UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ARKEMA FRANCE,

Petitioner

v.

HONEYWELL INTERNATIONAL INC.,

Patent Owner

_____

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

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

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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

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

I N D E X

P R O C E E D I N G S

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

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

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

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

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

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

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

Whereupon, LEO E. MANZER, having

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

EXAMINATION BY COUNSEL FOR PETITIONER

BY MR. ROSE:

Q. Good morning, Dr. Manzer.

A. Good morning.

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

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

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

A. Yes, I have.

Q. Approximately how many times?

A. I believe about three times.

Q. When was the last time?

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

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

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

A. Yes.

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

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

A. Okay. Thank you, yes.

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

A. Yes, that's fair.

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

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

A. That's fair.

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

answer, okay?

A. Okay.

Q. As you know, your counsel is here with you. Arkema's counsel is here, and they are here and permitted to object from time to time if they feel there's something improper about my question. However, once they lodge that objection, if you still understand the question, you're still required to answer it, understood?

A. Okay.

Q. Unless you get an instruction from counsel not to answer the question, you're still required to answer it to the best you can.

A. Okay.

Q. You prepared for this deposition, correct?

A. Yes.

Q. What did you do to prepare?

A. I did a lot of reading, read all of the declarations, read all of the prior art patents.

Q. Okay. And so we'll be looking at your declarations here today. You have a computer monitor with those as well. Do you have paper copies of the declaration?

A. I do.

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

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

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

A. Yes.

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

A. Yes.

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

A. Yes.

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

A. Yes.

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

A. Yes.

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

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

Q. Sure.

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

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

A. 236EA.

Q. And 245 will mean?

A. That's EB.

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

A. That's correct.

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

A. I will have to look up that one. Let's see here, 1234 I'm referring to HFO1234YF and 1225 will be HFO1225YE, okay.

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

reference?
A. Yes.
Q. Okay. And that is Exhibit number 1003 to your declarations. So when we refer to Smith today, will you understand that I'm referring to Exhibit number 1003 to your declarations?
A. Yes.
Q. And there's another reference known as Sedat that's been marked in connection with the 915 proceeding as Exhibit numbers 1004, which is the French language document, and 1005, which is the English translation. So when I refer to Sedat today, you'll understand that I'm referring to Exhibits 1004 and 5 in the 915 case?
A. Yes.
Q. There's also a reference known as Masayuki, which was identified in connection with the 916 and 917 proceedings as Exhibit number 1005. Will you understand when I refer to Masayuki today, that that's what I'm referring to?
A. Yes.
Q. There's also a reference known as Harrison, which is identified as Exhibit number 1006 in the 916 and 917 cases. So when I refer to Harrison, will you understand that that's what I'm referring to?

A. Yes.
Q. Fair enough. I'd like to open up your declaration, we can use the one in the 915 case, just because that's the first one, and I'd like to turn to your CV, which begins -- and when I refer to page numbers of documents today, I will do my best to refer to the number on the bottom right, which is printed in bold, black and white. If you need a copy, let me know, because we have extra copies here, but it looks like you have a copy.
A. It's included in the copy declaration.
MR. BEAUPRE: Sorry to interrupt, by the number in the lower right, sometimes there's two page numbers. You mean the one with lots of zeros and then the number?
MR. ROSE: Correct, the one with lots of zeros and then the number and the word page in front of it.
MR. BEAUPRE: Thank you.
BY MR. ROSE:
Q. So your CV begins on page several 0s and then 93?
A. Yes.
Q. On Exhibit 1002, which is your declaration in the 915 case, can you take a quick look at that and

confirm whether this is your most recent CV?

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

Q. Okay.

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

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

A. That's correct.

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

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

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

A. It would be a subset.
Q. And going back to the prior page, 93, from 2005 to the present, you identified as president and founder of Catalytic Insights. What is Catalytic Insights?
A. Catalytic Insights is a single-member LLC that I formed when I retired from DuPont in 2005.
Q. What kind of work do you do at Catalytic Insights?
A. I consult for various companies.
Q. Is Arkema one of those?
A. No.
Q. Is DuPont one of those?
A. No.
Q. You identified in that paragraph under Catalytic Insights that in 2005, you were an expert witness in a patent lawsuit. Can you tell me who the parties were in that case?
A. Where are you reading from?
Q. Yes, under 2005 to present, president and founder of Catalytic Insights. The third line from the bottom of that paragraph, it states: In 2008, he was an expert witness in a patent lawsuit.
MR. BEAUPRE: Page number?

BY MR. ROSE:

Q. I'm sorry, page 93.

A. Oh, 93.

Q. I'm sorry.

A. And --

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

A. Yes.

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

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

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

A. Ineos.

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

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

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

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

DuPont and BP, and Gevo, Inc.

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

A. For Gevo.

Q. That was a patent case?

A. Yes, it involved patents, yes.

Q. And was Gevo the patent owner?

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

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

A. That's correct.

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

A. No.

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

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

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

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

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

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

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

Q. So you opined on infringement as well?

A. Yes.

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

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

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

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

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

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

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

MR. BEAUPRE: Objection, form.

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

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

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

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

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

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

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

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

A. LLC.

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

MR. BEAUPRE: Objection, form.

A. One hundred percent.
Q. I want to talk a little bit about the work that's included in the 1986 to 2000 paragraph on page 94. Was that work primarily work done in a laboratory?
A. You're talking about the 1986 to 2000 section?
Q. Correct.
A. Yeah, okay. Well, certainly it involved work in a laboratory. I had a number of technicians that worked with me on various fluoro olefin and fluorocarbon processes.
In addition, I had other people working with me that had their own laboratories working in this area. So combined, my own work and work of others that I oversight(sic).
Q. So the work that you did was primarily in the laboratory, and you also oversaw others working in a laboratory, correct?
A. That's correct.
Q. And was the laboratory work -- well, strike that.
Outside the laboratory work, did you become involved in any work as far as developing a manufacturing process?
MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

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

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

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

A. Let me just correct that a little bit.

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

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

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

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

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

Q. But that was outside of your role? Your

role was discovering?

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

Q. Go ahead.

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

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

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

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

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

chemistry, correct, from the University of Waterloo?
A. That's correct.
Q. And then you have a Ph.D. in chemistry from the University of Western Ontario, correct?
A. That's correct.
Q. You don't hold any degrees in engineering?
A. No degrees in engineering.
Q. So at some point in the development process, going from your discoveries in the laboratory to scaling up to a manufacturing level, at some point, does an engineer become in charge of that project?
MR. BEAUPRE: Objection, form.
A. It depends. You know, as you spend time working in processes, you learn an awful lot of engineering. I've taken many engineering courses, but it doesn't necessarily mean that a project manager will be a chemist or an engineer.
Q. I want to go back to one of your previous answers. Give me just a second.
A. Sure. You referred to when we were talking about what takes place in the lab, you said -- let me correct you a little bit. You said that you come up with ideas, and you said -- referred to high yield and high selectivity. At what level would you consider starting development of a project once you determine it

has high enough yield or high enough selectivity?

MR. BEAUPRE: Objection, form.

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

Q. And what do you mean by yield?

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

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

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

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

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

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

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

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

MR. BEAUPRE: Objection, form.

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

Q. One hundred percent is not always the case?

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

Q. But one hundred percent conversion

sometimes is the case, just not always?

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

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

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

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

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

A. That could be the case.

Q. Just not always the case?

A. Not always the case, yes.

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

A. Yes.

Q. And just taking a look at those, do any of those awards have to do with your work involving HFOs?
A. Well, oftentimes awards are based on one's entire career.
Q. Okay.
A. Okay. But specifically the 2000 award, which was the National Medal of Technology Award, which means an awful lot to me, was related specifically to -- was awarded to the DuPont Company, and I was one of three people invited to attend that ceremony for specifically the phase out and the replacement of chlorofluorocarbons.
Q. Which award are you referring to?
A. The one in 2003 called the National Medal of Technology Award, which is presented at the White House by the president, and the DuPont Company was the recipient of that award. But I was asked to be one of the three attendees, because the three of us would play a significant role in that process.
The other award is the Philadelphia catalysis -- Catalysis Club of Philadelphia Award in 1997, that was -- a significant part of the contribution recognized by that award was my leadership role and personal role in the development of chlorofluorocarbon replacement.

Q. Including HFOs?
A. HFOs were intermediates in many of those processes, but the HFOs at the time, as you're well aware, the major products were HCFCs and HFCs not HFCOs but HFOs, as they are today.
Another valued award is the Hudree(sic) award in 2001, it's given by the North American Catalysis Society, and that was largely in recognition of my efforts to develop replacements from fluoro chloro carbons, and my speech was entirely around that process and many of these other --
Q. Again, that was focused on HCFCs as the replacement for CFCs, correct?
A. HFCs and HCFCs, both were acceptable at the time.
Q. I want to turn next to your issued patents. I believe that list starts on page 97 of your CV.
A. Yes.
Q. Now, you have them grouped by technology area, is that correct?
A. Yes, I have them grouped by technology area, and within that group, I have them organized by the year in which they issued.
Q. And the earliest patent you have was issued in 1997(sic), is that right?

A. Let me see here, the earliest patent was which year did you say?
Q. '77, I believe, looking at the bottom.
A. '77, at the bottom of page 101?
Q. Right.
A. Yes, I believe that was the first one.
Q. And then the most recent on here is 2015, but you said earlier you had another one?
A. But that was still 2015.
Q. And these were all based on your work at DuPont?
A. No. No some of these patents are based on my consulting efforts with companies in the -- in various areas, mostly in the area of biomass conversion.
Q. With your work that you've done with Catalytic Insights?
A. Yes, and obviously the company. I don't do any laboratory work at Catalytic Insights. It's strictly a consulting company.
Q. That was my next question.
And so the -- so you continued to apply for patents or the companies you worked for applied for patents based on your work?
A. Yes, the companies hire me to make a

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

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

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

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

MR. BEAUPRE: Objection, form.

A. Yes. Please rephrase that.

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

MR. BEAUPRE: Same objection and also foundation.

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

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

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

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

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

A. Yes.

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

MR. BEAUPRE: Objection, form and foundation.

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

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

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

Q. Did you become involved in those decisions,

whether there's a business reason?

A. Certainly. Certainly.

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

MR. BEAUPRE: Objection, form.

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

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

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

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

MR. BEAUPRE: Objection, form.

A. A significant do, yes.

Q. Significantly more than the number of patents for CFC replacements, correct?
MR. BEAUPRE: Same objection.
A. Sorry, could you ask that in a different way?
Q. Yeah. You have a little over three pages of patents listed under the category catalytic conversion of biomass, and then on page 100, after those three pages, you have other categories involving catalysts, enzyme catalysts, fluoro monomer catalysts, environmentally safer phosgene and thionyl chloride catalysts. So that's four pages of patents related to catalysts. And then a little less than a page, page 101 related to CFC replacement. So wouldn't it be fair to characterize it as you having more -- significantly more catalyst-related inventions than CFC replacement patents?
MR. BEAUPRE: Objection to form.
A. Well, if you add up the numbers, you could say that, yes.
Q. And looking at the CFC replacement category, can you tell me which, if any, of those have to do with processes for producing HFOs?
A. Well, without reading the patents, I don't believe any of the patents under the section

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

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

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

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

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

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

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

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

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

Q. DuPont was not a party to that case?

A. No.

Q. Was Ineos asserting one of your patents?
A. You know, I don't remember the specifics at this point in time. One of my patents was brought in as a reference, and I don't remember which side did it or in what the context was. Something to do with the reactor configuration in the Ineos process.
Q. So your patent wasn't being asserted in the case as being infringed, correct?
A. No, that's correct.
Q. Okay, right. So getting back to my prior question, are you aware of whether any of your patents listed in your CV has ever been asserted in a litigation? What I mean when I say asserted, meaning that there was an assertion of infringement?
A. I don't believe there has been.
Q. Okay. Have any of your patents listed in your CV been the subject of an assertion of invalidity?
A. Not to my knowledge.
Q. Not aware of any proceeding in which the validity of one of your patents has been challenged?
A. I can't think of any situation.
MR. BEAUPRE: Counsel, we've been going for about an hour, can we take a break at a good stopping point?
MR. ROSE: That's fine. I'm starting

a new section.
THE VIDEOGRAPHER: Going off the record, the time is 0959.
(Recess.)
THE VIDEOGRAPHER: We're back on the record, the time is 10:12.
MR. ROSE: I want to make one note on the record. When the videographer started the tape, he referred to this being matter IPR2015-00915, but this deposition is being taken in connection with also IPR2015-00916 and IPR2015-00917. Is that all understood?
MR. BEAUPRE: Yes.
BY MR. ROSE:
Q. Dr. Manzer, welcome back. I want to touch briefly on one of your patents under the category chlorofluorocarbon replacements on page 101 of your declaration in the 915 case. It's U.S. patent number 5,008,476, and it's titled process for preparation of 1,1,1,2-tetrafluoroethane. Do you see that?
A. I do.
Q. And 1,1,1,2-tetrafluoroethane is otherwise sometimes known as 134A?
A. That's correct.
Q. Can you describe just generally what the

process was that was the subject of that patent?
A. Not without looking at the patent. You know, there's so many processes to make 134A.
Q. So we will just mark this --
MR. BEAUPRE: Counsel, has this exhibit been submitted to us in advance?
MR. ROSE: It was not.
MR. BEAUPRE: Then is it being used for impeachment purposes?
MR. ROSE: No, I want to get background.
MR. BEAUPRE: Then it's not appropriate to introduce for the first time for substantive purposes at the deposition.
MR. ROSE: Okay. Well, I won't mark it, but I will certainly let you take a look at it, if it will help you to refresh your recollection.
MR. BEAUPRE: No, that's the same thing. I mean, there's no difference between introducing it and then showing it to him and asking him questions about it.
If you'd like to ask him questions, that's fine, but I don't think it's appropriate to use it as an exhibit or show

it to him.

BY MR. ROSE:

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

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

Q. And resulting in 134A?

A. Eventually resulting in 134A.

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

MR. BEAUPRE: Objection, form and relevance.

A. The reaction of tetrachloroethylene and HF.

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

MR. BEAUPRE: Same objections.

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

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

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

MR. ROSE: That's what this is.

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

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

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

MR. BEAUPRE: Objection, form and relevance.

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

Q. If I said tetrafluoro, I apologize. I

meant tetrachloro.

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

Q. And is hydrochloric acid one of those?

MR. BEAUPRE: Same objections.

A. Not be considered an intermediate.

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

MR. BEAUPRE: Objection form and relevance.

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

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

A. It's got to go somewhere.

MR. BEAUPRE: Same objections.

BY MR. ROSE:

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

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

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

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

A. Yes.

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

A. Yes.

Q. And you published multiple times?

A. Yes, I certainly did.

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

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

paper and publish it.

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

MR. BEAUPRE: Same objection.

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

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

MR. BEAUPRE: Objection, form.

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

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

Q. Do you recall if any of your publications

discuss dehydrohalogenation or dehydrofluorination?
A. I don't recall specifically, but they likely do.
Q. And you did work while at DuPont in the area of dehydrohalogenation?
MR. BEAUPRE: Objection, form.
A. I don't recall my own laboratory doing any of that work. Certainly there was work done on dehalogenation.
Q. On dehalogenation --
A. Hydrodehalogenation.
Q. We got to make sure we got our terminology together.
A. I know. I understand.
Q. You're using the term hydrodehalogenation?
A. Yes.
Q. And is that different than dehydrohalogenation?
A. In my mind it is.
Q. Can you describe what, in your mind, the difference is?
A. Yes. Hydrodehalogenation typically involves the reaction of hydrogen with, for example, a chlorocarbon to replace that chlorine on that carbon with hydrogen.

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

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

A. Halogen like chlorine.

Q. Right, I'm sorry, halogen, you're right.

And dehydrohalogenation means you're removing a haloalkane to produce an olefin?

A. Removing a hydrohalogen to make the olefin.

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

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

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

MR. BEAUPRE: Objection to form.

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

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

MR. BEAUPRE: Objection, form.
A. I don't believe so.
Q. Did your work involve HFC synthesis?
MR. BEAUPRE: Objection to form.
A. Yes.
Q. To the extent that your work involved HFC synthesis, did that involve any projects that included scaling an HFC synthesis up to a manufacturing level?
MR. BEAUPRE: Objection, form.
A. If you're asking did any of my work on the synthesis of HFCs result in a commercial plant, is that your question?
Q. I'm asking about your involvement. Were you involved first in developing an HFC synthesis process, but then scaling that process up to the manufacturing level?
A. Yes.
Q. Okay. Can you describe, give me some examples of those?
A. You're asking me back a long time.
Q. I realize it may not be exhaustive, but can you give me some examples?
A. Yeah, I was thinking of the reaction of trichloroethylene with HF to make HCFC123 and HFC125 and HCFC124.

Q. Do you recall approximately how long ago that was?
A. It was in the middle, early to middle, the late -- it was in the 1990s, I believe.
Q. Okay. And any others that come to mind?
A. There were aspects of the HFC134A process, but I can't remember the specifics of which route and which process eventually -- that were commercialized that I was involved with.
Q. Okay. When you were involved in that commercialization, your involvement in commercializing, describe generally what your involvement is or was?
A. Let me say it this way, it's to keep the engineers honest, but it involves discussions with engineers, process development chemists. And one goes from -- typically at DuPont, one would go from a laboratory operation through a larger scale operation, which we would call a pilot plant to integrate the process fully before -- and that would be to collect basic data for a full plant design and construction and commercialization.
So it would be involvement with many people along the way.
Q. And did you oversee or get involved with, for example, the design of a pilot plant in that

process?

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

A. To some level.

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

MR. BEAUPRE: Objection to form.

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.
A. Well, they may or may not change.
Q. Do you recall if it did in either of the two instances that you described today?
A. I don't recall whether it did or did not.
Q. Okay. When taking a process from the laboratory and moving up to the pilot plant, is it anticipated that there would be a change in conversion rate from the laboratory to the pilot plant?
MR. BEAUPRE: Objection, form, foundation.
A. You keep talking about conversion rate, which is different from conversion.
Q. Okay, I apologize. I'll restate the question.
In taking the process from the laboratory to a pilot plant, is there a difference in conversion?
MR. BEAUPRE: Objection, form and foundation.
A. There may or may not be a difference. One would always hope in a pilot plant that you would continue to improve a process.
Q. Are there instances where you anticipate that by increasing the size of the process, by going from laboratory to a pilot plant, the conversion would

decrease?

MR. BEAUPRE: Same objection.

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

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

MR. BEAUPRE: Same objection.

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

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

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

MR. BEAUPRE: Objection, form and foundation.

A. I would not anticipate that.

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

MR. BEAUPRE: Same objection to form and foundation.

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

Q. You would expect it to stay the same going from --
A. Or be approved.
Q. And is the same true with regard to selectivity?
MR. BEAUPRE: Same objections.
A. Yes.
Q. I may have asked this before. If I did, I apologize. Have you, in your work at Catalytic Insights or anywhere else, worked before for Arkema?
A. No.
Q. Have you worked before with the firm Brinks Hofer(sic)?
MR. BEAUPRE: Objection, form.
A. The name is not familiar.
Q. The law firm that's working with you on this matter, have you done any work with them before?
A. Oh, Brinks.
MR. BEAUPRE: We're Brinks Gilson.
MR. ROSE: I'm sorry.
A. No, I've never worked with them previously.
Q. Have you ever heard of the Daubert challenge?
A. Daubert?
Q. In the expert work that you've done before,

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

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

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

MR. BEAUPRE: Objection, form.

BY MR. ROSE:

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

A. Not that I recall.

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

A. This current patent?

Q. Yes.

A. It was in the fall of 2014.

Q. And who first contacted you?

A. Mr. Dupre(sic).

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

A. No.

Q. What were you asked to do?

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

case related to fluorocarbon chemistry.
Q. Were you given any more detail other than that?
A. Not at that point.
Q. What materials were provided to you at that point?
A. When I was contacted initially, nothing was provided to me.
Q. At some point, materials were provided, correct?
A. At some point, after I signed a nondisclosure agreement, material was provided to me.
Q. Had you seen the patent before you signed that?
A. No.
Q. How long was it after Mr. Dupre(sic) contacted you before you signed the nondisclosure agreement?
A. I seem to recall it was a few weeks.
Q. Okay. Had you done any analysis before agreeing to take on this matter?
A. No.
Q. Had you seen the '282 patent before agreeing to take on this matter?
A. No.

Q. After signing your nondisclosure agreement, Mr. Dupre(sic) provided you with materials, correct?
A. That is correct.
Q. Okay. What materials did he provide?
A. I don't recall exactly, but most likely it was the '282 patent and then some of the prior art references.
Q. Did he provide you with the Smith reference?
A. I think so.
Q. Did he provide you with the Sedat reference?
A. I think so.
Q. Did he provide you with the Masayuki reference?
A. I think so.
Q. Did he provide you with the Harrison reference?
A. I think so.
Q. Did he provide you with any other prior art references?
A. Did you mention the Masayuki?
Q. I did.
A. Yes. I don't recall any other references at that point in time.

Q. Did you do any prior art searching on your own?
A. Yes. Once I became familiar with the '282 patent and the other patents, I did some literature searching.
Q. And what did you locate in your literature searching?
A. Yeah, once again, without my computer, I don't recall specifically what I located.
Q. Is there anything that resulted from your literature searching that you reference in your declaration?
A. I am not sure, but I don't believe so.
Q. So all the references that you discuss in your declaration were provided to you by Mr. Dupre(sic)?
MR. BEAUPRE: Objection to form.
BY MR. ROSE:
Q. Or his law firm?
A. Or his law firm, that's correct.
MR. BEAUPRE: Beaupré.
THE WITNESS: I'm sorry, we're on such a first name basis, I forget the last names.
MR. BEAUPRE: It's all right. It's not the easiest one to remember.

BY MR. ROSE:

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

MR. BEAUPRE: Objection, form.

A. The file history from the patent office?

Q. Yes, the --

A. What they call the wrapper or whatever?

Q. The file wrapper?

A. No, I did not.

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

MR. BEAUPRE: Objection, form.

A. I don't recall.

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

A. I don't recall that either.

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

Who first created the first draft of your declaration?

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form.

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

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

A. I think it was this room actually.

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

MR. BEAUPRE: Objection, form.

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

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

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

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

Q. You said you reviewed the '282 patent. What else did you review?
A. I reviewed the other prior art references.
Q. You reviewed the materials that were all provided to you by the Brinks firm?
MR. BEAUPRE: Objection to form.
A. I provided -- I read those patents, and I, like I say, I did some searching on my own, which may or may not have provided any useful information, but I tried my best to make sure that I had uncovered as much information as I could.
Q. Okay. And since submitting those declarations, what has your involvement been in this matter?
MR. BEAUPRE: Objection, form.
A. It's been very little.
Q. Until it came time for your deposition?
A. Yeah, from April to today, I guess.
Q. Right. So at some point, you were advised that you would have your deposition taken, correct?
A. That's correct.
Q. What did you do to prepare for the deposition?
A. I read and reread all of the declarations and all of the patents, prior art patents.

Q. And did you have any meetings with counsel?
A. I had one meeting in early December for a couple of days.
Q. No other meetings leading up to today?
A. No other meetings leading up to this week.
Q. Okay. What about meetings this week?
A. Yes, I came up, as I told you earlier, on Monday.
Q. And how many times did you meet with counsel this week to get ready?
A. Monday afternoon, all day Tuesday and all day Wednesday.
Q. And other than the declarations, the '282 patent and the prior art cited in the declarations, did you review any other documents in getting ready?
MR. BEAUPRE: Objection, form.
A. I'm trying to remember. I may have briefly reviewed the petitions, but I didn't study them in any detail.
Q. If you will go ahead and turn back to your declaration, and we can use the 915 declaration, which is Exhibit 1002 in that proceeding, and in particular at paragraph 36 on page 17.
A. Yes.
Q. You say that: Based on my review of the

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

What do you mean by bulk chemical synthesis?

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

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

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

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

MR. BEAUPRE: Objection, form.

A. No, not necessarily.

Q. So laboratory scale synthesis is commercially attractive?

MR. BEAUPRE: Objection, form.

A. Not always.

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

A. Not always.

Q. Sometimes?
A. Sometimes.
Q. In what type of an instance would a laboratory synthesis be considered bulk?
MR. BEAUPRE: Objection, form.
A. Well, there's no clear definition of that, but in my mind, it's something that would likely go to commercialization versus a scientific experiment where it's only to advance science.
Q. So it would be commercially attractive in the sense that it might some day be scaled up to a commercial scale?
A. In industry, that's often the reason you do research.
Q. Right. That's what I'm just trying to understand. Is there some difference between a bulk synthesis and laboratory synthesis?
MR. BEAUPRE: Objection, form.
A. There's no clear answer to that question.
Q. Typically though isn't laboratory synthesis a precursor that leads to bulk synthesis, if successful?
MR. BEAUPRE: Objection, form.
A. That would almost always be the case.
Q. In your statement, you also say: Including

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

A. You're referring once again to 36?

Q. Yeah, to paragraph 36.

A. Yes.

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

A. Liquid phase process was one consideration.

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

A. Yes.

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

A. Yes.

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

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

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

A. Yes.

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

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form.

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

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

A. 1973.

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

A. I believe it was 1987.

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

MR. BEAUPRE: Objection, form.

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

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

A. Right, that's correct.

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

MR. BEAUPRE: Object to form.

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

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

MR. BEAUPRE: Object to form.

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

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

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form.

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

Q. But you weren't synthesizing

hydrofluorocarbons at that time, were you?
MR. BEAUPRE: Objection, form.
A. Personally, I was not running the laboratory, but I had responsibility for the laboratory that was running reactions to make hydrofluorocarbons.
Q. Okay. So I guess I'm having a hard time understanding then if your experience in synthesizing hydrofluorocarbons hadn't begun yet, you would certainly satisfy the requirement of a POSITA as having a Ph.D. in chemistry or chemical engineering, but as of your definition, you did not have at that time experience in synthesizing hydrofluorocarbons, correct?
MR. BEAUPRE: Objection to form.
A. Looking at the time frame of 1988, and I include my experience going back to the middle '70s, where we were synthesizing HF, HF134A, if I include that time, plus the time up to the issuance of the patent in 1988, it would be at least two years.
Q. So you're basing, when you refer to experience, that person could work at a laboratory where other people are synthesizing hydrofluorocarbons, correct?
MR. BEAUPRE: Objection, form.
A. Depends what you mean by work.
Q. I guess I'm trying to understand what you

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

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

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

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

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. ROSE: Objection, form and foundation.

A. They may or may not have had course work in hydrofluorocarbon synthesis, but it's really the practical experience that's useful.
Q. How about organic chemistry course work?
MR. BEAUPRE: Same objection.
A. Organal(sic) fluorine chemistry is different from much of simple hydrocarbon chemistry.
Q. So organic course work in undergraduate or postgraduate studies would not be relevant, is that your opinion?
MR. BEAUPRE: Objection, form.
A. Yeah, would you rephrase that, please?
Q. Yeah, so hydrocarbon or organic chemistry experience in undergraduate course work or postgraduate course work would not be relevant to determining whether somebody is a POSITA?
A. It would be helpful.
Q. Turning back to your declaration, paragraph 57. Paragraph 57 starts on page 32 and carries over to page 33, and looking at the sentence that starts five lines down you say: As Douglas explains, it was a "rule of thumb" in chemical process design that it is desirable to recover more than 99 percent of all valuable materials through recovering and recycling.
Do you see that?

A. Yes.
Q. First of all, what is meant there by recovering and recycling?
MR. BEAUPRE: Objection, form.
A. Recovering is collecting for further use.
Recycling is returning a component of the process to the process.
Q. So you're referring back to the claim interpretations that you gave in your report, I'm sorry, your declaration?
A. I'm referring back to page 22.
Q. Yeah, in your declaration?
A. Yes.
Q. And the Douglas reference that you're citing there is Exhibit 6. Is that something that was provided to you by counsel as well?
MR. BEAUPRE: Objection, form.
A. Yeah, the specific document was provided to me by counsel. I don't remember whether I uncovered that or not.
Q. Okay.
A. What I was looking for was the fact that in industry, it's just common practice to recover and recycle as much as you possibly can, and I was looking for a reference to that general rule of thumb, and I

don't remember who uncovered the Douglas reference.
Q. Douglas is the one that refers to it as a rule of thumb?
A. That's right. He's a professor, yes.
Q. Did you ever refer to it as a rule of thumb when you were at DuPont?
MR. BEAUPRE: Objection to form.
A. I don't think I had to. It was pretty obvious when we were doing any of these process development programs for any chemical to develop the lowest cost process. And one develops the lowest cost process by recovering, recycling anything that makes sense.
Q. So you didn't, in your work at DuPont, refer to a rule of thumb as being desirable to recover more than 99 percent of all valuable materials?
MR. BEAUPRE: Objection, form.
A. I don't recall specifically referring to it as a rule of thumb, other than just good practice.
Q. Did you refer to specifically the 99 percent figure while you were at DuPont?
MR. BEAUPRE: Objection, form.
A. I would refer to the highest number possible, whether it's 99 or 100 percent.
Q. It could be less than 99 percent, right?

MR. BEAUPRE: Objection, form.
A. It could. It might be. But the simple fact is you try to recover and reuse as much as you possibly can.
Q. Right. In looking at the Douglas reference, which is -- I believe it's Exhibit 6 to the 915 case. So actually Exhibit 1006.
A. Yes. It's sideways here. I have to rotate it somehow.
MR. BEAUPRE: Do you need help?
THE WITNESS: No, I got it.
A. Okay.
Q. And the quote that you recite is from -- starts on the bottom of page 116 and carries over to page 117. I'd like you to look at the page before that in the document, which is page multiple zeros and then eight.
A. Oh, okay, I'm sorry, we're going to the declaration, I'm in the Douglas document.
Q. Yes, I am too, in the Douglas document. Again, that document also has those numbers at the bottom.
A. Oh, okay. Oh, I see, yes, okay. I had expanded, because I couldn't read it. All right. What page are you on now?

Q. The page before that, page 00, multiple zeros, eight.
A. Eight, okay.
MR. BEAUPRE: Can I show him?
A. Do you have a table of contents there?
Q. Yeah, where it says preface.
MR. BEAUPRE: It looks like this, preface, and then it's got, so it's right after the first page after the table of contents.
A. Okay, I'm there.
Q. At the outset of his book, Douglas says in his preface, the second sentence reads: The goal of a conceptual design is to find the best process flow sheet, i.e., to select the process units and unit connections among these units and estimate the optimum design conditions. The problem is difficult because very many process alternatives can be considered. In addition, experience indicates that less than one percent of ideas for new designs ever become commercialized. Thus, there are many possibilities to consider with only a small chance of success.
Do you see that?
A. I do.
Q. Is that a fair characterization of how --

well, strike that.

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

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. BEAUPRE: Objection, form and foundation.

A. That is certainly a goal.

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

MR. BEAUPRE: Objection, form and foundation.

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

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form foundation.

A. It depends on the process, right.

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

A. Yes.

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

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

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

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

A. It's chemistry, exactly.

Q. Right. Stoichiometry requires that?

A. Exactly.

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

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

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. BEAUPRE: Objection, form and foundation.

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

Q. Including the capital investment?

A. Absolutely.

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

A. Dehydrohalogenation is the removal of HX.

Q. Right.

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

MR. ROSE: Yeah, that's fine.

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

(Recess.)

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

BY MR. ROSE:

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

A. It would be a halogen.

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

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

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

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

A. HF.

Q. HF?

A. Yes.

MR. BEAUPRE: Objection to form.

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

MR. BEAUPRE: Objection to form.

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

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

A. And reacting with KOH to make water.

Q. To make water?

A. And KF.

Q. And KF.

A. Right.
Q. So when you say the removal of HF, it's the removal of an H and an F?
A. Removal of H and F.
Q. Right. And you didn't -- strike that.
That's the plain and ordinary meaning to you of dehydrofluorination, right?
MR. BEAUPRE: Objection to form.
A. One can dehydrofluorinate with an agent, or one can do it catalytically by removal of HF.
Q. But the '282 patent doesn't describe it being done catalytically, does it?
A. No, it's a dehydrohal -- dehydrofluorine is the agent, so that would imply the use of a base, a base-mediated reaction.
Q. So as those terms are used in the claims of the '282 patent, will you understand them to have the plain and ordinary meaning of just the removal of the H and the halogen, or does that term have a specific meaning, as used in the '282 patent?
MR. BEAUPRE: Objection, form.
A. Yeah, please repeat that question for me?
MR. ROSE: Can you read it back?
(Record read.)
A. And the terms that are referred to?

Q. Dehydrohalogenation and dehydrofluorination.
A. Dehydrohalogenation and dehydrofluorination are the removal of HX or HF.
Q. Right, but it's only described being done in one manner in the '282 patent, correct?
A. It's described as being done in the presence of an agent, which is dehydrohalogenation agent.
Q. So when you refer to a catalytic removal, that's not what you would understand to be within the meaning of dehydrohalogenation or dehydrofluorination in the '282 patent, is that correct?
MR. BEAUPRE: Objection to form.
A. It's not done by a dehydrohalogenating agent.
Q. Right. So I guess my question to you is, does the term dehydrohalogenation, as used in the claims of the '282 patent, do you interpret that as meaning any removal of a hydrogen and a halogen, including removal by a catalyst, or is it used more narrowly in the '282 patent?
MR. BEAUPRE: Objection, form.
A. It's used narrowly in terms of the use of a dehydrohalogenating agent. In other words, a

stoichiometric removal presence of an agent or base.

Q. You also -- strike that.

What do you understand the word purifying to mean?

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. BEAUPRE: Objection, form.

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

Q. Does it require removal of anything?

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Same objection.

A. No, I don't.

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

A. That's correct.
Q. How does one spend KOH?
MR. BEAUPRE: Objection, form and foundation.
A. Well, I define the term spent, spent DHA not spend.
Q. Well, if something is spent, doesn't that mean --
A. Well, I haven't defined that, but spent DHA is unreacted DHA or specifically KOH that has been through the dehydrohalogenation reaction unreacted.
Q. Couldn't that also include KOH that has been reacted?
MR. BEAUPRE: Objection, form.
A. No, spent KOH is spent KOH. Spent KOH is not a byproduct salt.
Q. And the reaction of the KOH that results in KF, hasn't that potassium hydroxide been spent to create another molecule?
MR. BEAUPRE: Objection to form.
A. The KOH has been reacted to make water and byproduct salt.
Q. Right. So when it reacts, is it not being spent?
MR. BEAUPRE: Same objection.

A. Not by my definition. My definition was that it goes through the reaction unreacted.
Q. That it remains as --
A. It remains as KOH.
Q. As KOH. Could it also include KF?
A. No, it's KOH.
Q. Do you see anything in the '282 patent that would be contradictory to that?
MR. BEAUPRE: Objection to form.
A. Well, the terms in the '282 patent indicate that spent DHA and byproduct salts are referred to as two separate components, therefore --
Q. You state in your declaration at paragraph 45, seven lines in, you state: In the general context of dehydrohalogenation reactions, spent DHA or KOH could mean DHA or KOH that has been converted to a byproduct salt, such as KF, through reaction, correct?
A. Yes, that's what it says.
Q. Okay. So it could mean the KF?
MR. BEAUPRE: Objection, form.
BY MR. ROSE:
Q. Correct?
A. In the general context, in paragraph 45, it says that it could mean DHA that has been converted to a byproduct salt.

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

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

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

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

MR. BEAUPRE: Objection, form and foundation.

A. That is one interpretation.

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

A. Sorry. Okay, I'm there.

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

MR. BEAUPRE: Objection, form and

foundation.
A. They are both soluble in water, but to different degrees.
Q. Is there a significant difference in their solubility?
MR. BEAUPRE: Objection to form.
A. I would have to look up the solubilities of each one of those.
Q. And referring to example one, and read as much of it as you need to, but in particular, after the reaction, going to the paragraph beginning at line 44 in column 15, it states: Scrubber product collection cylinder was used to collect spent KOH and the portion of organic that was carried out with the spent KOH.
There's no discussion there of removal for separation of KF from KOH in that example, is there?
MR. BEAUPRE: Objection, form.
A. There is no discussion of KF in that example, in that section.
Q. So in that example, the KF and the KOH would both be collected together, correct?
MR. BEAUPRE: Objection, form and foundation.
A. They would be part of the aqueous stream that was collected.

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

MR. BEAUPRE: Objection, form and foundation.

A. That's an interpretation, yes.

Q. Is that a reasonable interpretation?

A. That's a reasonable interpretation.

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

MR. BEAUPRE: Objection, form and foundation.

A. Yes.

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

referred to that as taking out or removing?
A. That's correct.
Q. And then you refer to recovering spent DHA or recovering spent KOH as collecting those components for further use. You see that?
A. Yes, I do.
MR. BEAUPRE: Objection, form.
BY MR. ROSE:
Q. What do you mean by collecting?
MR. BEAUPRE: Objection, form.
A. I mean I'm collecting for further use.
Q. Is collecting any different than taking out or removing or withdrawing?
MR. BEAUPRE: Objection, form.
A. Taking out is taking out or removing. Recovering is collecting for further use. You can withdraw without collecting.
Q. Describe for me how do you withdraw something without collecting it?
MR. BEAUPRE: Objection, form.
A. Take a tank full of water, you open up a spigot on the bottom of the tank and dump the water on the grass, you have withdrawn the water, but you've not collected it for any further use.
Q. Then you refer to the term recycling,

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

MR. BEAUPRE: Objection, form.

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

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

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

A. Yes.

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

MR. BEAUPRE: Objection to form.

A. The '282 patent on page -- let's see, column two, so, please, can I have the question again?

(Record read.)

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

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

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

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

MR. BEAUPRE: Objection to form.

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

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

MR. BEAUPRE: Objection, form.

A. Those are examples of recovering for further use.

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

things, recovering, purifying and/or regenerating?
MR. BEAUPRE: Objection, form.
A. I view those terms separating, purifying, concentrating and regenerating as part of the collection process, collecting for further use.
Q. You use the word may in your construction, why is that?
MR. BEAUPRE: Objection, form.
BY MR. ROSE:
Q. Are there instances where those activities are not part of the recovering process or the collecting process?
MR. BEAUPRE: Same objection.
A. I think it means that any one of those could be part of a collecting process, but they don't all have to be included.
Q. Do any of them?
MR. BEAUPRE: Objection, form.
A. Well, as stated in the patent, yes, some of them do.
Q. And you're referring to purifying and regenerating?
A. Referring to by separating.
MR. BEAUPRE: Objection to form to that last one.

Q. Is the only one that is required is separating?
A. No, I said it may include one of those. It may include separating, may include purifying, it may include concentrating and it may include regeneration.
Q. All right. I had asked are there instances where those activities are not part of the recovering process or the collecting process. You said, I think it means that any one of those could be a part of the process, but they don't all have to be included, and I asked do any of them, and you said well, as stated in the patent, yes, some of them do.
And so my question is, which ones do have to be required or do have to be included?
MR. BEAUPRE: Objection, form.
BY MR. ROSE:
Q. When you said some of them do?
MR. BEAUPRE: Same objection.
A. Separating, purifying, concentrations and regenerating may be used in the collection process.
Q. Right. But my question to you was you said some of them do, some of them are required. My question is, which ones are required?
A. Oh.
MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Object to form.

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

Q. Okay.

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

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

Q. Yeah, and separation.

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

A. Please repeat that question?

(Record read.)

A. Once more again?

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

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

(Record read.)

A. Yes, that's correct.

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

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

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

to the process?
A. Yes.
Q. Sorry, let me give you time to get back to your declaration.
A. Returning a component of the process to the process, correct.
Q. My question is, what is the component that's being returned?
MR. BEAUPRE: Objection, form.
A. The component that's being returned is in the patent, line 13, column 33 once again, the organic free KOH isolate can be immediately recycled to the reactor or can be concentrated and the concentrated solution returned to the reactor.
Q. So is it the KOH that's being recycled or is it the K?
MR. BEAUPRE: Objection, form.
A. It is the spent KOH.
Q. Which you define as just unreacted KOH, correct?
A. It's KOH that had been through the dehydrohalogenation process, unreacted.
Q. Unreacted. But we've already discussed that a reasonable interpretation could also include for the term spent KOH the KF that comes out as a result of

the reaction, correct?

MR. BEAUPRE: Objection, form, mischaracterizes.

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

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

MR. BEAUPRE: Objection, form and foundation.

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

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

MR. BEAUPRE: Objection, form and foundation.

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

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

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

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

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

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

MR. BEAUPRE: Same objections.

BY MR. ROSE:

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

recycling?

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

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

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

MR. BEAUPRE: Same objections.

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

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

MR. BEAUPRE: Same objections.

A. Recovered potassium.

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

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

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

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

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

MR. BEAUPRE: Same objections.

BY MR. ROSE:

Q. Is that correct?

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

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

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

MR. BEAUPRE: Same objections.

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

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

A. Correct.
Q. And first of all, how -- where did you come up with the term volume?
A. For me, it was just if it's a stream, it's a volume, and that's what it meant to me.
Q. Does stream connote a continuous or semi-continuous process?
MR. BEAUPRE: Objection, form, foundation.
A. Product stream -- dehydrofluorinated product stream could come from either a continuous, semi-continuous or batch process.
Q. So to use your analogy before about a barrel of water and withdrawing it, if I were to take a bucket and scoop a bucket of water out of that barrel, is that a stream?
MR. BEAUPRE: Objection, form, incomplete hypothetical.
A. The volume of material, yes.
Q. It would be volume, but would it also be a stream?
MR. BEAUPRE: Same objections.
A. Well, in that analogy, I just presented you with material with a bucket with a container of water, but as it applies to this process, we have a stream

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

Q. Doesn't a stream have to flow?

MR. BEAUPRE: Objection, form, foundation.

A. Typically.

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

MR. BEAUPRE: Same objections, plus incomplete hypothetical.

A. You have a volume of material.

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

MR. BEAUPRE: Same objections.

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

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

any given point in time.

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

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

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

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

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

be the dehydrofluorinated organic products.

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

A. Yes.

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

MR. BEAUPRE: Object to form.

A. Yes.

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

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

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

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

A. Yeah, please rephrase that?
Q. Yeah, we already discussed before, remember we were looking at the examples where it talks about spent KOH, so if -- well, strike that.
The spent DHA, in one reasonable interpretation, could include unreacted DHA as well as the salt of the reaction?
MR. BEAUPRE: Objection, foundation, form and mischaracterization of previous testimony.
A. The product reaction stream does not include the regenerated KOH from KF. It contains DHA unreacted KOH, for example, and byproduct salts. Byproducts salts meaning KF and not byproduct salts that had been further converted.
Q. Right, I understand that. What I'm asking though is if you recall our discussion regarding the examples where the term spent KOH is used and includes unreacted KOH and the KF, if that's the interpretation of spent KOH, then the product reaction stream would be a volume of material including spent KOH and dissolved organics?
MR. BEAUPRE: Objection, form, foundation and mischaracterization of prior testimony and incomplete hypothetical.

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

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

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

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

A. Correct.

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

MR. BEAUPRE: Objection, form.

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

Q. Are the organics actually soluble in water?

MR. BEAUPRE: Objection, form.

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

Q. Are they entrained in the water?

MR. ROSE: Same objection.

A. Coming out of the reactor, there may be organics entrained with the water, not in the water.
Q. Okay. Entrained with the water, but they are not actually dissolved as being soluble, correct?
MR. BEAUPRE: Same objection.
A. I don't believe they are soluble in the water.
MR. ROSE: Now is probably a decent time to break for lunch. I'm getting into a new area.
MR. BEAUPRE: Sounds good.
THE VIDEOGRAPHER: Going off the record, the time is 12:33.
(Luncheon recess.)
(Continued on next page.)

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

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

BY MR. ROSE:

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

A. Yes, I'm there.

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Same objection.

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

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

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

MR. BEAUPRE: Objection, form.

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

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

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

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

A. Yes.

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form.

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

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

MR. BEAUPRE: Objection, form and incomplete hypothetical.

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

valuable.

Q. Right, so someone --

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

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

A. That's correct.

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

A. I have it right here.

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

A. I'm there.

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

MR. BEAUPRE: Objection, form.

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

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

A. That's correct.
Q. And then after hydrogenating, if you read down the claim, it says: To produce an intermediate product stream comprising of at least one alkane, according to the formula two. Do you see where that is?
A. This is in section B?
Q. We're not into B yet. We're still in A.
A. Oh, okay. Hydrogenating.
Q. We started with one alkane according to formula one?
A. Okay.
Q. And then the contact, that starting material with a reducing agent to produce an intermediate product stream comprising at least one alkane according to formula two?
A. Yes.
Q. And would that include under formula two what you've already referred to today as 236 and 245?
A. Yes.
Q. And then the dehydrohalogenation step that we've been talking about that takes place down at C, correct?
A. Yes.
Q. And that is defluorinating(sic) the

product -- strike that.

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

A. You're dehydrofluorinating.

Q. Correct, thank you.

A. Formula two, that's correct.

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

A. Yes.

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

MR. BEAUPRE: Form and foundation.

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

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

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

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

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

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

MR. BEAUPRE: Same objections.

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

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

A. Correct.

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

MR. BEAUPRE: Objection, form.

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

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

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

A. 1225 is derived from 245.

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

THE WITNESS: Repeat that again, please?

(Record read.)

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

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

A. 1225 is not directly derived from 245.

Q. Okay. Can you explain that?

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

Q. Okay. 1234 is derived from 245?

A. Correct.

Q. What is 1225 derived from?

A. 1225 is derived from 236.

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

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

A. Yes.

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

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

MR. BEAUPRE: Objection, form.

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

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

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

MR. BEAUPRE: Objection, form.

Q. Is that how you interpret that?

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

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

Maybe I misspoke.

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

Q. Understood. Thank you for the correction.

So what that means is 48 percent of the 245 was converted?

A. Correct.

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

MR. BEAUPRE: Objection, form.

A. 73 percent of the 245 was converted, was converted to 1234.

Q. And do you have any understanding of what the remaining 245 that would be converted would have been converted to?

MR. BEAUPRE: Objection, form.

A. No, it's not specific as to where the other 27 percent of the converted material is going to.

Q. Would 73 percent selectivity be acceptable in a commercial setting?

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

A. Once again it depends on the economics of the process.

Q. So based on your history with DuPont, you

don't know in this situation to make this product if that would be commercially viable?

MR. BEAUPRE: Same objections.

A. In this situation, without additional information, I wouldn't know.

Q. Okay. Let's go ahead and take a look at the Smith reference.

A. Do you happen to know the exhibit number?

Q. I'm sorry, it's Exhibit 1003.

A. All right. I have it.

Q. And Smith is one of the references that you rely on as prior art in each of the petitions, is that correct? In each of your declarations?

A. That's correct.

Q. And turning past to the third page of Smith -- strike that.

Go back to the second page of Smith, the last paragraph, there are descriptions for preparing 1234, do you see that, and 1225?

MR. BEAUPRE: You mean the page with zeros and the two?

Q. Sorry, it will help them in this one because they don't match up. I'm referring to the stamped number in the corner, which is a page with a bunch of zeros. Sorry about that.

A. So which page are you talking about?
Q. 00002.
A. Two, okay.
Q. And the discussion begins describing conversion of 245 to 1234. Do you see that?
A. Which line are you referring to there?
Q. I'm referring to the paragraph that begins at the bottom of page 00002 and carries over to the next page.
A. The second invention? Beginning with the second invention?
Q. Beginning with the subject invention.
A. Subject, I'm sorry, subject, yes.
Q. That's a description of the process or a process for converting 245 to 1234, correct?
A. Yes, that's one of the processes he identifies, yes.
Q. And in the third full paragraph of page 00003, it states: In any of the aspects of the process of the invention described herein, the products from step A, B, C and/or D may be subjected to a purifications step. Do you see that?
A. Yes.
Q. What did you understand that purification step to be?

MR. BEAUPRE: Objection to form.
A. It's not specific, but I would assume it would be any purification step that accomplishes purifications.
Q. What are the products from steps A, B, C and/or D?
MR. BEAUPRE: Objection, form.
A. Well, okay, so steps A and C are hydrogenation steps, and steps D -- B and D are dehydrofluorination steps.
Q. So what would the products of A and C be?
MR. BEAUPRE: Same objection.
A. The product of A, which starts with specifically HFP and hydrogen, would be 236.
Q. Okay.
A. The product of step C, which is -- starting material there is 1225 with hydrogen would give 245, and the product of step B would be dehydrofluorinating 236, which would give 1225, and the product of step D, dehydrofluorinating 245, as it says, would give 1234.
Q. And then we talked about the purifications of those products. Smith goes on to say in that third full paragraph on page 0003: The purification may be achieved, for example, by separation of the desired products. Separation was one of the terms you used in

defining recovery, correct?

MR. BEAUPRE: Objection, form.

A. The products of those forward actions are recovered for further use. One of those uses can be separation, could be purification, could be a number of things.

Q. Okay. That's where I direct my question, is purification a form of recovery?

A. Purification is a use or a follow-up step for a recovered product.

Q. Okay. You know what are the -- well, strike that.

Go down two more paragraphs, and there's a statement: Alternatively, the process may be carried out in a semi-batch manner. Do you know what's meant in a semi-batch manner?

A. Yes, a semi-batch manner is not a continuous manner.

Q. What's the difference then between semi-batch and batch?

MR. BEAUPRE: Objection, form.

A. Batch process is a process where the materials are charged to the reactor. They are reacted and then the products are recovered and recycled.

Semi-continuous process would be where

materials are charged to the reactor and for a period of time, there's some operation taking place beyond the initial charge to the reactor.

Q. So in a batch, the charts that are reacted then are reacted, and then are recovered and recycled. Products are recovered and recycled.

A. They are recovered and recovered for further use. One of those uses might be recycle.

Q. And then what is semi-batch?

A. Well, semi-batch is where you charge reactants to a reactor, run it for a period of time, you may be adding an additional reactant during that period of time, but at some point you stop the reaction. So it's run sort of continuously for a period of time and then stopped, so semi-batch.

Q. Now, what's being described as being purified by separation and other activities in that third paragraph on page 003, that's not -- that doesn't identify byproducts as being purified, correct?

MR. BEAUPRE: Objection, form and foundation.

A. That paragraph does not mention anything about byproducts.

Q. Does Smith discuss the recovery of any byproducts?

MR. BEAUPRE: Objection, form.
A. Now we're referring to byproducts or co-products?
Q. Well, in your report, you refer to byproducts. So my question is to byproducts.
MR. BEAUPRE: Same objection.
A. On page three, Smith -- paragraph three there it says: Alternatively, following optional purification to remove unwanted byproducts such as 254EB.
Q. You're on page 0004?
A. 0004, I'm sorry, yes. So he mentions the removal of unwanted byproducts.
Q. Does that fall under the characterization as being recovered?
MR. BEAUPRE: Objection, form.
A. It would have been a step to recover products from the reactor and a follow-up step of purification. And one of those purification steps following the recovery is to remove the unwanted byproducts by -- well, just to remove the unwanted byproducts.
Q. Right. So what you're doing is you're recovering the product, not the byproduct, correct?
MR. BEAUPRE: Objection, form.

A. Well, you're recovering the product and the byproduct, and then you're purifying the product by removing the unwanted byproduct.

Q. But you don't do any purification or separation or any of those other terms that fall into your definition of recovery? You're not applying those to the byproduct, are you?

MR. BEAUPRE: Objection, form.

A. The byproduct is recovered -- the byproduct is part of the stream containing the 245 that is recovered for subsequent step, which involves purification of that organic stream.

Q. So the recovery includes the product and the byproduct?

A. Correct.

Q. Okay. Can recovery also include a product and a co-product?

MR. BEAUPRE: Objection, form.

A. Recovery could include the byproduct and the desired product and byproducts as well.

Q. And co-products?

A. Co-products, byproducts and products.

Q. Okay. Now, Smith talks about a gas phase reaction, correct?

MR. BEAUPRE: Objection, form.

A. Which part of Smith are you referring to?
Q. Well, let's turn to page 0006, beginning with the first full paragraph, the dehydrofluorinization(sic) may be induced thermally may be base mediated and/or may be catalyzed by any suitable catalyst.
A. I'm sorry that was on six, right?
Q. 0006?
A. 0006.
Q. I'm looking at the first full paragraph.
A. Yes.
Q. Dehydrofluorinization(sic) may be induced thermally, may be base mediated or may be catalyzed by any suitable catalyst. Do you see that?
A. That's correct.
Q. Do you understand the catalyzed process?
A. I do.
MR. BEAUPRE: Objection to form.
Q. Well, do you understand what they're referring to as catalyzed by any suitable catalyst?
A. I understand that term.
Q. Yes. What is that process?
A. It is passing reactants over a catalyst to effect the dehydrofluorination.
Q. And when you say passing them over, you're

passing them over in a gaseous form, correct?
MR. BEAUPRE: Objection to form.
A. It's not specific. It could be a gas form or liquid form, but you got a catalyst in a reactor, and you're passing the starting material over that catalyst to make a product. It could be done either in a gas phase or it could be done in a liquid phase.
Q. Right. But in Smith, it's being done in a gas phase, correct?
MR. BEAUPRE: Objection, form and foundation.
A. I don't believe Smith is specific to carry out that catalytic reaction, only in the gas phase.
Q. Could you take a look at the examples that Smith provides, they start on page 00018. Is example one, is that the gaseous reaction?
A. I don't think you can tell whether it's gas phase in the reactive or liquid phase, because he doesn't say what the pressure in that reactor is. He talks about temperature. He doesn't say what the pressure is.
Q. He says inlet temperature is 51 degrees C, correct? I'm looking at table one.
A. Okay. Inlet temperature is 51 degrees.
Q. Do you know what the boiling point is of

236?

A. 236, according from memory, I seem to believe it's around, it's around 20 to 30 degrees centigrade at atmospheric pressure.

Q. And how about for 245?

A. I think it's a little higher, but I'm not sure. It's in that same ballpark.

Q. So at atmospheric pressure, they would be in the gas phase if the temperature, the reaction was 51 degrees C, correct?

MR. BEAUPRE: Objection, form.

A. At 51 degrees, an atmospheric pressure, they should be in the vapor phase, gas phase, but it doesn't say that.

Q. And, again, looking at example two, the defluorinization(sic) of 236, that's a gas reactor, correct, a gas phase reaction?

MR. BEAUPRE: Objection, form.

A. Can't draw that conclusion from the data that's presented.

Q. Again, the temperature here looks to me to be between 240 and 320 degrees C?

A. That's correct.

Q. Do you know what the pressure would need to be in order to have 236 in a liquid form at those

temperatures?
A. Not offhand I don't.
Q. Pretty high though, right?
MR. BEAUPRE: Objection to form.
A. I don't know what the pressure would be. At some pressure, it would force the reaction to be done in a liquid phase.
Q. Do you read in the second paragraph under example two where we first feed gas flow rates?
A. Yes.
Q. Doesn't that suggest this is a gas phase reaction?
MR. BEAUPRE: Objection, form.
A. Not at all.
Q. What does that mean, feed gas flow rates?
MR. BEAUPRE: Objection, form.
A. It says what it says. The feed gas flow rate was chosen such that at contact time of five seconds was achieved in the reactor, the feed gas, it doesn't say where that goes. It could go to a progresser and be pressurized, but based on the flow rates of the gas and the volume of the reactor, you can calculate a contact time.
Q. Right, but it's gas that's flowing, isn't it? It says the flow rate of the gas.

A. The gas, that's right, but it doesn't say gas into what. It just says the flow rate of gas was chosen to determine the contact time.

Q. So what you're saying is it could be that they used a compressor to compress the gas, such that at 300 degrees Celsius, it was nevertheless in liquid form when it went into the reactor?

A. That's certainly one possibility.

Q. And if it's being fed into the reactor in the liquid form, wouldn't it say feed liquid flow rates?

MR. BEAUPRE: Objection, form.

A. It doesn't say that.

Q. So doesn't that suggest to you that it's being fed in a gas phase or vapor phase?

MR. BEAUPRE: Same objection.

A. The feed gas flow rates were such to maintain the contact time of five seconds in the reactor between the catalyst and the feed mixture. It doesn't say whether the feed mixture in the reactor is a liquid or gas.

Q. It does call it feed gas?

MR. BEAUPRE: Objection.

A. It calls it feed mixture.

Q. It refers to the feed gas flow rate,

correct?
A. He used the term feed gas flow rate, that's right.
Q. And, again, at that temperature, approximately how many atmospheres would the pressure need to be to maintain a liquid phase?
MR. BEAUPRE: Objection, form and asked and answered.
A. I don't know without calculating what the pressure would have to be.
Q. Would it have to be more than three or four atmospheres?
MR. BEAUPRE: Same objections.
A. Once again, I would have to go through a calculation to determine that.
Q. To know whether it's more than three atmospheres?
MR. BEAUPRE: Same objections.
A. I'm not going to answer. I'd have to calculate.
Q. Turn your attention to page 11 of the Smith. The second full paragraph starts with: Another preferred method effecting dehydrofluorination in steps B and D is by contacting 236E and 245EB and/or 245EB with a base--(base-mediated defluorination.)

Is that what you were referring to in your report as a liquid phase reaction?

A. In which part of my report are you referring to?

Q. Hold on just a second. Yeah, at paragraph 43.

A. On page 21?

Q. Yeah. Where you say a dehydrohalogenating process using DHA, such as that claimed in the '282 patent, generally is a liquid phase process. That's what I'm referring to when I ask do you understand that what's being described in the second full paragraph on page 00012 of Smith, that's a liquid phase process?

MR. BEAUPRE: Objection to form.

A. Okay. So would you repeat the question?

Q. Yes. Does that suggest to you that what's being described in the second paragraph of page 0012(sic) of Smith is a liquid phase process?

MR. BEAUPRE: Objection, form.

A. It suggests that the base -- let me get the wording correct here. That the base mediated the hydrohalogenation reaction is conducted in the liquid phase.

Q. And do you know what concentrations of KOH Smith uses? If it will help, you can look to page

0013.

A. Typically present 50 percent based on the total weight of the components, which make up steps B and D, preferably the base is present in an amount five to 30 weight percent.

Q. And what is the effect on concentration of KOH in these reactions?

MR. BEAUPRE: Objection, form.

MR. ROSE: Let me reask the question, because I may have misspoken.

Q. What is the effect of concentration of KOH on these reactions?

MR. BEAUPRE: Objection, form.

A. Well, typically a POSITA would expect that higher concentrations would provide a faster reaction rate.

Q. And so Smith states that preferably, the base is present in an amount of five to thirty percent weight. Do you see that?

MR. BEAUPRE: Objection to the form.

A. By weight of the total weight of the components, yes.

Q. And so the POSITA would know that 30 weight percent would be better than five weight percent, for instance, correct?

MR. BEAUPRE: Objection to form and mischaracterizes.

A. POSITA would expect 30 percent higher concentration of the base would be desirable.

Q. So, for example, 15 percent would be more desirable than 5 percent, and 30 percent would be more desirable than 15 percent, correct?

MR. BEAUPRE: Same objections.

A. As I said, the higher the concentration of base, typically the higher concentration would be preferred, typically.

Q. Did you, when reaching your opinions in combining the Smith reference with other prior art references, consider the effect of concentration of KOH that might affect the combination?

MR. BEAUPRE: Objection to form.

A. When I looked at the -- as a POSITA, when I looked at the Smith patent, I was looking at the time frame of October the 12, 2010, all right. And I was sitting there with the problem of how one makes 234, 1234. So I go out and I look at the various references, and I see Smith, and Smith teaches one how to hydrogenate the various olefins to haloalkanes and teaches how to dehydrohalogenate those haloalkanes to olefins.

So that provides a starting point. I don't believe at that point a POSITA would have specifically gone in there and looked for details on concentrations.

Q. So in deciding and opining on the combinations, you didn't look at and consider the concentrations, correct?

MR. BEAUPRE: Objection, form, mischaracterizes.

A. Opining on the combinations of the Smith and Sedat?

Q. Well, we'll break those down, because I know right now we're talking about --

A. Smith?

Q. Smith. Smith in combination with either of them, either Sedat or Masayuki, did you consider, so we don't have to go back and reask the question a second time, did you consider the concentrations of KOH in opining as to Sedat in combination with Smith or Masayuki in combination with Smith, with either of them?

MR. BEAUPRE: Objection, form.

A. Not specifically, I was looking at some method of enabling the preparation of the haloalkanes and that comes from Smith, and I was looking at a method of dehydrohalogenating those alkanes to 1234,

and that was the reason for the Sedat and Masayuki references over Smith. And in looking at those references, I had a high degree of confidence that combining those references would enable me to develop a process. One of the steps in that development would have been looking at concentrations.

Q. But you just didn't at this time look at the concentrations?

MR. BEAUPRE: Objection, form.

A. Not as a POSITA in 2010. I was just looking for prior art references.

Q. Okay. I want to go back to something we were discussing a few moments ago.

When I had asked about does Smith describe the recovery of byproducts, and you had directed me to the second full paragraph on page 0004.

MR. BEAUPRE: What document? You're still on Smith?

MR. ROSE: I'm still on Smith, yeah.

MR. BEAUPRE: Okay.

BY MR. ROSE:

Q. And you had pointed out that following optional purification steps to remove unwanted byproducts, you were pointing me to that language when I asked if Smith taught recovery of byproducts?

MR. BEAUPRE: Objection, form.
A. Yeah, Smith talks about the paragraph starting the product of the reaction.
Q. Okay.
A. For example, in steps A and C are conducted simultaneously, the same reactor to those products may be separated by distillation as one example of a separation.
Q. And then you get to the next paragraph and it says alternatively, following any optional purification steps to remove unwanted byproducts, you see that?
A. Yes.
Q. So that's purification of the products to remove unwanted byproducts, correct?
MR. BEAUPRE: Objection, form.
A. Smith says that an optional purification can be done to remove byproducts from 236 and 245 before being fed to a reactor. So that is a purification step.
Q. Right. But that's not purification of the byproducts, is it?
MR. BEAUPRE: Objection to form.
A. It's removal of the byproducts.
Q. Right. It's not purification of the

byproducts, is it?

MR. BEAUPRE: Same objection to form.

A. It could be considered -- it's removal of the byproducts. It does not say what's done with those byproducts. It could be collected for their use.

Q. Right. So Smith doesn't teach the recovery of the byproducts? What you're saying is that it could happen, but Smith doesn't teach that, does it?

MR. BEAUPRE: Objection, form and mischaracterizing testimony.

A. I'm looking at figure one on page 25, where it shows a hydrogenation stage product still, and showing some material returning back to the hydrogenation step, and then it's showing the hydrogenation reactor recycle purge, so there's a purge from that stream. And down at the bottom of that still it says that there are possible heavies or there is a feed to a second stage preheater. Now, it doesn't say what happens to those streams, at least I don't think it does.

Q. Right. It doesn't say -- I just want to make sure I'm looking at the same stream as you're looking at. There's a stream leaving the still of possible heavies?

A. Yes.

Q. There's a stream of fluoro propane, right? Which stream are you talking about?
A. Yes, that's correct. There's a fluoro propane stream. There's a purge stream at the top.
Q. Which one of those streams has the byproducts?
MR. BEAUPRE: Objection, form.
A. It's not clear to me.
Q. Okay. So, again, going back to my prior question, Smith does not disclose the recovery of byproducts, correct?
MR. BEAUPRE: Objection, form and mischaracterizes prior testimony.
MR. ROSE: I haven't characterized his testimony. It's just a straight up question.
A. If you can save me some time maybe by pointing me back to that paragraph that was on page --
Q. It was on page 0004, yeah, 4.
A. 0004, oh, yes, I'm sorry. Yeah, the unwanted byproducts listed as 254EB as being one of other possible byproducts. He does not talk about purifying those byproducts.
Q. Or recovering those byproducts?
MR. BEAUPRE: Objection, form.

A. He's talking about removing them, and in my definition, to its removing further use, he does not talk about collecting those byproducts.

Q. Right, and removing is what you had used to describe withdrawing, correct?

Remember you gave the example of a container of water, and you let it run into the ground, it's been removed, but it's not been collected?

A. It does not say that it was collected. Implication, however, is it was collected. You just don't let this material get into the atmosphere.

Q. But he doesn't reference anything about that either, does he?

A. No, he doesn't. It's just common sense.

MR. BEAUPRE: Is now a good time for a break?

MR. ROSE: Yeah, that's fine.

THE VIDEOGRAPHER: Going off the record, the time is 1440.

(Recess.)

THE VIDEOGRAPHER: We're back on the record, the time is 1455.

BY MR. ROSE:

Q. Welcome back, Dr. Manzer. I want to direct your attention now to back to the Smith reference,

which is Exhibit 1003 in the proceedings, and we were looking previously at page 0012.

A. Yes.

Q. And I'm looking at the paragraph, second from the bottom, it starts with the word typically, using the printed numbers 0012.

A. Oh, you said 12, sorry.

Q. Yeah.

A. Typically, okay.

Q. It says: The base-mediated dehydrofluorination process of steps B and D is conducted at a temperature of from about minus 50 to about 300 degrees C?

A. Yes.

Q. Preferably about 20 to about 250-degree C, for example, from 50 to 200-degree C.

Would the 236 at those temperatures be in the liquid form or the gaseous form?

MR. BEAUPRE: Objection to form.

A. It depends on the pressure.

Q. And it also says in the next sentence: The base-mediated dehydrofluorination may be conducted at a pressure from about zero to about 30 BarA. Do you see that?

A. Yes.

Q. What is BarA?
A. Atmospheric pressure determined by gauge.
Q. So does that mean zero to about 30 atmospheres?
A. I believe that's what it means, yes.
Q. At those pressures and those temperatures, can you tell me whether the 236 would be in the gaseous or liquid form?
MR. BEAUPRE: Objection to form.
A. Which temperature are you specifically talking about?
Q. Let's look at the narrowest range that they provide, which is from 50 to about 200 and in that pressure range.
A. Yeah, I don't know specifically. I haven't looked at the temperature pressure at the lowest temperature and the highest pressure. It's likely I think they're in the liquid phase, but I don't know both the higher pressure and the higher temperature.
Q. Okay. Direct your attention to page 0014 of Smith. The first full paragraph starts with the sentence: The base-mediated dehydrofluorination of steps B and D is preferably conducted in the presence of a catalyst. Is a catalyst necessary for that reaction?

MR. BEAUPRE: Objection, form.
A. That's a misleading statement.
Q. Why is that misleading?
A. The base-mediated reaction is not catalytic.
Q. Then why is it stated that it's preferably conducted in the presence of a catalyst?
A. I have no idea.
MR. BEAUPRE: Same objection.
BY MR. ROSE:
Q. Okay. Did you notice that when you read Smith in preparing your declaration?
MR. BEAUPRE: Objection, form.
A. I don't know whether I noticed that error or not.
I'm sorry, you're saying discussing -- going on to the next sentence, discussing catalyst in terms of a phase transfer catalyst.
Q. What is a phase transfer catalyst as compared to a catalyst?
A. Yeah, both catalysts, whether it's phase transfer or one of the chrome catalysts they refer to in other cases, either one of those is consumed, but the base-mediated dehydrofluorination, for example, with KOH, the starting materials and products are not

soluble in water, and, therefore, it's hard to get the KOH that's in the water to react at any reasonable rate with the organic.

So one can use a phase transfer catalyst, which is not consumed, that has an organic and a hydrophilic component to it. So it, in a sense, acts as a way to bring the organic reagent, the KOH into contact with the organic layer. It's typically why one adds a base phase transfer catalyst, and that's because you have two reactive streams that are insoluble of one another.

Q. Does it affect the surface tension? Is that how it does it?

MR. BEAUPRE: Objection, form.

A. I don't know whether it affects the surface tension or not, but you've got a component of the phase transfer catalyst that's soluble in the organic phase. You've got a component of the phase transfer catalyst that's in the aqueous phase. So the aqueous part of that phase transfer catalyst is the opportunity to bring the KOH closer to the organic layer for reaction and partially more closer to it at the surface before further reaction.

Q. Okay. So I'm just trying to reconcile that with your prior definition of a catalyst. I can't

remember exactly what you said, but it's not consumed in the reaction, which is true with the phase transfer catalyst, but it affects the thermodynamics of the reaction?

MR. BEAUPRE: Objection, form.

A. It affects the rate of the reaction.

Q. Okay. And that's true for both a catalyst and a phase transfer catalyst?

A. Phase transfer catalyst in a heterogenous catalyst. It's not a phase transfer catalyst. It may affect the rate of the reaction.

Q. When you read Smith, did you understand Smith to be describing laboratory processes as compared to commercial processes?

MR. BEAUPRE: Objection, form.

A. I'm looking at in the examples, for example, two is two grams of catalyst and so on and so forth. That would suggest a laboratory reaction. What the purpose of that laboratory reaction is, I don't know.

Q. So Smith is not talking about bulk manufacture, correct?

MR. BEAUPRE: Objection, form.

A. I don't believe he mentions the term bulk manufacturing. Excuse me just a minute. Let me just

add something to that maybe.

(Pause.)

A. I've got nothing further to add.

Q. And Smith also doesn't discuss conversion percentages, is that right?

MR. BEAUPRE: Objection, form.

THE WITNESS: Would you read that question, please?

(Record read.)

A. No, that's not right.

Q. Okay. Where does Smith discuss conversion percentages?

A. Table two on page 00019, he's talking about the dehydrofluorination of 236. Now, this is with a chromium catalyst, but he talks about the conversion in table two, and he talks about the selectivity of the product conversion of 236 and the product of the two isomers of 1225.

Q. And I think we already discussed this, but the chromium process, you don't know whether that's a gas process or liquid?

MR. BEAUPRE: Objection, form.

A. I don't know specifically if it's a gas or liquid phase process, but it is a catalytic process without the addition of a base.

Q. Okay. In Smith's discussion of the dehydrofluorination process, the base-mediated process, he doesn't talk about conversion percentages, does he?

MR. BEAUPRE: Objection, form.

A. None of his examples give any details on the base-mediated dehydrofluorination.

Q. Okay. And right, so he provides no details on the conversion percentages or(sic) the base-mediated process, correct?

MR. BEAUPRE: Same objection, form.

THE WITNESS: So please repeat that again, the question?

(Record read.)

BY MR. ROSE:

Q. For the base-mediated process.

A. Yeah, I don't see any specifics for that.

Q. And getting back to page 0012, we were talking about the temperatures and the pressures disclosed by Smith at the last full paragraph of page 12, the paragraph beginning with typically.

A. Typically, okay.

Q. We were talking about the temperature ranges and the pressure ranges. Did you make any assumptions, when reaching your opinions regarding the combination of Smith, with any other reference as far

as temperature and/or pressure is concerned?
MR. BEAUPRE: Objection, form.
A. I didn't reach any specific temperature or pressure range by combining Smith with Sedat or Masayuki.
Q. So you made no assumption when you reached your ultimate opinions, correct?
MR. BEAUPRE: Same objection.
A. I don't recall making any assumptions.
Q. And Smith does not discuss anything having to do with spent KOH, correct?
MR. BEAUPRE: Objection, form.
A. No, I can't find anywhere where he does.
Q. And so there would be no mention of any desire to separate, purify, concentrate, regenerate or recycle spent KOH mentioned in Smith, correct?
MR. BEAUPRE: Objection, form.
A. I don't recall any mention of that specifically.
Q. And similarly, Smith also doesn't reference KF as a byproduct, does he?
MR. BEAUPRE: Objection, form.
A. I don't recall that.
Q. And, therefore, he doesn't mention regeneration using any KF?

A. No, but he does mention on page 13, middle of the page there, it says: A preferred base is an alkali metal hydroxide selected from the group consisting of lithium hydroxide, sodium hydroxide and potassium hydroxide; and, therefore, in the dehydrofluorination process, the byproduct using potassium hydroxide would be potassium fluoride from the chemistry.

Q. He just doesn't mention potassium fluoride?

A. Correct.

MR. BEAUPRE: Objection to form.

A. I don't recall him mentioning it specifically.

Q. Okay. And he doesn't reference regeneration, correct?

MR. BEAUPRE: Same objection.

A. No, I don't believe he references regeneration of KF, if he's using KOH as the base-mediated material.

Q. He doesn't reference regeneration of anything regardless of what the base-mediated material is, correct?

MR. BEAUPRE: Same objection.

A. Yeah, if your question was specific to the base mediated --

Q. Correct.
A. Yeah, okay, I was just looking to see if there was a reference to regeneration of the chromium catalyst, but if you're specific to the base mediated, he does not reference that, that I can see.
Q. Let's go ahead and move on to the Sedat reference. We have copies if you guys want them.
MR. BEAUPRE: I'm good. Thank you though.
MR. ROSE: And just for the record, Sedat is Exhibit 1004 in the 915 action. That's the French language document, and 1005, Exhibit 1005 in the 915 action, which is the English translation.
A. You prefer the English?
Q. Yes. Do you?
A. I can go either way.
Q. Good for you.
A. French is a common language in Canada, as you know, it's up there equal to English.
Q. Yeah, I guess in some parts of Canada.
A. I think it is an official language.
Q. Okay. Sedat is a reference that you combined with the Smith reference in reaching your opinion as to obviousness, correct?

A. That is correct.
Q. And if you would, turn to page 008 of Sedat.
A. Okay.
Q. In Sedat on page 008, referring to the number in the bottom right, I'd like to direct your attention down to the bottom, the last sentence of that single full paragraph on page eight, and certainly feel free to read as much of it as you want. But he refers to the temperature is preferably between 80 and 180 degrees C, advantageously between 125 and 180 degrees C and very particularly between 145 and 165 degrees C. Do you see that?
A. Yes.
Q. At those temperatures, would you expect the 236 to be in the gas phase or the liquid phase?
MR. BEAUPRE: Objection, form.
A. I'm just looking for a pressure.
Q. The language of Sedat goes on to discuss the dehydrofluorination reaction of step one may be carried at atmospheric pressure, but is preferred to work at a pressure above atmospheric pressure advantageously. This pressure is between 1.1 and 2.5 BarA.
A. Okay. So relatively low pressure, I would

expect the -- are you asking me the 236 and 245?

Q. 236.

A. 236, I would expect 236 to be fairly volatile at that temperature, yes.

Q. And the same with 245?

A. Yes.

Q. And referring to the experimental section in Sedat at page 0011.

A. Okay.

Q. There's a paragraph beginning: The outlet of the reactor six is connected to a filter eight in order to separate the calcium fluoride from the reaction medium.

The reaction medium, that is something other than spent KOH, correct?

A. Let me just go back to you're talking about a specific part of the process. Did you say inlet or outlet and which number?

Q. I'm sorry, on page 0011, three lines from the bottom. I'm sorry, I thought you were with me.

A. I was with you. I was up a paragraph though. Oh, reactor six, okay.

Q. Is connected to filter eight in order to separate the calcium chloride from the reaction medium. Do you see where I am?

A. Yes.
Q. That medium is something other than spent KOH, is that correct?
MR. BEAUPRE: Objection, form.
A. At that point, the reaction medium containing spent KOH is separated by filtration and then recycled. So the spent KOH is present in vessel number eight.
Q. Is that what you consider to be the reaction medium?
MR. BEAUPRE: Same objection.
BY MR. ROSE:
Q. Well, let me take a step back.
What does the term reaction medium mean to you?
A. That's what I was working at. Reaction medium to me, and to a POSITA, would likely mean the media in the reactor, vessel number one.
Q. Well, which of those -- okay, so the reactor, the medium and the reactor is number six, so what is the reaction medium being referred to there?
A. Okay, so we're talking about vessel eight. Where there's a filter to remove calcium chloride from the reaction medium, which at that point would be spent KOH, water and anything else that would be present in

that stream.

Q. Isn't the reactor six?

A. Well, the reactor six, but you're asking me, I think, about the reaction medium in separation step shown in vessel number eight.

Q. Okay. That was because you had said the reaction medium is what's in the reactor?

A. Yeah, typically I would think of a reaction medium as being something -- a medium -- a media in the reactor, but as described here, he's using it in various terms.

So I think the terms there would be the aqueous product from the reactor after it has been reacted with calcium hydroxide precipitate the calcium fluoride, which is separated in vessel number eight by filtration. And then the reaction media from vessel eight then is shown in the schematic to be returned to the concentrator.

Q. And that would be aqueous KOH?

A. That would be aqueous KOH -- would be a stream comprising certainly aqueous KOH.

Q. And that would include KOH that had been created by the reaction of calcium hydroxide with KF, correct?

A. That is correct.

Q. I'd like to turn to your declaration in the 916 matter, and in particular paragraph 60.
A. Which exhibit number is that?
Q. Sorry, it's 1002 in the 916 matter and also in the 917 matter.
A. Did you say 916 or 915?
Q. 916.
A. Yeah, I have 915 as Exhibit 102.
MR. BEAUPRE: You have to get out of that folder, probably.
THE WITNESS: Oh, I have to get out of the folder. I was just trying to bring up the exhibit, the 916.
A. Okay. That's 1002 in that folder, I guess. Okay, I'm there, yep.
Q. I apologize, I should be looking at 915.
A. Hey, I understand.
Q. I was looking at the wrong one.
A. Back on 915.
Q. Sorry about that.
A. That's okay.
Q. You state at the beginning of paragraph 60 on page 35.
A. Okay.
Q. There you state: Sedat teaches recovery of

spent KOH from the withdrawn dehydrohalogenation reaction medium as well as recovery of KOH regenerated from the metal salt byproduct KF. Do you see that?

A. Yes.

Q. So there you're referring to KF as a byproduct of the reaction?

MR. BEAUPRE: Objection to form.

A. I may have listed that from Sedat. I can look for that if you like, if it's important.

Q. Well, it's not in quotes, and that's why I just wanted to confirm whether KF is a byproduct of that reaction, in your opinion?

A. The terms are interchangeable in these various references.

Q. Which terms, which terms are interchangeable?

A. Byproduct and co-product. I tend to, and maybe I'm too focused on the real term, which is co-product when it's stoichiometric based, but the byproduct KF -- the term recovery of KOH regenerated from the metal salt byproduct or co-product is what I was referring to.

Q. So you're recovering the spent KOH, which you say is the unreacted KOH, correct?

MR. BEAUPRE: Objection, form.

A. Yes, Sedat teaches the recovery of the spent KOH as well as the KOH that's generated in the calcium hydroxide reactor.

Q. Would the POSITA having read Smith understand that there even is any spent KOH, using your definition of that term?

MR. BEAUPRE: Objection, form.

A. A POSITA reading Smith, in particular the section where he refers to base-mediated agents, such as KOH, would understand that there is a salt generated, which is KF.

Q. And that is part of spent KOH?

A. The KF that has been converted back to KOH is the stream that Sedat refers to as the KOH that is -- let's see --

MR. BEAUPRE: Counsel, you said you referred to Smith a few lines ago. Did you mean Sedat since we're on Sedat now?

MR. ROSE: Right, he's combined Sedat with Smith.

Q. So I'm asking if the POSITA read Smith, would that POSITA even know that there is an issue with spent KOH or even such a thing as spent KOH?

A. Yes, and as I mention within Smith, although there are no details, he does indicate that a

dehydrohalogenation can be an alkali metal hydroxide. He mentions KOH, and, therefore, if there's any reaction whatsoever, there will be KF present.

Q. And by having KF present, that leads to spent KOH, correct?

MR. BEAUPRE: Objection, form.

A. Not necessarily. Spent KOH, as I've mentioned, is KOH that has gone through the reactor and reacted.

Q. Right, and haven't we confirmed that Smith makes no mention of KOH going through the reactor unreacted?

MR. BEAUPRE: Objection to form.

A. He makes no mention of KOH going through unreacted.

Q. So the POSITA having read Smith would not know to look to recovering spent KOH, as you've defined that term, as being unreacted KOH?

MR. BEAUPRE: Objection, form.

A. No, a POSITA would look at Smith and see that he says one option is to use a basic hydroxide, such as KOH, and if Smith decides to use KOH and there's any reaction whatsoever, then he's going to generate KF, and there's going to be unconverted, unreacted KOH going through the process. That's what a

POSITA would understand.
Q. Yeah, but there's no mention in Smith of unreacted KOH going through the process, is there?
MR. BEAUPRE: Same objection.
A. No, but he does mention that, you know, a viable dehydrohalogenation agent is KOH.
Q. Right.
A. Therefore, if it's mentioned, I'm assuming that there's a reaction that takes place, otherwise why would he mention it.
Q. Right. But what if there's 100 percent conversion? There is no spent KOH involved, is there?
MR. BEAUPRE: Objection, form, incomplete hypothetical and foundation.
A. If he uses an excess of KOH, and there's a hundred percent conversion, there could still be unreacted KOH exiting the reactor, which is spent KOH.
Q. But that's not described in Smith either, correct?
MR. BEAUPRE: Same objections.
BY MR. ROSE:
Q. The use of excess KOH?
A. Yeah, well, I can go back and look, if you like. I don't recall whether he says that there's an excess, what the molar ratio of KOH is to organic.

Q. Well, Smith didn't even provide any examples in which he uses KOH, correct?
A. That's correct. So under what conditions he might have been thinking of.
Q. Right, he doesn't say?
A. He does not say.
Q. When you stated that Sedat teaches the recovery of the spent KOH in paragraph 60, you did not mean to say that Sedat teaches the separation of the spent KOH from dissolved or entrained organics, did you?
MR. BEAUPRE: Objection, form.
A. There is no mention of dissolved organics in Sedat.
Q. Or entrained organics?
A. Or entrained organics.
MR. BEAUPRE: Same objection.
BY MR. ROSE:
Q. Turning to page 38 of your declaration, paragraph 69.
A. Okay.
Q. Starting with the second sentence of that paragraph, where you refer to withdrawing the reaction medium, including KOH, from the dehydrohalogenating reactor occurs at outlet five, with the reactor one,

where the reaction medium is taken out or removed from the reactor and separated from the gaseous product. Does that mean that the reaction medium is moved and then -- at outlet five and then the gas is separated?

MR. BEAUPRE: Objection to form.

BY MR. ROSE:

Q. After the reaction medium is moved from the reactor?

MR. BEAUPRE: Objection, form.

A. I take that to read that the gas products exit the reactor via orifice four. It says that on the top of page 39. And the reactor media exits via outlet five and goes into vessel six.

Q. So when you said the medium is taken out or removed from the reactor and separated, the separation occurs before it leaves the reactor?

MR. BEAUPRE: Objection, form.

A. Separation of the gas products is taken place from reactor one before the aqueous stream is removed via orifice five.

Q. So the gaseous phase has already been separated from the aqueous phase before the aqueous phase leaves the reactor through five, correct?

A. That's my understanding, yeah.

MR. BEAUPRE: Sorry, objection to form

to that last one.

BY MR. ROSE:

Q. You then go on to paragraph 70, you state that: Sedat describes recovering spent KOH, step C of claim 21. And then you say: Sedat describes recovery of KOH remaining after the dehydrohalogenation reaction as well as recovering KOH regenerated from the metal salt byproduct. Do you see that?

A. Yes.

Q. Isn't recovery done of the metal byproduct by way of regeneration with lime?

MR. BEAUPRE: Objection, form.

A. Regeneration of KOH from KF by reaction with lime is done in vessel number six.

Q. Right. So isn't that recovery?

MR. BEAUPRE: Same objection.

A. Recovery of what?

Q. KOH. Isn't regeneration part of recovery?

A. Spent KOH passes through reactor six into reactor eight, and there's also the option of taking a sidestream there and recycling back the concentrator. But then the spent KOH along with the precipitated calcium fluoride are filtered, and then it's possible to recycle the filtrate, which contains the spent KOH and the KOH sits generated from the potassium fluoride

in that vessel.

Q. Okay. But I'm referring back to your interpretation of the recovering of the spent KOH, which is collecting spent KOH for further use, and you say may include separating, purifying and concentrating and/or regenerating.

So isn't the regeneration of the KF, isn't that what you would consider recovering spent KOH, the regeneration?

MR. BEAUPRE: Objection, form.

A. Recovery of spent KOH, spent KOH is done after six out of eight as it returns back to the concentrator. There is KOH generated from the reaction of calcium hydroxide with calcium fluoride in reactor six, separated in reactor eight. So there is recovery of spent KOH in reactor eight as well as additional potassium hydroxide is generated in that lime reaction.

So there is a separation from the solid calcium difluoride.

Q. Right, there's separation of the calcium difluoride from the aqueous KOH in number eight?

A. Yes.

Q. Of Sedat?

A. Yes.

Q. There is reaction of calcium hydroxide with

KF in reactor six, correct?
A. That's correct.
Q. In reactor six then, calcium hydroxide is regenerated from KF, correct?
MR. BEAUPRE: Objection, form.
A. Calcium hydroxide is prepared, is generated from the reaction of KF with lime in vessel six.
Q. What does regeneration mean?
A. This context, I think it means regenerating the base medium from the salt, yes.
Q. So converting the KF to KOH?
A. That's correct.
Q. Right. And so that regenerating takes place in the reactor six, correct?
A. That's correct.
Q. So, therefore, recovery takes place in reactor six?
MR. BEAUPRE: Objection to form.
A. That's one location.
Q. And then from the KOH, which includes the regenerated KOH and the unreacted KOH, that is sent to the evaporator?
A. The KOH, after separation from calcium difluoride, in addition to some KOH that's taken out of the stream exit reactor six, according to a scheme, is

sent around to the concentrator.
Q. The concentrator is which --
A. Vessel number 11.
Q. Okay. And how is concentration accomplished?
A. By boiling off water.
Q. And so what would the temperature be -- well, strike that.
What was the purpose of boiling off water?
MR. BEAUPRE: Objection, form.
A. The water is boiled off to concentrate the KOH. KOH is -- water is produced in the reaction as a result of the calcium hydroxide reaction with KF, so you'd like to remove the water from that reaction. In addition, you'd like to then concentrate on the potassium hydroxide to the preferred level that is quoted.
Q. So then at what temperature is the KOH then fed back into reactor one?
A. Let's go back to Sedat. He says: The temperature is kept at 160 in the reactor. So I assume the temperature is, you know, close to that temperature, or let me look at the temperature -- the temperature is probably listed for the evaporator.
(Pause.)

A. I'm not finding the temperature outlined for that concentration. It just says it's -- it says the concentration is adjusted.

Q. Is it adjusted to a particular concentration?

A. Yeah, the preferred concentration of potassium hydroxide is between 10 and 90 percent, but preferably between 20 and 86 percent and advantageously between 55 and 75 percent.

Q. And did you consider those concentrations when you reached your opinions regarding the combination of Smith with Sedat?

MR. BEAUPRE: Objection to form.

A. I did not consider at least specific concentrations of the base entering the dehydrohalogenation reactor.

Q. Now, the evaporation step number 11, that's vapor going off at 15, the water boiling off?

A. I believe that's correct.

Q. Okay. Is that used to adjust the KOH concentration that goes into the reactor?

MR. BEAUPRE: Objection, form.

A. Removing water via stream 15 would allow for concentration of the KOH that goes into the reactor.

Q. And 14, that's the raw KOH that's being fed into the reaction?

MR. BEAUPRE: Objection, form.

A. Yes, I believe so.

Q. In your experience, is KOH available commercially in any particular concentrations?

MR. BEAUPRE: Objection, form, foundation.

A. I have not looked into that at all.

Q. You don't have experience with that from your time at DuPont or your time at Catalytic Insights as far as the commercial availability of KOH?

MR. BEAUPRE: Same objections.

A. Well, KOH is commercially available, but I think you asked available at what concentrations.

Q. Right.

A. And I don't know what specific concentrations are available. Certainly pelletized or dry KOH is available.

Q. I'd like to turn to paragraph 71 of your declaration in the 915 case.

A. Okay.

Q. And you state: A POSITA would understand recovering to mean collecting for further use, which may include steps that render the component being

collected suitable for further use e.g. separating or purifying. Do you see that?

A. Yes.

Q. But isn't it true that Sedat's only disclosure of separating and purifying is with regard to the removal of CAF2 from the solution, correct?

MR. BEAUPRE: Objection, form.

A. That's one form of a separating. The other location for separating would be to gas products coming out of line four.

Q. But with regard to the KOH stream, there's no other separating or purifying done or disclosed by Sedat, correct?

MR. BEAUPRE: Object to form.

A. The purification step of spent KOH happens when the KF is converted to calcium fluoride and removed by filtration. That's a method of purifying.

Q. Right. My question is, there's no other form of separating or purifying, other than converting the KF or the CAOH and KF to KF and then separating -- strike that.

The only separating of that stream, separating and purifying happens when the KF and calcium hydroxide react to create calcium fluoride and KOH and the calcium fluoride is separated out, correct?

MR. BEAUPRE: Objection to form.
A. I don't think you were specific enough to refer me only to what happens in vessel six. As I said, there's a separation taking place of the organic products in vessel number one.
Q. Okay. But there's no other separation or purifying that's taking place as shown in Sedat, correct?
MR. BEAUPRE: Objection to form.
A. Other than in vessel eight and the line in nine.
Q. And there is no teaching of separating entrained or dissolved organics taught by Sedat?
MR. BEAUPRE: Objection to form.
A. There is no mention of entrained or dissolved organics in Sedat.
Q. Is there any teaching in Sedat of purifying, other than what is happening in vessel eight, which is the separation of calcium fluoride from the aqueous solution?
MR. BEAUPRE: Objection, form.
A. Once again there is a separation of the organics in line four, which are condensed and shown in line 13, but I'd have to see what happens after the organics are condensed. But I can look, if you like.

But I'm quite sure that if he was doing that, he would send it off for distillation and separation of components.

Q. I'm referring to what happens to the aqueous stream coming out of vessel one.

A. Okay.

Q. There's no other act of purification that happens with that after leaving vessel one?

A. No.

MR. BEAUPRE: Objection to form.

A. Other than the conversion of a KF to the calcium difluoride.

Q. Right. So would you consider that to be purification; converting calcium fluoride -- I'm sorry, converting potassium fluoride to calcium fluoride and settling out a precipitant?

A. I would consider that -- I'm sorry.

MR. BEAUPRE: Objection to form.

A. I would consider that a purification, yes.

Q. All right. Let's go on to the next --

MR. BEAUPRE: Would you want to take a break now?

MR. ROSE: Now is a good breaking point.

THE VIDEOGRAPHER: Going off the

record, the time is 1557.

(Recess.)

THE VIDEOGRAPHER: We're back on the record, the time is 1614.

BY MR. ROSE:

Q. Welcome back, Dr. Manzer. I had a couple of follow-up questions regarding your testimony concerning Sedat that we were talking about before the break. And we were asking about where in Sedat the steps of recovery take place and including separation and purification. And I understand that in vessel six, your interpretation of Sedat is that there is a reaction of calcium hydroxide with potassium fluoride resulting in calcium fluoride that is a precipitant, correct?

A. That's correct.

Q. Okay. And so some separation occurs in vessel six, correct?

A. That's correct.

Q. Okay. And then that product is then moved to vessel eight where the calcium fluoride is removed from the reaction mixture, correct?

MR. BEAUPRE: Objection to form.

BY MR. ROSE:

Q. Does any KF, is there any -- strike that.

Is any KF included in what flows from vessel six to vessel eight?

MR. BEAUPRE: Objection to form.

A. There's no statement as to whether it's complete conversion or not. It would make sense to do that, but --

Q. And it's not uncommon for there to be such thing as complete conversion, correct?

MR. BEAUPRE: Objection, form.

A. That would depend entirely on the amount of lime or calcium hydroxide that was added.

Q. And how long it mixed?

A. Yeah, there is mixing in there, that's right, but the reaction with any fluoride and calcium is pretty quick.

Q. Is it possible to entrain any unreacted calcium fluoride within the precipitant -- strike that. I misspoke.

Is it possible to entrain any of the potassium fluoride in the calcium fluoride precipitant?

MR. BEAUPRE: Objection to form.

A. There's no discussion of that. I'm assuming that there's sufficient lime added to remove the calcium fluoride -- yeah the calcium -- the potassium fluoride, I'm sorry.

Q. And then before the break, we were discussing briefly what was taking place in vessel one, and that you had said that the gaseous products of the reaction are removed through line four, correct?
A. Correct.
Q. Okay. And were you intending to include that when I asked about other instances of separation in the Sedat reference?
MR. BEAUPRE: Objection, form.
A. Well, there is a separation, so.
Q. Because there's separation, does recovery of spent KOH actually begin in vessel one?
MR. BEAUPRE: Objection, form and foundation.
A. I wouldn't phrase it that way.
MR. ROSE: I think that's all we have for today on the Sedat reference. So we plan to start tomorrow with 916 and 917.
MR. BEAUPRE: Okay.
THE VIDEOGRAPHER: Going off the record, the time is 1618.
(Whereupon the deposition was concluded at 4:18 p.m.)
(Signature reserved.)

SIGNATURE PAGE

_____

LEO E. MANZER

SUBSCRIBED AND SWORN to before me this _____ day of_____, 2016

_____

NOTARY PUBLIC

My Commission expires:_____

ERRATA PAGE

MMV

CASE NAME: France vs. Honeywell

WITNESS NAME: LEO E. MANZER

DATE: January 7, 2016

PAGE	LINE	READS	SHOULD READ	REASON FOR CHANGE

C E R T I F I C A T E

I, Marisa Munoz-Vourakis, RMR, CRR and Notary Public, the officer before whom the foregoing proceeding was conducted, do hereby certify that the witness(es) whose testimony appears in the foregoing proceeding were duly sworn by me; that the testimony of said witness(es) were taken by me to the best of my ability and thereafter transcribed under my supervision; and that the foregoing pages, inclusive, constitute a true and accurate transcription of the testimony of the witness(es).

I do further certify that I am neither counsel for, related to, nor employed by any of the parties to this action in which this proceeding was conducted, and further, that I am not a relative or employee of any attorney or counsel employed by the parties thereof, nor financially or otherwise interested in the outcome of the action.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 11th day of January, 2016.

MARISA MUNOZ-VOURAKIS

Notary #20032900127

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