually something that's
3 made that you don't want.

4 Q. Turning back to your CV, you list
5 publications beginning on page 102 of the 915
6 declaration. It looks like you began publishing as
7 early as 1971, right?

8 A. Yes.

9 Q. And does that coincide with your work on
10 your Ph.D.?

11 A. Yes.

12 Q. And you published multiple times?

13 A. Yes, I certainly did.

14 Q. Is it fair to say that these publications
15 coincide with your work as you progress through DuPont?

16 MR. BEAUPRE: Objection, form.

17 A. Referring to my publications relative to my
18 Ph.D. thesis?

19 Q. No, no, as you progressed through your work
20 at DuPont, these publications coincide generally with
21 the body of work that you were doing at the time at
22 DuPont?

23 MR. BEAUPRE: Objection, form.

24 A. Yes, as I was working at DuPont, when it
25 was appropriate to publish a paper, I would write a

1 paper and publish it.

2 Q. And similar to the patenting process, how
3 was the decision made to publish a paper on your work?

4 MR. BEAUPRE: Same objection.

5 A. I would write up an abstract of what I
6 intended to include in that publication. It would get
7 circulated to a publication group within the
8 organization. They would say yes or no. I would write
9 the paper up and recirculate the paper through the
10 organization again to see whether they agreed that I
11 should publish it.

12 Q. And, again, there are a lot of these, so I
13 certainly don't expect you to remember all of them, but
14 do you recall whether any of the papers have to do with
15 development of HFOs?

16 MR. BEAUPRE: Objection, form.

17 A. I don't recall whether HFOs were
18 specifically an objective. They may very well have
19 been mentioned in many of these papers.

20 For example, I did work shown in fluoro
21 monomers, did a lot of work on the preparation of HFPs
22 or fluoro propylene. There's no paper entitled HFP or
23 anything, but it may very well be included in some of
24 those papers.

25 Q. Do you recall if any of your publications

1 discuss dehydrohalogenation or dehydrofluorination?

2 A. I don't recall specifically, but they
3 likely do.

4 Q. And you did work while at DuPont in the
5 area of dehydrohalogenation?

6 MR. BEAUPRE: Objection, form.

7 A. I don't recall my own laboratory doing any
8 of that work. Certainly there was work done on
9 dehalogenation.

10 Q. On dehalogenation --

11 A. Hydrodehalogenation.

12 Q. We got to make sure we got our terminology
13 together.

14 A. I know. I understand.

15 Q. You're using the term hydrodehalogenation?

16 A. Yes.

17 Q. And is that different than
18 dehydrohalogenation?

19 A. In my mind it is.

20 Q. Can you describe what, in your mind, the
21 difference is?

22 A. Yes. Hydrodehalogenation typically
23 involves the reaction of hydrogen with, for example, a
24 chlorocarbon to replace that chlorine on that carbon
25 with hydrogen.

1 Dehydrohalogenation means that you are
2 removing a haloalkane to produce an olefin.

3 Q. So I understand then, hydrodehalogenation
4 means you're using hydrogen to replace an alkane like
5 chlorine --

6 A. Halogen like chlorine.

7 Q. Right, I'm sorry, halogen, you're right.
8 And dehydrohalogenation means you're
9 removing a haloalkane to produce an olefin?

10 A. Removing a hydrohalogen to make the olefin.

11 Q. You're removing the hydro, but are you also
12 adding a halogen?

13 A. No, you're removing a hydrogen and a
14 halogen to make the olefin.

15 Q. And have you in your work developed any
16 processes for dehydrohalogenation?

17 MR. BEAUPRE: Objection to form.

18 A. I may have, but I don't recall
19 specifically. I may have to go back and look at some
20 of those fluoro monomer patents where the HFO was
21 prepared.

22 Q. And did your work involve, to the extent
23 that dehydrohalogenation processes were developed
24 involving your work, did your work involve scaling it
25 up to a manufacturing level?

1 MR. BEAUPRE: Objection, form.

2 A. I don't believe so.

3 Q. Did your work involve HFC synthesis?

4 MR. BEAUPRE: Objection to form.

5 A. Yes.

6 Q. To the extent that your work involved HFC
7 synthesis, did that involve any projects that included
8 scaling an HFC synthesis up to a manufacturing level?

9 MR. BEAUPRE: Objection, form.

10 A. If you're asking did any of my work on the
11 synthesis of HFCs result in a commercial plant, is that
12 your question?

13 Q. I'm asking about your involvement. Were
14 you involved first in developing an HFC synthesis
15 process, but then scaling that process up to the
16 manufacturing level?

17 A. Yes.

18 Q. Okay. Can you describe, give me some
19 examples of those?

20 A. You're asking me back a long time.

21 Q. I realize it may not be exhaustive, but can
22 you give me some examples?

23 A. Yeah, I was thinking of the reaction of
24 trichloroethylene with HF to make HCFC123 and HFC125
25 and HCFC124.

1 Q. Do you recall approximately how long ago
2 that was?

3 A. It was in the middle, early to middle, the
4 late -- it was in the 1990s, I believe.

5 Q. Okay. And any others that come to mind?

6 A. There were aspects of the HFC134A process,
7 but I can't remember the specifics of which route and
8 which process eventually -- that were commercialized
9 that I was involved with.

10 Q. Okay. When you were involved in that
11 commercialization, your involvement in commercializing,
12 describe generally what your involvement is or was?

13 A. Let me say it this way, it's to keep the
14 engineers honest, but it involves discussions with
15 engineers, process development chemists. And one goes
16 from -- typically at DuPont, one would go from a
17 laboratory operation through a larger scale operation,
18 which we would call a pilot plant to integrate the
19 process fully before -- and that would be to collect
20 basic data for a full plant design and construction and
21 commercialization.

22 So it would be involvement with many people
23 along the way.

24 Q. And did you oversee or get involved with,
25 for example, the design of a pilot plant in that

1 process?

2 MR. BEAUPRE: Objection, form.

3 A. I would have input into the design of the
4 pilot plant.

5 Q. And then scaling up to the full plant, were
6 you still involved at that step as well?

7 MR. BEAUPRE: Objection, form.

8 A. To some level.

9 Q. And so in addition to the process for
10 manufacturing HCFC123, 124 and 125, and then the
11 aspects of the 134A process, are there any others that
12 you can recall?

13 MR. BEAUPRE: Objection to form.

14 A. I don't recall. There may have been.

15 Q. We talked a bit earlier about conversions
16 and selectivity. Were those aspects that were
17 considered in developing those projects that you worked
18 on?

19 MR. BEAUPRE: Objection, form.

20 A. Those are important parameters for any
21 process that's commercialized.

22 Q. How does the, for example, the conversion
23 rate differ or change when moving from a laboratory
24 operation of a process then into a pilot plant? Does
25 it differ?

1 MR. BEAUPRE: Objection, form.

2 A. Well, they may or may not change.

3 Q. Do you recall if it did in either of the
4 two instances that you described today?

5 A. I don't recall whether it did or did not.

6 Q. Okay. When taking a process from the
7 laboratory and moving up to the pilot plant, is it
8 anticipated that there would be a change in conversion
9 rate from the laboratory to the pilot plant?

10 MR. BEAUPRE: Objection, form,
11 foundation.

12 A. You keep talking about conversion rate,
13 which is different from conversion.

14 Q. Okay, I apologize. I'll restate the
15 question.

16 In taking the process from the laboratory
17 to a pilot plant, is there a difference in conversion?

18 MR. BEAUPRE: Objection, form and
19 foundation.

20 A. There may or may not be a difference. One
21 would always hope in a pilot plant that you would
22 continue to improve a process.

23 Q. Are there instances where you anticipate
24 that by increasing the size of the process, by going
25 from laboratory to a pilot plant, the conversion would

1 decrease?

2 MR. BEAUPRE: Same objection.

3 A. I can't think of an instance specifically
4 where it increases or decreases. You would hope that
5 it would always improve.

6 Q. And is the same true with regard to
7 selectivity?

8 MR. BEAUPRE: Same objection.

9 A. And the same answer, you would always hope
10 that selectivity would continue to be improved.

11 Q. But the question is would you -- maybe I
12 didn't state it correctly.

13 Would you anticipate that selectivity could
14 decrease in going from the laboratory to the pilot
15 plant?

16 MR. BEAUPRE: Objection, form and
17 foundation.

18 A. I would not anticipate that.

19 Q. And then in going from the pilot plant to a
20 full manufacturing plant, would you expect the
21 conversion would decrease?

22 MR. BEAUPRE: Same objection to form
23 and foundation.

24 A. And I have no reason to expect that it
25 would.

1 Q. You would expect it to stay the same going
2 from --

3 A. Or be approved.

4 Q. And is the same true with regard to
5 selectivity?

6 MR. BEAUPRE: Same objections.

7 A. Yes.

8 Q. I may have asked this before. If I did, I
9 apologize. Have you, in your work at Catalytic
10 Insights or anywhere else, worked before for Arkema?

11 A. No.

12 Q. Have you worked before with the firm Brinks
13 Hofer(sic)?

14 MR. BEAUPRE: Objection, form.

15 A. The name is not familiar.

16 Q. The law firm that's working with you on
17 this matter, have you done any work with them before?

18 A. Oh, Brinks.

19 MR. BEAUPRE: We're Brinks Gilson.

20 MR. ROSE: I'm sorry.

21 A. No, I've never worked with them previously.

22 Q. Have you ever heard of the Daubert
23 challenge?

24 A. Daubert?

25 Q. In the expert work that you've done before,

1 have you ever had, have you ever been challenged as an
2 expert?

3 A. Well, I think most depositions start off
4 with trying to disprove you as an expert.

5 Q. Okay. Are you aware of any papers that
6 were filed in any of the cases where you were an
7 expert, where the other side said you're not qualified
8 as an expert?

9 MR. BEAUPRE: Objection, form.

10 BY MR. ROSE:

11 Q. Or for some reason that your expert opinion
12 should not be considered?

13 A. Not that I recall.

14 Q. When did you first become involved in this
15 matter?

16 A. This current patent?

17 Q. Yes.

18 A. It was in the fall of 2014.

19 Q. And who first contacted you?

20 A. Mr. Dupre(sic).

21 Q. Have you worked with Mr. Dupre(sic) before?

22 A. No.

23 Q. What were you asked to do?

24 A. At that point, I was only asked if I was
25 interested in becoming an expert witness in a patent

1 case related to fluorocarbon chemistry.

2 Q. Were you given any more detail other than
3 that?

4 A. Not at that point.

5 Q. What materials were provided to you at that
6 point?

7 A. When I was contacted initially, nothing was
8 provided to me.

9 Q. At some point, materials were provided,
10 correct?

11 A. At some point, after I signed a
12 nondisclosure agreement, material was provided to me.

13 Q. Had you seen the patent before you signed
14 that?

15 A. No.

16 Q. How long was it after Mr. Dupre(sic)
17 contacted you before you signed the nondisclosure
18 agreement?

19 A. I seem to recall it was a few weeks.

20 Q. Okay. Had you done any analysis before
21 agreeing to take on this matter?

22 A. No.

23 Q. Had you seen the '282 patent before
24 agreeing to take on this matter?

25 A. No.

1 Q. After signing your nondisclosure agreement,
2 Mr. Dupre(sic) provided you with materials, correct?

3 A. That is correct.

4 Q. Okay. What materials did he provide?

5 A. I don't recall exactly, but most likely it
6 was the '282 patent and then some of the prior art
7 references.

8 Q. Did he provide you with the Smith
9 reference?

10 A. I think so.

11 Q. Did he provide you with the Sedat
12 reference?

13 A. I think so.

14 Q. Did he provide you with the Masayuki
15 reference?

16 A. I think so.

17 Q. Did he provide you with the Harrison
18 reference?

19 A. I think so.

20 Q. Did he provide you with any other prior art
21 references?

22 A. Did you mention the Masayuki?

23 Q. I did.

24 A. Yes. I don't recall any other references
25 at that point in time.

1 Q. Did you do any prior art searching on your
2 own?

3 A. Yes. Once I became familiar with the '282
4 patent and the other patents, I did some literature
5 searching.

6 Q. And what did you locate in your literature
7 searching?

8 A. Yeah, once again, without my computer, I
9 don't recall specifically what I located.

10 Q. Is there anything that resulted from your
11 literature searching that you reference in your
12 declaration?

13 A. I am not sure, but I don't believe so.

14 Q. So all the references that you discuss in
15 your declaration were provided to you by
16 Mr. Dupre(sic)?

17 MR. BEAUPRE: Objection to form.

18 BY MR. ROSE:

19 Q. Or his law firm?

20 A. Or his law firm, that's correct.

21 MR. BEAUPRE: Beaupré.

22 THE WITNESS: I'm sorry, we're on such
23 a first name basis, I forget the last names.

24 MR. BEAUPRE: It's all right. It's
25 not the easiest one to remember.

1 BY MR. ROSE:

2 Q. Did you review the file history for the
3 '282 patent?

4 MR. BEAUPRE: Objection, form.

5 A. The file history from the patent office?

6 Q. Yes, the --

7 A. What they call the wrapper or whatever?

8 Q. The file wrapper?

9 A. No, I did not.

10 Q. Were you instructed not to look at the file
11 wrapper?

12 MR. BEAUPRE: Objection, form.

13 A. I don't recall.

14 Q. Did you ask for a copy of the file wrapper?

15 A. I don't recall that either.

16 Q. I want to walk through the preparation of
17 your declarations.

18 Who first created the first draft of your
19 declaration?

20 MR. BEAUPRE: Objection, form.

21 A. I reviewed the '282 patent, provided my
22 interpretations, and then my interpretations were
23 included in the declaration, which is written jointly
24 by myself and me, the law firm.

25 Q. So when you say it was written jointly, how

1 did that physically take place? Did somebody create a
2 first draft?

3 MR. BEAUPRE: Objection, form.

4 A. Clearly there was a first draft prepared by
5 somebody. I prepared my thoughts on the claims, and
6 then we sat down jointly and then put this together.

7 Q. Jointly, you mean in the same room
8 together?

9 A. I think it was this room actually.

10 Q. So somebody here was typing the document
11 while you were giving your thoughts, is that how it
12 worked?

13 MR. BEAUPRE: Objection, form.

14 A. Yes, they were capturing my thoughts, and
15 somebody was typing. I mean, I'm not prepared to put
16 together a legal declaration, so clearly a lawyer has
17 to do that.

18 Q. Sure. I just want to understand the
19 process of exchange of drafts, how that went.

20 So was a first draft handed to you and then
21 you worked through with your thoughts?

22 A. No, I provided my thoughts, a draft was
23 prepared based on that joint meeting. I read through
24 it, corrected anything that I didn't think was
25 accurate.

1 Q. You said you reviewed the '282 patent.
2 What else did you review?

3 A. I reviewed the other prior art references.

4 Q. You reviewed the materials that were all
5 provided to you by the Brinks firm?

6 MR. BEAUPRE: Objection to form.

7 A. I provided -- I read those patents, and I,
8 like I say, I did some searching on my own, which may
9 or may not have provided any useful information, but I
10 tried my best to make sure that I had uncovered as much
11 information as I could.

12 Q. Okay. And since submitting those
13 declarations, what has your involvement been in this
14 matter?

15 MR. BEAUPRE: Objection, form.

16 A. It's been very little.

17 Q. Until it came time for your deposition?

18 A. Yeah, from April to today, I guess.

19 Q. Right. So at some point, you were advised
20 that you would have your deposition taken, correct?

21 A. That's correct.

22 Q. What did you do to prepare for the
23 deposition?

24 A. I read and reread all of the declarations
25 and all of the patents, prior art patents.

1 Q. And did you have any meetings with counsel?

2 A. I had one meeting in early December for a
3 couple of days.

4 Q. No other meetings leading up to today?

5 A. No other meetings leading up to this week.

6 Q. Okay. What about meetings this week?

7 A. Yes, I came up, as I told you earlier, on
8 Monday.

9 Q. And how many times did you meet with
10 counsel this week to get ready?

11 A. Monday afternoon, all day Tuesday and all
12 day Wednesday.

13 Q. And other than the declarations, the '282
14 patent and the prior art cited in the declarations, did
15 you review any other documents in getting ready?

16 MR. BEAUPRE: Objection, form.

17 A. I'm trying to remember. I may have briefly
18 reviewed the petitions, but I didn't study them in any
19 detail.

20 Q. If you will go ahead and turn back to your
21 declaration, and we can use the 915 declaration, which
22 is Exhibit 1002 in that proceeding, and in particular
23 at paragraph 36 on page 17.

24 A. Yes.

25 Q. You say that: Based on my review of the

1 '282 patent, the relevant field of art relates to bulk
2 chemical synthesis in manufacturing, including
3 production of fluorinated olefins by
4 dehydrohalogenation of fluorinated alkanes.

5 What do you mean by bulk chemical
6 synthesis?

7 A. When I use the term bulk chemical
8 synthesis, it usually refers to a reasonable scale
9 synthesis.

10 Q. What does that mean? I don't understand.

11 A. Well, it means in looking at it as it
12 states in there, it's something that's attractive
13 commercially, so that's why it's considered a bulk
14 chemical.

15 Q. So would that be something that's different
16 than, for example, laboratory scale synthesis?

17 MR. BEAUPRE: Objection, form.

18 A. No, not necessarily.

19 Q. So laboratory scale synthesis is
20 commercially attractive?

21 MR. BEAUPRE: Objection, form.

22 A. Not always.

23 Q. Well, at DuPont, would you consider your
24 work in the laboratory as a bulk chemical synthesis?

25 A. Not always.

1 Q. Sometimes?

2 A. Sometimes.

3 Q. In what type of an instance would a
4 laboratory synthesis be considered bulk?

5 MR. BEAUPRE: Objection, form.

6 A. Well, there's no clear definition of that,
7 but in my mind, it's something that would likely go to
8 commercialization versus a scientific experiment where
9 it's only to advance science.

10 Q. So it would be commercially attractive in
11 the sense that it might some day be scaled up to a
12 commercial scale?

13 A. In industry, that's often the reason you do
14 research.

15 Q. Right. That's what I'm just trying to
16 understand. Is there some difference between a bulk
17 synthesis and laboratory synthesis?

18 MR. BEAUPRE: Objection, form.

19 A. There's no clear answer to that question.

20 Q. Typically though isn't laboratory synthesis
21 a precursor that leads to bulk synthesis, if
22 successful?

23 MR. BEAUPRE: Objection, form.

24 A. That would almost always be the case.

25 Q. In your statement, you also say: Including

1 production of fluorinated olefins by
2 dehydrohalogenation of fluorinated alkanes, and you got
3 that from the '282 patent?

4 A. You're referring once again to 36?

5 Q. Yeah, to paragraph 36.

6 A. Yes.

7 MR. BEAUPRE: Objection, form.

8 A. I was referring to the '282 patent when I
9 was discussing production of fluorinated olefins by
10 dehydrohalogenation of fluorinated alkanes.

11 Q. And is that -- are you referring there to a
12 liquid phase synthesis for production?

13 MR. BEAUPRE: Objection, form.

14 A. Liquid phase process was one consideration.

15 Q. Then referring to paragraph 43 of your
16 declaration starts on page 20 and carries over to 21,
17 you see that?

18 A. Yes.

19 Q. On the top of page 21, there's a statement
20 that reads: A dehydrohalogenating process using DHA,
21 such as that claimed in the '282 patent, is generally a
22 liquid phase process where a haloalkane is reacted with
23 the basic DHA to produce an alkane or olefin and
24 byproducts such as salts. Do you see that?

25 A. Yes.

1 Q. So is that what you're referring to --
2 well, strike that.

3 Does that mean that what you're referring
4 to is the field of the invention has to do with a
5 liquid phase process?

6 MR. BEAUPRE: Objection, form.

7 A. Yes, it refers to the dehydrohalogenation
8 of a haloalkane with a base catalyst in the liquid
9 phase with the base reagent.

10 Q. So just so I'm understanding correctly
11 then, in that sentence, you're referring to a liquid
12 phase process, correct?

13 MR. BEAUPRE: Objection, form.

14 A. Referring to a liquid phase process with a
15 dehydrohalogenation agent produces the haloalkane and a
16 salt.

17 Q. You also define a person of ordinary skill
18 in the art, and that's at paragraph 37 in the 915
19 declaration?

20 A. Yes.

21 Q. How did you come up with your definition of
22 what a person of ordinary skill is?

23 MR. BEAUPRE: Objection, form.

24 A. It's just my interpretation of what a
25 POSITA is, as I state in there, a person with a Ph.D.

1 in chemistry or chemical engineering, two years of
2 practical experience in the area of fluorocarbon
3 synthesis, or it could be someone with a bachelor's or
4 master's degree in chemical engineering with at least
5 five years experience in the field of -- in the area of
6 hydrofluorocarbon synthesis.

7 Q. So does the person of ordinary skill have
8 to have had experience specifically in
9 hydrofluorocarbon synthesis, or can it be some other
10 broader range of experience in the chemical or chemical
11 engineering field?

12 MR. BEAUPRE: Objection, form.

13 A. It was either should have experience in the
14 area of hydrofluorocarbon synthesis.

15 Q. So, for example, you started at DuPont --
16 what year did you start at DuPont?

17 A. 1973.

18 Q. And what year did you begin your work in
19 hydrofluorocarbon synthesis?

20 A. I believe it was 1987.

21 Q. So you would not consider yourself a person
22 of ordinary skill in the art until 1989?

23 MR. BEAUPRE: Objection, form.

24 A. Well, by 1989, I think I'm more than a
25 POSITA.

1 Q. Right. But as of 1988, you had only had
2 the two years or one year of work in hydrofluorocarbon
3 synthesis?

4 A. Right, that's correct.

5 Q. And so you would not meet the definition
6 here of a Ph.D. in chemistry or chemical engineering
7 and two years experience in hydrofluorocarbon
8 synthesis, correct?

9 MR. BEAUPRE: Object to form.

10 A. Well, that's when the first patent issued.
11 I think by 1988, I had been involved in the studying of
12 chemistry and alternative methods to make HFCs and
13 HCFCs for two years.

14 Q. I thought you just testified that your work
15 in hydrofluorocarbon synthesis began in 1987? Did I
16 get wrong?

17 MR. BEAUPRE: Object to form.

18 A. Yeah, well, I'm saying it was in the time
19 frame '86 or '87. I don't recall the exact date. I
20 mean, we were constructing laboratories and bringing
21 people in to do the work, and during that time frame, I
22 would obviously be studying what was known about the
23 synthesis of the HFCs and interest 134A and some of the
24 others, and there had been work done at DuPont and
25 other places in earlier times.

1 Q. All right. So the POSITA wouldn't
2 necessarily have to have two years experience in
3 hydrofluorocarbon synthesis but could have other
4 organic chemistry experience, isn't that correct?

5 MR. BEAUPRE: Objection, form.

6 A. No, POSITA needs to have experience in the
7 hydrofluorocarbon area, since it's very different
8 catalysis from hydrocarbon chemistry.

9 Q. Okay. I guess I'm -- maybe I'm not
10 understanding everything correctly.

11 In your own experience, you had said your
12 experience in hydrofluorocarbon synthesis started more
13 than a decade after you began work at DuPont as a
14 chemist, correct?

15 MR. BEAUPRE: Objection, form.

16 A. I'm trying to remember the time frame, but
17 no, in 19 -- and I may be out a few years here, but it
18 was the middle '70s when there was a first effort to
19 replace CFCs. And one of the people in my group was
20 associated with the fluorochemicals business and the
21 first attempts to make 134A. So, therefore, I was
22 knowledgeable of his work in the laboratory and the
23 work going on in the other businesses in the
24 fluorocarbons business.

25 Q. But you weren't synthesizing

1 hydrofluorocarbons at that time, were you?

2 MR. BEAUPRE: Objection, form.

3 A. Personally, I was not running the
4 laboratory, but I had responsibility for the laboratory
5 that was running reactions to make hydrofluorocarbons.

6 Q. Okay. So I guess I'm having a hard time
7 understanding then if your experience in synthesizing
8 hydrofluorocarbons hadn't begun yet, you would
9 certainly satisfy the requirement of a POSITA as having
10 a Ph.D. in chemistry or chemical engineering, but as of
11 your definition, you did not have at that time
12 experience in synthesizing hydrofluorocarbons, correct?

13 MR. BEAUPRE: Objection to form.

14 A. Looking at the time frame of 1988, and I
15 include my experience going back to the middle '70s,
16 where we were synthesizing HF, HF134A, if I include
17 that time, plus the time up to the issuance of the
18 patent in 1988, it would be at least two years.

19 Q. So you're basing, when you refer to
20 experience, that person could work at a laboratory
21 where other people are synthesizing hydrofluorocarbons,
22 correct?

23 MR. BEAUPRE: Objection, form.

24 A. Depends what you mean by work.

25 Q. I guess I'm trying to understand what you

1 mean, what you're referring to here. Well, strike
2 that.

3 The definition that you've given here, is
4 that something that you came up with on your own, or is
5 that something suggested to you by counsel?

6 A. No, that's something that I came up with on
7 my own.

8 Q. And so at what point in your career would
9 you say that you became a POSITA in this field?

10 MR. BEAUPRE: Objection, form.

11 A. It may have been as early as 1975 or '76, I
12 don't recall the details. But as I said, DuPont had a
13 significant effort to make HFC134A in the middle '70s.
14 I led the new group within central research, and,
15 therefore, I don't remember how long it lasted, but I'm
16 sure it was at least two years.

17 So I would have had two years of experience
18 in that area, the fluorocarbon synthesis area.

19 Q. Would experience in the area of CFCs or
20 HCFCs qualify?

21 MR. BEAUPRE: Objection, form.

22 A. We're talking about experience in HFCs, and
23 the whole purpose of doing HFC catalysis was to replace
24 chlorofluorocarbons.

25 Q. And that's, I guess, sort of why I'm asking

1 the question. Is if somebody had worked previously in
2 the CFC area but had not worked in HFC area, in the HFC
3 area, could that person nonetheless be considered a
4 POSITA based on their prior work, if they met the
5 educational requirements?

6 MR. BEAUPRE: Objection, form and
7 foundation.

8 A. A person working in the hydrofluorocarbon
9 synthesis area may or may not have had experience in
10 making CFCs.

11 Q. But experience in making CFCs would not be
12 relevant to the POSITA regardless, correct?

13 MR. BEAUPRE: Objection, form and
14 foundation.

15 A. Well, it's -- a person making CFCs becomes
16 familiar with handling hazardous materials, such as HF,
17 running reactions at high temperatures, et cetera,
18 using hazardous materials. So that information is very
19 useful and applicable to the synthesis of
20 hydrofluorocarbons.

21 Q. Would the POSITA have had to have had any
22 particular course work in their undergraduate studies
23 or in their graduate studies?

24 MR. ROSE: Objection, form and
25 foundation.

1 A. They may or may not have had course work in
2 hydrofluorocarbon synthesis, but it's really the
3 practical experience that's useful.

4 Q. How about organic chemistry course work?

5 MR. BEAUPRE: Same objection.

6 A. Organal(sic) fluorine chemistry is
7 different from much of simple hydrocarbon chemistry.

8 Q. So organic course work in undergraduate or
9 postgraduate studies would not be relevant, is that
10 your opinion?

11 MR. BEAUPRE: Objection, form.

12 A. Yeah, would you rephrase that, please?

13 Q. Yeah, so hydrocarbon or organic chemistry
14 experience in undergraduate course work or postgraduate
15 course work would not be relevant to determining
16 whether somebody is a POSITA?

17 A. It would be helpful.

18 Q. Turning back to your declaration, paragraph
19 57. Paragraph 57 starts on page 32 and carries over to
20 page 33, and looking at the sentence that starts five
21 lines down you say: As Douglas explains, it was a
22 "rule of thumb" in chemical process design that it is
23 desirable to recover more than 99 percent of all
24 valuable materials through recovering and recycling.

25 Do you see that?

1 A. Yes.

2 Q. First of all, what is meant there by
3 recovering and recycling?

4 MR. BEAUPRE: Objection, form.

5 A. Recovering is collecting for further use.
6 Recycling is returning a component of the
7 process to the process.

8 Q. So you're referring back to the claim
9 interpretations that you gave in your report, I'm
10 sorry, your declaration?

11 A. I'm referring back to page 22.

12 Q. Yeah, in your declaration?

13 A. Yes.

14 Q. And the Douglas reference that you're
15 citing there is Exhibit 6. Is that something that was
16 provided to you by counsel as well?

17 MR. BEAUPRE: Objection, form.

18 A. Yeah, the specific document was provided to
19 me by counsel. I don't remember whether I uncovered
20 that or not.

21 Q. Okay.

22 A. What I was looking for was the fact that in
23 industry, it's just common practice to recover and
24 recycle as much as you possibly can, and I was looking
25 for a reference to that general rule of thumb, and I

1 don't remember who uncovered the Douglas reference.

2 Q. Douglas is the one that refers to it as a
3 rule of thumb?

4 A. That's right. He's a professor, yes.

5 Q. Did you ever refer to it as a rule of thumb
6 when you were at DuPont?

7 MR. BEAUPRE: Objection to form.

8 A. I don't think I had to. It was pretty
9 obvious when we were doing any of these process
10 development programs for any chemical to develop the
11 lowest cost process. And one develops the lowest cost
12 process by recovering, recycling anything that makes
13 sense.

14 Q. So you didn't, in your work at DuPont,
15 refer to a rule of thumb as being desirable to recover
16 more than 99 percent of all valuable materials?

17 MR. BEAUPRE: Objection, form.

18 A. I don't recall specifically referring to it
19 as a rule of thumb, other than just good practice.

20 Q. Did you refer to specifically the 99
21 percent figure while you were at DuPont?

22 MR. BEAUPRE: Objection, form.

23 A. I would refer to the highest number
24 possible, whether it's 99 or 100 percent.

25 Q. It could be less than 99 percent, right?

1 MR. BEAUPRE: Objection, form.

2 A. It could. It might be. But the simple
3 fact is you try to recover and reuse as much as you
4 possibly can.

5 Q. Right. In looking at the Douglas
6 reference, which is -- I believe it's Exhibit 6 to the
7 915 case. So actually Exhibit 1006.

8 A. Yes. It's sideways here. I have to rotate
9 it somehow.

10 MR. BEAUPRE: Do you need help?

11 THE WITNESS: No, I got it.

12 A. Okay.

13 Q. And the quote that you recite is from --
14 starts on the bottom of page 116 and carries over to
15 page 117. I'd like you to look at the page before that
16 in the document, which is page multiple zeros and then
17 eight.

18 A. Oh, okay, I'm sorry, we're going to the
19 declaration, I'm in the Douglas document.

20 Q. Yes, I am too, in the Douglas document.
21 Again, that document also has those numbers at the
22 bottom.

23 A. Oh, okay. Oh, I see, yes, okay. I had
24 expanded, because I couldn't read it. All right. What
25 page are you on now?

1 Q. The page before that, page 00, multiple
2 zeros, eight.

3 A. Eight, okay.

4 MR. BEAUPRE: Can I show him?

5 A. Do you have a table of contents there?

6 Q. Yeah, where it says preface.

7 MR. BEAUPRE: It looks like this,
8 preface, and then it's got, so it's right
9 after the first page after the table of
10 contents.

11 A. Okay, I'm there.

12 Q. At the outset of his book, Douglas says in
13 his preface, the second sentence reads: The goal of a
14 conceptual design is to find the best process flow
15 sheet, i.e., to select the process units and unit
16 connections among these units and estimate the optimum
17 design conditions. The problem is difficult because
18 very many process alternatives can be considered. In
19 addition, experience indicates that less than one
20 percent of ideas for new designs ever become
21 commercialized. Thus, there are many possibilities to
22 consider with only a small chance of success.

23 Do you see that?

24 A. I do.

25 Q. Is that a fair characterization of how --

1 well, strike that.

2 Would you -- is that a fair
3 characterization of your work at DuPont?

4 MR. BEAUPRE: Objection, form and
5 foundation.

6 A. I think its estimate of commercial success
7 is low, based on my experience in DuPont.

8 Q. But isn't the goal to find the best process
9 flow sheet and estimate the optimum design conditions?
10 Isn't that more of a rule of thumb than specifically 99
11 percent being recovered and recycled?

12 MR. BEAUPRE: Objection, form and
13 foundation.

14 A. That is certainly a goal.

15 Q. And that doesn't necessarily mean
16 recovering and recycling 99 percent of materials, does
17 it?

18 MR. BEAUPRE: Objection, form and
19 foundation.

20 A. It means to recover -- it means to develop
21 a process flow sheet that is the best process flow
22 sheet you can think about. If the amount of material
23 that's retained in the process captured and used is 99
24 percent, fine, it may be occasionally less than that.

25 Q. Okay. And, for example, if your conversion

1 is low, aren't there other options than recovering and
2 recycling?

3 MR. BEAUPRE: Objection, form.

4 A. I'm not exactly sure how to answer that
5 question. If the conversion is low, then you would
6 have to refer to a specific process. Recovery and
7 recycle is an option.

8 Q. It's just one option though. There are
9 others, aren't there?

10 MR. BEAUPRE: Objection, form
11 foundation.

12 A. It depends on the process, right.

13 Q. And I want to go back, let's talk about the
14 dehydrohalogenation of fluorinated alkanes we were
15 talking about earlier. A necessary result of that
16 chemical reaction is the production of potassium
17 fluoride, right?

18 A. Yes.

19 Q. Okay. And if conversion is high, you said
20 there's sometimes one hundred percent conversion, then
21 there would be a high amount of potassium fluoride
22 coming out of that reaction, correct?

23 A. The reaction of a basic agent like
24 potassium hydroxide to dehydrohalogenation, that's
25 stoichiometric chemistry.

1 So the production of KF by
2 dehydrofluorination would correspond to the degree of
3 conversion.

4 Q. Right. You know it's going to come out on
5 the other end?

6 A. It's chemistry, exactly.

7 Q. Right. Stoichiometry requires that?

8 A. Exactly.

9 Q. Okay. So wouldn't there also be options,
10 other than recovering and recycling that potassium
11 fluoride?

12 For example, if the price of potassium
13 fluoride is higher than the price of potassium
14 hydroxide, wouldn't it make sense for the manufacturer
15 to sell the potassium fluoride?

16 MR. BEAUPRE: Objection, form and
17 foundation.

18 A. There may be situations where you have
19 value for the potassium fluoride without converting it
20 back to potassium hydroxide with lime, yes.

21 Q. And particularly in commercializing the
22 process, wouldn't the cost to not only to do the actual
23 recycling or conversion of the KF, that would be a
24 consideration, but wouldn't the equipment also be a
25 cost consideration before making an investment?

1 MR. BEAUPRE: Objection, form and
2 foundation.

3 A. Those are all considerations when
4 developing a commercial process.

5 Q. Including the capital investment?

6 A. Absolutely.

7 Q. We touched on this earlier, what is
8 dehydrohalogenation?

9 A. Dehydrohalogenation is the removal of HX.

10 Q. Right.

11 MR. BEAUPRE: Counsel, would it make
12 sense to take a break if we could do that?

13 MR. ROSE: Yeah, that's fine.

14 THE VIDEOGRAPHER: Going off the
15 record, the time is 11:22.

16 (Recess.)

17 THE VIDEOGRAPHER: We're back on the
18 record, the time is 11:34.

19 BY MR. ROSE:

20 Q. Welcome back, Dr. Manzer. Before the
21 break, we were talking about dehydrohalogenation, and
22 you said you would define that as the removal of HX,
23 and just for clarity, what is the X in the HX?

24 A. It would be a halogen.

25 Q. And turning to your report, I'm sorry, your

1 declaration. you did not provide a definition of
2 dehydrohalogenation in your report, is there a reason
3 for that?

4 A. I guess I didn't, because to me it's a
5 pretty obvious term, dehydrohalogenation is
6 dehydrohalogenation.

7 Q. And similarly, you don't have a
8 construction for dehydrofluorination, and that would
9 just be the removal of hydrogen and fluorine?

10 A. HF.

11 Q. HF?

12 A. Yes.

13 MR. BEAUPRE: Objection to form.

14 Q. In that reaction, is the HF coming off as
15 HF, or is it coming off separately as hydrogen
16 fluorine?

17 MR. BEAUPRE: Objection to form.

18 A. Dehydrofluorination, as it relates to the
19 patent, uses a base and would make KF.

20 Q. Right. So there's a hydrogen ion being
21 removed and a fluorine ion being removed, correct?

22 A. And reacting with KOH to make water.

23 Q. To make water?

24 A. And KF.

25 Q. And KF.

1 A. Right.

2 Q. So when you say the removal of HF, it's the
3 removal of an H and an F?

4 A. Removal of H and F.

5 Q. Right. And you didn't -- strike that.

6 That's the plain and ordinary meaning to
7 you of dehydrofluorination, right?

8 MR. BEAUPRE: Objection to form.

9 A. One can dehydrofluorinate with an agent, or
10 one can do it catalytically by removal of HF.

11 Q. But the '282 patent doesn't describe it
12 being done catalytically, does it?

13 A. No, it's a dehydrohal -- dehydrofluorine is
14 the agent, so that would imply the use of a base, a
15 base-mediated reaction.

16 Q. So as those terms are used in the claims of
17 the '282 patent, will you understand them to have the
18 plain and ordinary meaning of just the removal of the H
19 and the halogen, or does that term have a specific
20 meaning, as used in the '282 patent?

21 MR. BEAUPRE: Objection, form.

22 A. Yeah, please repeat that question for me?

23 MR. ROSE: Can you read it back?

24 (Record read.)

25 A. And the terms that are referred to?

1 Q. Dehydrohalogenation and
2 dehydrofluorination.

3 A. Dehydrohalogenation and dehydrofluorination
4 are the removal of HX or HF.

5 Q. Right, but it's only described being done
6 in one manner in the '282 patent, correct?

7 A. It's described as being done in the
8 presence of an agent, which is dehydrohalogenation
9 agent.

10 Q. So when you refer to a catalytic removal,
11 that's not what you would understand to be within the
12 meaning of dehydrohalogenation or dehydrofluorination
13 in the '282 patent, is that correct?

14 MR. BEAUPRE: Objection to form.

15 A. It's not done by a dehydrohalogenating
16 agent.

17 Q. Right. So I guess my question to you is,
18 does the term dehydrohalogenation, as used in the
19 claims of the '282 patent, do you interpret that as
20 meaning any removal of a hydrogen and a halogen,
21 including removal by a catalyst, or is it used more
22 narrowly in the '282 patent?

23 MR. BEAUPRE: Objection, form.

24 A. It's used narrowly in terms of the use of a
25 dehydrohalogenating agent. In other words, a

1 stoichiometric removal presence of an agent or base.

2 Q. You also -- strike that.

3 What do you understand the word purifying
4 to mean?

5 MR. BEAUPRE: Objection, form and
6 foundation.

7 A. The word purifying is an ordinary meaning
8 and that is to purify.

9 Q. Do you have any understanding of what that
10 means, other than its own word?

11 MR. BEAUPRE: Objection, form.

12 A. No, to me it has the interpretation -- I
13 mean, it has the meaning of the word to purify,
14 purifications.

15 Q. Does it require removal of anything?

16 MR. BEAUPRE: Objection, form.

17 A. A form of purifying could mean removal of
18 something.

19 Q. But you don't have any other definition,
20 any definition of purifying, other than the word
21 itself, correct?

22 MR. BEAUPRE: Same objection.

23 A. No, I don't.

24 Q. You also provide a definition of the term
25 spent DHA and spent KOH, correct?

1 A. That's correct.

2 Q. How does one spend KOH?

3 MR. BEAUPRE: Objection, form and
4 foundation.

5 A. Well, I define the term spent, spent DHA
6 not spend.

7 Q. Well, if something is spent, doesn't that
8 mean --

9 A. Well, I haven't defined that, but spent DHA
10 is unreacted DHA or specifically KOH that has been
11 through the dehydrohalogenation reaction unreacted.

12 Q. Couldn't that also include KOH that has
13 been reacted?

14 MR. BEAUPRE: Objection, form.

15 A. No, spent KOH is spent KOH. Spent KOH is
16 not a byproduct salt.

17 Q. And the reaction of the KOH that results in
18 KF, hasn't that potassium hydroxide been spent to
19 create another molecule?

20 MR. BEAUPRE: Objection to form.

21 A. The KOH has been reacted to make water and
22 byproduct salt.

23 Q. Right. So when it reacts, is it not being
24 spent?

25 MR. BEAUPRE: Same objection.

1 A. Not by my definition. My definition was
2 that it goes through the reaction unreacted.

3 Q. That it remains as --

4 A. It remains as KOH.

5 Q. As KOH. Could it also include KF?

6 A. No, it's KOH.

7 Q. Do you see anything in the '282 patent that
8 would be contradictory to that?

9 MR. BEAUPRE: Objection to form.

10 A. Well, the terms in the '282 patent indicate
11 that spent DHA and byproduct salts are referred to as
12 two separate components, therefore --

13 Q. You state in your declaration at paragraph
14 45, seven lines in, you state: In the general context
15 of dehydrohalogenation reactions, spent DHA or KOH
16 could mean DHA or KOH that has been converted to a
17 byproduct salt, such as KF, through reaction, correct?

18 A. Yes, that's what it says.

19 Q. Okay. So it could mean the KF?

20 MR. BEAUPRE: Objection, form.

21 BY MR. ROSE:

22 Q. Correct?

23 A. In the general context, in paragraph 45, it
24 says that it could mean DHA that has been converted to
25 a byproduct salt.

1 Q. So it could be reasonable or would be
2 reasonable to include KOH and KF as spent KOH, isn't
3 that right?

4 MR. BEAUPRE: Objection, form and
5 objection, foundation.

6 A. I don't consider KF to be spent KOH. I say
7 in 45 there, you know, that's the general context,
8 that's an interpretation, but I consider KF to be KF
9 and spent KOH to be KOH that has gone through the
10 process unreacted.

11 Q. My question is, wouldn't it also be
12 reasonable to interpret it -- I know you haven't
13 interpreted it this way -- but it would be reasonable
14 to interpret the term spent KOH to include KF and
15 unreacted KOH?

16 MR. BEAUPRE: Objection, form and
17 foundation.

18 A. That is one interpretation.

19 Q. And if you will, look at the examples in
20 the '282 patent, which is Exhibit 1001, and
21 particularly the examples begin in column 15.

22 A. Sorry. Okay, I'm there.

23 Q. And just by way of background, the relative
24 solubilities between KH and KOH, are they similar?

25 MR. BEAUPRE: Objection, form and

1 foundation.

2 A. They are both soluble in water, but to
3 different degrees.

4 Q. Is there a significant difference in their
5 solubility?

6 MR. BEAUPRE: Objection to form.

7 A. I would have to look up the solubilities of
8 each one of those.

9 Q. And referring to example one, and read as
10 much of it as you need to, but in particular, after the
11 reaction, going to the paragraph beginning at line 44
12 in column 15, it states: Scrubber product collection
13 cylinder was used to collect spent KOH and the portion
14 of organic that was carried out with the spent KOH.

15 There's no discussion there of removal for
16 separation of KF from KOH in that example, is there?

17 MR. BEAUPRE: Objection, form.

18 A. There is no discussion of KF in that
19 example, in that section.

20 Q. So in that example, the KF and the KOH
21 would both be collected together, correct?

22 MR. BEAUPRE: Objection, form and
23 foundation.

24 A. They would be part of the aqueous stream
25 that was collected.

1 Q. So when they collect the spent KOH, that
2 includes unreacted KOH, the KF, which is the result of
3 the reaction, and water, correct?

4 MR. BEAUPRE: Objection, form and
5 foundation.

6 A. That's an interpretation, yes.

7 Q. Is that a reasonable interpretation?

8 A. That's a reasonable interpretation.

9 Q. And similarly, looking at exhibit, I'm
10 sorry, example three, which begins at the bottom of
11 column 15, carries over to column 16, similarly there's
12 discussion of the removal, beginning at line 11 of
13 column 16: Afterwards, 290 to 300 grams of spent KOH
14 was taken out, and given the relative solubilities in
15 water and no discussion of any steps taken to separate
16 the KF from the KOH in the water, again, that would be
17 reasonable to conclude that the reference to spent KOH
18 is referring to the aqueous solution of both the KOH
19 and the KF and the water that all resulted from that
20 reaction?

21 MR. BEAUPRE: Objection, form and
22 foundation.

23 A. Yes.

24 Q. You gave an interpretation in your
25 declarations to the word withdrawing. I believe you

1 referred to that as taking out or removing?

2 A. That's correct.

3 Q. And then you refer to recovering spent DHA
4 or recovering spent KOH as collecting those components
5 for further use. You see that?

6 A. Yes, I do.

7 MR. BEAUPRE: Objection, form.

8 BY MR. ROSE:

9 Q. What do you mean by collecting?

10 MR. BEAUPRE: Objection, form.

11 A. I mean I'm collecting for further use.

12 Q. Is collecting any different than taking out
13 or removing or withdrawing?

14 MR. BEAUPRE: Objection, form.

15 A. Taking out is taking out or removing.
16 Recovering is collecting for further use. You can
17 withdraw without collecting.

18 Q. Describe for me how do you withdraw
19 something without collecting it?

20 MR. BEAUPRE: Objection, form.

21 A. Take a tank full of water, you open up a
22 spigot on the bottom of the tank and dump the water on
23 the grass, you have withdrawn the water, but you've not
24 collected it for any further use.

25 Q. Then you refer to the term recycling,

1 returning a component of the process to the process,
2 okay. In the case of the '282 patent, what is the
3 component that's being returned?

4 MR. BEAUPRE: Objection, form.

5 A. So recovering in the context of the '282
6 patent means collecting spent DHA or KOH for further
7 use.

8 Q. Let's go back and talk about recovering.
9 We've done recycling. Let's talk about recovering
10 again.

11 You say recovering spent DHA, recovering
12 spent KOH is collecting spent DHA or KOH for further
13 use. But then you go on to say, may include
14 separating, purifying, concentrating and/or
15 regenerating, right?

16 A. Yes.

17 Q. Where did you come up with those as part of
18 your definition for recovering?

19 MR. BEAUPRE: Objection to form.

20 A. The '282 patent on page -- let's see,
21 column two, so, please, can I have the question again?
22 (Record read.)

23 A. The first instance being column two of the
24 '282 patent, line 49, which says -- 49: Instant
25 invention relates, at least in part, to a method for

1 increase in cost efficiency for dehydrohalogenation for
2 production of fluorinated olefin by recovering and
3 recycling spent reagent.

4 And if we go to column three in the '282
5 patent, starting at line 15, actually, starting a
6 little bit before that: Withdrawing a reaction stream
7 comprising spent dehydrohalogenating agent and
8 optionally no fluoride salt byproducts and recovering,
9 purifying and/or regenerating spent dehydrohalogenating
10 agent, that's where I came up with that wording, we go
11 to the patent.

12 Q. Okay. But that doesn't -- that includes
13 purifying and/or regenerating. That language doesn't
14 mention concentrating or separating, does it?

15 MR. BEAUPRE: Objection to form.

16 A. It does not -- the patent does not say
17 concentrating. The patent says recovering, purifying
18 and/or regenerating spent dehydrohalogenating agent.

19 Q. Right. So recovering, isn't that listed in
20 a series of things? Recovering, purifying and/or
21 regenerating, aren't those three separate activities?

22 MR. BEAUPRE: Objection, form.

23 A. Those are examples of recovering for
24 further use.

25 Q. You don't read that as being three separate

1 things, recovering, purifying and/or regenerating?

2 MR. BEAUPRE: Objection, form.

3 A. I view those terms separating, purifying,
4 concentrating and regenerating as part of the
5 collection process, collecting for further use.

6 Q. You use the word may in your construction,
7 why is that?

8 MR. BEAUPRE: Objection, form.

9 BY MR. ROSE:

10 Q. Are there instances where those activities
11 are not part of the recovering process or the
12 collecting process?

13 MR. BEAUPRE: Same objection.

14 A. I think it means that any one of those
15 could be part of a collecting process, but they don't
16 all have to be included.

17 Q. Do any of them?

18 MR. BEAUPRE: Objection, form.

19 A. Well, as stated in the patent, yes, some of
20 them do.

21 Q. And you're referring to purifying and
22 regenerating?

23 A. Referring to by separating.

24 MR. BEAUPRE: Objection to form to
25 that last one.

1 Q. Is the only one that is required is
2 separating?

3 A. No, I said it may include one of those. It
4 may include separating, may include purifying, it may
5 include concentrating and it may include regeneration.

6 Q. All right. I had asked are there instances
7 where those activities are not part of the recovering
8 process or the collecting process. You said, I think
9 it means that any one of those could be a part of the
10 process, but they don't all have to be included, and I
11 asked do any of them, and you said well, as stated in
12 the patent, yes, some of them do.

13 And so my question is, which ones do have
14 to be required or do have to be included?

15 MR. BEAUPRE: Objection, form.

16 BY MR. ROSE:

17 Q. When you said some of them do?

18 MR. BEAUPRE: Same objection.

19 A. Separating, purifying, concentrations and
20 regenerating may be used in the collection process.

21 Q. Right. But my question to you was you said
22 some of them do, some of them are required. My
23 question is, which ones are required?

24 A. Oh.

25 MR. BEAUPRE: Objection, form.

1 A. None of them are required. One or more of
2 them may be used.

3 Q. And when I asked for support where you came
4 up with those, you pointed to column three beginning at
5 line 15 that refers to recovering, purifying and/or
6 regenerating. Where did you come up with separating
7 and concentrating?

8 MR. BEAUPRE: Object to form.

9 A. We go to the '282 patent, column 13, line
10 43.

11 Q. Okay.

12 A. It says: The organic free KOH isolate can
13 be immediately recycled to the reactor or can be
14 concentrated, and the concentrated solution can be
15 returned to the reactor.

16 So if I remember your question, you were
17 asking me about concentration?

18 Q. Yeah, and separation.

19 A. It says right there, the organic free
20 isolate can be immediately recycled through the reactor
21 or can be concentrated, and the concentrated solution
22 can be returned to the reactor.

23 Q. And, again, that's a step that's separate
24 from recovering, isn't that correct?

25 MR. BEAUPRE: Objection, form.

1 A. Well, the recovering definition says
2 recovering for further use, which -- so that recovering
3 step can involve concentration, collecting the spent
4 KOH concentrating.

5 Q. So identifying those terms that you say may
6 be included in recovering, you identified the language
7 at lines 15 through 18 of column three and then
8 beginning at line 43 of column 13, correct?

9 MR. BEAUPRE: Objection, form.

10 A. Please repeat that question?

11 (Record read.)

12 A. Once more again?

13 Q. If you like, I can break it up.

14 A. I think I got it. Let me just -- maybe
15 I'll ask you to do that.

16 (Record read.)

17 A. Yes, that's correct.

18 Q. And in preparing your report, did you find
19 those references on your own, or is that something that
20 counsel suggested to you should be included in the term
21 recovering?

22 A. No, I found those references on my own.

23 Q. And then moving on to the term recycle, you
24 touched on it briefly earlier, you construe recycling,
25 or to recycle as returning a component of the process

1 to the process?

2 A. Yes.

3 Q. Sorry, let me give you time to get back to
4 your declaration.

5 A. Returning a component of the process to the
6 process, correct.

7 Q. My question is, what is the component
8 that's being returned?

9 MR. BEAUPRE: Objection, form.

10 A. The component that's being returned is in
11 the patent, line 13, column 33 once again, the organic
12 free KOH isolate can be immediately recycled to the
13 reactor or can be concentrated and the concentrated
14 solution returned to the reactor.

15 Q. So is it the KOH that's being recycled or
16 is it the K?

17 MR. BEAUPRE: Objection, form.

18 A. It is the spent KOH.

19 Q. Which you define as just unreacted KOH,
20 correct?

21 A. It's KOH that had been through the
22 dehydrohalogenation process, unreacted.

23 Q. Unreacted. But we've already discussed
24 that a reasonable interpretation could also include for
25 the term spent KOH the KF that comes out as a result of

1 the reaction, correct?

2 MR. BEAUPRE: Objection, form,
3 mischaracterizes.

4 A. The entire purpose of the patent is to make
5 the process more cost effective and cost efficient. KF
6 is present in a stoichiometric amount of the haloalkane
7 that's been dehydrohalogenated. So it would be logical
8 to assume that one would want to convert the KF and the
9 K, as you've indicated, back to potassium hydroxide for
10 recycle.

11 Q. Right. So in that instance, for example,
12 if KF comes out of the reaction that potassium -- the
13 goal was to recycle that potassium back to the process,
14 correct?

15 MR. BEAUPRE: Objection, form and
16 foundation.

17 A. That is one option is to recover the
18 potassium from the potassium chloride in a process that
19 regenerates the potassium hydroxide, which can be used
20 in an earlier part of the process or recycled to the
21 process.

22 Q. Right. And so, for example, the potassium
23 fluoride can be reacted with calcium hydroxide to
24 introduce a new hydroxide stoichiometrically, and then
25 it goes back to the system as KOH, is that recycling?

1 MR. BEAUPRE: Objection, form and
2 foundation.

3 A. That is recovering for further use. That
4 further use is regenerating KOH from the KF.

5 Q. So in that instance, if, for example, if we
6 had, and we talked about instances of conversion, a
7 high instance of conversion, where what comes out of
8 the reaction is just KF, that's then converted to KOH
9 and sent to the reactor, that would not constitute
10 recycling, would it?

11 MR. BEAUPRE: Objection, form,
12 foundation, incomplete hypothetical.

13 A. That is a hypothetical question. You said,
14 I think, the only thing that came out of the reactor
15 was KF.

16 Q. Right. Yeah, it's hypothetical. You're an
17 expert. I want your opinion on whether that would
18 constitute recycling?

19 A. That wouldn't be the only thing that came
20 out of the reactor.

21 MR. BEAUPRE: Same objections.

22 BY MR. ROSE:

23 Q. The KF that does come out of the reactor
24 that is then reacted with calcium hydroxide, it then is
25 KOH, it then goes back to the reactor, is that

1 recycling?

2 MR. BEAUPRE: Objection, form,
3 foundation and incomplete hypothetical.

4 A. It is recycling the potassium part of
5 the --

6 Q. And that's getting back to my original
7 question. What is the component that's being recycled?
8 Is it the potassium that's being recycled, or is it the
9 potassium hydroxide that's being recycled?

10 MR. BEAUPRE: Same objections.

11 A. The potassium fluoride is reacting with
12 lime to generate calcium difluoride, which is removed
13 and regenerates KOH, which is then -- could be then
14 recycled to the process.

15 Q. So the component being recycled could
16 include regenerated KOH?

17 MR. BEAUPRE: Same objections.

18 A. Recovered potassium.

19 Q. So a component, in using your definition of
20 recycle, the component, when you say returning a
21 component of the process to the process, that could
22 include potassium by itself?

23 MR. BEAUPRE: Objection, form,
24 foundation and incomplete hypothetical.

25 A. Potassium is present as a salt. There's an

1 annine that goes along with it, and that would, in this
2 case, be hydroxide, which is the useful version of the
3 potassium.

4 Q. Right. But that hydroxide annine is not
5 being recycled, just the potassium cation, is being
6 recycled?

7 MR. BEAUPRE: Same objections.

8 BY MR. ROSE:

9 Q. Is that correct?

10 A. The hydroxide in the potassium hydroxide
11 that is returned to the process after the conversion of
12 KF is coming from the calcium hydroxide lime that is
13 added to the regeneration step.

14 So the potassium has been through the
15 process and is recovered, the OH, not necessarily.

16 Q. Right. So the hydroxide ion is not being
17 recycled. The potassium cation is being recycled?

18 MR. BEAUPRE: Same objections.

19 A. If it comes from KF through a reaction with
20 calcium hydroxide.

21 Q. The next term you discuss is
22 dehydrofluorinated product stream. You construe that
23 to mean a volume of material resulting from
24 dehydrofluorination, including dehydrofluorinated
25 organic products?

1 A. Correct.

2 Q. And first of all, how -- where did you come
3 up with the term volume?

4 A. For me, it was just if it's a stream, it's
5 a volume, and that's what it meant to me.

6 Q. Does stream connote a continuous or
7 semi-continuous process?

8 MR. BEAUPRE: Objection, form,
9 foundation.

10 A. Product stream -- dehydrofluorinated
11 product stream could come from either a continuous,
12 semi-continuous or batch process.

13 Q. So to use your analogy before about a
14 barrel of water and withdrawing it, if I were to take a
15 bucket and scoop a bucket of water out of that barrel,
16 is that a stream?

17 MR. BEAUPRE: Objection, form,
18 incomplete hypothetical.

19 A. The volume of material, yes.

20 Q. It would be volume, but would it also be a
21 stream?

22 MR. BEAUPRE: Same objections.

23 A. Well, in that analogy, I just presented you
24 with material with a bucket with a container of water,
25 but as it applies to this process, we have a stream

1 from the reactor, the dehydrofluorinated product
2 stream, and it is from the reactor, and so it's a
3 volume of material resulting from that
4 dehydrofluorination process.

5 Q. Doesn't a stream have to flow?

6 MR. BEAUPRE: Objection, form,
7 foundation.

8 A. Typically.

9 Q. Right. So that's what I'm saying is
10 starting with your example of a container of water, I
11 stick a bucket in and walk away with it. I now have a
12 volume of water. Do I also have a stream of water?

13 MR. BEAUPRE: Same objections, plus
14 incomplete hypothetical.

15 A. You have a volume of material.

16 Q. Whatever was in the container, I now have a
17 volume of it, but the question is that's different than
18 having a stream of that material, isn't it?

19 MR. BEAUPRE: Same objections.

20 A. I guess I'm not fully understanding where
21 this is going.

22 The dehydrofluorinated product stream is a
23 stream that has been removed, withdrawn from the
24 reactor. And if you segregate that into different
25 sections, you have different volumes in that stream at

1 any given point in time.

2 Q. Okay. And it's not intended to go
3 anywhere. I'm just trying to understand how the term
4 stream equates with volume, because to me, they mean
5 two different things, and I want to get an
6 understanding of how volume is the definition of
7 stream?

8 A. I was simply meaning that the stream, which
9 you're right, implies that it's flowing, and the volume
10 of material is a part of that stream that you're
11 collecting. It could include the entire stream you are
12 collecting for further use. So that stream is flowing,
13 and it's being collected somewhere for further use,
14 otherwise it's being discarded.

15 So it could include, you know, if you ran
16 this in a batch process, it could include everything
17 that flowed out of the reactor and was collected in a
18 bucket, which would then be the volume of material,
19 that's what I meant.

20 Q. And you say in your definition, a volume of
21 material resulting from dehydrofluorination, including
22 dehydrofluorinated organic products. What are the
23 products you're referring to?

24 A. The dehydrofluorinated organic products
25 would be the 1234 and the 1225, and, yes, those would

1 be the dehydrofluorinated organic products.

2 Q. And then the next term is product reaction
3 stream, second product stream or reaction stream, and
4 you refer to that as a volume of material, including
5 spent DHA that may also include byproducts, salts and
6 dissolved organics, correct?

7 A. Yes.

8 Q. Okay. And without having to go through the
9 whole discussion again, your rationale for using the
10 word volume instead of stream is the same for this term
11 as it was for the term we just discussed?

12 MR. BEAUPRE: Object to form.

13 A. Yes.

14 Q. And then you say including spent DHA,
15 that's using your definition set forth previously,
16 meaning unreacted DHA remaining after the
17 dehydrohalogenation reaction?

18 A. Yes, because I differentiate that from the
19 term that may also include byproduct salts.

20 Q. Right. And as we discussed, one
21 interpretation of spent DHA could include the byproduct
22 salts as well as unreactive KOH, correct?

23 MR. BEAUPRE: Objection, form,
24 foundation and mischaracterization of
25 previous testimony.

1 A. Yeah, please rephrase that?

2 Q. Yeah, we already discussed before, remember
3 we were looking at the examples where it talks about
4 spent KOH, so if -- well, strike that.

5 The spent DHA, in one reasonable
6 interpretation, could include unreacted DHA as well as
7 the salt of the reaction?

8 MR. BEAUPRE: Objection, foundation,
9 form and mischaracterization of previous
10 testimony.

11 A. The product reaction stream does not
12 include the regenerated KOH from KF. It contains DHA
13 unreacted KOH, for example, and byproduct salts.
14 Byproducts salts meaning KF and not byproduct salts
15 that had been further converted.

16 Q. Right, I understand that. What I'm asking
17 though is if you recall our discussion regarding the
18 examples where the term spent KOH is used and includes
19 unreacted KOH and the KF, if that's the interpretation
20 of spent KOH, then the product reaction stream would be
21 a volume of material including spent KOH and dissolved
22 organics?

23 MR. BEAUPRE: Objection, form,
24 foundation and mischaracterization of prior
25 testimony and incomplete hypothetical.

1 A. I may be missing it, but I don't see
2 anywhere in the examples where it talks about the KOH
3 regenerating from the byproduct salt being turned to
4 the -- recycled to the process. If I'm missing
5 something --

6 Q. No. Let's move on to the next component of
7 your construction. It says: And dissolved organics
8 being in the product reaction stream. Do you see that?

9 A. Dissolved organics would be organics that
10 are dissolved in the stream.

11 Q. Okay. And that gets to the next term you
12 construe which is dissolved organics?

13 A. Correct.

14 Q. Okay. And you construe that as organic
15 that is dissolved in a stream. Can you tell me what
16 does dissolved means?

17 MR. BEAUPRE: Objection, form.

18 A. Dissolved means it's a homogeneous
19 component of that stream, not a separate phase.

20 Q. Are the organics actually soluble in water?

21 MR. BEAUPRE: Objection, form.

22 A. I don't believe the organics are soluble in
23 water.

24 Q. Are they entrained in the water?

25 MR. ROSE: Same objection.

1 A. Coming out of the reactor, there may be
2 organics entrained with the water, not in the water.

3 Q. Okay. Entrained with the water, but they
4 are not actually dissolved as being soluble, correct?

5 MR. BEAUPRE: Same objection.

6 A. I don't believe they are soluble in the
7 water.

8 MR. ROSE: Now is probably a decent
9 time to break for lunch. I'm getting into a
10 new area.

11 MR. BEAUPRE: Sounds good.

12 THE VIDEOGRAPHER: Going off the
13 record, the time is 12:33.

14 (Luncheon recess.)

15 (Continued on next page.)

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1 A F T E R N O O N S E S S I O N

2 THE VIDEOGRAPHER: We're back on the
3 record, the time is 1331.

4 BY MR. ROSE:

5 Q. Welcome back, Dr. Manzer. I want to take
6 you back to your declaration, in particular starting in
7 paragraph 45, which in the 915 case is on page 23.

8 A. Yes, I'm there.

9 Q. I'm referring to the line beginning after
10 the chemical equations you have. We talked a little
11 bit about this before. You say in the general context
12 of dehydrohalogenation, reaction spent DHA or KOH could
13 mean DHA or KOH that has been converted to a byproduct
14 salt, which is KF through a reaction. I want to have
15 an understanding of what do you mean by a byproduct?

16 MR. BEAUPRE: Objection, form.

17 A. A byproduct is actually -- byproduct, in my
18 mind, is a minor component of a process. Co-product is
19 something that is produced along with the desired
20 product.

21 Q. So when you say a byproduct is minor, do
22 you mean minor as far as the volume of it gets created,
23 or what do you mean by minor?

24 MR. BEAUPRE: Same objection.

25 A. What I mean is it's usually considered to

1 be less than the stoichiometric amount that one would
2 expect a reaction and not the product of interest.

3 Q. So in the interest of the
4 dehydrohalogenation using KOH that we're talking about
5 here, is the KF that's produced by that reaction is
6 that not in a stoichiometric amount?

7 MR. BEAUPRE: Objection, form.

8 A. It is in a stoichiometric amount. It's
9 often called byproduct, but I would refer to it as
10 co-product.

11 Q. So it is a stoichiometric and so more
12 accurately would be characterized as a co-product?

13 A. Yes, in my opinion. Stoichiometric
14 relative to the amount relative to the organic that's
15 converted.

16 Q. Right. And then moving on to paragraph 50,
17 you start that paragraph with a statement: In general,
18 it is desirable to recover valuable reactants. Do you
19 see that?

20 A. Yes.

21 Q. Is that always the case in the terms of
22 recovery, as you've used it, which includes separating,
23 purifying, concentrating and/or regenerating? What
24 form of recovery are you referring to there?

25 MR. BEAUPRE: Objection, form.

1 A. I'm referring to materials that are
2 collected for further use, and that would include
3 unreacted starting material, which is a valuable
4 reactant.

5 Q. Right. Could it also include co-products?

6 MR. BEAUPRE: Objection, form.

7 A. Well, the term says recovering valuable
8 reactants, not reagents. But if KF is a valuable
9 product, it could include recovering KF for further
10 use.

11 Q. By the way, in that sentence, it is
12 generally desirable to recover. Is it generally the
13 desire to also purify, concentrate and regenerate?

14 MR. BEAUPRE: Objection, form.

15 A. Well, it's desirable to recover for further
16 use, and that could include concentrating and the other
17 terms that you mentioned.

18 Q. One would need to evaluate the overall
19 economics of the process before deciding if you wanted
20 to do those other steps of purifying, concentrating and
21 regenerating, correct?

22 MR. BEAUPRE: Objection, form and
23 incomplete hypothetical.

24 A. One can recover various materials from the
25 reaction. Some may be valuable, some may not be

1 valuable.

2 Q. Right, so someone --

3 A. But that's an economic -- excuse me -- but
4 that's an economic consideration.

5 Q. Right. That was all I was asking was in
6 order to decide if you want to recover in the sense of
7 purifying, concentrating and regenerating, one would
8 need to evaluate the overall economics of the
9 situation?

10 A. That's correct.

11 Q. Direct you to the '282 patent, if I could.
12 If you don't have it --

13 A. I have it right here.

14 Q. And particularly referring to the claims,
15 and I'm looking at column 16 of claim one.

16 A. I'm there.

17 Q. And the first step is hydrogenating
18 starting material stream comprising at least one alkane
19 according to formula one. And so would you refer to
20 that as the hydrogenation step of the overall process?

21 MR. BEAUPRE: Objection, form.

22 A. Yes, the hydrogenation step would refer to
23 hydrogenating the material of that general formula.

24 Q. And that general formula would include
25 what's known as HFP?

1 A. That's correct.

2 Q. And then after hydrogenating, if you read
3 down the claim, it says: To produce an intermediate
4 product stream comprising of at least one alkane,
5 according to the formula two. Do you see where that
6 is?

7 A. This is in section B?

8 Q. We're not into B yet. We're still in A.

9 A. Oh, okay. Hydrogenating.

10 Q. We started with one alkane according to
11 formula one?

12 A. Okay.

13 Q. And then the contact, that starting
14 material with a reducing agent to produce an
15 intermediate product stream comprising at least one
16 alkane according to formula two?

17 A. Yes.

18 Q. And would that include under formula two
19 what you've already referred to today as 236 and 245?

20 A. Yes.

21 Q. And then the dehydrohalogenation step that
22 we've been talking about that takes place down at C,
23 correct?

24 A. Yes.

25 Q. And that is defluorinating(sic) the

1 product -- strike that.

2 Defluorinating(sic) in the presence of a
3 dehydrohalogenating agent and there you're
4 defluorinating the product of formula two, correct?

5 A. You're dehydrofluorinating.

6 Q. Correct, thank you.

7 A. Formula two, that's correct.

8 Q. Right. So in the example I just gave you
9 would be dehydrofluorinating the 236 and/or the 245?

10 A. Yes.

11 Q. Okay. And in that reaction, what
12 conversion percent would you consider to be acceptable?

13 MR. BEAUPRE: Form and foundation.

14 A. Once again, that's an economic
15 consideration.

16 Q. Do you, from your experience at DuPont and
17 in the work that you have done in commercializing
18 processes that you developed or invented in your
19 laboratory, do you have any understanding as to what
20 would be an acceptable on a commercial level conversion
21 percentage?

22 MR. BEAUPRE: Same objection, form,
23 foundation and incomplete hypothetical.

24 A. There's no answer to that question without
25 knowing what the results of that dehydrohalogenation

1 step, the conversion is. If the conversion, as you go
2 up, as the conversion gets to some level where you make
3 more byproducts, then that would be unacceptable
4 potentially. So you have to look at the overall
5 selectivity in addition to the conversion and the
6 rates.

7 Q. So for the particular process of
8 dehydrofluorinating 236 or 245, you don't know, as you
9 sit here today, what would be a commercially acceptable
10 conversion percentage?

11 MR. BEAUPRE: Same objections.

12 A. I can't, I can't give you an answer to
13 that.

14 Q. Okay. And in following that reaction, that
15 would produce what we've already talked about today as
16 the 1234 and the 1225?

17 A. Correct.

18 Q. Okay. And so when we talk about
19 selectivity, if the desired product is 1234, what does
20 selectivity mean in that context?

21 MR. BEAUPRE: Objection, form.

22 A. 1234 is derived from 245, so the conversion
23 of 245 would result from how much of the 245 is fed to
24 the reactor is converted to something. If that
25 something is all 1234, then you would have very high

1 selectivity. If that conversion related in only
2 trivial amounts of the 1234, then that would be low
3 selectivity and undesirable situation to be in.

4 Q. And how is the 1225 made through that
5 reaction? Is that from the 236?

6 A. 1225 is derived from 245.

7 Q. Did you just say that the 1234 is also
8 derived from the 245?

9 THE WITNESS: Repeat that again,
10 please?

11 (Record read.)

12 A. I didn't say it's also -- maybe I did. I
13 said it's derived from 245.

14 Q. Right. So both 1225 and 1234 are derived
15 from 245?

16 A. 1225 is not directly derived from 245.

17 Q. Okay. Can you explain that?

18 A. Yes. 245 is dehydrofluorinated to 12 --
19 I'm sorry, 245 -- 236 -- I'm getting confused, okay.
20 So please ask the question again here.

21 Q. Okay. 1234 is derived from 245?

22 A. Correct.

23 Q. What is 1225 derived from?

24 A. 1225 is derived from 236.

25 Q. And so if you would look at the patent at

1 column 15 at line, the end of line 53, when talking
2 about example one, it states: Average conversion was
3 48 percent, selectivity of 1234 was 73 percent. Do you
4 see that?

5 A. Yes.

6 Q. So does that mean that the 48 percent, does
7 that mean that 48 percent of the KOH that was used --
8 strike that.

9 Does that mean that 48 percent of the KOH
10 introduced was actually used?

11 MR. BEAUPRE: Objection, form.

12 A. I think that term is referring to the
13 organic conversion. The organic conversion could lead
14 to byproducts that don't require KOH and be thermal
15 conversions.

16 So the conversion, I believe we're talking
17 about here is the conversion of the 245.

18 Q. So what you're saying is that what this
19 means is that 48 percent of the 245 that was introduced
20 was converted to 1234?

21 MR. BEAUPRE: Objection, form.

22 Q. Is that how you interpret that?

23 A. No, I'm saying 48 percent of the 245 that
24 was introduced was converted.

25 Q. Right. I thought that's what I said.

1 Maybe I misspoke.

2 A. No, I think you said to 1234, if I'm not
3 mistaken.

4 Q. Understood. Thank you for the correction.
5 So what that means is 48 percent of the 245
6 was converted?

7 A. Correct.

8 Q. Of the amount that was converted, 73
9 percent was converted to 1234YF?

10 MR. BEAUPRE: Objection, form.

11 A. 73 percent of the 245 was converted, was
12 converted to 1234.

13 Q. And do you have any understanding of what
14 the remaining 245 that would be converted would have
15 been converted to?

16 MR. BEAUPRE: Objection, form.

17 A. No, it's not specific as to where the other
18 27 percent of the converted material is going to.

19 Q. Would 73 percent selectivity be acceptable
20 in a commercial setting?

21 MR. BEAUPRE: Objection, foundation,
22 form, incomplete hypothetical.

23 A. Once again it depends on the economics of
24 the process.

25 Q. So based on your history with DuPont, you

1 don't know in this situation to make this product if
2 that would be commercially viable?

3 MR. BEAUPRE: Same objections.

4 A. In this situation, without additional
5 information, I wouldn't know.

6 Q. Okay. Let's go ahead and take a look at
7 the Smith reference.

8 A. Do you happen to know the exhibit number?

9 Q. I'm sorry, it's Exhibit 1003.

10 A. All right. I have it.

11 Q. And Smith is one of the references that you
12 rely on as prior art in each of the petitions, is that
13 correct? In each of your declarations?

14 A. That's correct.

15 Q. And turning past to the third page of
16 Smith -- strike that.

17 Go back to the second page of Smith, the
18 last paragraph, there are descriptions for preparing
19 1234, do you see that, and 1225?

20 MR. BEAUPRE: You mean the page with
21 zeros and the two?

22 Q. Sorry, it will help them in this one
23 because they don't match up. I'm referring to the
24 stamped number in the corner, which is a page with a
25 bunch of zeros. Sorry about that.

1 A. So which page are you talking about?

2 Q. 00002.

3 A. Two, okay.

4 Q. And the discussion begins describing
5 conversion of 245 to 1234. Do you see that?

6 A. Which line are you referring to there?

7 Q. I'm referring to the paragraph that begins
8 at the bottom of page 00002 and carries over to the
9 next page.

10 A. The second invention? Beginning with the
11 second invention?

12 Q. Beginning with the subject invention.

13 A. Subject, I'm sorry, subject, yes.

14 Q. That's a description of the process or a
15 process for converting 245 to 1234, correct?

16 A. Yes, that's one of the processes he
17 identifies, yes.

18 Q. And in the third full paragraph of page
19 00003, it states: In any of the aspects of the process
20 of the invention described herein, the products from
21 step A, B, C and/or D may be subjected to a
22 purifications step. Do you see that?

23 A. Yes.

24 Q. What did you understand that purification
25 step to be?

1 MR. BEAUPRE: Objection to form.

2 A. It's not specific, but I would assume it
3 would be any purification step that accomplishes
4 purifications.

5 Q. What are the products from steps A, B, C
6 and/or D?

7 MR. BEAUPRE: Objection, form.

8 A. Well, okay, so steps A and C are
9 hydrogenation steps, and steps D -- B and D are
10 dehydrofluorination steps.

11 Q. So what would the products of A and C be?

12 MR. BEAUPRE: Same objection.

13 A. The product of A, which starts with
14 specifically HFP and hydrogen, would be 236.

15 Q. Okay.

16 A. The product of step C, which is -- starting
17 material there is 1225 with hydrogen would give 245,
18 and the product of step B would be dehydrofluorinating
19 236, which would give 1225, and the product of step D,
20 dehydrofluorinating 245, as it says, would give 1234.

21 Q. And then we talked about the purifications
22 of those products. Smith goes on to say in that third
23 full paragraph on page 0003: The purification may be
24 achieved, for example, by separation of the desired
25 products. Separation was one of the terms you used in

1 defining recovery, correct?

2 MR. BEAUPRE: Objection, form.

3 A. The products of those forward actions are
4 recovered for further use. One of those uses can be
5 separation, could be purification, could be a number of
6 things.

7 Q. Okay. That's where I direct my question,
8 is purification a form of recovery?

9 A. Purification is a use or a follow-up step
10 for a recovered product.

11 Q. Okay. You know what are the -- well,
12 strike that.

13 Go down two more paragraphs, and there's a
14 statement: Alternatively, the process may be carried
15 out in a semi-batch manner. Do you know what's meant
16 in a semi-batch manner?

17 A. Yes, a semi-batch manner is not a
18 continuous manner.

19 Q. What's the difference then between
20 semi-batch and batch?

21 MR. BEAUPRE: Objection, form.

22 A. Batch process is a process where the
23 materials are charged to the reactor. They are reacted
24 and then the products are recovered and recycled.

25 Semi-continuous process would be where

1 materials are charged to the reactor and for a period
2 of time, there's some operation taking place beyond the
3 initial charge to the reactor.

4 Q. So in a batch, the charts that are reacted
5 then are reacted, and then are recovered and recycled.
6 Products are recovered and recycled.

7 A. They are recovered and recovered for
8 further use. One of those uses might be recycle.

9 Q. And then what is semi-batch?

10 A. Well, semi-batch is where you charge
11 reactants to a reactor, run it for a period of time,
12 you may be adding an additional reactant during that
13 period of time, but at some point you stop the
14 reaction. So it's run sort of continuously for a
15 period of time and then stopped, so semi-batch.

16 Q. Now, what's being described as being
17 purified by separation and other activities in that
18 third paragraph on page 003, that's not -- that doesn't
19 identify byproducts as being purified, correct?

20 MR. BEAUPRE: Objection, form and
21 foundation.

22 A. That paragraph does not mention anything
23 about byproducts.

24 Q. Does Smith discuss the recovery of any
25 byproducts?

1 MR. BEAUPRE: Objection, form.

2 A. Now we're referring to byproducts or
3 co-products?

4 Q. Well, in your report, you refer to
5 byproducts. So my question is to byproducts.

6 MR. BEAUPRE: Same objection.

7 A. On page three, Smith -- paragraph three
8 there it says: Alternatively, following optional
9 purification to remove unwanted byproducts such as
10 254EB.

11 Q. You're on page 0004?

12 A. 0004, I'm sorry, yes. So he mentions the
13 removal of unwanted byproducts.

14 Q. Does that fall under the characterization
15 as being recovered?

16 MR. BEAUPRE: Objection, form.

17 A. It would have been a step to recover
18 products from the reactor and a follow-up step of
19 purification. And one of those purification steps
20 following the recovery is to remove the unwanted
21 byproducts by -- well, just to remove the unwanted
22 byproducts.

23 Q. Right. So what you're doing is you're
24 recovering the product, not the byproduct, correct?

25 MR. BEAUPRE: Objection, form.

1 A. Well, you're recovering the product and the
2 byproduct, and then you're purifying the product by
3 removing the unwanted byproduct.

4 Q. But you don't do any purification or
5 separation or any of those other terms that fall into
6 your definition of recovery? You're not applying those
7 to the byproduct, are you?

8 MR. BEAUPRE: Objection, form.

9 A. The byproduct is recovered -- the byproduct
10 is part of the stream containing the 245 that is
11 recovered for subsequent step, which involves
12 purification of that organic stream.

13 Q. So the recovery includes the product and
14 the byproduct?

15 A. Correct.

16 Q. Okay. Can recovery also include a product
17 and a co-product?

18 MR. BEAUPRE: Objection, form.

19 A. Recovery could include the byproduct and
20 the desired product and byproducts as well.

21 Q. And co-products?

22 A. Co-products, byproducts and products.

23 Q. Okay. Now, Smith talks about a gas phase
24 reaction, correct?

25 MR. BEAUPRE: Objection, form.

1 A. Which part of Smith are you referring to?

2 Q. Well, let's turn to page 0006, beginning
3 with the first full paragraph, the
4 dehydrofluorinization(sic) may be induced thermally may
5 be base mediated and/or may be catalyzed by any
6 suitable catalyst.

7 A. I'm sorry that was on six, right?

8 Q. 0006?

9 A. 0006.

10 Q. I'm looking at the first full paragraph.

11 A. Yes.

12 Q. Dehydrofluorinization(sic) may be induced
13 thermally, may be base mediated or may be catalyzed by
14 any suitable catalyst. Do you see that?

15 A. That's correct.

16 Q. Do you understand the catalyzed process?

17 A. I do.

18 MR. BEAUPRE: Objection to form.

19 Q. Well, do you understand what they're
20 referring to as catalyzed by any suitable catalyst?

21 A. I understand that term.

22 Q. Yes. What is that process?

23 A. It is passing reactants over a catalyst to
24 effect the dehydrofluorination.

25 Q. And when you say passing them over, you're

1 passing them over in a gaseous form, correct?

2 MR. BEAUPRE: Objection to form.

3 A. It's not specific. It could be a gas form
4 or liquid form, but you got a catalyst in a reactor,
5 and you're passing the starting material over that
6 catalyst to make a product. It could be done either in
7 a gas phase or it could be done in a liquid phase.

8 Q. Right. But in Smith, it's being done in a
9 gas phase, correct?

10 MR. BEAUPRE: Objection, form and
11 foundation.

12 A. I don't believe Smith is specific to carry
13 out that catalytic reaction, only in the gas phase.

14 Q. Could you take a look at the examples that
15 Smith provides, they start on page 00018. Is example
16 one, is that the gaseous reaction?

17 A. I don't think you can tell whether it's gas
18 phase in the reactive or liquid phase, because he
19 doesn't say what the pressure in that reactor is. He
20 talks about temperature. He doesn't say what the
21 pressure is.

22 Q. He says inlet temperature is 51 degrees C,
23 correct? I'm looking at table one.

24 A. Okay. Inlet temperature is 51 degrees.

25 Q. Do you know what the boiling point is of

1 236?

2 A. 236, according from memory, I seem to
3 believe it's around, it's around 20 to 30 degrees
4 centigrade at atmospheric pressure.

5 Q. And how about for 245?

6 A. I think it's a little higher, but I'm not
7 sure. It's in that same ballpark.

8 Q. So at atmospheric pressure, they would be
9 in the gas phase if the temperature, the reaction was
10 51 degrees C, correct?

11 MR. BEAUPRE: Objection, form.

12 A. At 51 degrees, an atmospheric pressure,
13 they should be in the vapor phase, gas phase, but it
14 doesn't say that.

15 Q. And, again, looking at example two, the
16 defluorinization(sic) of 236, that's a gas reactor,
17 correct, a gas phase reaction?

18 MR. BEAUPRE: Objection, form.

19 A. Can't draw that conclusion from the data
20 that's presented.

21 Q. Again, the temperature here looks to me to
22 be between 240 and 320 degrees C?

23 A. That's correct.

24 Q. Do you know what the pressure would need to
25 be in order to have 236 in a liquid form at those

1 temperatures?

2 A. Not offhand I don't.

3 Q. Pretty high though, right?

4 MR. BEAUPRE: Objection to form.

5 A. I don't know what the pressure would be.

6 At some pressure, it would force the reaction to be
7 done in a liquid phase.

8 Q. Do you read in the second paragraph under
9 example two where we first feed gas flow rates?

10 A. Yes.

11 Q. Doesn't that suggest this is a gas phase
12 reaction?

13 MR. BEAUPRE: Objection, form.

14 A. Not at all.

15 Q. What does that mean, feed gas flow rates?

16 MR. BEAUPRE: Objection, form.

17 A. It says what it says. The feed gas flow
18 rate was chosen such that at contact time of five
19 seconds was achieved in the reactor, the feed gas, it
20 doesn't say where that goes. It could go to a
21 progresser and be pressurized, but based on the flow
22 rates of the gas and the volume of the reactor, you can
23 calculate a contact time.

24 Q. Right, but it's gas that's flowing, isn't
25 it? It says the flow rate of the gas.

1 A. The gas, that's right, but it doesn't say
2 gas into what. It just says the flow rate of gas was
3 chosen to determine the contact time.

4 Q. So what you're saying is it could be that
5 they used a compressor to compress the gas, such that
6 at 300 degrees Celsius, it was nevertheless in liquid
7 form when it went into the reactor?

8 A. That's certainly one possibility.

9 Q. And if it's being fed into the reactor in
10 the liquid form, wouldn't it say feed liquid flow
11 rates?

12 MR. BEAUPRE: Objection, form.

13 A. It doesn't say that.

14 Q. So doesn't that suggest to you that it's
15 being fed in a gas phase or vapor phase?

16 MR. BEAUPRE: Same objection.

17 A. The feed gas flow rates were such to
18 maintain the contact time of five seconds in the
19 reactor between the catalyst and the feed mixture. It
20 doesn't say whether the feed mixture in the reactor is
21 a liquid or gas.

22 Q. It does call it feed gas?

23 MR. BEAUPRE: Objection.

24 A. It calls it feed mixture.

25 Q. It refers to the feed gas flow rate,

1 correct?

2 A. He used the term feed gas flow rate, that's
3 right.

4 Q. And, again, at that temperature,
5 approximately how many atmospheres would the pressure
6 need to be to maintain a liquid phase?

7 MR. BEAUPRE: Objection, form and
8 asked and answered.

9 A. I don't know without calculating what the
10 pressure would have to be.

11 Q. Would it have to be more than three or four
12 atmospheres?

13 MR. BEAUPRE: Same objections.

14 A. Once again, I would have to go through a
15 calculation to determine that.

16 Q. To know whether it's more than three
17 atmospheres?

18 MR. BEAUPRE: Same objections.

19 A. I'm not going to answer. I'd have to
20 calculate.

21 Q. Turn your attention to page 11 of the
22 Smith. The second full paragraph starts with: Another
23 preferred method effecting dehydrofluorination in steps
24 B and D is by contacting 236E and 245EB and/or 245EB
25 with a base--(base-mediated defluorination.)

1 Is that what you were referring to in your
2 report as a liquid phase reaction?

3 A. In which part of my report are you
4 referring to?

5 Q. Hold on just a second. Yeah, at paragraph
6 43.

7 A. On page 21?

8 Q. Yeah. Where you say a dehydrohalogenating
9 process using DHA, such as that claimed in the '282
10 patent, generally is a liquid phase process. That's
11 what I'm referring to when I ask do you understand that
12 what's being described in the second full paragraph on
13 page 00012 of Smith, that's a liquid phase process?

14 MR. BEAUPRE: Objection to form.

15 A. Okay. So would you repeat the question?

16 Q. Yes. Does that suggest to you that what's
17 being described in the second paragraph of page
18 0012(sic) of Smith is a liquid phase process?

19 MR. BEAUPRE: Objection, form.

20 A. It suggests that the base -- let me get the
21 wording correct here. That the base mediated the
22 hydrohalogenation reaction is conducted in the liquid
23 phase.

24 Q. And do you know what concentrations of KOH
25 Smith uses? If it will help, you can look to page

1 0013.

2 A. Typically present 50 percent based on the
3 total weight of the components, which make up steps B
4 and D, preferably the base is present in an amount five
5 to 30 weight percent.

6 Q. And what is the effect on concentration of
7 KOH in these reactions?

8 MR. BEAUPRE: Objection, form.

9 MR. ROSE: Let me reask the question,
10 because I may have misspoken.

11 Q. What is the effect of concentration of KOH
12 on these reactions?

13 MR. BEAUPRE: Objection, form.

14 A. Well, typically a POSITA would expect that
15 higher concentrations would provide a faster reaction
16 rate.

17 Q. And so Smith states that preferably, the
18 base is present in an amount of five to thirty percent
19 weight. Do you see that?

20 MR. BEAUPRE: Objection to the form.

21 A. By weight of the total weight of the
22 components, yes.

23 Q. And so the POSITA would know that 30 weight
24 percent would be better than five weight percent, for
25 instance, correct?

1 MR. BEAUPRE: Objection to form and
2 mischaracterizes.

3 A. POSITA would expect 30 percent higher
4 concentration of the base would be desirable.

5 Q. So, for example, 15 percent would be more
6 desirable than 5 percent, and 30 percent would be more
7 desirable than 15 percent, correct?

8 MR. BEAUPRE: Same objections.

9 A. As I said, the higher the concentration of
10 base, typically the higher concentration would be
11 preferred, typically.

12 Q. Did you, when reaching your opinions in
13 combining the Smith reference with other prior art
14 references, consider the effect of concentration of KOH
15 that might affect the combination?

16 MR. BEAUPRE: Objection to form.

17 A. When I looked at the -- as a POSITA, when I
18 looked at the Smith patent, I was looking at the time
19 frame of October the 12, 2010, all right. And I was
20 sitting there with the problem of how one makes 234,
21 1234. So I go out and I look at the various
22 references, and I see Smith, and Smith teaches one how
23 to hydrogenate the various olefins to haloalkanes and
24 teaches how to dehydrohalogenate those haloalkanes to
25 olefins.

1 So that provides a starting point. I don't
2 believe at that point a POSITA would have specifically
3 gone in there and looked for details on concentrations.

4 Q. So in deciding and opining on the
5 combinations, you didn't look at and consider the
6 concentrations, correct?

7 MR. BEAUPRE: Objection, form,
8 mischaracterizes.

9 A. Opining on the combinations of the Smith
10 and Sedat?

11 Q. Well, we'll break those down, because I
12 know right now we're talking about --

13 A. Smith?

14 Q. Smith. Smith in combination with either of
15 them, either Sedat or Masayuki, did you consider, so we
16 don't have to go back and reask the question a second
17 time, did you consider the concentrations of KOH in
18 opining as to Sedat in combination with Smith or
19 Masayuki in combination with Smith, with either of
20 them?

21 MR. BEAUPRE: Objection, form.

22 A. Not specifically, I was looking at some
23 method of enabling the preparation of the haloalkanes
24 and that comes from Smith, and I was looking at a
25 method of dehydrohalogenating those alkanes to 1234,

1 and that was the reason for the Sedat and Masayuki
2 references over Smith. And in looking at those
3 references, I had a high degree of confidence that
4 combining those references would enable me to develop a
5 process. One of the steps in that development would
6 have been looking at concentrations.

7 Q. But you just didn't at this time look at
8 the concentrations?

9 MR. BEAUPRE: Objection, form.

10 A. Not as a POSITA in 2010. I was just
11 looking for prior art references.

12 Q. Okay. I want to go back to something we
13 were discussing a few moments ago.

14 When I had asked about does Smith describe
15 the recovery of byproducts, and you had directed me to
16 the second full paragraph on page 0004.

17 MR. BEAUPRE: What document? You're
18 still on Smith?

19 MR. ROSE: I'm still on Smith, yeah.

20 MR. BEAUPRE: Okay.

21 BY MR. ROSE:

22 Q. And you had pointed out that following
23 optional purification steps to remove unwanted
24 byproducts, you were pointing me to that language when
25 I asked if Smith taught recovery of byproducts?

1 MR. BEAUPRE: Objection, form.

2 A. Yeah, Smith talks about the paragraph
3 starting the product of the reaction.

4 Q. Okay.

5 A. For example, in steps A and C are conducted
6 simultaneously, the same reactor to those products may
7 be separated by distillation as one example of a
8 separation.

9 Q. And then you get to the next paragraph and
10 it says alternatively, following any optional
11 purification steps to remove unwanted byproducts, you
12 see that?

13 A. Yes.

14 Q. So that's purification of the products to
15 remove unwanted byproducts, correct?

16 MR. BEAUPRE: Objection, form.

17 A. Smith says that an optional purification
18 can be done to remove byproducts from 236 and 245
19 before being fed to a reactor. So that is a
20 purification step.

21 Q. Right. But that's not purification of the
22 byproducts, is it?

23 MR. BEAUPRE: Objection to form.

24 A. It's removal of the byproducts.

25 Q. Right. It's not purification of the

1 byproducts, is it?

2 MR. BEAUPRE: Same objection to form.

3 A. It could be considered -- it's removal of
4 the byproducts. It does not say what's done with those
5 byproducts. It could be collected for their use.

6 Q. Right. So Smith doesn't teach the recovery
7 of the byproducts? What you're saying is that it could
8 happen, but Smith doesn't teach that, does it?

9 MR. BEAUPRE: Objection, form and
10 mischaracterizing testimony.

11 A. I'm looking at figure one on page 25, where
12 it shows a hydrogenation stage product still, and
13 showing some material returning back to the
14 hydrogenation step, and then it's showing the
15 hydrogenation reactor recycle purge, so there's a purge
16 from that stream. And down at the bottom of that still
17 it says that there are possible heavies or there is a
18 feed to a second stage preheater. Now, it doesn't say
19 what happens to those streams, at least I don't think
20 it does.

21 Q. Right. It doesn't say -- I just want to
22 make sure I'm looking at the same stream as you're
23 looking at. There's a stream leaving the still of
24 possible heavies?

25 A. Yes.

1 Q. There's a stream of fluoro propane, right?
2 Which stream are you talking about?

3 A. Yes, that's correct. There's a fluoro
4 propane stream. There's a purge stream at the top.

5 Q. Which one of those streams has the
6 byproducts?

7 MR. BEAUPRE: Objection, form.

8 A. It's not clear to me.

9 Q. Okay. So, again, going back to my prior
10 question, Smith does not disclose the recovery of
11 byproducts, correct?

12 MR. BEAUPRE: Objection, form and
13 mischaracterizes prior testimony.

14 MR. ROSE: I haven't characterized his
15 testimony. It's just a straight up
16 question.

17 A. If you can save me some time maybe by
18 pointing me back to that paragraph that was on page --

19 Q. It was on page 0004, yeah, 4.

20 A. 0004, oh, yes, I'm sorry. Yeah, the
21 unwanted byproducts listed as 254EB as being one of
22 other possible byproducts. He does not talk about
23 purifying those byproducts.

24 Q. Or recovering those byproducts?

25 MR. BEAUPRE: Objection, form.

1 A. He's talking about removing them, and in my
2 definition, to its removing further use, he does not
3 talk about collecting those byproducts.

4 Q. Right, and removing is what you had used to
5 describe withdrawing, correct?

6 Remember you gave the example of a
7 container of water, and you let it run into the ground,
8 it's been removed, but it's not been collected?

9 A. It does not say that it was collected.
10 Implication, however, is it was collected. You just
11 don't let this material get into the atmosphere.

12 Q. But he doesn't reference anything about
13 that either, does he?

14 A. No, he doesn't. It's just common sense.

15 MR. BEAUPRE: Is now a good time for a
16 break?

17 MR. ROSE: Yeah, that's fine.

18 THE VIDEOGRAPHER: Going off the
19 record, the time is 1440.

20 (Recess.)

21 THE VIDEOGRAPHER: We're back on the
22 record, the time is 1455.

23 BY MR. ROSE:

24 Q. Welcome back, Dr. Manzer. I want to direct
25 your attention now to back to the Smith reference,

1 which is Exhibit 1003 in the proceedings, and we were
2 looking previously at page 0012.

3 A. Yes.

4 Q. And I'm looking at the paragraph, second
5 from the bottom, it starts with the word typically,
6 using the printed numbers 0012.

7 A. Oh, you said 12, sorry.

8 Q. Yeah.

9 A. Typically, okay.

10 Q. It says: The base-mediated
11 dehydrofluorination process of steps B and D is
12 conducted at a temperature of from about minus 50 to
13 about 300 degrees C?

14 A. Yes.

15 Q. Preferably about 20 to about 250-degree C,
16 for example, from 50 to 200-degree C.

17 Would the 236 at those temperatures be in
18 the liquid form or the gaseous form?

19 MR. BEAUPRE: Objection to form.

20 A. It depends on the pressure.

21 Q. And it also says in the next sentence: The
22 base-mediated dehydrofluorination may be conducted at a
23 pressure from about zero to about 30 BarA. Do you see
24 that?

25 A. Yes.

1 Q. What is BarA?

2 A. Atmospheric pressure determined by gauge.

3 Q. So does that mean zero to about 30
4 atmospheres?

5 A. I believe that's what it means, yes.

6 Q. At those pressures and those temperatures,
7 can you tell me whether the 236 would be in the gaseous
8 or liquid form?

9 MR. BEAUPRE: Objection to form.

10 A. Which temperature are you specifically
11 talking about?

12 Q. Let's look at the narrowest range that they
13 provide, which is from 50 to about 200 and in that
14 pressure range.

15 A. Yeah, I don't know specifically. I haven't
16 looked at the temperature pressure at the lowest
17 temperature and the highest pressure. It's likely I
18 think they're in the liquid phase, but I don't know
19 both the higher pressure and the higher temperature.

20 Q. Okay. Direct your attention to page 0014
21 of Smith. The first full paragraph starts with the
22 sentence: The base-mediated dehydrofluorination of
23 steps B and D is preferably conducted in the presence
24 of a catalyst. Is a catalyst necessary for that
25 reaction?

1 MR. BEAUPRE: Objection, form.

2 A. That's a misleading statement.

3 Q. Why is that misleading?

4 A. The base-mediated reaction is not
5 catalytic.

6 Q. Then why is it stated that it's preferably
7 conducted in the presence of a catalyst?

8 A. I have no idea.

9 MR. BEAUPRE: Same objection.

10 BY MR. ROSE:

11 Q. Okay. Did you notice that when you read
12 Smith in preparing your declaration?

13 MR. BEAUPRE: Objection, form.

14 A. I don't know whether I noticed that error
15 or not.

16 I'm sorry, you're saying discussing --
17 going on to the next sentence, discussing catalyst in
18 terms of a phase transfer catalyst.

19 Q. What is a phase transfer catalyst as
20 compared to a catalyst?

21 A. Yeah, both catalysts, whether it's phase
22 transfer or one of the chrome catalysts they refer to
23 in other cases, either one of those is consumed, but
24 the base-mediated dehydrofluorination, for example,
25 with KOH, the starting materials and products are not

1 soluble in water, and, therefore, it's hard to get the
2 KOH that's in the water to react at any reasonable rate
3 with the organic.

4 So one can use a phase transfer catalyst,
5 which is not consumed, that has an organic and a
6 hydrophilic component to it. So it, in a sense, acts
7 as a way to bring the organic reagent, the KOH into
8 contact with the organic layer. It's typically why one
9 adds a base phase transfer catalyst, and that's because
10 you have two reactive streams that are insoluble of one
11 another.

12 Q. Does it affect the surface tension? Is
13 that how it does it?

14 MR. BEAUPRE: Objection, form.

15 A. I don't know whether it affects the surface
16 tension or not, but you've got a component of the phase
17 transfer catalyst that's soluble in the organic phase.
18 You've got a component of the phase transfer catalyst
19 that's in the aqueous phase. So the aqueous part of
20 that phase transfer catalyst is the opportunity to
21 bring the KOH closer to the organic layer for reaction
22 and partially more closer to it at the surface before
23 further reaction.

24 Q. Okay. So I'm just trying to reconcile that
25 with your prior definition of a catalyst. I can't

1 remember exactly what you said, but it's not consumed
2 in the reaction, which is true with the phase transfer
3 catalyst, but it affects the thermodynamics of the
4 reaction?

5 MR. BEAUPRE: Objection, form.

6 A. It affects the rate of the reaction.

7 Q. Okay. And that's true for both a catalyst
8 and a phase transfer catalyst?

9 A. Phase transfer catalyst in a heterogenous
10 catalyst. It's not a phase transfer catalyst. It may
11 affect the rate of the reaction.

12 Q. When you read Smith, did you understand
13 Smith to be describing laboratory processes as compared
14 to commercial processes?

15 MR. BEAUPRE: Objection, form.

16 A. I'm looking at in the examples, for
17 example, two is two grams of catalyst and so on and so
18 forth. That would suggest a laboratory reaction. What
19 the purpose of that laboratory reaction is, I don't
20 know.

21 Q. So Smith is not talking about bulk
22 manufacture, correct?

23 MR. BEAUPRE: Objection, form.

24 A. I don't believe he mentions the term bulk
25 manufacturing. Excuse me just a minute. Let me just

1 add something to that maybe.

2 (Pause.)

3 A. I've got nothing further to add.

4 Q. And Smith also doesn't discuss conversion
5 percentages, is that right?

6 MR. BEAUPRE: Objection, form.

7 THE WITNESS: Would you read that
8 question, please?

9 (Record read.)

10 A. No, that's not right.

11 Q. Okay. Where does Smith discuss conversion
12 percentages?

13 A. Table two on page 00019, he's talking about
14 the dehydrofluorination of 236. Now, this is with a
15 chromium catalyst, but he talks about the conversion in
16 table two, and he talks about the selectivity of the
17 product conversion of 236 and the product of the two
18 isomers of 1225.

19 Q. And I think we already discussed this, but
20 the chromium process, you don't know whether that's a
21 gas process or liquid?

22 MR. BEAUPRE: Objection, form.

23 A. I don't know specifically if it's a gas or
24 liquid phase process, but it is a catalytic process
25 without the addition of a base.

1 Q. Okay. In Smith's discussion of the
2 dehydrofluorination process, the base-mediated process,
3 he doesn't talk about conversion percentages, does he?

4 MR. BEAUPRE: Objection, form.

5 A. None of his examples give any details on
6 the base-mediated dehydrofluorination.

7 Q. Okay. And right, so he provides no details
8 on the conversion percentages or(sic) the base-mediated
9 process, correct?

10 MR. BEAUPRE: Same objection, form.

11 THE WITNESS: So please repeat that
12 again, the question?

13 (Record read.)

14 BY MR. ROSE:

15 Q. For the base-mediated process.

16 A. Yeah, I don't see any specifics for that.

17 Q. And getting back to page 0012, we were
18 talking about the temperatures and the pressures
19 disclosed by Smith at the last full paragraph of page
20 12, the paragraph beginning with typically.

21 A. Typically, okay.

22 Q. We were talking about the temperature
23 ranges and the pressure ranges. Did you make any
24 assumptions, when reaching your opinions regarding the
25 combination of Smith, with any other reference as far

1 as temperature and/or pressure is concerned?

2 MR. BEAUPRE: Objection, form.

3 A. I didn't reach any specific temperature or
4 pressure range by combining Smith with Sedat or
5 Masayuki.

6 Q. So you made no assumption when you reached
7 your ultimate opinions, correct?

8 MR. BEAUPRE: Same objection.

9 A. I don't recall making any assumptions.

10 Q. And Smith does not discuss anything having
11 to do with spent KOH, correct?

12 MR. BEAUPRE: Objection, form.

13 A. No, I can't find anywhere where he does.

14 Q. And so there would be no mention of any
15 desire to separate, purify, concentrate, regenerate or
16 recycle spent KOH mentioned in Smith, correct?

17 MR. BEAUPRE: Objection, form.

18 A. I don't recall any mention of that
19 specifically.

20 Q. And similarly, Smith also doesn't reference
21 KF as a byproduct, does he?

22 MR. BEAUPRE: Objection, form.

23 A. I don't recall that.

24 Q. And, therefore, he doesn't mention
25 regeneration using any KF?

1 A. No, but he does mention on page 13, middle
2 of the page there, it says: A preferred base is an
3 alkali metal hydroxide selected from the group
4 consisting of lithium hydroxide, sodium hydroxide and
5 potassium hydroxide; and, therefore, in the
6 dehydrofluorination process, the byproduct using
7 potassium hydroxide would be potassium fluoride from
8 the chemistry.

9 Q. He just doesn't mention potassium fluoride?

10 A. Correct.

11 MR. BEAUPRE: Objection to form.

12 A. I don't recall him mentioning it
13 specifically.

14 Q. Okay. And he doesn't reference
15 regeneration, correct?

16 MR. BEAUPRE: Same objection.

17 A. No, I don't believe he references
18 regeneration of KF, if he's using KOH as the
19 base-mediated material.

20 Q. He doesn't reference regeneration of
21 anything regardless of what the base-mediated material
22 is, correct?

23 MR. BEAUPRE: Same objection.

24 A. Yeah, if your question was specific to the
25 base mediated --

1 Q. Correct.

2 A. Yeah, okay, I was just looking to see if
3 there was a reference to regeneration of the chromium
4 catalyst, but if you're specific to the base mediated,
5 he does not reference that, that I can see.

6 Q. Let's go ahead and move on to the Sedat
7 reference. We have copies if you guys want them.

8 MR. BEAUPRE: I'm good. Thank you
9 though.

10 MR. ROSE: And just for the record,
11 Sedat is Exhibit 1004 in the 915 action.
12 That's the French language document, and
13 1005, Exhibit 1005 in the 915 action, which
14 is the English translation.

15 A. You prefer the English?

16 Q. Yes. Do you?

17 A. I can go either way.

18 Q. Good for you.

19 A. French is a common language in Canada, as
20 you know, it's up there equal to English.

21 Q. Yeah, I guess in some parts of Canada.

22 A. I think it is an official language.

23 Q. Okay. Sedat is a reference that you
24 combined with the Smith reference in reaching your
25 opinion as to obviousness, correct?

1 A. That is correct.

2 Q. And if you would, turn to page 008 of
3 Sedat.

4 A. Okay.

5 Q. In Sedat on page 008, referring to the
6 number in the bottom right, I'd like to direct your
7 attention down to the bottom, the last sentence of that
8 single full paragraph on page eight, and certainly feel
9 free to read as much of it as you want. But he refers
10 to the temperature is preferably between 80 and 180
11 degrees C, advantageously between 125 and 180 degrees C
12 and very particularly between 145 and 165 degrees C.
13 Do you see that?

14 A. Yes.

15 Q. At those temperatures, would you expect the
16 236 to be in the gas phase or the liquid phase?

17 MR. BEAUPRE: Objection, form.

18 A. I'm just looking for a pressure.

19 Q. The language of Sedat goes on to discuss
20 the dehydrofluorination reaction of step one may be
21 carried at atmospheric pressure, but is preferred to
22 work at a pressure above atmospheric pressure
23 advantageously. This pressure is between 1.1 and 2.5
24 BarA.

25 A. Okay. So relatively low pressure, I would

1 expect the -- are you asking me the 236 and 245?

2 Q. 236.

3 A. 236, I would expect 236 to be fairly
4 volatile at that temperature, yes.

5 Q. And the same with 245?

6 A. Yes.

7 Q. And referring to the experimental section
8 in Sedat at page 0011.

9 A. Okay.

10 Q. There's a paragraph beginning: The outlet
11 of the reactor six is connected to a filter eight in
12 order to separate the calcium fluoride from the
13 reaction medium.

14 The reaction medium, that is something
15 other than spent KOH, correct?

16 A. Let me just go back to you're talking about
17 a specific part of the process. Did you say inlet or
18 outlet and which number?

19 Q. I'm sorry, on page 0011, three lines from
20 the bottom. I'm sorry, I thought you were with me.

21 A. I was with you. I was up a paragraph
22 though. Oh, reactor six, okay.

23 Q. Is connected to filter eight in order to
24 separate the calcium chloride from the reaction medium.
25 Do you see where I am?

1 A. Yes.

2 Q. That medium is something other than spent
3 KOH, is that correct?

4 MR. BEAUPRE: Objection, form.

5 A. At that point, the reaction medium
6 containing spent KOH is separated by filtration and
7 then recycled. So the spent KOH is present in vessel
8 number eight.

9 Q. Is that what you consider to be the
10 reaction medium?

11 MR. BEAUPRE: Same objection.

12 BY MR. ROSE:

13 Q. Well, let me take a step back.
14 What does the term reaction medium mean to
15 you?

16 A. That's what I was working at. Reaction
17 medium to me, and to a POSITA, would likely mean the
18 media in the reactor, vessel number one.

19 Q. Well, which of those -- okay, so the
20 reactor, the medium and the reactor is number six, so
21 what is the reaction medium being referred to there?

22 A. Okay, so we're talking about vessel eight.
23 Where there's a filter to remove calcium chloride from
24 the reaction medium, which at that point would be spent
25 KOH, water and anything else that would be present in

1 that stream.

2 Q. Isn't the reactor six?

3 A. Well, the reactor six, but you're asking
4 me, I think, about the reaction medium in separation
5 step shown in vessel number eight.

6 Q. Okay. That was because you had said the
7 reaction medium is what's in the reactor?

8 A. Yeah, typically I would think of a reaction
9 medium as being something -- a medium -- a media in the
10 reactor, but as described here, he's using it in
11 various terms.

12 So I think the terms there would be the
13 aqueous product from the reactor after it has been
14 reacted with calcium hydroxide precipitate the calcium
15 fluoride, which is separated in vessel number eight by
16 filtration. And then the reaction media from vessel
17 eight then is shown in the schematic to be returned to
18 the concentrator.

19 Q. And that would be aqueous KOH?

20 A. That would be aqueous KOH -- would be a
21 stream comprising certainly aqueous KOH.

22 Q. And that would include KOH that had been
23 created by the reaction of calcium hydroxide with KF,
24 correct?

25 A. That is correct.

1 Q. I'd like to turn to your declaration in the
2 916 matter, and in particular paragraph 60.

3 A. Which exhibit number is that?

4 Q. Sorry, it's 1002 in the 916 matter and also
5 in the 917 matter.

6 A. Did you say 916 or 915?

7 Q. 916.

8 A. Yeah, I have 915 as Exhibit 102.

9 MR. BEAUPRE: You have to get out of
10 that folder, probably.

11 THE WITNESS: Oh, I have to get out of
12 the folder. I was just trying to bring up
13 the exhibit, the 916.

14 A. Okay. That's 1002 in that folder, I guess.
15 Okay, I'm there, yep.

16 Q. I apologize, I should be looking at 915.

17 A. Hey, I understand.

18 Q. I was looking at the wrong one.

19 A. Back on 915.

20 Q. Sorry about that.

21 A. That's okay.

22 Q. You state at the beginning of paragraph 60
23 on page 35.

24 A. Okay.

25 Q. There you state: Sedat teaches recovery of

1 spent KOH from the withdrawn dehydrohalogenation
2 reaction medium as well as recovery of KOH regenerated
3 from the metal salt byproduct KF. Do you see that?

4 A. Yes.

5 Q. So there you're referring to KF as a
6 byproduct of the reaction?

7 MR. BEAUPRE: Objection to form.

8 A. I may have listed that from Sedat. I can
9 look for that if you like, if it's important.

10 Q. Well, it's not in quotes, and that's why I
11 just wanted to confirm whether KF is a byproduct of
12 that reaction, in your opinion?

13 A. The terms are interchangeable in these
14 various references.

15 Q. Which terms, which terms are
16 interchangeable?

17 A. Byproduct and co-product. I tend to, and
18 maybe I'm too focused on the real term, which is
19 co-product when it's stoichiometric based, but the
20 byproduct KF -- the term recovery of KOH regenerated
21 from the metal salt byproduct or co-product is what I
22 was referring to.

23 Q. So you're recovering the spent KOH, which
24 you say is the unreacted KOH, correct?

25 MR. BEAUPRE: Objection, form.

1 A. Yes, Sedat teaches the recovery of the
2 spent KOH as well as the KOH that's generated in the
3 calcium hydroxide reactor.

4 Q. Would the POSITA having read Smith
5 understand that there even is any spent KOH, using your
6 definition of that term?

7 MR. BEAUPRE: Objection, form.

8 A. A POSITA reading Smith, in particular the
9 section where he refers to base-mediated agents, such
10 as KOH, would understand that there is a salt
11 generated, which is KF.

12 Q. And that is part of spent KOH?

13 A. The KF that has been converted back to KOH
14 is the stream that Sedat refers to as the KOH that
15 is -- let's see --

16 MR. BEAUPRE: Counsel, you said you
17 referred to Smith a few lines ago. Did you
18 mean Sedat since we're on Sedat now?

19 MR. ROSE: Right, he's combined Sedat
20 with Smith.

21 Q. So I'm asking if the POSITA read Smith,
22 would that POSITA even know that there is an issue with
23 spent KOH or even such a thing as spent KOH?

24 A. Yes, and as I mention within Smith,
25 although there are no details, he does indicate that a

1 dehydrohalogenation can be an alkali metal hydroxide.
2 He mentions KOH, and, therefore, if there's any
3 reaction whatsoever, there will be KF present.

4 Q. And by having KF present, that leads to
5 spent KOH, correct?

6 MR. BEAUPRE: Objection, form.

7 A. Not necessarily. Spent KOH, as I've
8 mentioned, is KOH that has gone through the reactor and
9 reacted.

10 Q. Right, and haven't we confirmed that Smith
11 makes no mention of KOH going through the reactor
12 unreacted?

13 MR. BEAUPRE: Objection to form.

14 A. He makes no mention of KOH going through
15 unreacted.

16 Q. So the POSITA having read Smith would not
17 know to look to recovering spent KOH, as you've defined
18 that term, as being unreacted KOH?

19 MR. BEAUPRE: Objection, form.

20 A. No, a POSITA would look at Smith and see
21 that he says one option is to use a basic hydroxide,
22 such as KOH, and if Smith decides to use KOH and
23 there's any reaction whatsoever, then he's going to
24 generate KF, and there's going to be unconverted,
25 unreacted KOH going through the process. That's what a

1 POSITA would understand.

2 Q. Yeah, but there's no mention in Smith of
3 unreacted KOH going through the process, is there?

4 MR. BEAUPRE: Same objection.

5 A. No, but he does mention that, you know, a
6 viable dehydrohalogenation agent is KOH.

7 Q. Right.

8 A. Therefore, if it's mentioned, I'm assuming
9 that there's a reaction that takes place, otherwise why
10 would he mention it.

11 Q. Right. But what if there's 100 percent
12 conversion? There is no spent KOH involved, is there?

13 MR. BEAUPRE: Objection, form,
14 incomplete hypothetical and foundation.

15 A. If he uses an excess of KOH, and there's a
16 hundred percent conversion, there could still be
17 unreacted KOH exiting the reactor, which is spent KOH.

18 Q. But that's not described in Smith either,
19 correct?

20 MR. BEAUPRE: Same objections.

21 BY MR. ROSE:

22 Q. The use of excess KOH?

23 A. Yeah, well, I can go back and look, if you
24 like. I don't recall whether he says that there's an
25 excess, what the molar ratio of KOH is to organic.

1 Q. Well, Smith didn't even provide any
2 examples in which he uses KOH, correct?

3 A. That's correct. So under what conditions
4 he might have been thinking of.

5 Q. Right, he doesn't say?

6 A. He does not say.

7 Q. When you stated that Sedat teaches the
8 recovery of the spent KOH in paragraph 60, you did not
9 mean to say that Sedat teaches the separation of the
10 spent KOH from dissolved or entrained organics, did
11 you?

12 MR. BEAUPRE: Objection, form.

13 A. There is no mention of dissolved organics
14 in Sedat.

15 Q. Or entrained organics?

16 A. Or entrained organics.

17 MR. BEAUPRE: Same objection.

18 BY MR. ROSE:

19 Q. Turning to page 38 of your declaration,
20 paragraph 69.

21 A. Okay.

22 Q. Starting with the second sentence of that
23 paragraph, where you refer to withdrawing the reaction
24 medium, including KOH, from the dehydrohalogenating
25 reactor occurs at outlet five, with the reactor one,

1 where the reaction medium is taken out or removed from
2 the reactor and separated from the gaseous product.

3 Does that mean that the reaction medium is moved and
4 then -- at outlet five and then the gas is separated?

5 MR. BEAUPRE: Objection to form.

6 BY MR. ROSE:

7 Q. After the reaction medium is moved from the
8 reactor?

9 MR. BEAUPRE: Objection, form.

10 A. I take that to read that the gas products
11 exit the reactor via orifice four. It says that on the
12 top of page 39. And the reactor media exits via outlet
13 five and goes into vessel six.

14 Q. So when you said the medium is taken out or
15 removed from the reactor and separated, the separation
16 occurs before it leaves the reactor?

17 MR. BEAUPRE: Objection, form.

18 A. Separation of the gas products is taken
19 place from reactor one before the aqueous stream is
20 removed via orifice five.

21 Q. So the gaseous phase has already been
22 separated from the aqueous phase before the aqueous
23 phase leaves the reactor through five, correct?

24 A. That's my understanding, yeah.

25 MR. BEAUPRE: Sorry, objection to form

1 to that last one.

2 BY MR. ROSE:

3 Q. You then go on to paragraph 70, you state
4 that: Sedat describes recovering spent KOH, step C of
5 claim 21. And then you say: Sedat describes recovery
6 of KOH remaining after the dehydrohalogenation reaction
7 as well as recovering KOH regenerated from the metal
8 salt byproduct. Do you see that?

9 A. Yes.

10 Q. Isn't recovery done of the metal byproduct
11 by way of regeneration with lime?

12 MR. BEAUPRE: Objection, form.

13 A. Regeneration of KOH from KF by reaction
14 with lime is done in vessel number six.

15 Q. Right. So isn't that recovery?

16 MR. BEAUPRE: Same objection.

17 A. Recovery of what?

18 Q. KOH. Isn't regeneration part of recovery?

19 A. Spent KOH passes through reactor six into
20 reactor eight, and there's also the option of taking a
21 sidestream there and recycling back the concentrator.
22 But then the spent KOH along with the precipitated
23 calcium fluoride are filtered, and then it's possible
24 to recycle the filtrate, which contains the spent KOH
25 and the KOH sits generated from the potassium fluoride

1 in that vessel.

2 Q. Okay. But I'm referring back to your
3 interpretation of the recovering of the spent KOH,
4 which is collecting spent KOH for further use, and you
5 say may include separating, purifying and concentrating
6 and/or regenerating.

7 So isn't the regeneration of the KF, isn't
8 that what you would consider recovering spent KOH, the
9 regeneration?

10 MR. BEAUPRE: Objection, form.

11 A. Recovery of spent KOH, spent KOH is done
12 after six out of eight as it returns back to the
13 concentrator. There is KOH generated from the reaction
14 of calcium hydroxide with calcium fluoride in reactor
15 six, separated in reactor eight. So there is recovery
16 of spent KOH in reactor eight as well as additional
17 potassium hydroxide is generated in that lime reaction.

18 So there is a separation from the solid
19 calcium difluoride.

20 Q. Right, there's separation of the calcium
21 difluoride from the aqueous KOH in number eight?

22 A. Yes.

23 Q. Of Sedat?

24 A. Yes.

25 Q. There is reaction of calcium hydroxide with

1 KF in reactor six, correct?

2 A. That's correct.

3 Q. In reactor six then, calcium hydroxide is
4 regenerated from KF, correct?

5 MR. BEAUPRE: Objection, form.

6 A. Calcium hydroxide is prepared, is generated
7 from the reaction of KF with lime in vessel six.

8 Q. What does regeneration mean?

9 A. This context, I think it means regenerating
10 the base medium from the salt, yes.

11 Q. So converting the KF to KOH?

12 A. That's correct.

13 Q. Right. And so that regenerating takes
14 place in the reactor six, correct?

15 A. That's correct.

16 Q. So, therefore, recovery takes place in
17 reactor six?

18 MR. BEAUPRE: Objection to form.

19 A. That's one location.

20 Q. And then from the KOH, which includes the
21 regenerated KOH and the unreacted KOH, that is sent to
22 the evaporator?

23 A. The KOH, after separation from calcium
24 difluoride, in addition to some KOH that's taken out of
25 the stream exit reactor six, according to a scheme, is

1 sent around to the concentrator.

2 Q. The concentrator is which --

3 A. Vessel number 11.

4 Q. Okay. And how is concentration
5 accomplished?

6 A. By boiling off water.

7 Q. And so what would the temperature be --
8 well, strike that.

9 What was the purpose of boiling off water?

10 MR. BEAUPRE: Objection, form.

11 A. The water is boiled off to concentrate the
12 KOH. KOH is -- water is produced in the reaction as a
13 result of the calcium hydroxide reaction with KF, so
14 you'd like to remove the water from that reaction. In
15 addition, you'd like to then concentrate on the
16 potassium hydroxide to the preferred level that is
17 quoted.

18 Q. So then at what temperature is the KOH then
19 fed back into reactor one?

20 A. Let's go back to Sedat. He says: The
21 temperature is kept at 160 in the reactor. So I assume
22 the temperature is, you know, close to that
23 temperature, or let me look at the temperature -- the
24 temperature is probably listed for the evaporator.

25 (Pause.)

1 A. I'm not finding the temperature outlined
2 for that concentration. It just says it's -- it says
3 the concentration is adjusted.

4 Q. Is it adjusted to a particular
5 concentration?

6 A. Yeah, the preferred concentration of
7 potassium hydroxide is between 10 and 90 percent, but
8 preferably between 20 and 86 percent and advantageously
9 between 55 and 75 percent.

10 Q. And did you consider those concentrations
11 when you reached your opinions regarding the
12 combination of Smith with Sedat?

13 MR. BEAUPRE: Objection to form.

14 A. I did not consider at least specific
15 concentrations of the base entering the
16 dehydrohalogenation reactor.

17 Q. Now, the evaporation step number 11, that's
18 vapor going off at 15, the water boiling off?

19 A. I believe that's correct.

20 Q. Okay. Is that used to adjust the KOH
21 concentration that goes into the reactor?

22 MR. BEAUPRE: Objection, form.

23 A. Removing water via stream 15 would allow
24 for concentration of the KOH that goes into the
25 reactor.

1 Q. And 14, that's the raw KOH that's being fed
2 into the reaction?

3 MR. BEAUPRE: Objection, form.

4 A. Yes, I believe so.

5 Q. In your experience, is KOH available
6 commercially in any particular concentrations?

7 MR. BEAUPRE: Objection, form,
8 foundation.

9 A. I have not looked into that at all.

10 Q. You don't have experience with that from
11 your time at DuPont or your time at Catalytic Insights
12 as far as the commercial availability of KOH?

13 MR. BEAUPRE: Same objections.

14 A. Well, KOH is commercially available, but I
15 think you asked available at what concentrations.

16 Q. Right.

17 A. And I don't know what specific
18 concentrations are available. Certainly pelletized or
19 dry KOH is available.

20 Q. I'd like to turn to paragraph 71 of your
21 declaration in the 915 case.

22 A. Okay.

23 Q. And you state: A POSITA would understand
24 recovering to mean collecting for further use, which
25 may include steps that render the component being

1 collected suitable for further use e.g. separating or
2 purifying. Do you see that?

3 A. Yes.

4 Q. But isn't it true that Sedat's only
5 disclosure of separating and purifying is with regard
6 to the removal of CAF₂ from the solution, correct?

7 MR. BEAUPRE: Objection, form.

8 A. That's one form of a separating. The other
9 location for separating would be to gas products coming
10 out of line four.

11 Q. But with regard to the KOH stream, there's
12 no other separating or purifying done or disclosed by
13 Sedat, correct?

14 MR. BEAUPRE: Object to form.

15 A. The purification step of spent KOH happens
16 when the KF is converted to calcium fluoride and
17 removed by filtration. That's a method of purifying.

18 Q. Right. My question is, there's no other
19 form of separating or purifying, other than converting
20 the KF or the CaOH and KF to KF and then separating --
21 strike that.

22 The only separating of that stream,
23 separating and purifying happens when the KF and
24 calcium hydroxide react to create calcium fluoride and
25 KOH and the calcium fluoride is separated out, correct?

1 MR. BEAUPRE: Objection to form.

2 A. I don't think you were specific enough to
3 refer me only to what happens in vessel six. As I
4 said, there's a separation taking place of the organic
5 products in vessel number one.

6 Q. Okay. But there's no other separation or
7 purifying that's taking place as shown in Sedat,
8 correct?

9 MR. BEAUPRE: Objection to form.

10 A. Other than in vessel eight and the line in
11 nine.

12 Q. And there is no teaching of separating
13 entrained or dissolved organics taught by Sedat?

14 MR. BEAUPRE: Objection to form.

15 A. There is no mention of entrained or
16 dissolved organics in Sedat.

17 Q. Is there any teaching in Sedat of
18 purifying, other than what is happening in vessel
19 eight, which is the separation of calcium fluoride from
20 the aqueous solution?

21 MR. BEAUPRE: Objection, form.

22 A. Once again there is a separation of the
23 organics in line four, which are condensed and shown in
24 line 13, but I'd have to see what happens after the
25 organics are condensed. But I can look, if you like.

1 But I'm quite sure that if he was doing that, he would
2 send it off for distillation and separation of
3 components.

4 Q. I'm referring to what happens to the
5 aqueous stream coming out of vessel one.

6 A. Okay.

7 Q. There's no other act of purification that
8 happens with that after leaving vessel one?

9 A. No.

10 MR. BEAUPRE: Objection to form.

11 A. Other than the conversion of a KF to the
12 calcium difluoride.

13 Q. Right. So would you consider that to be
14 purification; converting calcium fluoride -- I'm sorry,
15 converting potassium fluoride to calcium fluoride and
16 settling out a precipitant?

17 A. I would consider that -- I'm sorry.

18 MR. BEAUPRE: Objection to form.

19 A. I would consider that a purification, yes.

20 Q. All right. Let's go on to the next --

21 MR. BEAUPRE: Would you want to take a
22 break now?

23 MR. ROSE: Now is a good breaking
24 point.

25 THE VIDEOGRAPHER: Going off the

1 record, the time is 1557.

2 (Recess.)

3 THE VIDEOGRAPHER: We're back on the
4 record, the time is 1614.

5 BY MR. ROSE:

6 Q. Welcome back, Dr. Manzer. I had a couple
7 of follow-up questions regarding your testimony
8 concerning Sedat that we were talking about before the
9 break. And we were asking about where in Sedat the
10 steps of recovery take place and including separation
11 and purification. And I understand that in vessel six,
12 your interpretation of Sedat is that there is a
13 reaction of calcium hydroxide with potassium fluoride
14 resulting in calcium fluoride that is a precipitant,
15 correct?

16 A. That's correct.

17 Q. Okay. And so some separation occurs in
18 vessel six, correct?

19 A. That's correct.

20 Q. Okay. And then that product is then moved
21 to vessel eight where the calcium fluoride is removed
22 from the reaction mixture, correct?

23 MR. BEAUPRE: Objection to form.

24 BY MR. ROSE:

25 Q. Does any KF, is there any -- strike that.

1 Is any KF included in what flows from
2 vessel six to vessel eight?

3 MR. BEAUPRE: Objection to form.

4 A. There's no statement as to whether it's
5 complete conversion or not. It would make sense to do
6 that, but --

7 Q. And it's not uncommon for there to be such
8 thing as complete conversion, correct?

9 MR. BEAUPRE: Objection, form.

10 A. That would depend entirely on the amount of
11 lime or calcium hydroxide that was added.

12 Q. And how long it mixed?

13 A. Yeah, there is mixing in there, that's
14 right, but the reaction with any fluoride and calcium
15 is pretty quick.

16 Q. Is it possible to entrain any unreacted
17 calcium fluoride within the precipitant -- strike that.
18 I misspoke.

19 Is it possible to entrain any of the
20 potassium fluoride in the calcium fluoride precipitant?

21 MR. BEAUPRE: Objection to form.

22 A. There's no discussion of that. I'm
23 assuming that there's sufficient lime added to remove
24 the calcium fluoride -- yeah the calcium -- the
25 potassium fluoride, I'm sorry.

1 Q. And then before the break, we were
2 discussing briefly what was taking place in vessel one,
3 and that you had said that the gaseous products of the
4 reaction are removed through line four, correct?

5 A. Correct.

6 Q. Okay. And were you intending to include
7 that when I asked about other instances of separation
8 in the Sedat reference?

9 MR. BEAUPRE: Objection, form.

10 A. Well, there is a separation, so.

11 Q. Because there's separation, does recovery
12 of spent KOH actually begin in vessel one?

13 MR. BEAUPRE: Objection, form and
14 foundation.

15 A. I wouldn't phrase it that way.

16 MR. ROSE: I think that's all we have
17 for today on the Sedat reference. So we
18 plan to start tomorrow with 916 and 917.

19 MR. BEAUPRE: Okay.

20 THE VIDEOGRAPHER: Going off the
21 record, the time is 1618.

22 (Whereupon the deposition was
23 concluded at 4:18 p.m.)

24 (Signature reserved.)

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SIGNATURE PAGE

LEO E. MANZER

SUBSCRIBED AND SWORN to before me this _____
day of _____, 2016

NOTARY PUBLIC

My Commission expires: _____

1 C E R T I F I C A T E

2 I, Marisa Munoz-Vourakis, RMR, CRR and Notary Public,
3 the officer before whom the foregoing proceeding was
4 conducted, do hereby certify that the witness(es) whose
5 testimony appears in the foregoing proceeding were duly
6 sworn by me; that the testimony of said witness(es) were
7 taken by me to the best of my ability and thereafter
8 transcribed under my supervision; and that the foregoing
9 pages, inclusive, constitute a true and accurate
10 transcription of the testimony of the witness(es).

11 I do further certify that I am neither counsel for,
12 related to, nor employed by any of the parties to this
13 action in which this proceeding was conducted, and
14 further, that I am not a relative or employee of any
15 attorney or counsel employed by the parties thereof, nor
16 financially or otherwise interested in the outcome of the
17 action.

18 IN WITNESS WHEREOF, I have hereunto subscribed my name
19 this 11th day of January, 2016.

20 

21 MARISA MUNOZ-VOURAKIS

22
23
24 Notary #20032900127

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Leo E. Manzer, Ph.D. on 01/07/2016

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