Volume 19

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

Before The Honorable Jeffrey S. White, Judge

UNITED STATES OF AMERICA, Plaintiff,	)	
VS.	)	NO. CR 11-00573 JSW
WALTER LIEW; ROBERT MAEGERLE; and USA PERFORMANCE TECHNOLOGY, INC., Defendants.	)	

San Francisco, California
Tuesday, February 11, 2014

TRANSCRIPT OF PROCEEDINGS

APPEARANCES:

For Plaintiff:

MELINDA HAAG
United States Attorney
450 Golden Gate Avenue
San Francisco, California 94102

BY: PETE AXELROD
JOHN H. HEMANN
ASSISTANT UNITED STATES ATTORNEYS

U.S. DEPARTMENT OF JUSTICE
600 E Street NW
Washington, D.C. 20044

BY: RICHARD S. SCOTT
ASSISTANT U.S. ATTORNEY

(APPEARANCES CONTINUED ON FOLLOWING PAGE)

Reported by: Jo Ann Bryce, CSR No. 3321, RMR, CRR, FCRR
Official Reporter

APPEARANCES: (CONTINUED)

For Defendant Walter Liew and USA Performance Technology, Inc.:
KEKER & VAN NEST LLP
633 Battery Street
San Francisco, California 94111
BY: STUART L. GASNER
SIMONA A. AGNOLUCCI
KATHERINE M. LOVETT
CHRISTINA BLAIS
ATTORNEYS AT LAW

For Defendant Robert J. Maegerle:
MCKENNEY & FROELICH
1349 West Peachtree Street
Two Midtown Plaza - Suite 1250
Atlanta, Georgia 30309
BY: JEROME J. FROELICH, JR.
ATTORNEY AT LAW

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Tuesday - February 11, 2014 **7:37 a.m.**

P R O C E E D I N G S

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(Proceedings were heard out of the presence of the jury:)

THE COURT: Good morning, everybody. Please be seated.

Please call the case.

THE CLERK: Calling Case Number CR-11-573, United States versus Walter Liew, United States versus Robert Maegerle, and United States versus USAPTI.

Counsel, please state your appearances.

MR. AXELROD: Good morning, Your Honor. Pete Axelrod, John Hemann, and Richard Scott for the United States.

THE COURT: Good morning.

MR. HEMANN: Good morning, Your Honor.

MR. GASNER: Good morning, Your Honor. Stuart Gasner, Simona Agnolucci, and Katie Lovett for defendants USAPTI and Mr. Liew, who is present.

THE COURT: Good morning. Good morning, Mr. Liew.

MR. FROELICH: Good morning, Your Honor. Jerry Froelich for Mr. Maegerle. Mr. Maegerle is standing next to me here in court.

THE COURT: Good morning. Good morning, Mr. Maegerle.

DEFENDANT MAEGERLE: Good morning, Your Honor.

THE COURT: So I understand there are a couple of

issues to take up before the jury comes in?

MR. AXELROD: Yes, Your Honor. Before we do, since it pertains to testimony of Mr. Cooper, I believe he's in the courtroom, and I'd ask him to step outside.

THE COURT: Yes. Please, Mr. Cooper. He raised his hand, and he's on his way out.

MR. AXELROD: Great. Thank you.

(Pause in proceedings.)

THE COURT: All right. He's gone.

MR. AXELROD: Great. So, Your Honor, a couple of issues with respect to Mr. Cooper's testimony. The first concerns the Ashtabula contract. The Court has ruled on our objections, and we understand that -- and the parties have worked out a stipulation. So we understand that that document will come into evidence, but we don't think -- and that is the contract that DuPont and Sherwin-Williams entered into relating to the sale of that plant and technology.

We don't think that's an appropriate document to use with Mr. Cooper. First of all, it was not an exhibit disclosed on his expert disclosure. He's not a lawyer. I don't believe he's seen it before he saw it in conjunction with this litigation. And, so, I think we understand that the document itself is going to come in, but to have Mr. Cooper talk about it, it seems inappropriate in light of what he's here to testify about, which is not legal documents. So that's the

first issue.

The second issue is -- and, you know, the parties have been working together to sort of narrow the scope of documents and exhibits that are still out there to be resolved, and the Defense was going to call one of our agents and then the paralegal and now has indicated they want to put in a number of documents through Mr. Cooper. I think there's about 200 or plus documents that the Defense may still seek to introduce.

The concern that the Government has, Your Honor, is that we don't know which ones they're going to attempt to put in through Mr. Cooper. They're not documents that he put on his disclosure.

To the extent they're plans and things of that nature, I don't know that we'll necessarily have an objection; but if they're Walter Liew's emails, that's not something that an expert in his field would rely on, and it's not appropriate to have him admitting those exhibits.

So I just wanted to raise these issues. Hopefully, we can sort of manage or narrow the scope of all the objections we're going to have during his testimony and facilitate things moving.

THE COURT: All right. What's your response?

MR. GASNER: Well, Your Honor, a couple of responses. One, this ties in to our witnesses. We have Walt Conner still on our list that we provided at 4:00 o'clock yesterday, who's

the DuPont custodian of records. We've asked the Government to stipulate to the admissibility of the Sherwin-Williams contract. And the indication that I've gotten is that, yes, they no longer object. So I'd like to put that on the record right now, if we could, and at the appropriate time admit it into evidence. At least my understanding is they no longer object in light of the Court's ruling to its admissibility as a stand-alone document that we could argue in closing or otherwise use.

THE COURT: All right. Is that correct?

MR. HEMANN: So, Your Honor, the Government is willing to stipulate that it is a DuPont document, that it was located by the DuPont Legal Department in the files of the DuPont Legal Department, and that it is authentic.

We've objected on relevance and hearsay grounds to the document. The Court has overruled our objection. We do not stipulate to the admissibility. We stipulate to the authenticity and understand the Court's ruling on the matter.

THE COURT: All right. Well, put another way, subject to the objections that you've made and the ruling, which you maintain, that would be the extent of your objections?

MR. HEMANN: Indeed, Your Honor.

THE COURT: All right. So I will -- with that, given the Court's prior ruling, I will -- pursuant to that stipulation, I will admit the document.

MR. GASNER: Very well, Your Honor.

So in that case we'll take Mr. Conner off our list.

What is left, we have really shrunk down the case at this point. Mr. Cooper is going to testify after Ms. Sanghi, and I think his testimony will probably take all of today and into tomorrow.

We also have listed our paralegal, Cynthia Hernandez, and the case agent, Cynthia Ho, as the two witnesses after him.

In responding to Mr. Axelrod's comment, we're not planning to put in emails of Mr. Liew through Mr. Cooper, but what I do hope to do is to address the notebooks that were identified by FBI Agent White.

As the Court will recall, there were notebooks that had all kinds of patent notes. The Court declined to admit those in toto, which really puts the burden on us to go through each page and identify what's relevant. I think Mr. Cooper is able to talk about the patents that are listed in the Liew notebooks and to talk about their significance to the jury.

And my plan would be to seek the admission of pages of those notebooks through Mr. Cooper's testimony which relate -- which were disclosed. The notebooks were disclosed pursuant to the Court's standing order. And that's our plan.

If I'm successful in accomplishing what I need to get into evidence, then I think that the testimony of Ms. Hernandez and/or Agent Ho just shrinks. The more I can get in with

Mr. Cooper, the less I need from them. So that's our plan.

In terms of Mr. Cooper talking about the Sherwin-Williams agreement, I think I'll try to lay a foundation. When we get to those questions, the Court can rule one way or the other; and I'll either get his testimony, or I'll simply have the agreement in evidence for argument.

THE COURT: All right. Yes, do you have a response to that?

MR. AXELROD: Well, I just -- about the notebooks, you know, I think what the Defense wants to have the notebooks for is to somehow argue Walter Liew's state of mind, and I don't think that's an issue that Mr. Cooper can address.

THE COURT: Well, I guess what Mr. Cooper would address would be he's going to be talking about, I assume, attempting to rebut Dr. Diemer and Gibney and the other gentleman's testimony as to whether or not these items, essentially, are trade secrets, were they publicly known, et cetera. And to the extent that the proper foundation can be laid as far as his consideration of these notebooks as, you know, in his expert opinion about whether, you know, these documents constitute trade secrets, I assume that would be within the scope of his expertise.

I mean, so it's a different issue, however, about under 703, whether you can get the exhibits in. Remember, to the extent that the documents are inadmissible, he's allowed -- and

a proper foundation can be laid, as the Court mentioned in its previous order dealing with the financial expert, then he can rely on those, but they don't come in; and it may or may not be the case, depending upon the testimony, that the substance of the exhibits would be made known to the jury.

So all this has to evolve. Just because a document was found in the possession of one of the defendants, doesn't make it admissible automatically. And that may be true of a lot of the documents you're seeking to admit through Agent Ho or your paralegal.

I have to rule on each one of those, and you're going to have to make a showing of both relevance and the fact that they're not hearsay. Because the way the rules are, the Government can introduce communications or statements by the defendant to show state of mind or as an admission of a party -- or statement of a party opponent. When it comes to the defendants, though, it becomes hearsay, as to which no exception applies.

So I think I'm going to have to hear more, but I'm not going to allow wholesale admission of documents just because they happen to have been found in the defendant's possession. That's not sufficient grounds.

MR. GASNER: Fair enough, Your Honor.

But my point -- first of all, it's been stipulated as to these documents, and they were identified with Agent White, and

we have a further stipulation that they were not seized, and they were taken from storage and provided to Keker & Van Nest. So we have their provenance stipulated to as to where they came from.

THE COURT: All right. So that may -- I don't know what issue that relates to. I mean, that may relate -- to the extent there's a chain of custody, that may relate to authenticity, but that doesn't get you very far as far as relevance and not being hearsay.

MR. GASNER: So the handwriting is also stipulated to. And we believe that these documents go to state of mind in the way that many other documents have come in during the case, which is they show work by Mr. Liew, his awareness of the prior art, and what's out there.

And I thought that the Court's reason for not admitting the documents wholesale with the agent is the agent really couldn't say what all these patents were. And that's our point, is to prove that up with Mr. Cooper, that he can identify patents and their relevance to this case and the issues.

THE COURT: Well, that's fine. If he can say that elements of or the totality of charged trade secrets were embodied, to some extent, in publicly available documents, such as patents and the like, I think that's fair game.

But to show generally that Mr. Liew is running, you know,

a, quote/unquote, legitimate business and he had -- was working on these projects, that doesn't really get us -- that's not relevant.

So I guess I'm going to have to hear -- I think you're going to have to lay the foundation through the expert and to the particular point you're making, which has to do with, I assume, that his testimony, the expert's testimony, is in relation to whether Mr. Liew was -- and USAPTI were in possession of trade secrets, or are they not trade secrets because they're in the public domain.

For those purposes I think I would allow it. But if we start getting into just myriads of technical documents that say, "Oh, the company -- Mr. Liew and his businesses had projects that were legitimate," I don't think that's relevant in this case.

MR. GASNER: That's not our plan.

THE COURT: All right.

MR. GASNER: I think the Court will be satisfied.

THE COURT: Okay. Well, I'll take the evidence and the testimony as I find it, and I don't think we can do much more with that at this point.

All right. Anything else? I know Mr. Froelich had one issue, but anything else that you wanted to bring up, Mr. Gasner?

MR. GASNER: My only tweak to the stipulation is that

in talking with DuPont counsel, I believe the information we got is that the records came from Vital Records in a particular building. I don't think they said it was from the Legal Department.

MR. HEMANN: The Legal Department files are in -- the DuPont file room, as I understand it, is called the Vital Records Department, which means that both vital records and shopping lists end up stored there. So we would not stipulate without a witness' testimony that it came from the Vital Records Department because it sounds more vital than it really is.

THE COURT: Well, I think -- I think you don't need more than the fact that the documents were, you know, found in the possession of DuPont and are authentic. I don't think you need to go further than that.

MR. GASNER: I'll accept Mr. Hemann's representation that the information we got is consistent with what he got, but I would -- would the Court prefer that we admit the document now or in front of the jury?

THE COURT: I think in front of the jury.

MR. GASNER: Very well.

THE COURT: All right. Mr. Froelich, you have an issue you want?

MR. FROELICH: Yes. I've told the Government and cocounsel, and I wanted to inform the Court so Your Honor knows

the direction of the case is going, how long it's going to take.

THE COURT: Okay.

MR. FROELICH: I've been working with Mr. Maegerle. We've made -- he's made the decision that he's not going to testify, Your Honor. So I wanted the Court and the Government and everybody to know that for planning purposes and work purposes.

THE COURT: Okay. Thank you.

And I'm assuming -- and at the appropriate time I think after Mr. Liew and USAPTI rest, then I'll ask if you have any further witnesses, and I would voir dire Mr. Maegerle outside the presence of the jury.

So it sounds like that we will not complete testimony this week. It sounds like if we're going to go all day with your next expert and then we have the two bankruptcy/tax types --

MR. GASNER: I'm sorry, Your Honor. Just to complete our disclosure of yesterday.

THE COURT: Okay.

MR. GASNER: We are not calling Mr. Cox or Mr. Klein in light of the Court's ruling. We reserve our objections, but what's left after the Court's ruling we think is not worthy of further time. So we have told the Government that we're not calling Mr. Klein or Mr. Cox.

THE COURT: So thinking out loud with you, then, if

your next expert after this witness finishes, how much more -- Ms. Lovett? Is she around here somewhere?

Oh, there you are. Hi.

How much more time do you think you have on direct with her?

MS. LOVETT: 25 minutes max.

THE COURT: Okay. And what's your thinking about --

MR. HEMANN: Very brief, Your Honor.

THE COURT: Okay. So let's say 45 minutes, and then we have the expert you're saying will take most of the day on direct, and I imagine cross will be fairly substantial, which sounds like, then, we will finish testimony sometime tomorrow, which is Wednesday; right?

Then if we're completely done at that point, then we can go back to our other schedule of arguing -- you know, we'll take Thursday off or even have -- where are you folks on -- I know the Government has stated that it's looked at the jury instructions. Where is the Defense in terms of its objections?

MR. FROELICH: I'll have something to the Court. I understand we had to have it by tomorrow sometime.

THE COURT: Yes.

MR. FROELICH: And I'll have something to the Court by then.

THE COURT: All right. Are you guys pretty far along?

MS. LOVETT: We've reviewed the instructions and come

up with an initial reaction to each one, and we'll be ready by tomorrow.

THE COURT: Okay. Great. So I think maybe -- we'll see how we adjust the schedule to give everybody more time to, you know, at least have some sort of a weekend -- is maybe, depending on how things unfold today and tomorrow, to do the charging conference sometime on Thursday. And then we'll just, whenever we finish, we finish; and then we'll take off until Tuesday morning, at which point we're going to have closing arguments.

And let me -- while I have you here and we have a few minutes, in terms of planning the closing argument, I want to ask the Government and then I'll ask the Defense: In rough terms, have you given any thought to how long you anticipate your initial closing argument will be?

MR. AXELROD: I'm guessing about two hours, Your Honor.

THE COURT: All right. Two hours. And, Mr. Gasner, I know you haven't heard your expert yet, but --

MR. GASNER: Probably about the same, Your Honor.

THE COURT: So that's two hours. And --

MR. FROELICH: I won't go two hours, Your Honor. That's just not what I do. But I would say it will be over an hour.

THE COURT: Okay. So that's five hours, and then the

Government's response presumably will be 45 minutes to an hour, I'm guessing. So that's five hours -- that's about six hours.

MR. FROELICH: I'd say give me an hour just to play it safe.

THE COURT: I'm not going to cut you off. I don't do that in criminal cases.

So it may well be that we can get all the -- and I would be willing, if we're talking about a half hour here and there -- I know the urban myths about, you know, recency and primacy in closing arguments. I don't think any of it washes, especially after a long trial.

But my hope would be to do all of the closing arguments on Tuesday so that -- and if we had to go an extra -- because we're talking about six hours. If we had to go an extra 30 minutes with the breaks, I'm sure the jury would indulge because that's all -- they're not going to be getting the case -- they wouldn't be getting the case until Wednesday morning.

MR. AXELROD: The only factor to think about as well is how long it's going to take the Court to instruct, because --

THE COURT: I know, but that's going to be no more than 45 minutes. So I would stretch a little bit just because I know there's this issue about, you know, if there's an overnight and the Government gets to go last. I had it in my

last criminal trial and we split it up, but it was -- it was an awkward moment, I think, in terms of how it was split up overnight.

So we'll work on that. And there are alternative ways, and we can put our thinking caps on to figure out a way that we can present this so that nobody gets an undue strategic advantage or disadvantage.

So thinking out loud, depending on how correct your estimates are, we'll work that out toward the end of today when we'll know where you are on your direct and cross. And then I'll set a time, maybe even Thursday morning or late morning on Thursday, so we have plenty of time before the Court's criminal calendar to finish the charging conference.

MR. FROELICH: Your Honor.

THE COURT: Yes, Mr. Froelich.

MR. FROELICH: I was thinking, Your Honor, I hate -- I don't mean to -- I'm wondering if we should kind of give the jury a heads-up that Tuesday may be a longer day.

THE COURT: I will, but not yet.

MR. FROELICH: No, I understand.

THE COURT: Because the way -- you know, if you predict and you disappoint them -- but I will do that. Before they break, I'll say, here's our current plan. I'll do it during a break and say we may go an extra -- I don't think it would be more than an extra 30 minutes or so. We'll give them

an extra break, natural break; would they have any problem with doing that just to get all the closing arguments. If they can stand to hear lawyers for six and a half hours, then that's up to them.

But I think they've been a very attentive jury, so we'll see. We'll play it by ear. If not, if they don't want to do that or we don't feel we have the time, we'll figure out an equitable way to split it.

One way to do it would be to have the Government, one -- let's pick a person -- Mr. Liew's side and then adjourn and then do Mr. Maegerle's closing and the Government's rebuttal the next day. So at least there's a Defense closing contiguous to the Government's.

So that's another way to break this up. Otherwise, there's no other way I can figure out how to do this. But that's a possibility to think about as an alternative, and you all can, on the Defense side, can talk about that and see whether you would prefer that. And then it would be a little bit more relaxed day and then the jury would get the case midday the following day.

And then I always, just this is probably too far down the road, but I always give the jury, if they wish -- they almost never take the opportunity -- to deliberate on Friday. I allow them to do that. Once they get the case, the schedule is theirs; and, so, other than, you know, cajoling them that they

should at least work during the normal court day of 8:00 to 1:30, if they want to work later; or if they want to work on Friday to deliberate and it's unanimously decided to do so, then I will allow them to do so because I don't want to either interfere with them or pressure them to come in on a day that they weren't planning it. So we'll see what happens.

And I would suggest we bring in the jury.

MR. GASNER: One other quick point, Your Honor.

THE COURT: Yes, sure.

MR. GASNER: I notice that Mr. Dayton is in the courtroom; and as the Court will recall, he was a lay witness during the trial.

THE COURT: Right.

MR. GASNER: So we would object to him being a rebuttal witness. It's, of course, always good to see Mr. Dayton; but if he's going to watch testimony, then we would argue that he could not be a rebuttal.

MR. AXELROD: He's not going to be a rebuttal witness for the United States.

THE COURT: All right. There you go.

MR. GASNER: Last question, Your Honor. In terms of the Court's practice with, if Mr. Cooper goes all day and then he's still on direct, does the Court --

THE COURT: You can talk to him.

MR. GASNER: I can talk to him.

THE COURT: Once he goes on cross, then it's verboten.

MR. GASNER: Very well. Thank you.

THE COURT: All right. Let's get the jury.

(Proceedings were heard in the presence of the jury:)

THE COURT: Please be seated.

Good morning, everybody. I hope you had a pleasant evening and afternoon.

And we are ready to continue. Since you all were on time, we're on time as well. So just to remind you, we are in the defendants' case, Mr. Liew and USAPTI, and we'll continue with direct examination of this witness.

And I just wanted to remind you that you're still under oath.

THE WITNESS: Yes.

THE COURT: Okay. Proceed.

SUDHA SANGHI,

called as a witness for the Defendants, having been previously duly sworn, testified further as follows:

DIRECT EXAMINATION (resumed)

BY MS. LOVETT:

Q. Good morning, Ms. Sanghi.

A. Good morning.

Q. You'll recall -- do you recall that yesterday we spoke about a number of process flow diagrams?

A. Yes.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 1433?

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, take a moment to review the pages of this exhibit, but do you recognize this document?

A. Yes.

Q. What is it?

A. This is process flow diagrams.

Q. And did you work on these process flow diagrams?

A. Yes, I worked on them.

Q. Did you work on every page of these diagrams?

A. (Witness examines document.) Yes. Yes, I worked on every page.

Q. And was your work on these diagrams part of your ordinary responsibilities as working for Mr. Liew?

A. Yes. Yes, correct.

MS. LOVETT: Your Honor, I move to admit Trial Exhibit 1433 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 1433 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, looking at this document, either on the screen or in front of you, what do these process flow diagrams relate

to?

A. This is ore and coke petroleum handling system.

Q. Oil and coke petroleum handling system?

A. Ore, O-R-E.

Q. Got it.

And we looked at a number of different process flow diagrams yesterday and today.

A. Uh-huh.

Q. Can you estimate how many process flow diagrams did you work on in autoCAD while you worked for Mr. Liew?

A. I work many of them, but there's only one version, final version. But since we have many and many changes and updates, we have to save them, and again I made the changes. So probably around a hundred I worked on, yeah.

Q. And there were many different versions?

A. Yes, correct.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibits 1994, 1995, and 1996?

THE COURT: You may.

(Pause in proceedings.)

BY MS. LOVETT:

Q. Ms. Sanghi, you can take a moment to look at these documents.

A. (Witness examines documents.)

Q. Looking first at 1994, which I think is the one that you're looking at right now --

A. Yes.

Q. -- do you recognize this document?

A. Yes.

Q. What is it?

A. This is chlorinator layer brick details.

Q. And did you work on this drawing?

A. Yes.

Q. Did you work on every page of Exhibit 1994?

A. Yes.

Q. And was your work on that drawing part of the ordinary course of your job responsibilities?

A. Yes, correct.

MS. LOVETT: Your Honor, I move to admit Exhibit 1994 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 1994 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, what does this drawing relate to?

A. This is equipment specification drawing.

Q. An equipment specification drawing?

A. Uh-huh.

Q. And what part of the process does this relate to?

A. This is the chlorinator.

Q. And does this bear any relation to the chlorinator bricks?

A. Yes.

Q. Can you explain how this relates to the bricks?

A. I guess -- I'm not very sure, because it's been, like, five years. So I'm not -- I cannot recollect all of them.

Q. Thank you.

Ms. Sanghi, looking at 1995 and 1996, which were also in the pile I just gave you, do these -- do 1995 and 1996 also relate to chlorinator bricks?

A. (Witness examines documents.) Yes.

Q. And did you also work on Exhibits 1995 and 1996?

A. Yes, I did.

Q. And did you do that work in the ordinary course of your job responsibilities?

A. Yes, uh-huh.

MS. LOVETT: Your Honor, I move to admit Exhibit 1995 and 1996 into evidence.

THE COURT: Any objection?

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibits 1995 and 1996 received in evidence)

BY MS. LOVETT:

Q. And, Ms. Sanghi, again, these drawings were done in CAD, autoCAD; right?

A. Yes, correct.

Q. And are these also equipment specifications?

A. Yes, uh-huh.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 2175?

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is P&ID for 30K project.

Q. Did you do work on this drawing?

A. Yes.

Q. And was part -- was that work part of your normal job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 2175 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 2175 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, looking at this diagram, can you explain for the jury, what is a P&ID?

A. P&ID is a piping and instrumentation diagram where we have the piping equipment layout and the instrumentation on the diagrams.

Q. And is this different than a process flow diagram?

A. Yes.

Q. How do they differ?

A. The process flow diagram, we have the equipment and the flow, process flow; whereas, here in the piping and instrumentation, we have the piping and the instrumentation details.

Q. Thank you.

And is this another drawing that you would do in a CAD program?

A. Yes.

MS. LOVETT: Your Honor, may I approach the witness with Exhibits 2176 through 2188?

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, take a moment to look through that pile of exhibits I just handed you.

A. (Witness examines documents.)

Q. What are these documents?

A. These are P&ID.

Q. Did you work on these P&IDs?

A. Yes.

Q. Did you work on each of the P&IDs that I just handed you?

A. Yes. Yes.

Q. Was that work part of your normal job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, this will be tedious for a moment, but I move to admit 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, and 2188 into evidence.

THE COURT: Any objection?

MR. SCOTT: May I have one moment?

THE COURT: All right.

(Pause in proceedings.)

MR. SCOTT: No objection.

THE COURT: Admitted. They're all admitted.

(Trial Exhibits 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, and 2188 received in evidence)

MS. LOVETT: Mr. Guevara, can you please display 2176 as an example?

Q. Ms. Sanghi, this is another process and instrumentation diagram; correct?

A. Yes, piping and instrumentation.

Q. Piping and instrumentation. I'm sorry.

How many piping and instrumentation diagrams did you work on while you worked for Mr. Liew?

A. I worked on many of them, but the final version should be one. But I worked on the changes. So I don't remember how

many I worked, but there should be about 150 somewhere.

Q. 150?

A. Yes.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 3505?

THE COURT: Yes.

MS. LOVETT: And, Ms. Ottolini, to the extent you need a description for this, it's an equipment specification.

THE CLERK: Equipment specification?

MS. LOVETT: Yes.

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is chlorinator equipment specification.

Q. Equipment specification for the chlorinator?

A. Yes.

Q. Did you work on this drawing?

A. Yes.

Q. Did you work on this drawing as part of your normal job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 3505 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 3505 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, what is an equipment specification?

A. Equipment specification is where we have the equipment details, all the size details and all the normal details and the views and different views of the equipment.

Q. Different views of the equipment?

A. Yes.

Q. You mentioned this is for the chlorinator?

A. Yes.

Q. What kinds of things did you specifically work on in this diagram?

A. Actually, some of the drawings I got it from Brijesh Bhatnagar brought to me, so he used to give me in autoCAD, so I used to make the changes. Sometimes I used to dimension them, text them, and resize them if needed, and add the nozzles and, yeah, the things on the diagram.

Q. So you mentioned that you did dimensioning?

A. Yes.

Q. And you added text?

A. Yes.

Q. And you worked on the nozzles as well?

A. Yes, correct.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 2940?

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. Equipment specifications.

Q. And can you -- did you work on this equipment specification?

A. Yes.

Q. Can you briefly look through the pages of this document and tell me whether you worked on every page of this document?

A. (Witness examines document.) Yes, I worked on every page.

Q. Did you work on this document as part of your ordinary job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 2940 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 2940 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, you mentioned that this is a further equipment specification; correct?

A. Yes.

Q. What part of the process does this specification relate to?

A. This is oxidation reactor equipment specification.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach with Exhibit 3005?

THE COURT: Yes, you may.

(Pause in proceedings.)

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. Equipment specification drawings.

Q. Did you work on these drawings?

A. Yes.

Q. Take a moment. Did you work on every page of these drawings?

A. (Witness examines document.) Yes, I worked on every page.

Q. And was your work on each page of this document part of your ordinary job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 3005 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 3005 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, you mentioned that this is a further equipment specification. What part of the process is it related to?

A. This is for 30K.

Q. And what piece of equipment does it relate to?

A. Pure -- there are many equipment diagrams here, like pure TiCl tank, aluminum chloride generator, and flue pond pipe, et cetera.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 2234?

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is equipment specification.

Q. Did you work on this equipment specification?

A. Yes, I did.

Q. And as you look through the document, did you work on each page of this equipment specification?

A. (Witness examines document.)

Q. And take your time.

A. (Witness examines document.) Yes, I worked on each page.

Q. And did you do these -- your work on these drawings in the ordinary course of your job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 2234 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 2234 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, looking at this drawing, you mentioned that this is an equipment specification. What piece of equipment is this for?

A. This is for micron grinder.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach the witness with Exhibit 2237?

THE COURT: Yes.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is micron grinder equipment specification.

Q. Did you work on this document?

A. Yes.

Q. Was your work on this document part of your ordinary job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 2237 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 2237 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, this equipment specification also relates to the micron grinder?

A. Yes.

Q. Thank you.

How many equipment specifications did you work on while you worked for Mr. Liew?

A. I worked on many of them, but the final version for the equipment drawings also should be one. So I worked about, like, a hundred.

Q. A hundred?

A. Yes.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach with Exhibit 1400?

THE COURT: Yes.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is equipment layout.

Q. Equipment layout?

A. Yes.

Q. Did you work on this document?

A. Yes.

Q. Did you work on each page of this document?

A. (Witness examines document.) Yes.

Q. Did you work on each page of this document as part of your ordinary job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 1400 into evidence.

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 1400 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, you mentioned that this is an equipment layout.

A. Uh-huh.

Q. What is the purpose of an equipment layout?

A. The equipment layout has the layout where the equipment

should be placed in the field, and it has all the dimensions and all the equipment in it.

Q. Thank you.

MS. LOVETT: Your Honor, may I approach with Exhibit 2775.

THE COURT: Yes, you may.

BY MS. LOVETT:

Q. Ms. Sanghi, do you recognize this document?

A. Yes.

Q. What is it?

A. This is plot plan.

Q. Did you work on this plot plan?

A. Yes.

Q. Did you work on each page of this plot plan?

A. (Witness examines document.) Yes.

Q. And was your work on each page of this plot plan part of your ordinary job responsibilities?

A. Yes.

MS. LOVETT: Your Honor, I move to admit Exhibit 2775.

THE COURT: Any objection?

MR. SCOTT: One moment, Your Honor.

THE COURT: Yes.

(Pause in proceedings.)

MR. SCOTT: No objection.

THE COURT: Admitted.

(Trial Exhibit 2775 received in evidence)

BY MS. LOVETT:

Q. Ms. Sanghi, you mentioned that this is a plot plan. What's the purpose of a plot plan?

A. A plot plan is same like the layout. We have the top view of the equipment placement and the dimension of the field.

Q. The dimension of the --

A. All the layout.

MS. LOVETT: Thank you. I have no further questions at this time, Your Honor.

THE COURT: Thank you, Ms. Lovett.

Mr. Scott, you may cross-examine.

MR. SCOTT: Yes, please, Your Honor.

CROSS-EXAMINATION

BY MR. SCOTT:

Q. Good morning, Ms. Sanghi.

A. Good morning.

Q. So in your testimony both yesterday and today, we've looked at a lot of drawings; right?

A. Yes.

Q. With regard to all of the drawings you've discussed, you were given design criteria by someone else; correct?

A. Yes, correct.

Q. And it was your job to draw equipment that had been designed by someone else; correct?

A. Uh-huh.

THE COURT: Is that a yes?

THE WITNESS: Yes. I'm sorry. Yes.

BY MR. SCOTT:

Q. You didn't do any research yourself into how to design an oxidation reactor or other equipment, did you?

A. No.

Q. When you said you'd worked on all the drawings, you meant you'd drawn the equipment based on criteria developed by other persons; correct?

A. Yes.

Q. Before you worked at Performance Group, did you have any experience in titanium dioxide?

A. No.

MR. SCOTT: No further questions, Your Honor.

THE COURT: Thank you.

Anything further?

MS. LOVETT: Nothing further, Your Honor.

THE COURT: All right. You're excused. Thank you very much. You may step down. You're excused.

THE WITNESS: I'm sorry.

MS. LOVETT: Ms. Sanghi?

THE COURT: Thank you.

(Witness excused.)

MS. LOVETT: Your Honor, may I approach to retrieve

the exhibits?

THE COURT: Please do. And in the meantime perhaps, Mr. Gasner, you can call your next witness.

MR. GASNER: Thank you, Your Honor.

Before calling Mr. Cooper, I'd like to introduce Exhibit 900, which is the Sherwin-Williams agreement, and it's been stipulated that it is authentic and comes from the files of the Legal Department of DuPont Corporation.

THE COURT: Is that stipulation correct?

MR. HEMANN: That is correct, Your Honor.

THE COURT: All right. Subject to the discussion we had before, the document is admitted.

(Trial Exhibit 900 received in evidence)

MR. GASNER: Thank you, Your Honor.

The defendants call Paul Cooper.

PAUL ANTHONY COOPER,

called as a witness for the Defendants, having been duly sworn, testified as follows:

THE WITNESS: I do.

THE CLERK: Thank you.

Please be seated and state and spell your full name for the record.

THE WITNESS: My name is Paul, spelled P-A-U-L, Anthony, A-N-T-H-O-N-Y, Cooper, C-O-O-P-E-R.

THE CLERK: Thank you.

DIRECT EXAMINATION

BY MR. GASNER:

Q. Good morning, Mr. Cooper. Could you tell us about your educational background?

A. I have a Bachelor of Science degree with honors in chemical engineering from the University of Manchester Institute of Science and Technology in England.

Q. Are you a member of any professional societies?

A. I'm charts engineer in the UK, a member of the Institute of Chemical Engineers, a member of the American Chemical Society.

Q. I'd like to talk a little bit about your employment history. When did you graduate from college?

A. 1969.

Q. Did you get a job in the titanium dioxide industry thereafter?

A. Immediately after graduating, I went to join Laporte Industries, Limited, at their Stallingborough plant, which was a chloride-route titanium dioxide plant, which was then under construction.

Q. Where is that located?

A. In the northeast of England.

Q. What was your job at Laporte at the Stallingborough plant?

A. To start off, I had to be trained. The plant had been developed jointly by American Potash and Laporte. American

Potash is now Tronox. So there were people who had been to America to construct and run that plant. They came back and trained us. When I'd done that, I assisted in training all the new operators who were hired at the time.

Q. Tell us about your first series of jobs at the Stallingborough plant.

A. When the plant was ready to start up, I went on shift assisting the operators and mechanics in starting up the plant. On and off, then, for about five years I was on shift commissioning the various parts of the plant. And then finally, actually, the shift manager for all the parts of the plant on site. We had both a chloride plant and a sulfate plant.

Q. Can you tell us -- the members of the jury what you mean when you talk about doing work on the shift?

A. It meant I worked a rotating shift system: 8:00 to 4:00, 4:00 to midnight, midnight to 8:00, seven days a week. And we used to rotate the shifts. We used to go around with the operators, assist them in doing their job, and training them technically in what the process was all about. Most of these were new hires, had not been in the chemical industry before, so that was what the primary function of the job was.

Q. How long were you doing basically shift work working either --

A. About --

Q. -- morning or night or graveyard --

A. About five years.

Q. -- shifts?

Did you rise through the ranks?

A. Oh, yes. I finished up as site manager, which run the plant out of hours during the shifts.

Q. Tell us --

A. We had just the sulfate plant and the chloride plant, boiler houses, instrument compressors, waste treatment, and all the other ancillary plants.

Q. Was one of these jobs called a section leader?

A. After I came off shift, I was appointed a section leader, which handled all the detailed daily technical operations, as well as long-term projects.

Q. Did there come a time during this phase of your career at Stallingborough where you came to learn about the Kerr-McGee technologies?

A. As I said, the original process was developed by Laporte and American Potash. American Potash was taken over by Kerr-McGee. And in 1981, we renewed a technical agreement with, as it was now, Kerr-McGee. So I came to the States for the first time ever to visit the Hamilton plant for approximately two weeks.

Q. Where is the Hamilton plant?

A. Mississippi.

Q. Is that a chloride-route titanium dioxide plant?

A. That is a chloride-route titanium dioxide plant.

Q. Did you come to learn the technology as part of that exchange?

A. Yes. And it should be noted that the Laporte process was very similar to the Tronox process.

Q. Did there come a time when a company called SCM took over the company where you were working, Laporte?

A. Yes. In 1984-'85 era, SCM, which is an American company based in Baltimore, Maryland, bought the titanium dioxide assets of Laporte Industries. That was the Stallingborough plant and the small plant we had in Australia.

Q. And we've heard a lot during the trial about the Ashtabula plant. What relationship, if any, did you become aware of between SCM and the Ashtabula plant?

A. In 1985, SCM decided to double the size of the plant at Stallingborough. As part of that, we had to completely replace the oxidation unit, which is the middle part of the plant. The design for that plant was done by Americans out of Baltimore, who told me that, essentially, it was technology that had been acquired from the Ashtabula 1 plant, which was formerly the Sherwin-Williams plant, and they had developed it on and doubled and finally trebled the size of that equipment.

Q. So in terms of chronology, what year were you in when SCM takes over and you get involved with the Ashtabula plant?

A. 1985.

Q. 1985?

A. '85.

Q. And what was your position at what was now SCM at that time?

A. I became lead process engineer for the expansion, which was basically doing all the process design for this new oxidation unit from the States.

Q. Did you also get involved in licensing in this time period?

A. A little later on in my career. In -- beginning in that time, but also later, we set up a special department. It was our intention to license our own process as Laporte's, and then I, basically, put together licensing packages for companies to come and look and buy the technology.

Q. As you rose through the ranks at SCM, did you get involved in mergers and acquisitions?

A. Yes. My last big job was process engineering manager, which was working on all capital projects, big projects, but also part of that was a licensing function where we actually attempted to license the process.

Q. Did there come a time when you were involved in building a brand new TiO2 plant in Western Australia?

A. Yes. We'd finished the Stallingborough job, which we brought online in two years, and very successfully I might add.

And because of that, the company asked if I would be prepared to design the new plant for Western Australia. Of course, I accepted. And I spent one year in London doing all the process design, the engineering design. Then I transferred to Australia for a full year for the construction part of the job.

Q. And were there trials run as part of the Western Australia plant?

A. Yes. We were going to run a new raw material, which Laporte had never run before, but it had been run at our Ashtabula 2 facility.

Q. So tell the members of the jury, what's the difference between Ashtabula 1 and Ashtabula 2?

A. Ashtabula 1 was the original Sherwin-Williams plant. At the same time as that was running, a plant was built by Gulf & Western, actually, at Ashtabula 2. They are a mile apart. They were totally different companies until 1983, when SCM bought Ashtabula 2. It had already purchased Ashtabula 1 in the '70s.

Q. What was your involvement in terms of running the trials for the Western Australia plant and -- Ashtabula is near Cleveland in Ohio; is that correct?

A. That's correct.

Q. So what's the connection between a plant in Western Australia and a couple of plants in Ohio?

A. The actual raw material for the Western Australia plant

was to be actually manufactured in Western Australia. That's why the plant was built there.

However, Ashtabula 2 plant had been running what is called synthetic rutile for many years. So I set up a program. The only chlorinator that we could run it on was in Ashtabula 2. So I flew to the States for about three weeks to actually oversee the trial.

Q. And did there come a time when you became familiar with the operations of the Ashtabula 1 plant?

A. At that time, because it was just down the road, I asked if I could go and see the plant, because I'd actually designed the plant without seeing it. So they invited me down, and I spent about a full day on the plant at that time.

Q. Was there a time later in your career where you spent more time at Ashtabula 1?

A. Yes. I did a second visit and brought some supervisors across because they were going to be trained, and we went to Ashtabula 1, spent probably a week, give or take, then.

Then after we'd finished the Australian job -- again it took us two years, came online just after Christmas, and I stayed behind, but later I transferred to the States.

As part of that, my job was to review the designs for a new line to be built at Ashtabula 1. They were adding a second line on top of the original Sherwin-Williams plant.

So I flew to Baltimore. I was about to set up house,

decided, after a lot of discussions, that the design for the new Ashtabula 1 plant was not the latest that it should be. So I relocated to Philadelphia to the engineering house, spent nine months in Philadelphia redesigning the plant, and then transferred to Ashtabula 1 to become assistant project manager for the installation of the second line. And I spent about a full year on Ashtabula 1 plant.

Q. So this was designing a second line for the Ashtabula 1 plant?

A. That is correct.

Q. So how long did you spend at Ashtabula 1 learning about the old system and installing the new one?

A. A full year.

Q. What was your title back then?

A. It started as review engineer, because I was reviewing the designs, and finally ended up as assistant project manager.

Q. Did there come a time when a company called Millennium became your new boss?

A. Yeah. That was purely a spinoff from the original SCM. We had actually gone through another takeover, which was very quiet, by the Hanson Company of the United Kingdom. They didn't choose to exchange any names, so we stayed SCM. But finally they spun us off as a separate entity called Millennium Inorganic Chemicals.

Q. When did a company called Cristal get involved?

A. Cristal. A strange history. Cristal was actually running a Tronox plant in Yanbu, Saudi Arabia. In 2007 they decided to grow very rapidly in the titanium dioxide business; so they actually hired me as a consultant to buy Millennium Inorganic Chemicals.

Q. And was there a time later where Cristal acquired Millennium?

A. Oh, yes. That year, 2007, they bought them.

Q. Once you were at Millennium, how long did you stay there in what jobs?

A. In Millennium -- I came to the States in 1989, spent, let's say, two years on the Ashtabula 1 job. I then transferred to Ashtabula 2 as process engineering manager. I did that for about nine years, and that was covering everything from day-to-day operation through major capital expenditures in the tens of millions of dollars.

In about 1999, we thought about building another big plant, and they asked me to go and head up a group of engineers to design the new plant, which I did. I was still based -- located in Ashtabula, but I sort of traveled the world for a few years.

In 2001 the market tanked. The titanium dioxide business just -- the bottom dropped out of the market. So they laid off a lot of people. One of them was me. Fortunately, I was senior enough that I could take early retirement, which I did,

and left Millennium in 2001.

Q. So let's pause there.

During your career from 1969 through 2001, you actually designed plants?

A. Four major plants, plus a lot of other projects.

Q. Did you become familiar with reading process flow diagrams and piping and instrumentation diagrams, equipment specifications, all of those things?

A. I drew most of them, yes.

Q. What plant did you actually design in your career?

A. Stallingborough, the oxidation unit, was the first one. Then the Western Australian, which had both a titanium tetrachloride, TiCl, plant and an oxidation plant. Ashtabula 1, which was a complete line right from ore-and-coke handling right through to finishing. And then the last one that actually happened was the Ashtabula 2 expansion where we doubled the capacity of that one as well.

However, I also designed with a team -- these are all team projects; they're not one person -- what is called a standard plant model, which is a plant that you can design for anyplace in the world. And I also designed, with a team, a 150,000-ton expansion for Western Australia. Neither of those plants were built, but we designed them.

Q. Let's turn to your consulting career. What have been some of your projects and experience in that area?

A. I don't look for work. I was quite happily retired, but I was approached firstly to do a merger and acquisition, which was a bit strange because the private equity company that hired me was trying to buy Tronox/Kerr-McGee, which is -- one of the plants was the Hamilton plant I visited in '81.

The second major job was in an arbitration case between, strangely enough again, Kerr-McGee, which was the original AMPOT, and Kimera of Finland. That was a civil arbitration in front of the London Court of International Arbitration.

Q. Let's focus on your technical consulting. Did you work for a plant that was built in China?

A. Yes.

Q. Tell us about that. What did you do there?

A. I was approached to update a design that the company had purchased from RMI. RMI was a major titanium manufacturer, not titanium dioxide, and they had designed a TiCl plant. This company purchased all of the designs, but they were very old designs. We're talking about the late '80s, and this is now 2007. And they asked me, and I put together a small team, to update those designs. The plant was built in Hunan province in a place called Xi'an in 2008, 2009.

Q. So you spent some time in China looking at their titanium dioxide or TiCl facilities?

A. With this same company, firstly, in 2005 I went to see the Jinzhou plant. Then I visited about three times for this

particular titanium plant that I designed. And then finally I went to visit Zhongye, which is another titanium manufacturer.

Q. Let's talk about the paint side of this business. We've heard a lot about paint companies being customers of titanium dioxide.

Have you consulted for the paint industry?

A. Yes. I consulted with the second largest -- first or second largest paint company in the world, PPG, Pittsburgh Plate Glass as it used to be called.

Q. In terms of other aspects of your consulting, on the business side of TiO2, have you done any due diligence for acquisitions?

A. Three of them. The first one I mentioned, which was private equity trying to buy Tronox. Tronox then went into bankruptcy, and again I was approached to redo the due diligence on the bankrupt company.

And then finally, quite amusing, Cristal hired me to, actually, buy my old company, which was quite an interesting exercise.

Q. So you went -- they pulled you back into the Cristal orbit.

And in terms of other work in China, have you worked on a TiCl plant?

A. That's the one we described at Xi'an.

Q. Okay. So in terms of plants that you've visited around

the world, in addition to that, have you had occasion to study patents, articles, textbooks, things of that nature?

A. Throughout my career we always studied what the competitors were doing. The main source of information is patents.

There aren't many textbooks written on titanium dioxide. There are some fundamental texts for parts of the plant but, actually, about TiO2 there aren't that many. There are a couple of very famous ones, but maybe three more of real interest.

So most of your information comes from patents. We had a library that did nothing but search out patents that were being submitted and published all over the world.

Q. And was that a resource that you regularly looked at?

A. Every month I used to get a list of patents that had been issued.

Q. So in terms of the plants around the world that you hadn't actually visited, did you come to know them through studying patents of their companies?

A. Yes, I did.

Q. Have you been qualified as an expert before?

A. Yes, before the London Court of International Arbitration.

Q. Was that a case involving titanium dioxide?

A. Yes. Two manufacturers basically disagreed, and I was called in as an expert to give my opinion as to the

arbitration.

Q. Let's turn to the work that you've done for this case. Can you tell the members of the jury what, in terms of bulk, just quantity, how much material have you received?

A. My wife gets very annoyed. In hard copy I received initially eight boxes, bankers boxes, of documents. I once calculated it was about 30,000 pages.

In addition to that, I received later on another two bankers boxes, which had various folders in them. And about every two weeks I'd receive what's called an FTP file, which is a very large computer file. It can't be attached to an email; it's too big. And I would receive one of those every two weeks. I think I got between six and eight of those, probably 5 to 10 gigabytes.

Q. So roughly how many gigabytes of electronic files do you think you received?

A. Previously, I'd already received some files. So altogether it was between 15 and 20 gigabytes of data.

Q. And in terms of the content of what you got, what did you get in terms of the work product that both the Performance Group and USAPTI and its various employees and consultants did over the years? What did you look at in that regard?

A. There were two projects. The first one was the so-called 30K, and then the second one was the 100K. For each of those projects I received -- I think the earliest documents I've got

go back to about 2005. They would include process descriptions, piping and instrumentation diagrams, process flow diagrams, equipment specification sheets, and all the other documents that would be associated with putting a big project together.

The sort of size of this type of project would probably be about, the last one I did was eight 4-inch ring binders with two or three what we call 11-by-17 binders to put the big drawings in, and those were all final issues. They weren't all the revisions that were in these boxes.

Q. So in addition to the actual work, finished work product, did you look at the calculations and other things leading up to those sketches, things of that nature, leading up to the final work product?

A. There was a lot of hand-drawn sketches, a lot of calculation sheets. Then there were some types of type sheets showing calculations and specifications. All these are done at the start of a project. They're all preliminary stuff, which finally get translated into the big documents at the end.

Q. Did you review the technical library resources that USAPTI and Performance Group had; that is, the patents and other materials that they had collected?

A. One of the file transfers that they sent, Keker & Van Nest sent to me, was actually the USAPTI library. I was quite jealous because it was absolutely huge. It had everything from

standard textbooks, which I have, to very detailed textbooks to patent information, extracts from magazines. They covered chemical engineering, mechanical engineering, control engineering, fluidization, environmental engineering, practical design. It was just huge.

Q. In terms of documents that the Government identified as ones they potentially were going to use in this trial, do you recall getting those materials?

A. Yes.

Q. And what was the quantity of the potential exhibits that you received and reviewed?

A. It varied depending on what part of the trial you're talking about, but probably started off with three or four bankers boxes full.

Q. And how did you go about studying all these materials?

A. I have a sort of way of doing it. For the arbitration, civil arbitration, I got roughly the same number of documents, so I developed a process.

Basically, I sit down with a bankers box on my knee and go through it page by page. I don't read it in detail, but just identify what is likely to be relevant to the case. Clearly there's a lot of some things you can say, "Not relevant." And you just, basically, don't flag that. The rest you flag.

You go through each of the boxes in turn. And then when you've -- when I've flagged each of the pages or documents that

are applicable, I then go back and read them very thoroughly.

Q. Did you do any of your own research on what types of information in titanium dioxide was publicly available?

A. Yeah. I did a search because, you know, I left the industry in 2001, and I thought maybe I got behind a bit. So I did a search for textbooks that had been published since I left, magazine articles. The major search turned out to be a patent search, because now I had to do it myself. I didn't have a librarian to do it for me.

Fortunately, Google has a separate search engine nowadays just to do patents. So I went on to there, and by the time I'd finished the patent search, I probably had three, maybe four 4-inch ring binders of patents that I was actually going to use. I had an awful lot more electronically.

Q. Did you prepare a report of your conclusions?

A. Yes, I did.

Q. And without getting into the details yet, because we'll discuss that as the day proceeds, how long was your report?

A. I think it was about 80-odd pages. The text of the report, the attachments were many hundreds of pages.

Q. What were in the attachments?

A. They listed all the textbooks I've referred to, all the patents I've referred to, all the magazine articles I've referred to, and that sort of background information.

Other areas that I had investigated -- and it's a very

useful source -- permit applications, both in Europe and in the States, for clean-water permits, the Clean Air Act Title V permits, which have a lot of information about air emissions, the state permitting. There's a lot of those around with quite valuable information in it. So I'd listed all these sorts of things in my appendices.

Q. Did you read the reports of the Government expert, in particular Mr. Gibney?

A. I received Mr. Gibney's report with the documents he had referred to -- sorry -- that he had viewed.

Q. So you looked at the same documents that he looked at?

A. I got them all sent to me, and I went through all of those as well.

Q. And how about the transcripts of this trial over the last several weeks? Have you had a chance to review those?

A. Yes. You've been sending me them, plus I've been looking at things like the minutes that are published on Pacer and things like that. So I keep up-to-date.

Q. How much time have you spent? We started working together in November of 2012?

A. Correct.

Q. Does that sound right?

And since then, how many hours have you put in?

A. Actual hours that I've told you about, about 800.

Q. And your work has not been for free. What is your hourly

rate?

A. I charge $250 an hour.

Q. So what's the -- what has been the damage so far in terms of the cost of your review?

A. Close to $150,000.

MR. GASNER: Your Honor, the defendants offer Mr. Cooper as an expert in titanium dioxide technology and the titanium dioxide business.

THE COURT: Any objection?

MR. AXELROD: Your Honor, may I voir dire the witness?

THE COURT: Yes, you may.

MR. AXELROD: Thank you.

(Pause in proceedings.)

THE COURT: Before you start, maybe we can take a stretch break now.

You can stand up if you like too.

THE WITNESS: Thank you.

(Pause in proceedings.)

THE COURT: Please be seated.

You may continue.

MR. AXELROD: May I begin, Your Honor?

THE COURT: Yes, you may.

VOIR DIRE EXAMINATION

BY MR. AXELROD:

Q. Good morning, Mr. Cooper.

A. Good morning.

Q. You indicated that you were retained, I think, around November of 2012 on this case?

A. By Keker & Van Nest, that's correct.

Q. Okay. And you prepared an expert report; right?

A. Correct.

Q. And I gather that prior to submitting the expert report, you reviewed the Indictment in this case?

A. That is correct.

Q. Okay. And you understood that one of the purposes of your report was to provide some background about yourself and your experience; right?

A. Correct.

Q. And to that end, you provided a CV in your report; right?

A. Yes, I did.

Q. And that CV generally summarized your professional experience?

A. Correct.

Q. I looked at -- in looking at the report, you left Millennium in 2001; right?

A. Correct.

Q. And then since that time, until today, you've served as a consultant?

A. Not continuously.

Q. But that's how you've -- when you've worked, you've worked

as a consultant in the TiO2 industry?

A. That is correct.

Q. And you summarized that work in your CV; right?

A. Correct.

Q. Now, you chose -- you chose to go back eight years, and that just seems kind of odd. Why did you pick eight years to go back on your CV?

MR. GASNER: Objection, Your Honor. This is voir dire on credentials this sounds like.

THE COURT: Yes. Sustained.

BY MR. AXELROD:

Q. Well, let's talk about the work that you did. You described, when Mr. Gasner was asking you -- and I want to just make sure I got the time line -- the work that you did in China.

A. Uh-huh.

Q. Okay. So let's just talk about the work that you did in China.

And could you tell me -- could you tell us about the first project that you got involved with in China? When was that?

A. I believe I say that's in 2005.

Q. Okay.

A. May I refer?

Q. To your report?

A. Yes.

Q. Please.

A. (Witness examines document.) Actually, I didn't mention that one.

Q. What did --

A. It's prior to.

Q. Tell me what you didn't mention.

A. In 2005 I went to Jinzhou, which is a chloride-route titanium dioxide plant in the northeast of China.

Q. And what did you do -- now, you were in court yesterday; right?

A. Yes.

Q. So you heard testimony about Jinzhou; right?

A. Correct.

Q. And that's the very same place that you went to in 2005?

A. Correct.

Q. Did you disclose that in your expert report?

A. No, because it was only three days. I don't think I put it down.

Q. Did you advise counsel of that?

A. Yes, I did.

Q. You did. But you elected not to put it into your report?

MR. GASNER: Objection.

THE COURT: Sustained.

BY MR. AXELROD:

Q. Okay. So what did you do in Jinzhou in 2005?

A. I spent three days there, and I went to look at their plant, particularly with a view to looking at their titanium tetrachloride facility.

Q. Why did you go there?

A. As I said, the company that I had been hired as a consultant to had obtained a license from RMI for a titanium tetrachloride plant. I believe they were intending to try and sell that design to Jinzhou.

Q. Okay. What was the name of the company that you were consulting with?

MR. GASNER: Objection, Your Honor. This is improper voir dire.

THE COURT: Overruled.

THE WITNESS: Professionals Development Sino, S-I-N-O, USA Corporation.

BY MR. AXELROD:

Q. Professional Development?

A. Sino USA Corporation.

Q. Okay. So in 2005 you went to Jinzhou with the Professional Development Sino USA Corp, and you -- what was the purpose of the visit?

A. I was not told that by that company. I was told we were going to look at their TiCl production facilities.

Q. Well, you were going there to bid on a contract, weren't you?

A. Not to my knowledge at that time.

Q. Well, you were there as the technical expert for that contract, weren't you?

MR. GASNER: Objection.

THE COURT: Sustained.

BY MR. AXELROD:

Q. Weren't you there as the technical expert?

MR. GASNER: Same objection.

THE COURT: Overruled.

THE WITNESS: Yes.

BY MR. AXELROD:

Q. Okay. So you went there. And who was with you when you went?

A. The head of Professional Development Sino USA Corporation.

Q. And who is that?

A. Mr. James Wang.

Q. Had you worked with Mr. Wang before?

A. No, that was the first time.

Q. And did you travel with him to China?

A. Yes, I did.

Q. And did you talk about the work you were going to do?

A. Yes, we did.

MR. GASNER: Objection, Your Honor. Outside the scope of voir dire.

THE COURT: Sustained. Please keep this within the

scope of a proper voir dire.

MR. AXELROD: Well -- thank you, Your Honor.

Q. You were going there as the technical expert to bid on a contract; right?

A. I did not know that at the time.

MR. GASNER: Objection.

THE COURT: Overruled.

BY MR. AXELROD:

Q. When did you learn that you were there to bid on a contract?

A. In 2007, when I was rehired by Professional Development Sino USA Corporation to update the designs that he had purchased from RMI. That's when he told me that that's what we'd gone to Jinzhou for.

Q. So you went to Jinzhou with him in 2005. And this was in the fall, right? This was October 2005?

MR. GASNER: Objection.

THE COURT: Overruled.

THE WITNESS: I don't remember the timing, no. I'm sorry.

BY MR. AXELROD:

Q. You don't remember going to Beijing on October 25th, 2005?

A. It sounds about the right time. I don't remember the exact date.

Q. Okay. So you went with him, and he later told you --

you're saying in 2005 you went there to Jinzhou to do some work; right? You just didn't know you were bidding on a contract?

A. That is correct.

Q. Okay. Describe for me the work that you thought you were going there to do.

A. At Jinzhou was purely to review their TiCl plant to see whether Professionals Development Sino USA could be of assistance to them in improving that TiCl plant.

Q. And you subsequently learned that PD Tech had actually bid on a contract at Jinzhou; right?

A. I --

MR. GASNER: Objection.

THE COURT: Sustained.

BY MR. AXELROD:

Q. When you were there, did you meet with employees of Pangang Jinzhou?

A. Yes.

Q. Did you meet with a gentleman by the name of Zheng Shaohua?

MR. GASNER: Objection.

THE COURT: Overruled.

THE WITNESS: It doesn't ring a bell.

BY MR. AXELROD:

Q. It doesn't ring a bell? Well, you met with engineers

there; right?

A. That is correct.

Q. And some of the engineers -- who are the engineers that you met at Pangang Jinzhou?

A. I only remember one because I only received one business card, which I looked up, and that was Liu Changhe. I apologize for the pronunciation.

Q. What was his role?

A. He was introduced to me -- and I don't speak Chinese, so I was working through an interpreter -- as part-owner of Jinzhou Titanium Company, I believe, is what it was called.

Q. So what did you learn about the bid that PD Tech made in 2005 on the Jinzhou contract?

A. Nothing.

Q. You never learned anything about it?

A. Nothing.

Q. So you're saying you went there in 2005 with Mr. Wang, and you didn't know that he was making a $4.4 million proposal to bid for the Pangang Jinzhou contract?

A. I did not know that.

MR. GASNER: Objection.

BY MR. AXELROD:

Q. You did not know that?

THE COURT: Overruled.

BY MR. AXELROD:

Q. You didn't learn at that time that Mr. Liew won that contract?

A. No, I did not know that.

Q. When did you learn that?

A. Not until I started this case.

Q. Okay. So at the time you started the case, you were aware of the fact that Mr. Liew had won the contract that the company that you worked for went to get; right?

MR. GASNER: Objection.

THE COURT: Overruled.

THE WITNESS: I didn't know that's why we were going to Jinzhou.

BY MR. AXELROD:

Q. No, I understand that, sir, but I'm asking you a different question.

A. Okay.

Q. Okay. My question is: When you got involved in this case, you knew that Walter Liew won the Jinzhou contract; right?

A. From the documents I received from Keker & Van Nest, that is correct.

Q. Okay. And you also knew that the company that you worked for had bid for that very same contract; right?

MR. GASNER: Objection. Argumentative.

THE COURT: Sustained.

BY MR. AXELROD:

Q. Well, you testified that that company -- you learned when you got involved in this case, right, that the company you worked for had bid for the Jinzhou contract?

MR. GASNER: Objection. Asked and answered.

THE COURT: Overruled.

THE WITNESS: In 2007 when I was rehired by Professionals Development Sino USA, he told me that he had bid on that contract.

BY MR. AXELROD:

Q. And you knew that this case was about that contract; right?

A. Not specifically, no.

Q. Well, you reviewed the Indictment?

A. Yes, I did.

Q. And you sat in court yesterday?

A. Yes, I did.

Q. Do you mean to tell me that before you wrote your expert report, you had no idea that the Pangang Jinzhou contract was one of the issues in this case?

A. I knew it was part of this case.

Q. And you chose not to put it into your report?

MR. GASNER: Objection.

THE COURT: Overruled.

THE WITNESS: Because it was such a short period, I did not include it in this -- in my report, correct.

BY MR. AXELROD:

Q. And the very first time that you disclosed anything about your involvement in Jinzhou was just a few moments ago when Mr. Gasner asked you questions on direct examination; isn't that right?

MR. GASNER: Objection.

THE COURT: Overruled.

THE WITNESS: I believe I revealed that to Keker & Van Nest before, but in my expert report, that is correct.

BY MR. AXELROD:

Q. Okay. Well, when did you tell Keker & Van Nest about it?

A. Very early on in the case when I was explaining to them my credentials, that I had been to Jinzhou.

Q. And whose decision was it not to put it in your expert report?

A. Mine.

Q. Why didn't you put it in?

A. Because it was three days. It was a small one. I did not include in my expert report all my assignments as a consultant. There are others. I just chose to leave them out.

Q. Okay. Well, but this wasn't the first time in your professional life that you had been -- that you had met with

Pangang; right?

A. I have only met with Pangang people at Jinzhou once.

Q. Right. But I'm asking you about other contacts you've had with Pangang.

A. To the best of my knowledge, I've not met anybody else from Pangang.

Q. Really?

MR. GASNER: Objection.

THE COURT: Sustained.

BY MR. AXELROD:

Q. How about when you were at Millennium?

A. I never met anybody from Pangang at Millennium.

Q. Are you saying, sir, that you never met with the Pangang delegation that came to Millennium in 2001?

A. Correct.

Q. Did you know about that visit?

A. No, I did not.

Q. So you were unaware of the fact that Pangang and its executives came to Millennium in September 2001?

A. I'd already left Millennium in September 2001.

Q. You'd already left?

A. Yes.

Q. Okay. I want to return to the question of your work in China. So when you went to Jinzhou, you said there was one gentleman that you recalled meeting, right? Liu Changhe?

A. Correct.

Q. Or something to that effect.

A. Yes.

Q. I'm sure my pronunciation is not good either.

Anybody else that you recall meeting that day?

A. By name, no. There was a room of about, I would guess, 20 people, maybe 25 for the introductions. Only, I think, two presented me with cards, and the one I've still kept is Mr. Changhe's.

Q. What other -- I want to make sure we get all of the work you've done in China out. So what else haven't you told us about?

MR. GASNER: Objection.

THE COURT: Sustained.

BY MR. AXELROD:

Q. Can you please identify all the other China work?

A. In 2007, I began the redesign of a TiCl plant to be built at Xi'an in the Hunan province.

Q. And how do you spell that?

A. X-I apostrophe N-A-N [sic].

Q. And that was to do a TiCl?

A. TiCl plant. The TiCl plant was associated with a titanium sponge plant, not a titanium dioxide plant. And as part of that, I made, I believe, three visits to China, one of them to Beijing to see the design, and two were to the site.

As part of the final visit, I also went down to a company called Zhongye, which I think is now part of Bao Tie.

Q. Bao Tie?

A. Yeah, I believe.

Q. When was that?

A. Sorry?

Q. When was that trip?

A. About 2000 -- right at the end. So it would be 2009. Again, a titanium sponge plant.

Q. Okay. Anything else?

A. That's it.

Q. I wanted to also clarify one thing. You said you get paid $250 an hour?

A. Correct.

Q. And you've worked about 800 hours on this?

A. If that's $150,000, yes.

Q. Okay. I think that's more like $200,000.

A. Sorry. I got my math wrong. It's $150,000 billed at $250 an hour. I didn't calculate the hours.

Q. Okay. Right. But I think the billings that I've reviewed is almost $200,000, and that was as of the end of January.

A. I haven't submitted January's yet.

Q. Okay. But that's a $20,000 bill; right?

A. It will -- I haven't worked it out. It will be of that order, yes.

Q. And then since the end of January, how much have you billed to date?

A. To date, I've not billed anything yet.

Q. Well, about how much have you worked on it?

A. Probably about 60 to 80 hours.

Q. 60 to 80 hours.

A. I know it's 150 because I just received a 1099 --

Q. Okay.

A. -- doing me taxes.

MR. AXELROD: I have no further voir dire questions. I do believe that he's a percipient witness to the events in this case and should testify as a percipient witness, not as an expert.

THE COURT: All right. The objection is overruled. You may continue, Mr. Gasner.

MR. GASNER: Thank you, Your Honor.

THE COURT: Would you remove the easel unless you're going to be using it, somebody, please.

MR. GASNER: Yes.

THE COURT: Because it blocks counsel's view. Thank you.

DIRECT EXAMINATION (resumed)

BY MR. GASNER:

Q. Okay. Let's shift gears. We've heard a lot of testimony in this case about DuPont and their chloride-route process, and

I'd like to spend some time discussing with you, for the jury's benefit, other chloride-route processes that have been employed elsewhere in the past.

So let's start with a little bit of a refresher on the chemical process. Can you refresh the jury's memory on just the very highest level of the chloride-route process?

A. There are essentially three parts to a chloride process. The first one is the manufacture of titanium tetrachloride. We all call it TiCl, so I'll call it TiCl.

The second part of the process is the oxidation unit where you take the TiCl, react it with oxygen to form what I call base pigment, which is raw titanium dioxide powder.

The third part of the process is called "finishing" by most people, and by that, finishing puts a surface coating, a bit like the chocolate in M & M is covered with a sugarcoating, we do the same with titanium dioxide. This makes it useful in the final product because some surface coatings work in plastics applications, some work in paint applications, some work in paper applications. They don't all work in everything. So you tailor the surface treatment.

Q. Have you had occasion to become familiar with a company called Ti-Cons?

A. Ti-Cons are one of the process consultants companies in the industry, yes.

Q. Have you looked at the presentation that they put on their

website?

A. Yes, I have.

Q. Would that be a helpful demonstrative in helping the jury to understand the process at another level of detail?

A. That's very good.

MR. GASNER: Your Honor, request permission to display Exhibit 1688 as a demonstrative.

THE COURT: Yes.

MR. GASNER: Mr. Guevara, if you can put that up.

Q. So let's just start on the front page. What are we looking at here?

A. This is just a photograph of the plant that was in the -- this is from the website, I presume. The copy I got is from the website. And this is the first page of that website presentation.

Q. Where is Ti-Cons located?

A. Leverkusen, Germany.

Q. Let's go to the next page, if we could, Mr. Guevara.

And tell us what, in terms of the chloride-route process, is being explained on this slide.

A. Because of the history of titanium dioxide, a number of people split off what is called the front end -- here it's called base material -- from the back end, which is the finishing plant that I just described.

The reason for that is that the base pigment is

specifically chloride. The finishing plant, however, is also used in the sulfate process. So there are commonalities between the finishing process in chloride and the finishing process in the sulfate process.

Q. In a typical TiO2 plant, are there different sections of the plant?

A. Yes.

Q. Tell us about that.

A. Normally, the first part of the plant is the ore-and-coke-handling system. You have to bring raw materials into the process. The two major ones are titanium dioxide ore and some form of coke, usually petroleum coke.

Q. So is that part of the TiCl plant?

A. Usually, yes.

Q. Okay. So there's the TiCl plant, and then there's, at the other end, the finishing plant. What's in between?

A. The oxidation plant.

Q. Okay. So let's go to the next slide, and this is -- combines both the TiCl plant and the oxidation plant; true?

A. That is correct.

Q. Okay. If you could just walk us through this very quickly just as a refresher course on the process.

A. On the left-hand side in red are the raw materials coming into the plant, which is ore, coke, oxygen, and chlorine.

Q. Okay. And what happens in the chlorination box?

A. In the chlorination box, you react the ore and coke with chlorine to form what we call crude titanium tetrachloride. It's unpurified at this point. It's a fluid bed. It works at very high temperatures, and the TiCl4 -- TiCl -- is driven off the top of the chlorinator as a gas.

It then passes over to condensation, where the TiCl is condensed. Some of the impurities are removed, not all but some. This crude TiCl4 then goes to the next box, which is TiCl4 purification.

Q. Okay. I'm just going to circle where you are.

A. Right.

Q. And you should feel free to do that as well if you need to use the display.

So we're at TiCl4 purification. What's the next step after that?

A. Basically, the pure TiCl4 now, which is what we call gin white, is fed into the TiCl4 oxidation process.

Q. Okay.

A. Into this section here (indicating).

Q. And then the bottom part -- let's see if we can clear that. There we go.

In terms of everything that's happening down here that I've just circled, what's that?

A. Associated with particularly the chlorination unit, there's a number of sort of ancillary plants. Out of

chlorination -- titanium ore is not pure titanium dioxide. It contains anywhere between, let's say, 60 percent TiO2 and 95 percent. The impurities all react in the chlorinator, just about. You have to get rid of those.

So what they do is they form metal chlorides, which is this box here (indicating), and these are removed and treated in a dust-treatment plant, and finally neutralized, solids removed, and then usually sent to an ocean or a river as almost pure water.

Q. Okay. Let's go to the next page, if we could.

In terms of the chlorination step, what further detail does this slide provide?

A. What it shows you, basically, is that the chlorine -- the majority of the chlorine that is being used comes back from the oxidation unit. It's a closed-loop recirculation, so the chlorine goes round and round. It keeps reacting and then keeps being regenerated in the oxidation unit.

Q. Okay. Mr. Guevara, let's go to the next slide, if we could.

Condensation step. Tell us at just a high level what's going on here.

A. There are two parts to condensation. The first part is the gases still contain a lot of impurities and a lot of dust. The only way to get rid of those is to, basically, wash them with liquid TiCl4. That washes out the dust and the impurities

and cools the gases further.

Then those gases, now free of all these solids, goes into either another series of what are called contact condensers, where you spray cold TiCl4 into the vessel to cool the gases further, or indirect, in which case you pass them up a piece of equipment which has water on the shell side, on the side -- on one side of the tubes and the gases pass up the other side of the tubes.

The last stage -- and this is this low-temperature cooling system here (indicating) -- titanium tetrachloride at this stage is a very expensive chemical. So you want to get as much of it out as you can, so you actually use a refrigeration unit to condense the last dregs. The gases then go off to be treated. The treatment plant, depends where you're located, but more and more they are getting to be very complicated pieces of equipment.

Q. Okay. Let's go to the next step, purification. What's depicted here in terms of typical practice in TiO2?

A. One of the impurities we don't want is a compound called vanadium. It actually turns white pigment pink, which would not be very useful in white paint. So we actually react the TiCl4, which contains vanadium, with a number of different compounds. There's many listed in the literature.

It forms a sludge. You then boil this liquid. The sludge stays behind. The liquid passes up this distillation column,

very pure now; goes over the top; and then is condensed into a storage tank.

Q. Okay. Mr. Guevara, let's go to the next slide, oxidation.

Again, is this an illustration of a typical practice throughout the industry?

A. Yeah. There are some pictorial difference, I almost call them, between some of the processes, but they all function the same.

Sorry. There are two different types of processes in oxidation. This one depicts what is called a high-pressure process. Okay?

Q. I take it the other kind is a low-pressure process?

A. Low-pressure, yes. Logical.

Q. All right. So tell us about the high-pressure. And, for example, what is DuPont?

A. DuPont is a high-pressure process.

Q. Okay. So this is depicting the same type of process that DuPont uses?

A. That is correct.

Q. Okay. Tell us about the oxidation process as depicted on this slide.

A. Pure titanium tetrachloride, that one (indicating), is heated to about 450, 500 degrees centigrade in what is actually a piece of equipment mainly used in the petrochemical industry. It was sort of borrowed for the TiO2 industry. They're much

more common in the petrochemical industry.

It heats the TiCl4 up. It boils, so it's now a gas. It passes into what here is called the aluminum chloride generator. This is a vessel where you actually make a compound called aluminum chloride. I apologize. I slip to English occasionally. We call it aluminium. But it's an aluminum chloride generator.

Here you react aluminum with chlorine. The final pigment requires to have a compound called alumina in it. So you actually put aluminum chloride in, which later reacts with oxygen to form alumina. And then this is fed into the reactor.

Along the bottom you also need to heat oxygen to make the reaction go. Oxygen is heated in two parts. The first part heats it to about a thousand degrees centigrade, which is in this oxygen heater (indicating).

It then passes into the reactor, the back part of the reactor, and it's still not hot enough. So you actually burn toluene.

Q. So the reactor is this thing I'm --

A. Let me try and clear it.

Q. -- circling?

A. That's it.

Q. Okay.

A. That one (indicating).

Q. All right. I'll go with your circle.

That's a reactor there?

A. That's a reactor.

Q. Okay. And by the way, let's just pause for a second. Are there -- how many major titanium dioxide manufacturers are there in the world today?

A. Five.

Q. And those are?

A. DuPont, Cristal, Huntsman, Kronos, and Tronox.

Q. So which of those are high-pressure system?

A. DuPont, Kronos, Huntsman, part of Cristal.

Q. And who uses low pressure?

A. Tronox and part of Cristal.

Q. Okay. So DuPont is not unique in using a high-pressure system?

A. No, it is not.

Q. And in this -- is this typical, from your experience, this slide we're looking at, of the oxidation method used by high-pressure manufacturers?

A. Yes.

Q. Okay. Why don't you finish up on this one. Tell us what else is in the typical high-pressure system.

A. So when you burn the toluene and the oxygen, you push the temperature up. Now you're getting hot, about 1500 degrees centigrade. The two are combined in -- the oxygen and the TiCl4 are combined and they react very quickly. This is a

millisecond reaction time. It also gives out heat. It's what's called exothermic. It gives out a lot of heat. So you have to cool the gases, which is done in this cooling duct that is here (indicating). There (indicating). That's the cooling duct.

This is a representation more akin to the Kronos design. The others use something that's pictorially different, but functions the same.

Then the pigment, which is now a solid and it's cooled to about 200 degrees centigrade in this cool pipe or cooling duct, is taken out by a bag filter.

Q. Okay. And bag filters, are those different designs at every plant?

A. Surprisingly, most of them are sent from the same supplier. They're all the same.

Q. Let's go to the next slide, dust treatment. Is this something common to all the major manufacturers or just high-pressure or what?

A. It is not -- it is not determined by high pressure or low pressure. This is determined purely by the site on which the plant is built. Some processes just purely neutralize the waste with lyme, and some go through quite sophisticated methods to recover some of the ore and coke. This happens to show a recovery system.

Q. Okay. Let's go to the next slide, second dust treatment.

Same situation: Everybody does it in slightly different ways?

A. No. DuPont does not treat their effluent on a couple of plants like this. Those plants are Altamira and DeLisle in Mississippi.

Q. Okay. Let's go to the next slide, off-gas treatment. Is this something common to all plants?

A. Yes.

Q. Tell us briefly what is going on in terms of the process here.

A. In the chlorinator when you add the coke, the coke is there to raise the temperature and also to act to rejuice the TiO2. So you form CO and CO_2.

As part of that you also -- because there's a bit of water slips into the process through various routes, you form HCl or hydrochloric acid. You also lose a little bit of TiCl4. So you have to remove these under the various air regulations. So you go through a scrubbing system.

They all have part one, this one (indicating); they all have part two, this one (indicating); they all have part three, this one (indicating).

The last two may or may not be present, although incinerators are becoming more and more common.

Q. Okay. Let's jump a couple of pages. If you could go to the next-to-the-last page, Mr. Guevara, that says "Typical Consumptions-1."

What's this?

A. Ti-Cons present a chart which tells you how much of what we call utilities -- steam, electricity, gas, oxygen, nitrogen -- are used in the process to produce one ton, in this case, of TiO2. They also tell you the main raw materials: coke and slag, how much you need to produce it. It's actually quite accurate.

Q. And let's go to the next page, Mr. Guevara, if you might.

This is more of the typical consumptions of utilities at plants around the world; true?

A. That is correct.

Q. And last page talks about a typical plant and provides some project data.

Tell us about that. I mean, is this, in your experience, about how complicated a plant is in titanium dioxide?

A. Oh, yes, very much so.

Q. So it's more than 22 kilometers of piping?

A. Yes, it is more than.

Q. More than a thousand isometric drawings?

A. Nowadays we tend to do all that electronically, but, yes, that is about the right number.

Q. And 41,000 piping objects. Is that typical?

A. Yes.

Q. Now, this Exhibit 1688 that we've been looking at, this is just available on the Internet?

A. Yes.

Q. And why -- Ti-Cons, what business are they in?

A. They are in business to license titanium dioxide by the chloride route. That's their sole function.

Q. Have they done that in the past?

A. Yes.

Q. What plants have they licensed, in your --

A. To my knowledge at present they have licensed Xinli, X-I-N-L-I, in China; Henan Billions in China; Xingmao Luohe China. Those are the ones I know about.

Q. So in taking this to the next level -- so this kind of information is available just on the Internet. You can go to consultants.

Are there process choices that, if you're going to design a titanium dioxide plant, that any engineer has to face?

A. Oh, yes. Yes.

Q. Let's take a look --

MR. GASNER: If I might, Your Honor, permission to display 1692 as a demonstrative.

THE COURT: Yes.

BY MR. GASNER:

Q. What is this?

A. This is a flow chart that I produced, and it tells the choices, the major choices that you have when you come to design a chloride-route titanium dioxide plant.

Q. All right. So let's go through this. The first box that you have is ore and coke feed, and you have under process choices, pneumatic and mechanical.

What is -- tell the members of the jury what are those choices there?

A. When you bring the ore and coke into the plant, you can either convey it on big conveyors and elevators that are standard commercial equipment, grain silos, and things like that; or you can blow it around the plant in piping using air, again standard commercial equipment. But you do have that choice. It depends where you are.

Q. So you can either move the ore and coke with air -- that's pneumatic feed -- or mechanical?

A. That's correct.

Q. How about the process choices at the chlorination phase? What are your choices?

A. Really there is only one choice. There is a very strange process at Jinzhou that uses what is called molten salt. You actually melt sodium chloride and add the ore and coke to it. The only chloride plant that uses this is Jinzhou.

There are other plants in the Ukraine which produce TiCl4 for titanium metal -- a different thing altogether -- that use molten salt. But apart from Jinzhou, everybody uses a fluid bed.

Q. Next step, cooling. Process choices, spray duct or spray

duct and spray dryer. Tell us about that.

A. Off the top of the chlorinator, you have to cool the gases. To cool the gases, you have to spray liquid TiCl4. It's the only way.

So you can do it one of two ways. You either spray the liquid TiCl4 into a big pipe or you spray the TiCl4 into a big pipe plus a big vessel, which is the spray dryer in this case.

Q. Basically, two ways to do it; take your pick?

A. Basically, yes. By the way, a lot of -- it varies. Each company has done both. All the companies have used both methods, and they seem to fix on one method because it's what they get used to.

Q. Next step, solids removal. We talked about that with the Ti-Cons website. You got down two process choices, cyclone or spray dryer.

A. Yes.

Q. Tell us about that.

A. If you've cooled the gases down to 200 degrees centigrade, then the best way of doing it is go through what is called a cyclone. It spins the gases very fast. The solids go to the outside; the pure gases go up out of the top.

A spray dryer is part of the cooling system, but it's also a very inefficient cyclone. So it's just a choice again.

Q. Next step moving down is condensation, and you've got two process choices, either direct contact or shell/tube heat

exchangers.

Tell us about those basic engineers choices that people make in this industry.

A. Firstly, all processes have a direct-contact condenser. It's the only way because, as I said earlier on, these gases still have some solids, so you have to wash them out. So you have the first stage is always a direct contact.

Then a direct -- you can either use to cool the gases down to about minus 20 degrees centigrade to get all the TiCl4 out of it. You can either use more of these where you spray TiCl4 in, or you have TiCl4 gases passing up the inside of a pipe and cooling water or refrigeration passing down the outside of the pipe, and that gets you the cooling.

That's how -- the shell-and-tube heat exchanger is.

Q. So let's just pause for a second. Is this process choice thing, is this a document you prepared for this case or did you use this in your consulting practice?

A. No, I've used this in my consulting practice.

Q. This is to explain to potential clients of yourself what their design choices are?

A. That is correct.

Q. I notice for crude TiCl storage, you don't give them any choices. Why not?

A. It's a big tank. That's all it is. It's a tank.

Q. Okay. Next one down, purification. You've got either

batch distillation or continuous distillation. Tell us what that means.

A. Okay. The batch distillation is basically obsolete nowadays. There are still a few around. What it is, is you put this crude TiCl4 into a vessel; you add the reactant to remove the vanadium; and then you can either boil it, a bit like a whiskey still -- in other words, you put a charge in, boil it, and then you recharge it later on -- or you continuously add the TiCl4 and continuously boil it.

The actual equipment looks almost the same. It's just the way you run it.

Q. And then pure TiCl storage, that's just tanks?

A. Tanks.

Q. Now, are there lots of them?

A. Depends on the plant. Anywhere between -- if you're supplying the TiCl4 in the titanium industry, you have to have a lot more, but typically it's two or three.

Q. Okay. Let's go to the next page. So those are the design choices that would be into designing the TiCl plant, the first part of any TiO2 plant.

A. That is correct.

Q. Let's go to the second building, if you will, the oxidation building, and talk about the oxidation process here.

You've divided the world into Kerr-McGee, common, and DuPont/Millennium; is that right?

A. That's correct.

Q. Why do you divide the world up into those three?

A. Kerr-McGee is the only low-pressure titanium dioxide process left, but it is used by other companies because Tronox, as it is now called, licensed the process to Cristal, to Ishihara in Japan, and to KMML in India. So it's not just one company. That's why I call it a process. But it's essentially a single company.

Q. So in your industry, is it common to refer to a DuPont/Millennium process?

A. No.

Q. How do people -- is that your phrase?

A. That's my phrase.

Q. What do people talk about in common -- when engineers get together in the titanium dioxide industry and talk about types of processes? How do they divide it up, in your experience?

A. The main way is high pressure, low pressure, but also it's a DuPont type or it's a Tronox type.

Q. Those are the way people divide the world up in conversation?

A. Pretty much, yes.

Q. All right. So tell us about -- why don't we start with the DuPont-type process in the right side. Walk us through each of those boxes.

A. Well, from the Ti-Cons drawing, we've already seen this.

The first part of it is the TiCl4 vaporizer superheater. That's where you heat the TiCl4 to 450 to 500 degrees centigrade.

You then pass it forward into an Al chloride generator, where you react the aluminum and chlorine to form aluminum chloride. That passes then into the reactor. Down the center, all plants have an oxygen preheater, independent of process.

Q. Okay. And after the reactor, what happens next?

A. Then, functionally, it's the same piece of equipment, but the DuPont type and, say, the Kronos type look different. One has got what is called a flue pond, where pipes are submerged in water and you can see the pipes; the other one, instead of submerging in water, they have another pipe around the outside of them, and you pump water through that, that pipe.

Q. So if I understand your chart correctly, if you want to build a plant, you can either have a cooling tube or a flue pond, both?

A. That's correct.

Q. So who's got which? In the world's major manufacturers of TiO2, who are the flue pond people and who are the cooling tube people?

A. In the high-pressure process, Kronos have got a cooling tube; everybody else is flue ponds. In the low-pressure process, Kerr-McGee has a cooling tube.

Q. Okay. And then, finally, in terms of the oxidation plant,

design choice separator and bag filter in the Kerr-McGee process or bag filter in the DuPont/Millennium process. Is that the choice?

A. Yeah. One of the patents I did find shows, actually, a second piece of equipment in the DuPont process, which is a cyclone, which is somewhat similar to a separator, but they all have bag filters.

Q. Okay. And then slurrying and pretreatment is something that everybody does?

A. Yes.

Q. All right. Finally, let's go to the next page.

THE COURT: Before we do that, maybe this is a good time to take our break.

MR. GASNER: Certainly, Your Honor.

THE COURT: All right, ladies and gentlemen, we'll take our first break of this morning. Remember the Court's usual admonitions. Keep an open mind. Don't discuss the case. I'll see you in 15 minutes.

And you can step down, sir, as well.

THE WITNESS: Thank you.

(Proceedings were heard out of the presence of the jury:)

THE COURT: 15 minutes, Counsel.

(Recess taken at 9:42 a.m.)

(Proceedings resumed at 10:00 a.m.)

(Proceedings were heard out of the presence of the jury:)

THE COURT: Please bring the jury in.

(Proceedings were heard in the presence of the jury:)

THE COURT: Please be seated.

You may continue.

MR. GASNER: Thank you, Your Honor. Mr. Guevara, let's go to the next page of the slide, finishing process.

Q. Mr. Cooper, can you tell the members of the jury what are the basic design choices involved in this third part of the titanium dioxide plant, that is the finishing plant?

A. All processes have already slurried the titanium dioxide in water. So on the right-hand side, the DuPont process, they screen the slurry.

Q. What does everybody else do?

A. They have what is called a "sand mill" or "media mill" in which the slurry is passed through. It contains sand in an agitator, which actually grinds up the pigment to a very small size.

Q. So then Kerr-McGee, Millennium, and others do some milling before it gets to the treatment phase; true?

A. That is correct.

Q. Okay. And then treatment, washing, drying, steam micronizing, those are all the same for everybody?

A. You've got a choice of treatment. You can either use batch treatment where you put a load in and treat with chemicals, let it react, and then pump it out.

There is one, maybe two companies who don't do batch but instead do it in a continuous method in a piece of pipe and just continuously add the chemicals. But mainly it's batch.

Q. Okay. And then for washing, what are the design choices there?

A. In the early days, there was only one choice, which is what is called "rotary vacuum filters" or "rotary drum filters." And what you do is you -- basically, like a coffee filter. You pour the slurry in. The water is drawn through the filter; and to wash out any impurities, you add water just like in a percolator or a filter drip.

There have been new types come onto the -- into the industry recently which are called pressure filters, which you pump it in under high pressure and then wash it.

Q. How about the next stage, drying. Everybody has to do that. What are the different methods?

A. Tunnel dryers, which is a very old-fashioned -- an old-fashioned bread-oven-type design where you put a pigment in at one end, it goes along a long belt with hot air, and it removes the moisture from it. Those are pretty much gone nowadays.

So today spray dryers, very common piece of industrial equipment. You spray it into a big chamber, you pass hot gas up through it, and it removes the water.

Spin flash dryer is essentially the same, but it does it

with a much more concentrated amount of TiO2 of pigment going into it, but very, very similar.

Q. What's the next box in the finishing plant?

A. Steam micronizing.

Q. What's that?

A. I hesitate about the word "micronizing" because micronizing is, in fact, a trade name by the Sturtevant company. But what it is is --

Q. Did you say Sturtevant?

A. Sturtevant.

Q. They're a vendor of some type?

A. Yes, they're a vendor. They sell to many more industries than just the TiO2 industry.

And what you do in there is you put pigment, which is now dry or semi -- almost dry, into a vessel. You accelerate it using steam, very high-pressure steam, so the particles collide and break up. They got stuck together in drying is what happens, so you need to break them up again.

Q. Let's go to the last couple of boxes there. You talk about slurry production and then packing. What does that mean?

A. In the United States a lot of the big paint companies require their product mixed with water already, so they don't have to do it. And that's slurry production. It's only done in the United States essentially.

Q. What's the other method?

A. The other method is to put it in big bags of bigger, bigger bags; in other words, I say 25K because I'm, you know, I'm a European, but it's 50-pound in the States; or anything up to 1 ton bags, and it just goes in through a packet. These packing machines are standard. They pack cat litter, flour, and corn, and all sorts of stuff. You can just buy them off the shelf basically.

Q. Okay. So these are the design choices that anybody would phase in designing the three parts of the plant: The TiCl plant, oxidation plant, finishing plant?

A. That is correct.

Q. Let's pull the camera back a little bit and talk historically.

When did TiCl plants first come into being?

A. TiCl plants came in a lot earlier than chloride route plants. The earliest reference I found is in 1919, which is the Stauffer Chemical Company in Niagara was making TiCl.

Q. So TiCl has other users besides making titanium dioxide?

A. Yeah. About 90 percent of it is going to titanium dioxide, but about 5 percent goes into making titanium metal, you know, Dreamliners and 747s and submarines, and things like that.

And then there are some special titanium chemicals, which is the other 5 percent.

Q. Okay. So that's -- so TiCl plants go all the way back to

the first World War or thereabouts.

And how about titanium dioxide by the sulfate route, when did that all start?

A. It's been developed over the years. It started very early, but you can trace sort of modern sulfate plants to the 1930s, mainly in Europe, actually, but also in the States; and they were developed on a parallel path, basically.

Q. So of the three parts of any TiO2 plant, what's the same and what's different in a sulfate plant versus a chloride-route plant?

A. Essentially the base pigment plant that we talked about in that first job with the one box, so the difference is the base pigment. Once you get beyond base pigment, the finishing plant, if not identical, then almost identical between the two.

Q. Okay. All right. So let's zero in now a little bit on titanium dioxide by the chloride route. When was that first developed?

A. That was in the late '40s, early '50s, primarily by DuPont but followed very quickly by a number of other manufacturers.

Q. Who are the other manufacturers back then that also started doing chloride route in the '40s and '50s?

A. DuPont is clearly in the '40s. In the '50s there was work being done by people like PPG, Pittsburgh Plate Glass, a company called American Cyanamid, New Jersey Zinc, National Lead; and then the ones we know of today, the Tronoxs, in

particular, started in the early '60s. Kronos was about the same time, I believe.

Q. So have you had occasion to refer to a textbook by the name of "Titanium" by a fellow by the name of Jelks Barksdale?

A. Jelks Barksdale is the first book on titanium in all its forms. He started off looking at the oil supply and then developed on to look at its uses.

There are two editions. The first one is in the '40s.

Q. So tell us about that as a reference manual. Is it one that's often referred to in the field?

A. Oh, yes. Oh, yes, particularly us old guys, yes.

Q. Is it a reliable authority for old and young?

A. It carries an awful lot of the detail work that was done in laboratories and research facilities around the world.

MR. GASNER: Ms. Ottolini, if we could turn to the ELMO, is it --

THE COURT: Yes. Push it all the way up.

MR. GASNER: Push it all the way up. Okay. There we go.

Your Honor, I would ask permission to display the "Titanium" textbook by Barksdale as a learned treatise, 1949, reliable authority, and would ask for permission for the witness to refer to it during his direct examination?

THE COURT: Any objection?

MR. AXELROD: No objection, Your Honor.

THE COURT: All right. You may do so.

MR. GASNER: Thank you, Your Honor.

Q. So I'm putting on the ELMO the cover of this so we can all see it. Is this the Barksdale textbook?

A. This is the first edition, yes.

Q. All right. And let's flip to the copyright page. So that's copyright 1949; correct?

A. That's correct.

Q. Okay. And if we go to the Table of Contents, there is a chapter on the chloride process; is there not?

A. That's correct, Chapter 17.

Q. Okay. Let's turn to Chapter 17.

Did you look at this textbook in your work on this case?

A. Yes, indeed.

Q. Okay. So let's -- maybe you can just give the members of the jury just a quick overview. Back in 1949, when this textbook was written, had anybody commercially manufactured titanium dioxide by the chloride route?

A. No, they hadn't.

Q. And when did that happen?

A. In the mid to late '50s is when commercialization was done.

Q. So at this stage in 1949, what was the kind of information that Mr. Barksdale had assembled?

A. There was an awful lot of research and research papers

being done at the time. It had been identified that using TiCl as an intermediate in the process had a great number of advantages over the sulfate process. I mean, it's a lot easier to purify, for instance. So there was a lot of research going on at the time.

Q. Let's take a look at page 311 in the middle there. Can you tell the members of the jury what's involved in the Barksdale textbook at the part that we're looking here just at a high level?

A. This is describing research work that was being carried out on the production of titanium tetrachloride at the time. It's quoting temperatures and raw materials, and, you know, 1,050 degrees C required, and various basic data like that.

Q. Okay. Let's continue on on our guided tour of Barksdale.

I'm showing you and putting on the screen for the jury there's a section called "Ilmenite." What's that about?

A. Ilmenite is one of the raw materials that was being looked at in the research work at the time. Ilmenite is a lower -- I don't want to use grade -- a lower TiO2 content raw material; and there was a lot of work going on because ilmenite is very, very common. It's much more common than some of the other ores. So that's where people started trying to make that work.

Q. And does this also disclose various temperatures and other parameters for making --

A. Yes.

Q. -- TiO2 from ilmenite?

A. And the amount of carbon you need and how you mix it together, and all that sort of thing.

Q. Okay. So there's several pages on ilmenite; and if we continue along, I'm putting on the screen now there's a section on purification. Do you see that?

A. Yeah.

Q. And what was the state of the art for getting vanadium out of TiCl back in 1949?

A. It was realized very early that you had to get rid of the vanadium. So there was a lot of work going on with some very strange materials, as well as some very common ones. This one refers to things like gold, silver, mercury, sodium amalgam. But it was actually doing the fundamental work on how to remove vanadium.

Q. And, eventually, what was the material that was commonly used to remove vanadium?

A. There were a number, but they all have the same similar property in the way they react. So soap was used, certain natural oils.

Q. Okay.

A. Copper was used.

Q. So back in 1949, they were talking about how to get the vanadium out.

A. That's right.

Q. And in this next section it talks about precipitation of titanium dioxide. Tell us what Barksdale had to say back in 1949 on that topic.

A. Yeah. What they were trying to do is reproduce the sulfate process using titanium tetrachloride, which is the one that's bracketed number one, hydrolysis of aqueous solutions.

Then number two starts talking about in the vapor phase, which is in the development of the modern process.

And then three is where we really got to, it says: (reading)

"By heating the anhydrous material in the vapor phase, admixed with air or oxygen at high temperature, either indirectly or directly."

That's number three.

Q. So just pointing with my pen to item three, can you read that to the jury and tell them what it means?

A. "By heating the anhydrous material," which is pure TiCl4, which we've talked about, "in the vapor phase," in other words, it's a gas, it's actually like a modern process, "admixed," means mixing it with air or oxygen which is a modern process, "at high temperature," which is the modern process, "either indirectly," that's not done, but directly in a flame is what we do today.

Q. So as early as 1949 in textbooks talked about how to do oxidation?

A. That's correct.

Q. Okay. So let's continue along on our history tour. So who first commercialized the chloride-route process?

A. DuPont.

Q. Which plant?

A. I believe it was Edgemoor was where the first pigment came out of commercially.

Q. That's the plant in Edgemoor, Delaware?

A. That's correct.

Q. And what year, roughly, did they first start producing?

A. I believe -- there are a number of reports they said they were making it earlier but were admixing it with sulfate grade; so let's say the late '50s would be a pretty fair estimate of when the commercialization happened to early '60s.

Q. Did DuPont set about, from your research, doing patents on the chloride route at an early stage?

A. Certainly.

Q. I'd like to show you what has been marked as Exhibit 2256.

MR. GASNER: Ms. Ottolini, if we can go back to the -- or I just put this down, is that --

THE CLERK: Turn it off. Turn off the lamp down at the bottom. The top left-hand corner on the bottom.

MR. GASNER: Oh, there we go.

THE CLERK: Just so the light doesn't burn out. There you go and you're ready. Thank you.

MR. GASNER: Thank you.

Your Honor, may I approach the witness with Exhibit 2256.

THE COURT: Yes.

BY MR. GASNER:

Q. Mr. Cooper, I'm showing you what's been marked as Exhibit 2256. What is it?

A. It's a DuPont patent dated on the top 1949.

Q. Does this relate to the chloride route method of manufacturing titanium dioxide?

A. Yes, specifically the oxidation unit.

Q. Is this one of the patents that you relied upon in your report in reaching your opinions?

A. Yes, indeed.

MR. GASNER: Your Honor, move the admission of 2256.

THE COURT: Any objection?

MR. AXELROD: No objection.

THE COURT: Admitted.

(Trial Exhibit 2256 received in evidence)

BY MR. GASNER:

Q. So let's blow up the front part.

Thank you, Mr. Guevara.

Can you just tell the members of the jury, first of all, this was patented on November 15, 1949; is that right?

A. That's correct.

Q. And the inventor is shown as a Mr. Schaumann. Do you see

that?

A. Yes, that's correct.

Q. And then it says he's an assignor to E.I. DuPont de Nemours & Company, et cetera. Do you see that?

A. Yes.

Q. Can you tell the members of the jury what does it mean to be an assignor to the company?

A. People make inventions, but usually they're working for a company; and part of the agreement is if you make an invention, you'll assign it, you'll give the rights of the patent to the company, in this case DuPont, so they can commercialize or do whatever they want with it.

Q. And if we go a little bit further down, it shows, in that same block, that it was -- there's an application November 30, 1946. Do you see that?

A. That's correct.

Q. That means the inventor applied for the patent in 1946; right?

A. That's correct, and then it has to go through a period of review before it will be finally published.

Q. And that's the patented date is when it gets published a few years later?

A. That's correct.

Q. Let's take a look, Mr. Guevara, if you would, at Column 1, lines 6 through 10. If you could just blow that up for us.

So it talks about the preparation of titanium dioxide through the reaction of titanium tetrachloride in the vapor phase with an oxygen-containing gas or by a so-called steam-splitting reaction is already known.

Do you see that?

A. Yes.

Q. What was steam splitting?

A. Instead of using oxygen, you actually used water vapor to react with the TiCl4.

Q. How did that work?

A. Not well.

Q. And let's go, then, to Column 9, lines 20 through 31. Blow that up for the witness and the jury.

And this is in the claims; right?

A. That's correct.

Q. And can you tell the members of the jury the difference between what's in the specification part of the patent and what's in the claims?

A. The claims set, basically, the boundaries of what the guy is claiming that the actual invention works. They are usually quite broad, as broad as the patent examiner will let you get away with, because that makes it somewhat more difficult for other people to avoid the patent, let me put it that way.

Q. Okay. And in this particular claim, DuPont got a patent for a process for producing a titanium oxide patent comprising

reacting titanium tetrachloride in the vapor phase at an elevated temperature of at least 800 degrees C with an oxygen-containing gas. Do you see that?

A. Yes, I do.

Q. Is that essentially the modern method of --

A. Yes, indeed.

Q. -- making titanium dioxide?

And then it goes on to provide other limitations.

A. Yeah. As I mentioned, it's a very fast reaction, so it mentions .01 seconds to five seconds is the reaction time. So it's a very fast reaction.

Q. And this is -- a patent at this time, this patent would last for 17 years; is that right?

A. That's what my research shows, yes.

Q. And if you were with a competitor -- you mentioned earlier the employers that you've worked with have studied patents.

A. Yes.

Q. Do they study them with an eye towards absorbing knowledge from them while the patents are still in force?

A. There are really two or three main things. One, patents when they're published tell you what the competition is doing, where their research and where their developments are going, which tends to suggest to you that you better either be doing the same thing or similar; or there's a company about to be going bankrupt because it's not what you should be doing,

depending on your level of knowledge.

The second thing really is, yes, how does our process comply with this.

The third thing you have to be very careful about in patents is what is called "prior art." Prior art, basically, says, if you've done it before but didn't patent it, it's a way of avoiding the patent. So it means you have to document very carefully all your R&D work, so that if it ever comes up in case law, in a case, you can prove that you didn't infringe the patent because of doing it earlier.

And the final way is how to avoid the patent on your own process because it may be a very good idea, but clearly you don't want to take the patent information and just plug it into your own plant. So you want to do it without infringing the patent.

Q. And that's a process that companies go to looking at the claims; is that fair to say?

A. Yes, that is true.

Q. So even while the patent is in force, it's possible to absorb knowledge from the patent for a variety of purposes, you just need to avoid infringing the claims of the patent; true?

A. That is correct.

MR. AXELROD: Objection, Your Honor.

THE COURT: Sustained.

MR. AXELROD: May I ask to have the last answer

stricken?

THE COURT: Yes. The jury will disregard the last answer. It's stricken.

BY MR. GASNER:

Q. Is there another version of the Barksdale textbook that came out later?

A. Yeah. Barksdale significantly extended his work in, I think, it was 1966 or 1968. I forget the exact date. Somewhere around there, '69 maybe, into a second edition, which is much more comprehensive.

MR. GASNER: Your Honor, I would ask to show the witness as part of his testimony Exhibit 3219, which is the Barksdale textbook, for purposes of referring to it during his direct examination as a learned treatise.

THE COURT: All right. Any objection?

MR. AXELROD: No objection, Your Honor.

THE COURT: All right. You may go ahead.

MR. GASNER: So, Mr. Guevara, if you could call up 3219, in particular page 574.

Q. So kind of scrolling forward in time in the '60s, was Barksdale keeping track of the titanium dioxide plants around the world?

A. Yes, he was.

Q. And if we can go to just a little bit further down, Mr. Guevara, just include that next paragraph, both Table 24

and the next. That's perfect. Thank you.

Barksdale goes on to say: (reading)

"In addition to the plants listed above, that titanium pigment plants based on the chloride process are in operation or are planned in France, Japan, and the United Kingdom."

Do you see that?

A. Yes, I do.

Q. Tell us about that United Kingdom one. Is that where you got your first job?

A. Yeah. In fact, there were two in the United Kingdom. One was Laporte Industries, as I said. The other one was a company called British Titan Products.

Q. So in the DuPont world, they had the Edgemoor plant listed. When did the Antioch plant come around for DuPont?

A. I'm not exactly sure, but it was sometime after that. I think it was the late '60s.

Q. And tell us about the Antioch plant. Did you come to know how that plant operated?

A. Yeah. The Antioch was a relatively small 27,000, 25,000-ton plant built in what is now Oakley, California, I believe they call it. It was meant to serve the West Coast paint market was its original intent.

For a number of reasons it was slightly different in that it used high-grade ore. Later on in my career, when I came to

the States, I was told that that was what was copied to go into the Ashtabula Plant 1.

Q. Okay. And how long was the Antioch plant in operation?

A. I think it finally closed, I think, in 1998, but parts of it were closed before that.

Q. So let's talk kind of internationally. You mentioned in your conversation with Mr. Axelrod that you had visited the Jinzhou plant in China.

A. That is correct.

Q. I think you said that it involved molten salt?

A. Yes.

Q. Tell us about that. In terms of a molten salt plant, what parts are similar to chloride route and which are different?

A. The major difference is in the chlorinator right at the front of the chlorination unit, so instead of using what is called the fluid bed where you put solid ore and coke into a bed, get it hot and it bubbles and boils away. I think there was a previous description in some testimony.

In the Jinzhou plant instead of doing that, you actually melt salt, sodium chloride, common salt. And then you put ore and coke into it and bubble chlorine through this molten salt mixture.

This was a process developed, to my knowledge, by the Ukraine when it was still part of the Soviet Socialist Republic, to produce titanium. It never was meant to produce

titanium dioxide.

Once you get passed that sequence, the equipment becomes, if not the same, very similar to a normal chloride plant chlorination unit; and then beyond that the oxidation unit and the finishing plants are just the same. So it's just that very specific area.

Q. So in terms of, you know, TiCl plant, oxidation plant, finishing plant, molten salt is just a way of doing the chlorinator itself?

A. That is correct.

Q. Is the rest of the TiCl plant similar?

A. Very much so.

Q. Oxidation plant similar to other chloride route plants?

A. Yes, it is.

Q. And how about the finishing plant?

A. Yes, it is.

MR. GASNER: Your Honor, may I approach the witness with Exhibit 1910?

THE COURT: Yes.

BY MR. GASNER:

Q. Showing you what's been marked as Exhibit 1910. What is this, Mr. Cooper?

A. This is actually appears to be photographs of the Jinzhou plant.

Q. Does it accurately depict the Jinzhou plant when you saw

it in 2005?

A. Yes, it does.

MR. GASNER: Your Honor, move the admission of 1910.

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 1910 received in evidence)

BY MR. GASNER:

Q. So let's zoom in. What are we looking at on the left at the Jinzhou plant?

A. The left, I believe, is the purification unit of the TiCl plant.

Q. And how about on the right?

A. That's the flue pond of the oxidation unit with the two heaters.

Q. So Jinzhou had a flue pond already in 2005?

A. Oh, yes.

Q. And they had an oxidation unit; is that true?

A. That is correct.

Q. Was this plant operating when you were there?

A. Yes, it was.

Q. What kind of output did it have when you visited?

A. It's relatively small, nameplate is about 15,000 tons per year. Probably operating somewhere around 10 to 12,000 tons per year.

Q. Was it operating as just a batch process or as a

continuous process?

A. No, it was a fully continuous process.

Q. Commercially successful?

A. In China, yes, it was.

Q. Mr. Axelrod asked you some questions about the circumstances of your visit. Do you recall him asking those questions earlier today?

A. I do.

Q. Is it unusual in your profession to work for one party looking for a contract and then later to work for a different party?

A. It's fairly common. There aren't many of us around is what it comes down to. The TiO2 industry, the chloride TiO2 industry, is relatively a small industry. Cristal Global just announced they only employ 4,000 people worldwide, and they're the second largest producer. So when you look at people with technical expertise, there aren't many of us around.

Q. Could you function as a consultant if you just worked for one party in the titanium industry?

A. No, and I don't.

Q. So let's talk about Jinzhou a little bit.

You said you met a person there by the name of Changhe Liu?

A. Yes. I apologize for my pronunciation.

Q. Well, and I apologize likewise.

Can we just get clear on one thing? Mr. Liu's first name is Changhe?

A. Yes.

Q. And last name Liu?

A. L-I-U, yes.

Q. But sometimes in China they put the last name first as a matter of practice?

A. Yes, I guess.

Q. So for today we'll go with the American style of surname last. Does that work for you?

A. Yes, that's fine with me.

Q. And did you come to know that Mr. Changhe Liu had written a book about titanium dioxide?

A. Yes. You gave me the copies of it.

Q. And is that a book that you reviewed in connection with your opinions --

A. Yes, I did.

Q. -- here today?

MR. GASNER: Your Honor, I would ask to display 2879 simply as a demonstrative.

THE COURT: Any objection?

MR. AXELROD: No objection, Your Honor.

THE COURT: All right. You may proceed.

MR. GASNER: And if we could turn the ELMO back, Ms. Ottolini, I would appreciate it.

Q. So is this the Changhe Liu textbook that you reviewed?

A. Yes.

Q. And did you have an opportunity to review some translations of it?

A. I did.

MR. GASNER: Your Honor, may I approach with Exhibit 3411?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. I just want to focus on --

MR. AXELROD: Your Honor, may we have a sidebar on this issue?

THE COURT: All right. You may stand, ladies and gentlemen.

(The following proceedings were heard at the sidebar:)

THE COURT: Yes, Mr. Axelrod?

MR. AXELROD: Your Honor, the concern I have is I don't believe this is the kind of textbook that this expert relies on in his work. It's in Chinese. I don't believe he reads Chinese or speaks Chinese, or that in the ordinary course of his work he gets books translated.

And, so, I'm not sure where they're going. They haven't indicated if they're trying to admit this, but it doesn't seem to be the type of information that would be appropriate.

THE COURT: All right.

MR. GASNER: So, Your Honor, what I propose to show the witness is several of the illustrations. One at page 341 of the exhibit is just the depiction of the molten salt chlorinator. Just a demonstrative to see if that squares with his recollection of it.

And then another diagram at page 347, which shows the operation process of foreign equipment for fluidized bed chlorination.

And this is really kind of an illustration for his testimony, which is that Jinzhou in 2005 already had a pretty detailed appreciation of what foreign plants were. So it's really just an illustration of his verbal testimony. I'm not going to get into the Chinese text, but I think it is part of his testimony.

MR. AXELROD: Well, I don't -- I'm not sure that that's relevant. He can speak to those things and what he understood; but to try to bolster it with a textbook that he doesn't rely on seems inappropriate. He's talked about molten salt. He can talk about molten salt. He can talk about what he observed at Jinzhou; but to bring in and show the jury all these images from books, it's not appropriate.

THE COURT: Well, more to the point, I think you need to lay a proper foundation that this is the type of textbook that is a recognized treatise or textbook in the field as opposed to some illustrative book. So I think that's really

what I'd like to see.

MR. GASNER: Okay.

THE COURT: All right.

MR. GASNER: I'll give it a try.

MR. AXELROD: But I don't understand how Chinese textbooks would be something that would be in the field that he would be evaluating. I mean --

THE COURT: We need to hear a foundation because there hasn't been one, I think.

MR. AXELROD: Understood. Thank you.

THE COURT: All right.

(The following proceedings were heard in open court:)

MR. GASNER: May I proceed now, Your Honor?

THE COURT: Yes. Would you mind taking that off until you've laid the proper foundation?

MR. GASNER: Yes.

THE COURT: Thank you.

MR. GASNER: May I show it to the witness?

THE COURT: Of course.

BY MR. GASNER:

Q. Mr. Cooper, in the course of research that you've done, both over the years in the industry and in preparation for your testimony here, do you occasionally rely on foreign textbooks?

A. Yes.

Q. Why is that?

A. You get what you can. Recently, the Germans in particular, but also some English, have been publishing quite detailed textbooks on TiO2. So I just buy them. So, yes.

Q. And do you rely upon translations for your analysis of those kinds of works?

A. Yes.

Q. Did you rely on the Changhe Liu textbook in the course of reaching your opinions here today?

A. The translation of, yes.

MR. GASNER: Your Honor, I would ask to display the indicated portions, if I might.

THE COURT: All right. Yes?

MR. AXELROD: I have the same objection.

THE COURT: All right. It's overruled. It's not going to be admitted into evidence, but you may show it to the jury.

MR. GASNER: Thank you, Your Honor.

If I can retrieve -- may I approach the witness?

THE COURT: Yes. Please retrieve that.

BY MR. GASNER:

Q. I'm going to show you what has been marked as Figure 410. Let's start -- let's go straight to 4-10, which is at page 347 of your translation. And I'm going to display on the screen the Chinese version.

And the translation below this it says: (reading)

"Figure 4-10, operation process of foreign equipment for fluidized bed chlorination."

Do you see that?

A. I do.

MR. AXELROD: If I may ask Mr. Gasner what exhibit is the translation?

MR. GASNER: It's 3411, Mr. Axelrod.

MR. AXELROD: Thank you.

MR. GASNER: You're welcome.

Q. Do you have that in front of you, Mr. Cooper?

A. Yes, I do.

Q. Based on your review of this document, can you explain to the jurors what's depicted in Figure 4-10 in terms of the processes that we've been talking about before?

A. This is a standard chlorination unit up to and including the condensation system. It starts on the left with the raw materials addition. It goes through a fluid bed. Then the cyclone in this particular case, and then it shows three-stage condensation system.

Q. There are numbers associated with each of these devices, so what numbers are you referring to?

A. The Number 6 is the chlorinator, Number 7 is the cyclone, Number 10 is the first-stage condenser, 14 is the second-stage condenser, and 15 is the third-stage condenser.

And below them are the various tanks that collect the

TiCl4, Number 12 and 16, and in them -- sorry, 12 is the pump, 16 is the tank. There are two pumps shown circulating the liquid around because you need to pump it around, and those are 12 and 17.

Q. In your three-day visit to Jinzhou, that was in 2005, did you say?

A. That's correct.

Q. And did you come to appreciate their level of sophistication in terms of knowledge of worldwide practices?

A. Yes, I did.

Q. What was your impression?

A. They were fairly up-to-date on what we discussed in terms of the technology. Their plant clearly was much, much older than the things that they knew.

Q. And let's take a look, if you would, at the beginning of this textbook. And there's a part where I'm pointing my pen that says "2005." If you look at the translation, can you read that to us where it says "Production and application technology"?

A. Sorry, what page are we on?

Q. So this is the second page of Exhibit 24 -- 3411, the translation. If you look at the -- it's the frontest piece that has the cataloging information on it.

A. Oh, yes. I've got it: (reading)

"Beijing new arrival Number 039."

Q. And where it says below that, "Cataloging and publication CIP data," and it goes on, could you read that for us, please?

A. Yes. (reading)

"Chinese version of library CIP checking data 2005 Number 100350."

Q. Okay. So what I'm looking for is the date of publication as best you can ascertain it from the translation.

A. From 2005.

Q. Okay. Thank you.

Did you get a chance to meet Mr. Liu, Changhe Liu?

A. Yes. He was in this big meeting that we had with their engineers, and he was specifically introduced to me.

Q. In addition to being a textbook author, did he have any other relationship with the Jinzhou project?

A. I was told that he was a part owner of the plant. I believe his card said "Senior Engineer" or something on it.

Q. Let's go back. I want to show you another patent. Just scrolling back, so we were just in 2005. I want to roll back a little bit to the early stages and show you what I've marked as Exhibit 2246.

MR. GASNER: May I approach, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Do you recognize this document?

A. Yes, I do.

Q. What is it?

A. It's a patent put out by the Pittsburgh Plate Glass company dated 1939.

Q. So we talked about DuPont being a pioneer in the chloride route for titanium dioxide. This is an even earlier patent; true?

A. That is correct.

Q. And does this relate to opinions that you reached in this case?

A. Yes. This relates to the titanium tetrachloride production, particularly iron removal and things like that. So, as I say, TiCl4 manufacture predated the chloride process by many years, and this happens to be a patent from 1939.

MR. GASNER: Your Honor, move the admission of 2246.

THE COURT: Any objection?

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 2246 received in evidence)

MR. GASNER: If we could switch back, Ms. Ottolini. Thank you.

Q. And let's go to this first figure. And, Mr. Guevara, if you could pop out, so we can read it a little bit better, underneath Figure 1, the text there. Thank you.

Can you tell us what chlorination of ilmenite at 980 degrees C, how does that fit into your opinions, if at all?

A. As I stated, the TiCl4 production process was much earlier than the chloride route TiO2 process. A number of companies, and PPG happened to be one, were investigating the use of ilmenite chlorination in their chlorinators, and this is what this patent specifically refers to, the use of ilmenite in the chlorinator.

Q. And ilmenite is ultimately the ore material that DuPont used extensively in its commercial processes; true?

A. That is correct.

Q. But the science behind chlorinating ilmenite had been around for a while; is that fair to say?

A. Quite a long time, yes.

Q. And patents, such as this one, disclose particular temperatures, things of that nature?

A. Yes, the amount of coke you need, the temperatures of operation, how much iron was removed because that's what you're trying to do is remove the iron from the ore. So it's quite a nice patent for telling you how to chlorinate ilmenite.

Q. Let me show you what we'll mark, while we're still in this time frame, Exhibit 2252.

MR. GASNER: If I might approach, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Another DuPont patent. Can you tell us on a high level what this is?

A. (Witness examines document.) This is, actually, I believe what is called a patent for the finishing plant describing how to put the surface coating on and what chemicals you should be using.

Q. Is this one of the patents that you relied upon in your opinions?

A. Yes, it is.

MR. GASNER: Move the admission of 2252, Your Honor.

MR. AXELROD: No objection.

THE COURT: Admitted.

(Trial Exhibit 2252 received in evidence)

BY MR. GASNER:

Q. And, again, this is a different inventor at DuPont?

A. Yeah. Yes.

Q. What I'd like to do next, if we might, is to turn to the 30K and 100K projects involved in this case, and to walk you through the plant.

A. All right.

Q. And ask you questions relating to the Government's allegations at each step of the way.

So, Mr. Guevara, if we could put up previously admitted 2615.

This is the 30K chlorination plant. And if we could turn it, Mr. Guevara so that it --

A. I don't have it.

THE COURT: It's not up on his screen.

MR. GASNER: It's on my screen.

THE WITNESS: It's not on mine.

THE COURT: I know, but the witness --

THE WITNESS: Now it is.

THE COURT: All right. Thank you.

THE WITNESS: Thank you.

MR. GASNER: Thank you.

Q. And if you can walk us through left to right, there are these yellow vertical structures. So if you just go through just relatively quickly for each one and tell us what it is. That first vertical structure, what is that?

A. The first vertical structure here -- sorry -- the first --

Q. Actually, why don't we --

A. Yeah, let's clear that.

Q. Yeah. Let's clear that off.

A. And I'll just point.

Q. Maybe we can let Mr. Guevara do some neater -- it's easier for him than it is for you and myself.

So -- okay. Thank you, Mr. Guevara.

What part of the plant is that?

A. This is the ore and coke handling system.

Q. Okay. And let's erase that and then identify the next vertical area. What are we talking about in that part?

A. This is two things. The first is the chlorinator to the

left and the spray cooler or spray dryer to the right.

Q. Okay. Then what's the next area?

A. This is the condensation system.

Q. Okay. And continuing onto the right, what's next?

A. This is actually -- too much.

Q. Okay.

A. The first part of that on the left of it, before the big stacks, that is the gas scrubbing system.

Q. Okay. What's next?

A. And the next one is the purification system.

Q. All right. Okay. And in designing each part of the plant, can you tell the members of the jury, what are the different -- where do you start and where do you end up in tackling a project of this magnitude?

A. The first thing you do, actually, is you talk to the client and ask him what he wants to be built, what capacity it's going to be, what the raw material is going to be, what the site conditions are. This is called a process-design brief in my terms. You've got to have that information before you can even start a design.

The next thing you do is, you do an outline process description of the process. You say what each part is going to do.

Q. Is there a name in engineering for this part of the process?

A. This is called preparation of a feed front-end engineering design.

Q. Okay. So you interact with the client, find out their needs. What's next?

A. Then, as I say, after you've done the basic description, you do the process-flow diagrams, because they give you all the flows, the temperatures, the pressures, the chemicals that are going to be used.

Q. What happens after the PFDs?

A. After the PFDs, you go to -- you start doing the piping and instrumentation diagrams, the P&IDs, and you also start doing your preliminary equipment specifications. When you get to that stage, then you start doing the drawings --

Q. Okay.

A. -- which are preliminary layouts as this drawing is presently showing. This will go through a number of revisions as you further develop the process and instrumentation diagrams primarily and also the equipment specifications. And then you will keep revising and revising as you get more and more information. I've been through 10 revisions on some of these things.

Q. Let's just pause here and kind of walk through on the 30K plant some of these building block documents.

MR. GASNER: Your Honor, may I approach with Exhibit 1477?

THE COURT: Yes.

MR. GASNER: And I'll note, Your Honor, that it's been stipulated that this was seized from the Maegerle residence.

THE COURT: All right. Is that correct?

MR. AXELROD: Yes, Your Honor.

THE COURT: All right. So stipulated.

BY MR. GASNER:

Q. Do you recognize this document, Mr. Cooper?

A. Yes, I do.

Q. What is it?

A. These are the process flow diagrams going up to and including the end of the TiCl plant, which includes purification and storage.

MR. GASNER: Your Honor, move the admission of 1477.

THE COURT: Any objection?

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 1477 received in evidence)

BY MR. GASNER:

Q. So let's take a look at the lower right-hand corner, the title block. And can you tell the members of the jury, first of all, where it says, "Drawing Number, PFD-01," how does, based on your review, the PFDs -- how are they numbered? What do they go up to, for one thing, in this packet?

A. They're numbered by plant unit. In other words, the

chlorination unit has one set of numbers, the oxidation unit has another set, the finishing plant has another set. So this one in particular, the chlorination goes 01 through 09. The oxidation units, I believe, go through 101 to I think it's 109, but I can't quite remember at this stage.

Q. Okay. And to the right of that it says, "Rev A," do you see that?

A. Yes, indeed.

Q. Tell the members of the jury, what does that mean?

A. This is the first time that the drawing will be issued. You will start -- one of the beauties of CAD systems is you can keep changing and changing. So what you would do is draw an outline of the drawing. It would be then checked. It would go back and be corrected. And when you get to that stage, it would be issued in this case as a revision A, the first revision.

Q. Then it says, "Title: Process Flow Diagram. Petroleum Coke Handling System." Do you see that?

A. Yes.

Q. What's that?

A. That is the coke that is going to be fed to the chlorinator. It shows the handling systems. Typically coke will be delivered by either ship or truck or train, and then you have to offload it somehow. And these are the off-loading systems.

Q. This is basically the charcoal that goes in the chlorinator to heat it up?

A. That is correct.

Q. And above that the project shows this is a 30K project; true?

A. Correct.

Q. And then if we go up, it's kind of hard to read, but the line above "Performance Group," it talks about "P Zisko, project engineer." Do you see that?

A. Yes, I do.

Q. And we met Mr. Zisko earlier in the trial. What else is on that line in terms of people participating in this drawing?

A. These are typical title blocks that most companies use, by the way. So it is drawn by R -- I believe, sorry, A. Sher. It was drawn on the 11th of May '05. The designer was E. Nelson. The project engineer, who basically is the next level up, was P. Zisko, and the project manager was P. Zisko.

Q. And if you look up where I've just put a little arrow, what does "issued for basic design review" mean?

A. This means this is the first formal drawing that's going to go out for review by the various engineers and sometimes the client as well.

Q. Okay. So let's put the title block down, Mr. Guevara, if you would, and let's blow up this area here (indicating) where it says, "Dryer system vendor package." If I can get rid of my

arrow.

So, Mr. Cooper, can you explain to us, where it says, "dryer system vendor package," what does that mean?

A. Petroleum coke or cokes are used in many for industries than titanium dioxide, so they're very common.

So rather than design something yourself, you go out to a supplier who's already done it, and you just say, "Will you supply me a design of equipment to do this?" And that becomes what is called a "vendor package." You don't usually go into as much detail in a vendor package drawing because he's going to supply the drawings at a later stage.

Q. So I'd like to switch gears just for a moment and put up one of the alleged trade secrets in the case?

THE COURT: Before we do that, or while you're doing that, let's take a stretch break for a minute.

MR. GASNER: Fine, Your Honor.

THE COURT: All right. Thank you.

(Pause in proceedings.)

THE COURT: All right. Please be seated, ladies and gentlemen.

And you may proceed, Mr. Gasner.

MR. GASNER: Thank you, Your Honor.

I'd like to display previously admitted Exhibit 8 if we might, Mr. Guevara.

Q. So we've seen a lot of this document while we're in the

trial. So we can put away the title block for now, Mr. Guevara. Thank you.

What I want you to do, Mr. Cooper, is to show us, what is the ore and coke handling part of Exhibit 8?

A. If I can draw?

Q. Yeah. Give it a try.

A. These are the ore and coke storage hoppers --

Q. Okay.

A. -- on this one.

This is the feed system to the chlorinator (indicating).

Q. Okay. And are there additional features in this document?

A. Yeah. This drawing shows some features which clearly DuPont show, that they actually show what is called an ore and coke recovery system.

Q. Where is that on the diagram?

A. This is this area here (indicating).

Q. Okay.

A. I think that's come out fairly well.

Q. Have you compared the ore and coke system that's shown on Exhibit 8, which we've referred to during the trial as trade secret or alleged Trade Secret 4, and compared it to the 30K ore system?

A. Yes, I have.

Q. And what conclusions did you draw?

A. Well, the only similarities, that it's got a storage bin

for ore, a storage bin for coke, and it uses a feed pump to put the ore and the coke into the chlorinator. The rest is all different.

Q. And are those features that you just mentioned, are those publicly disclosed?

A. Yes, they are.

Q. And I believe you said when you were looking at the 30K drawing for the PFD, that this was going to be a vendor-supplied system; is that --

A. This particular part of it. In fact, there's two parts. This is the storage system on this first page, that is the vendor system he's drawing.

In practice, from what I can tell from this drawing, DuPont do not use a dryer because they're using a roaster, which is a very different piece of equipment. So it's just different.

Q. Okay. Well, while we're on alleged Trade Secret 4, let's dig into this document.

And, Mr. Guevara, if you could go to the lower right and blow up the title block there.

Looking at this part, can you tell the members of the jury kind of what phase of the revision process this drawing is at based on the title block?

A. Based on the title block, you can't really tell where it's from. You can tell who it's drawn by. You can tell somewhat

when it was drawn. You can tell who requested it to be drawn and who was doing the drawing, but I'm struggling to find a revision date or number on it.

Q. Okay. So is this early, middle, or late stage of drawing?

A. My interpretation from what's here, it is not a drawing of the plant at all.

Q. What is it, as far as you can tell?

A. What it's intended to do is to supply an outline for, in this case, the R & D Department, to allow them to do -- set up a model for the flow rates, temperatures and pressures, of an existing plant. It's not the start of a project or the middle of a project or the end. It's for an existing plant, and they're going to do some work. Mainly, I draw my conclusion from that because it says "R&D," and also there's no numbers on it. There's no details of any.

And it shows what I normally do when I'm checking a drawing, is it shows highlighting on all the lines that say I've checked, the lines are there.

Q. So let's pull away from that block. Let's go to the upper part, Mr. Guevara, where I've -- let's do the whole thing, if you don't mind. Yeah, just go all the way across.

So did you look at this part of alleged Trade Secret 4?

A. Yes, I did.

Q. Did you find any data of any use on this part of the drawing?

A. No, there's nothing.

Q. Are there any numbers on there at all as far as you could tell?

A. No, there are no numbers at all.

Q. Is there any useful information on the left part of this part of the drawing?

A. No.

Q. Okay. Is there anything -- let's put that away.

So you talked about the ore and coke part. What about -- what about the rest of this? Maybe Mr. Guevara can improve on my scrawling.

Is there anything in this part of the drawing that has not been publicly disclosed?

A. No. It's all in the public.

Q. Explain that for us.

A. Well, when you start on the left-hand side, the chlorinator, there are so many patents regarding the chlorinator, you just go and look it up, and it will tell you what temperature and pressure and flow rates they operate at.

The line coming off the top of the chlorinator, it's got many -- no, not that one. The one off the top of the chlorinator.

Q. I think it's --

A. This one here (indicating). That's it.

Q. Okay.

A. Where the arrow is, that is called various names, normally called a spray duct. That's clear DuPont did draw it in some of their patents.

Then it goes into the spray -- I believe this one says "spray condenser." The writing's terrible. Again, that's in all the patents.

Going out to the bottom of that particular vessel is where you mix up the metallic chlorides, the waste with water. That's drawn in patents, and it's also in the descriptions in textbooks.

The bit to the right is the ore and coke recovery system. Some plants have these, some plants don't; and there's been a lot of data published, particularly in Australia, which I happen to favor because I was there for two years. But there's a lot published there.

You then go into the condensation system. The one thing you do notice about this drawing is, A, there's equipment missing; and, B, there's a lot of lines, piping, missing. So it's a very basic drawing of only the chlorination and condensation areas. There's no purification. There's no gas scrubbing. There's just a basic.

Q. Now, there's been some testimony about Aspen Plus notations on here.

A. I have seen references to that, yes.

Q. Okay. Can you tell us what those particular references

are in this drawing?

A. Yeah. They're handwritten, which is why I think this is very early on in the process; but on some of the lines you'll see a reference such as RX25. What that will do is refer in the Aspen model to that line and what's actually happening in that line; but clearly this is so early that they're still handwritten.

Q. Can you derive from that 'X25, if you don't have the table that it refers to, is there any information or is this like something on top?

A. It tells you nothing.

Q. Does this drawing, in your opinion, have any value whatsoever?

A. No. None.

Q. Let's move on to -- back to the process flow diagrams, if we might, Exhibit 1477. And let's do a -- perhaps a quick tour through this.

If you go to the third page, Mr. Guevara, this is the process flow diagram for the chlorination system, again, Rev A, but let's blow up the table here (indicating).

Did you study this?

A. Yes, I did.

Q. Can you tell the members of the jury what this is?

A. What this tells you down the left-hand side is all the chemicals that are going to be present on the plant. It's

basically a title block.

At the top it starts with "petroleum coke, slag ore," and it goes right down to the box on TiCl4.

Below that are the temperature and pressures, and one other number called "specific gravity," which is a very useful number, for each of these lines that are referenced by the numbers in the circles at the top of the table.

Q. So what stage of the development of the 30K project are we looking at here in terms of these process flows to and from the chlorinator?

A. These are early flows. Clearly there's some notations which suggest that, you know, there's more to come.

MR. GASNER: Your Honor, may I approach with Exhibit 1547?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Mr. Cooper, have you reviewed that document as part of your opinions?

A. Yes, I have.

Q. What is it?

A. These are the calculations that are used to fill in the table to put the numbers into the table for temperatures, pressures, and the like.

MR. GASNER: Your Honor, move the admission of 1547.

MR. AXELROD: Objection.

THE COURT: May I see it, please?

(Pause in proceedings.)

THE COURT: Let's come to sidebar. If you want to stand, ladies and gentlemen, while we're doing that, you may do so.

(The following proceedings were heard at the sidebar:)

THE COURT: All right.

MR. AXELROD: Your Honor, this is hearsay. This is a series -- it's a document called "process calculations." It, I believe, was found at the home. I don't know how he knows where these numbers came from, what they are. There's handwritten notes in here. He's not -- he wasn't there. He's not in a position to explain what these documents are without -- it's just a hearsay compilation.

THE COURT: All right. Well, what's your response?

MR. GASNER: He's an expert. He relied on these. They're not offered for the truth of the matter asserted but, rather, to illustrate his opinion and he'll describe to the jury what they are. If Mr. Axelrod thinks he doesn't know what he's talking about, he can cross-examine him.

MR. AXELROD: He can talk about them, but this document doesn't come in just because he's an expert.

THE COURT: All right. My ruling is the objection is sustained pursuant to Rule 703. You can certainly ask him whether he relied on this document and what his conclusions are

based upon it, but you cannot get into the content of it because it's hearsay. It's also lacking foundation. So I'm going to sustain the objection.

(The following proceedings were heard in open court:)

MR. GASNER: May I proceed, Your Honor?

THE COURT: Yes. The objection is sustained.

BY MR. GASNER:

Q. I want to ask you about the process calculations that you reviewed as part of your study.

Can you tell the jury generally, based on your review, how Performance Group put together the process flows that we see on Exhibit 477 [sic] in the left side?

A. From the documents I saw, there were too many sources of the information. The first one there were a number of Excel spreadsheets which showed the calculations for most of the plant. They had the supporting calculations behind them, like all Excel tables.

In addition, there was series of documents that I reviewed which specifically stated FactSage. These were very complicated, very comprehensive calculations using what I would consider sophisticated calculations using a lot of things we call thermodynamics, equations which calculate temperatures and pressures.

Q. And is FactSage a software that's commonly used in the industry?

A. I don't know that it's commonly used. It is commonly -- it is available because I found it on their website and studied it on the website.

Q. Did you study the FactSage calculations?

A. I did.

Q. Did you correlate them to the work that USAPTI and Performance Group did?

A. Yes, I did.

Q. And can you tell the members of the jury what you found?

A. As I say, there were very sophisticated, very detailed calculations referring to -- the ones I reviewed in particular related to the chlorination reactions. They contained a lot of information.

MR. GASNER: Your Honor, may I approach with Exhibit 1519?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Can you tell us what that is, Mr. Cooper?

A. Yes. This is a summary report dealing -- from Arthur D. Pelton, Youn-Bae Kang, regarding the FactSage work and the fluid bed chlorination process using FactSage.

Q. What is the date of this report on the front page?

A. April 2006.

Q. Is this a document that you reviewed as part of your opinions?

A. Yes, I did.

MR. GASNER: Your Honor, move the admission of 1519.

MR. AXELROD: Same objection, Your Honor.

THE COURT: Same ruling. Sustained.

BY MR. GASNER:

Q. Can you describe the methodology of the mass and heat balances using the FactSage program that you determined based on your review of the records?

A. The FactSage program shows that it has a very large database of chemical reactions. The people who generated the report used that database to calculate all the reactions. And the one that I particularly studied around the chlorinator, it tells you how much heat is required, how much heat is generated, all the flow rates, how much carbon monoxide produced, how much carbon dioxide produced. It is very detailed.

It also continues, although I did not quite go into the details of it, of the rest of the TiCl plant.

Q. Let's go back to Exhibit 1477, which has been admitted. And if we could look at -- back at page 3, PFD-3. And if we could zoom in on the actual little sketch of the chlorinator there.

Did you study the design of the 30K chlorinator?

A. Yes, I did.

Q. Can you tell the members of the jury what were the design

features that they used?

A. Essentially, chlorinators in the industry are the same. They vary in diameter and height depending on the throughput you put through them. There are specific differences relating to how the gas is distributed, although that's not shown on this drawing.

But particular on this drawing what I see is, that this chlorinator has only a partial brick lining.

Q. How does that differ from other chlorinators you've seen in your experience?

A. There are a few chlorinators that do not have a domed -- the top part of the chlorinator which is not lined. Most chlorinators are completely lined.

Q. Have you come to know how the DuPont chlorinators are bricked?

A. Yes, I have.

Q. How is that?

A. Fully lined.

Q. In terms of the rest of the process flows, we talked about coke and ore. We won't go through each of these, but let's go to the PFD-5 if we could, Mr. Guevara.

Can you tell us what the draw system is?

A. In the ore there are some compounds, some chemicals that either don't react with the chlorine, or the products of the reaction are actually liquid even at a thousand degrees

centigrade. They steadily build up in the chlorinator bed; and if you don't draw them off, then the bed will either stop reacting altogether, or it will go what we call sticky. It will be like toffee and then you won't get reaction either.

Q. What was the design solution that Performance Group used to solve this problem?

A. They installed a tank, a refractory line tank, with a piece of piping that connected to the chlorinator with very high-temperature valves because you're dealing with thousand degrees centigrade. The tank then vented to a scrubber, which is shown.

And on the right of the drawing, in fact, there is a cooling system because this material is thousand degrees centigrade. So when you mix it with water, it gets very hot, so you have to cool it.

Q. Let's go to the next page, the process flow diagram 06. Did you review this as part of your opinions?

A. Yes, I did.

Q. And what can you tell us about how this was designed?

A. This is the condensation system. It is different to anything that I've seen before.

Q. How's that?

A. It runs at very different temperatures. It's only got a couple of condensers shown. It's just different. It's not typical of the industry. It's not described in textbooks.

Q. Let's continue on to the fume disposal, the next PFD. What did you do to determine how this was designed?

A. Looked at the PFD, looked at the P&ID, and read the process description. Again, this is very different from what I'm typically used to in the industry, and it's -- it's just different. It's not as efficient as most of the modern ones would be.

Q. And in looking at these last two sections that you described, did you find anything that had not been publicly disclosed or readily ascertainable?

A. No. These are all -- they're all plain sort of standard pieces of equipment in the industry.

Q. You mentioned P&IDs. Can you tell the members of the jury what phase of the project that involves?

A. P&IDs start being drawn immediately after you finish the process flow diagrams for the first time. P&IDs have a lot of information which relates to pipe sizing, for instance. It has control systems on it, which none of these drawings do.

In other words, it shows how to control the plant. It shows a lot of valving. It begins to show materials of construction for the piping. In modern drawings, which some of these are, it shows all the safety interlock systems as well.

MR. GASNER: Your Honor, may I approach with Exhibit 2175?

THE COURT: Yes.

BY MR. GASNER:

Q. Did you review 2175 as part of your opinions?

A. Yes, I did.

Q. What is it?

A. This is the piping and instrumentation diagram for the petroleum coke handling systems.

MR. GASNER: Your Honor, this document has been admitted, and I would request permission to display it.

THE COURT: Yes, you may.

BY MR. GASNER:

Q. In the middle part here it talks about the vendor system. Do you see that?

A. Yes, I do.

Q. Is that what you were talking about before, there's a whole ore and coke --

A. This is the drying system. When -- coke sometimes is delivered wet, and you don't want moisture into the chlorinator. So in this particular case, they chose to have a fluid bed dryer installed to dry the coke. This is a standard commercial package.

Q. But even if you have a standard commercial package, you have to do all the connections and all of that?

A. And what you -- exactly. And what you see is going across the dashed line, you will see a change in detail. So you'll see pipe sizes to the left; but within the vendor package, you

don't see any details.

Q. Okay. So maybe you can just explain to us what all these little circles and Xs and things mean. We've kind of looked at these briefly, but perhaps you could take us to the next level of understanding.

A. There is a standard nomenclature for all of these symbols issued by the Instrument Society of America. So, for instance, a diamond with an "I" in it is always an interlock; a circle with no lines or anything is always field-mounted equipment. So if I could point.

Q. Please do.

A. If I can draw here (indicating) -- sorry. I'm terrible.

The circle is there (indicating) -- that's better. Thank you very much -- show that those are field-mounted instruments.

Q. Okay. So the record should reflect that you pointed to WSH 1806, WSL 1805, and WT 1806.

A. That's correct.

Q. So what are -- those are instruments?

A. Those are instruments that are used, in fact, to weigh in this case, because, again, it's a standard nomenclature. So that says "WSH" stands for weigh switch high. It tells you when the hopper's full.

It then sends a signal back to the computer system to the left -- correct -- which tells you -- "WAH" tells you in the computer system there is a weight alarm high. So it will tell

you when you're filling -- when you fully filled in the hopper. These are all standard things. So you just go to the tables and you look them up, and they've all got their own meanings.

But the particular things that I was trying to emphasize very badly here (indicating), you can see that the line has actually got a sizing, in this case 1 inch, 25 is the millimeters. The process fluid that's going down it, air. A line number which would refer to a table in which you'd look for more details, then 50 -- sorry, S5, which would be the actual piping specification which told you the material of construction. These are all standard ways of doing things. But inside the box you won't find hardly any of that, if any.

Q. Okay. Let's talk about another level of the process. We've now gone through some process flows, a P&ID.

MR. GASNER: Your Honor, may I approach with 2174? Your Honor, if I might approach?

THE COURT: Yes.

MR. GASNER: Yes, thank you.

THE COURT: Has this been admitted yet?

THE CLERK: No.

THE COURT: No. Okay. Thank you.

THE CLERK: You're welcome.

BY MR. GASNER:

Q. Did you review this document as part of your opinions?

A. Yes, I did.

Q. What is it?

A. This is an equipment list for the 30K.

MR. GASNER: Your Honor, move the admission of 2174.

MR. AXELROD: Objection, Your Honor.

THE COURT: Sustained.

BY MR. GASNER:

Q. Can you tell us just generally, what's an equipment list?

A. It lists all the equipment on the plant by number, usually by process flow diagram, although sometimes it lists it by piping and instrumentation diagram. It gives you a brief equipment description, which is usually included in other process descriptions.

If you've actually written a specification for the piece of equipment, it will tell you what the specification number is. And, again, these are typical of all projects.

It tells you the material of construction. Sometimes when you're using -- they've got motors on them, electric powers supplied to them. It will tell you what you expect the power to be, how big the power supply needs to be.

It usually then includes some basic data; such as diameter, height, length, things like that. There's always a remarks column so you can qualify everything that you've said before.

Q. And what part of the process is involved in actually designing each and every item on the equipment specification?

When does that happen?

A. Normally what you do is generate the equipment list first, and that acts as an index for all your equipment specification sheets which follow. That's the classic way of doing the project.

Q. Did you review all those drawings for the 30K project?

A. Yes, I did.

Q. Were there a lot them?

A. There were a lot of them.

Q. Now we're down to drawing the actual equipment, what are the other pieces of the puzzle in putting together a plant such as the 30K project?

A. There are a number of other documents. I mentioned on the P&ID there is a line number. There will be another index with all the line numbers listed with flow rates, temperatures, pressures, insulation, a whole raft of details. There will be an instrument list backed up by a complete specification for each instrument.

There will be what is -- some people call it a safety or a control system or an interlock system showing you all the interlocks on the plant. So, in other words, if something happens to go wrong, it shuts down automatically, and that will tell you all that.

And then there's usually another document, which has various names, but some of the equipment doesn't fit. It

doesn't fit into a standard specification sheet, so they're called various names. I call them piping specials, for instance, which is a separate sheet of paper where you put in special details about that particular piece of equipment. There are more, but I just can't recollect them all at the moment.

Q. Did you go through all those documents for both the 30K and the 100K plants?

A. Yes, I did.

Q. Let's move from ore and coke handling.

Mr. Guevara, if we can go back to 2615. And let's zoom in, if we might, on the chlorinator section. So let's see if we can get that in the middle, Mr. Guevara. Thank you.

And perhaps, Mr. Guevara, you can draw -- or, better yet, Mr. Cooper, can you draw a section around the chlorinator and the --

A. (Witness complying.) Better.

Q. Okay. How many chlorinators have you designed in your career?

A. Last count was eight.

Q. Have you studied the chlorinators that are at other plants in the titanium dioxide industry?

A. Yes, I have.

Q. What are the commonalities between and among all the chlorinators that you've designed or reviewed?

A. They're all round. They all have straight sides. They all have a domed end, which is the top of the chlorinator. We call it a dome. They all have a gas distribution system. They all have an outlet. There is a slight difference on some chlorinators that the outlet is not quite on the top, it's on the side at the top.

They are all pressure vessels by code. And when I say that, to an engineer that means something special.

Q. What does that mean?

A. It means they're all designed to this American Society of Mechanical Engineers Pressure Vessel Code. We refer to it as ASME-8. These are all pressure vessels.

Q. How about the temperature of intended operation for the chlorinators you've seen in your experience?

A. There are very narrow ranges. The ranges typical would be between 950 degrees centigrade and approximately 1,030 degrees centigrade. The pressures also are very similar with a few exceptions. Typically they run 10 to 15 pounds.

Q. Did you review patents relating to chlorinators?

A. There are many, many patents relating to chlorinators.

Q. In your report, kind of ballpark, how many patents did you find that relate to chlorinator design?

A. I think in my book I've got 30 to 40 that I actively rely on, and I usually use two or three as examples.

MR. GASNER: Your Honor, may I approach with

Exhibit 2290?

THE COURT: Yes.

BY MR. GASNER:

Q. What is 2290?

A. This is one of the early DuPont patents on chlorination, patented in 1971.

Q. Is this document part of your opinions?

A. It is.

MR. GASNER: Your Honor, move the admission of 2290?

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 2290 received in evidence)

BY MR. GASNER:

Q. So can you tell the members of the jury what this patent discloses about chlorinator design?

A. I tend to use the examples because they're written in plain English; but it says this chlorinator here operates at 950 degrees centigrade.

Q. All right. So, Mr. Guevara, let's go to Column 4, line 2 through 5.

And can you tell the members of the jury what you found significant about this patent?

A. Well, this temperature is the standard, one of the standard quoted temperatures for the operation of a chlorinator.

Interestingly, if you do the calculations, you can actually calculate what the flow rate through the chlorinator is, because it tells you it's 122 cubic feet per second of effluent of the gas coming off.

It also tells you what the outlet dope diameter is for this particular chlorinator.

Q. Why is that significant?

A. Because you need to know the diameter and the residence time to be able to spray enough cool TiCl4 to cool the gases to the required temperature.

Q. So let's go, if we might, to the figure on the second page, Mr. Guevara.

And can you tell us what we're looking at here?

A. This is a sketch of the chlorinator, the offgas duct, and in this case the spray dryer assembly.

Q. Okay. So in this drawing, where's the chlorinator?

A. This is the chlorinator (indicating).

Q. Okay. And what's the vessel on the right?

A. This vessel is normally called the spray condenser or spray dryer.

Q. And what's the thing connecting them?

A. That's the spray duct.

Q. Okay. So, Mr. Guevara, if you could put this side by side with 2615.

What can you tell us, Mr. Cooper, in terms of comparing

the 30K design to what DuPont had disclosed in patents, just in terms of the overall look?

A. The overall picture looks identical, frankly, as a sketch to a sketch. They both have a chlorinator with a domed end, with an offgas duct, and with a spray dryer on the end of it.

Q. So I want to talk about some of the prior DuPont reactors or chlorinators, and what they've disclosed.

How, looking at the 30K chlorinator, how does that compare, in your experience, to Antioch and Edgemoor in terms of features that have been publicly disclosed in your opinion?

A. The Antioch chlorinator is identical to the Ashtabula 1 chlorinators that were installed on that plant. There were two of them at Ashtabula 1. There are now three because I designed the one in the middle. So I was able to, basically, copy a lot of the DuPont designs from that plant into, in fact, my own designs in the U.S.

Q. All right. So let's take this to another level of detail. We've talked about similarities at a high level between chlorinators at all these different plants.

The Government has alleged during the trial some very specific things. So let's talk about that.

If we can take a look at chlorinator velocity. Is that one of the things you looked at in your --

A. Very much so.

Q. I want to ask you some questions about Exhibit 78, which

has previously been introduced. Did you review this email as part of your work?

A. Yes, I did.

Q. And there was discussion about normal velocity being .75 --

MR. AXELROD: Your Honor?

THE COURT: Yes.

MR. AXELROD: I just want to be -- I'm sorry to interrupt Mr. Gasner. I do want to be sensitive to disclosure of specific figures in the courtroom.

THE COURT: All right. Is there a way we can avoid that at this time?

MR. GASNER: Yes, Your Honor. I can just talk about the numbers.

THE COURT: Understanding from the jury's perspective that obviously there's a difference of opinion about whether the numbers or what aspects of this may or may not be secret -- or not secret but trade secret. So in deference to at least the Government and DuPont's contention, we are attempting to keep the actual numbers out of the public domain. That has no impact on your verdict or your decision, but that's the protocol we've used.

So is there a way that you can --

MR. GASNER: Yes.

THE COURT: -- be deferential to that?

MR. GASNER: And the jury can also see the number themselves without the public hearing it.

THE COURT: Yes. It's perfectly okay for you to see the numbers. We just don't want -- this is a public courtroom, and we don't want the numbers broadcast out to the public here.

MR. AXELROD: Thank you, Your Honor.

THE COURT: And, Mr. Gasner, would this be a good time for a break while you get ready?

MR. GASNER: Absolutely.

THE COURT: All right. Ladies and gentlemen, we're going to take our second and last break. Keep in mind the Court's usual admonitions. Keep an open mind. Don't discuss the case or get any information. And I'll see you in 15 minutes.

(Proceedings were heard out of the presence of the jury:)

THE COURT: All right. You can step down.

May I ask you how long -- how much more you have on direct estimated?

MR. GASNER: Definitely through the end of today.

THE COURT: Okay.

MR. GASNER: And then several hours tomorrow.

THE COURT: Okay. All right. Thank you. 15 minutes.

(Recess taken at 11:41 a.m.)

(Proceedings resumed at 12:02 p.m.)

(Proceedings were heard out of the presence of the jury:)

THE COURT: All right. Let's bring the jury in, please.

(Proceedings were heard in the presence of the jury:)

THE COURT: Please be seated.

You may continue.

MR. GASNER: Thank you, Your Honor.

Q. Do you have Exhibit 78 in front of you, Mr. Cooper?

A. Yes, I do.

Q. And there is a spot about halfway down that says "Brick Inside Diameter." Do you see that?

A. I do.

Q. And there's a number next to it; correct?

A. Correct.

Q. And below that it says "Normal Velocity" and then there's a number next to that. Do you see that?

A. Yes, I do.

Q. Did you do some research to determine whether those figures are publicly available?

A. Yes, I did.

Q. Let me show you what's been marked as 3171.

MR. GASNER: May I approach, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Do you recognize this document?

A. Yes, I do.

Q. What is it?

A. It's a patent by DuPont dated 1995 regarding chlorinating titanium ores.

Q. Did you rely upon this patent in responding to the Government's allegations about Exhibit 78?

A. Yes, I did.

MR. GASNER: Move the admission of 3171, Your Honor.

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 3171 received in evidence)

BY MR. GASNER:

Q. So let's take a look at the name of this patent. This is one called "Fluidized Bed Process for Chlorinating Titanium-Containing Material and Coke Useful in Such Process." Do you see that?

A. Yes, I do.

Q. And this was issued back in 1995?

A. That's correct.

Q. Let's go to Column 4, lines 30 through 35.

And the patent disclosure talks about the chlorinator reactor operated at a temperature of 1,000 to 1500 degrees C, a superficial gas velocity of about 0.8 feet per second. Then it goes on from there. Do you see that?

A. That's correct.

Q. Okay. Can you tell the members of the jury what you

determined based on comparing the language in the patent to the normal velocity that is in Exhibit 78?

A. Those are the same numbers subject to the normal mathematical rounding that we do.

Q. Now, tell us, what is chlorinator velocity?

A. It is as the gases enter the chlorinator, you need a certain velocity to keep the particles bubbling away so they will react. Typically, it's called the fluidizing velocity. There are actually many ways of calculating it, but....

Q. Is it possible to go from normal velocity to the inside diameter of a chlorinator?

A. Yes, and I've done it many times.

Q. How do you do it, without mentioning particular numbers? But tell the members of the jury how you go about taking that number that's disclosed in the patent and going to an inside diameter of a chlorinator.

A. From the process flow diagram you know what the flow rates are to the chlorinator. It's, actually, one of the numbers there. You can add them up and calculate the volume of gas that you require. That comes out as cubic feet per minute.

You very simply divide the cubic feet per minute by this superficial velocity, and you come out with the area of the chlorinator. And then it's simple mathematics: Pi R squared equals the area. So you just calculate the radius and then the diameter of the chlorinator.

Q. Do you have an opinion as to whether the mathematical process you described is readily ascertainable by an engineer?

A. Oh, yes. Absolutely.

Q. What's your opinion?

A. I've done it eight times. It's very simple and very straightforward.

Q. And what's your opinion about whether others in your profession could readily ascertain that number?

A. Yes, it's one of the basic calculations you do in designing a chlorinator.

Q. Let me show you another patent. That last one we looked at was to DuPont.

MR. GASNER: If I might approach with Exhibit 1439, Your Honor?

THE COURT: Yes, you may.

THE CLERK: I'm sorry. The number, Counsel?

MR. GASNER: 1439.

THE CLERK: Thank you.

MR. GASNER: You're welcome.

Q. What is this, Mr. Cooper?

A. This is another patent issued to the Canadian Liquid Air Company published in 1989.

Q. What is the Canadian Liquid Air Company?

A. I believe it was part of their products at one time. It has no TiO2 plants.

Q. This is a patent --

A. It was getting into the business and doing some research.

Q. This is a patent that relates to TiO2 pigment manufacturing?

A. Oh, yes, chloride route TiO2 pigment manufacture.

Q. Did you rely upon this patent in reaching your conclusions?

A. Yes, I did.

MR. GASNER: Your Honor, move the admission of 1439.

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 1439 received in evidence)

BY MR. GASNER:

Q. So let's take a look at this patent. And, again, this is to Canadian Liquid Air. So this is not a DuPont company; right?

A. That's correct.

Q. And this one was issued in 1989; right?

A. Yes.

Q. Let's go to Column 1, line 34, 35, and 36.

And can you tell us, what's your opinion about what's disclosed in this patent with respect to gas velocity in the chlorinator compared to Exhibit 78 that is the email from Mr. Maegerle that the Government talked about earlier in the case?

A. As I said, they are the same numbers subject to mathematical rounding, which we do.

Q. Let's talk about another one of the Government's emails that Mr. Axelrod went over earlier in the case.

MR. GASNER: And may I approach with Exhibit 87 previously admitted, Your Honor?

THE COURT: Yes.

BY MR. GASNER:

Q. Sir, is that back in there?

A. Yes.

Q. Great. Keep them in there. That will be great. Thank you.

Have you reviewed Exhibit 87?

A. I have.

Q. And let's take a look at page 2, if we could. Do you recognize that as a sketch that Mr. Maegerle did?

A. Yes, I do.

Q. And how, in your experience, does that sketch compare to chlorinators that you've seen in your practice?

A. All chlorinators are brick lined. The difference with this one is that the dome is not lined, and that is not particularly common.

Q. Have you seen that anywhere, including DuPont plants?

A. Yes. There are probably two or three chlorinators that's designed like this.

Q. Which plants are those?

A. Stallingborough in the UK.

Q. That's the one that you used to work at?

A. That's correct.

Q. But this is different than DuPont plants as you've come to understand them?

A. That is correct.

Q. And how about the shape and other aspects of this chlorinator compared to the many that you've seen or designed yourself?

A. These are very typical of all the chlorinators, including the ones I designed.

Q. Let's take a look at the next page, the sketch, another one that Mr. Maegerle did for the 100K reactor. What is this?

A. This is a spray condenser. It comes immediately after the chlorinator.

Q. And how does this sketch compare to other spray condensers you've seen in your experience at all the plants you've looked at in your research?

A. It is very similar to some -- a number of companies have removed this device, but they started off with it. There are still some in existence with the typical -- with this type of device. A lot were removed. And it is typical of a spray dryer. It's not a -- it's used in very similar duties in other industries.

Q. Is there anything in the spray condenser design that you think has not been publicly disclosed prior to July 12, 2009?

A. No. It's all been publicly disclosed.

Q. And how about the calculations and their dimensions? Anything there that has not been either publicly disclosed or is readily ascertainable, in your view?

A. No. In general, it's pretty standard.

Q. Let's take a look at the next page.

What's this? This one's a little-harder to decipher.

A. This is -- sorry.

If you're looking down on the top of the plant from, you know, from an airplane, what you would see at the top of the page is actually the chlorinator, and then above that is the spray condenser. So looking down this is what you'd see.

Q. And is there anything in this sketch that strikes you as not having been publicly disclosed prior to July 12 of '09 or that couldn't be readily ascertained?

A. No. It's very similar to a lot of plants that we have.

(Pause in proceedings.)

MR. GASNER: Okay. Continuing on our discussion of the chlorinator, I'd like to approach with Exhibit 85 previously admitted, Your Honor.

THE COURT: Yes.

BY MR. GASNER:

Q. And if we could turn to -- just for the record, this is an

email from Mr. Maegerle to Mr. Liew dated in July of 2009 where Bob says, "Attached is my preliminary chlorinator design information," and he goes on from there.

Do you see that?

A. Yes, I do.

Q. And let's go to the second page, Mr. Guevara, if we might.

Have you reviewed this document as part of your opinions?

A. Yes, I have.

Q. Okay. So let's just walk through this.

It says Kuan Yin. Do you see that?

A. Yes, I do.

Q. And is there anything unusual about having a two-chlorinator plant in your experience?

A. No, there is not. It's almost universally done, if not more chlorinators.

Q. How about at Ashtabula, how many, Line 1, how many chlorinators do they have?

A. They have two.

Q. And if we continue along, the next couple of lines talk about capacity. Let's not avoid -- let's avoid calling these numbers out, but do you have that in front of you?

A. I do.

Q. Can you tell the members of the jury about the public nature of capacity information in the industry?

A. There are a number of companies who specialize in

gathering information regarding TiO2, and one of the numbers we're all interested in is how much any plant is making. These companies are well known. TZMI, IBMA, SRI, Articol (phonetic) in the UK all publish this sort of data.

Q. And is that something that competitors keep track of with each other using those publicly available sources?

A. Oh, yes, and others.

Q. Let's go on. There's some figures in the next line for ID brick. Do you see that?

A. Yes, I do.

Q. And that's the -- you talked about that earlier, how you could calculate that, right, from the --

A. Yes.

Q. -- the publicly available chlorinator velocity?

And how about the dimension for the steel? Do you see where it says that?

A. Yeah. That's very simple. Once you've calculated the inside diameter, ID, of the chlorinator, you put bricks on the inside. The bricks are standard 30-and-a-half-inch long. So it's two 13-and-a-half inches is 2-foot 3. So you have 2-foot 3 to 16-foot, and you end up with 18-foot 3. It's not rocket science.

Q. So let's go down to the next line. It talks about --

MR. AXELROD: Your Honor, I apologize to Mr. Gasner. I just want to be careful about the figures being put in

the record, and ask that that not be put on the record.

THE COURT: Yes, please. As much as possible, would you avoid that, please, sir?

THE WITNESS: Thank you, Your Honor.

MR. GASNER: I'll try -- if it's okay to lead a little bit, Your Honor, I'll try to do that.

THE COURT: Yes. That's okay.

MR. GASNER: Okay.

Q. So then there's some information in the next couple of lines about brick and mortar. Do you see that?

A. Yes, I do.

Q. Tell us about how do people in the TiO2 industry go about getting the ceramic bricks that line these chlorinators? Can you tell us about that?

A. There are a few companies who specifically make these types of refractory brick. They're not house bricks, but they are special refractories. Three or four maybe. You approach them. You ask them, "What would you use for this service?" Generally, they will tell you if it's not already been published.

Generally, then what you do is maybe run a few trials to make sure it's okay, and then you buy them.

The bricking design is usually done -- the refractory design is usually done by the refractory company. They're the experts. These refractories go into steel kilns, coke kilns,

all sorts of other industries. So they really are the experts.

Q. How about the mortar? Anything special about the mortar?

A. No, I don't recognize it. As I said to you, it looks almost like a homemade mortar. Normally you would buy the mortar from the people who make the bricks.

Q. Okay. And a little further down there's mention of a system for new beds. So without kind of talking about that specifically on the record, are you familiar with that kind of system?

A. Yes, I am.

Q. Tell us about that in general terms.

A. When you first start up a chlorinator brand new, you can heat it up by going directly -- the gases go directly to the air. There's been, in my personal experience, a number of fines issued because it's very black smoke.

So a number of companies have had to install what we call -- what I call startup scrubbers -- here it says startup blow system -- to remove this horrible black smoke, and it is visible for miles.

Q. And then a little bit below that, without getting into the figures, there's a part that says "Air Equivalent Flow" and there's a number there. Did you determine whether that number is publicly disclosed or not?

A. Yes, it is. It's just how much oxygen and nitrogen is equivalent to air.

Q. A little further down there's mention of a certain structure in the transfer line. Do you see that?

A. Yes, I do.

Q. Is that something publicly disclosed in your opinion?

A. Yeah. That's in the patents.

Q. Further on there's a diameter for the transfer line. Do you see that?

A. Yes. That's also in the patents.

Q. And --

A. And it's calculable from the velocity.

Q. So if you just have the velocity from the patent that we looked at earlier, you can readily calculate this?

A. From the process flow diagram and that velocity, you calculate the diameter.

Q. Let's go a little further down.

There was some focus earlier in the case about this jet piping spacing. Do you see that? There's a bunch of figures there --

A. Yes, I do.

Q. -- and all of that.

MR. GASNER: And if I can approach with Exhibit 86, Your Honor, previously admitted.

THE COURT: Yes, you may.

BY MR. GASNER:

Q. So if you go to the third page of Exhibit 86, do you have

that in front of you?

A. Yes, I do.

Q. And do you see the spacing configuration that's there?

A. Yes, I do.

Q. Do you have an opinion as to whether that spacing has been publicly disclosed?

A. Yes, it has.

Q. Where?

A. One, a photograph I found from Benicia Fabrication, which actually shows a photograph of the chlorinator. Benicia is located close to Antioch.

And the second one is when we opened the Australia -- West Australian plant, we handed everybody a brochure which actually shows the bottom of the chlorinator showing all these pipes and risers and manifolds.

MR. GASNER: May I approach with Exhibit 3222, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. What is 3222?

A. This is the official opening brochure that was handed out to all visitors for the official opening of the Australian plant, which I designed.

Q. And it talks about SCM Western Australia on the front. Do you see that?

A. Yes.

Q. And does this document relate to your opinions about chlorinator public information?

A. Yes. This is my document.

Q. Was this the plant that you worked at and helped build for many years?

A. Yes. I designed this one.

MR. GASNER: Your Honor, I'd move the admission of 3222.

MR. AXELROD: Objection.

THE COURT: Sustained.

BY MR. GASNER:

Q. Can you tell the members of the jury what about this particular document relates to your opinions about chlorinator spacing?

A. There is a page in the document which shows a photograph of the bottom of the chlorinator, the base we call it, which shows the actual piping, including the riser layout; and it's very easy to go from that to calculate what the riser spacing would be.

MR. GASNER: Your Honor, I would seek the admission of just that page that shows the chlorinator spacing.

MR. AXELROD: Same objection, Your Honor.

THE COURT: Sustained.

BY MR. GASNER:

Q. Is the document you have in front of you, was that publicly distributed?

A. It was, indeed, to all the people who were at the opening.

MR. HEMANN: Mr. Gasner, what page were you referring to?

MR. GASNER: The pages aren't numbered, but it's that one (indicating).

(Pause in proceedings.)

MR. GASNER: I'd like to approach, Your Honor, with Exhibit 1819 previously admitted.

THE COURT: Yes.

BY MR. GASNER:

Q. Did you review Exhibit 1819 as part of your opinions?

A. Yes, I did.

Q. And you were talking earlier about that the refractory brick manufacturers are the experts in the field in terms of how to install this refractory brick?

A. Yes, they are.

Q. How does this document, if at all, relate to your opinions?

A. This specifies the materials; the brick sizing that they wanted to use; the brick type, which is the -- gives you the specification of the bricks and how the chemicals pass through it. And it also says, basically, they will supply field

supervision at such and such a rate for the installation of the brick.

Q. Now, there are also companies that provide engineering services in this kind of thermal design?

A. There are.

MR. GASNER: Your Honor, may I approach with Exhibit 1726 previously admitted?

THE COURT: Yes.

BY MR. GASNER:

Q. Have you reviewed this photograph in connection with your opinions?

A. Yes, I have.

Q. What is it?

A. It's the bottom of a chlorinator showing the riser pipes.

Q. Do you believe that it's readily ascertainable from this photograph how to space the chlorinator jets?

A. Yes. It's very straightforward.

Q. Can you tell the members of the jury how an engineer would go about doing that?

A. From this drawing, purely you know what the standard trailer size is that goes on the roads. That will tell you the diameter of the chlorinator. And from that, you measure up the distance spacing between the various riser pipes, and you can just measure it.

Q. In the course of your preparation for your report and your

testimony, did you have occasion to go on the Benicia Fab website?

A. I did.

Q. Did you determine whether or not this picture is available on Benicia Fab's website?

A. It is, and it's showing this chlorinator.

Q. Let me ask you a few questions about nitrogen flow to the chlorinator. That was a topic of some email discussion earlier in the case.

MR. GASNER: May I approach with Exhibit 126, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. Did you review this email as part of your studies, Mr. Cooper?

A. Yes, I did.

Q. So this has been previously admitted, and perhaps we can display it, Mr. Guevara.

So this is from Mr. Maegerle to Allen Chang, cc to Walter Liew, "Nitrogen Flow to Chlorinator." Do you have that in front of you?

A. Yes, I do.

Q. And there was some discussion about that number of pounds per hour. So without repeating it, as the Government has asked that we not do, did you look into whether that number is

publicly disclosed?

A. It is disclosed. The piece of equipment is a standard piece of equipment purchased from a company called Fuller-Kinyon. They tell you how much nitrogen they will need to, basically, blow the ore and coke mixture into the chlorinator, and it was actually specified in the quotation from Fuller-Kinyon.

MR. GASNER: May I approach with Exhibit 1813, Your Honor?

THE COURT: Yes.

BY MR. GASNER:

Q. Is that the Fuller-Kinyon document you just referred to?

A. It is.

Q. Can you explain to the jury what about this document discloses the information that was on the email from Mr. Maegerle that we just were talking about?

A. Yes. This is a complete design for this piece of equipment. And going -- I believe page 5 it actually tells you how much nitrogen is required for conveying. It says so many SCFM at such and such a pressure.

Q. So let's pull the camera back a little bit and put this in laymen's terms.

On that email from Mr. Maegerle to Mr. Chang, just without getting into the numbers, what are they talking about?

A. They're talking about a very early design, and he's made

an estimate of what flow will be required. He says, "I would assume this number would be adequate."

You then -- as you progress through the detail design and you actually buy the equipment, you refine that number. And the final refining of the number comes when you actually buy the equipment and they tell you what to use.

Q. So we're still in the chlorinator part of the plant; right?

A. Yes.

Q. And this is nitrogen getting blown from where to where?

A. It's blowing ore and coke from the ore and coke handling system directly into the chlorinator.

Q. And if I understand you correctly, the equipment that does that, you buy from companies like FK Pumps?

A. Yeah, there's a couple of well-known manufacturers who do it.

Q. And can you explain to the jury what's the connection between buying that piece of equipment and the nitrogen flow that the Government has pointed to as part of their case? What's the connection?

A. You put out a request for quotation, which says you need to move so much ore and coke mixture. This goes to a company. In this case there's an agent. This company's the agent for Fuller-Kinyon.

They come back with saying, "This is what we are

requiring" -- sorry. Let's go back a step.

They are telling you what we would like -- prefer to supply to you for this duty. They tell you that. In other words, they will tell you the materials of construction. They will tell you the size. They will tell you the horsepower. They give you all the details. One of those details happens to be the amount of nitrogen you require -- their system requires to blow the ore and coke into the chlorinator.

Q. Did you look at what USAPTI actually did in designing and ordering this piece of equipment?

A. Yeah. They put out a request for quotation, and then they got it back. They went to two companies, and two companies quoted, and got a document back just like this.

Q. If I understand you correctly, the nitrogen flow that is in the document they got back from the vendor compares to the nitrogen flow figures in the Maegerle email?

A. Yes, it does.

Q. So can you tell the members of the jury, how does it compare?

A. It doesn't.

Q. So what does that tell you --

A. What happened --

Q. -- as an expert?

A. What I'm sure happened is --

THE COURT: Sir, would you wait until he finishes his

question. Thank you very much.

THE WITNESS: I'm sorry, Your Honor.

BY MR. GASNER:

Q. What does that tell you as an expert? If you can put that into laymen's terms for the members of the jury.

A. Basically, that Fuller-Kinyon knows more about their job than we do, and they told them, "This is what you really need."

Q. Let me show you what we've marked as 2326.

MR. GASNER: May I approach, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. What is this, Mr. Cooper?

A. This is a DuPont patent showing how they feed their chlorinators. It was issued in 1994.

Q. Does this patent relate to your opinions about this nitrogen flow email that we've been talking about?

A. It does.

MR. GASNER: Your Honor, move the admission of 2326.

MR. AXELROD: No objection, Your Honor.

THE COURT: It's admitted.

(Trial Exhibit 2326 received in evidence)

BY MR. GASNER:

Q. So this is from a fellow named Eastham; is that right?

A. That's correct.

Q. And the title is "Solids Feed System and Method for

Feeding Fluidized Beds"; is that right?

A. That's correct.

Q. So in laymen's terms, we're still talking about how to get coke and ore into the chlorinator?

A. That is correct.

Q. Let's go to Column 7, line 59 through 65.

And this is a DuPont patent; is it not?

A. It is.

Q. And in the patent it discloses use a Fuller-Kinyon pump; true?

A. That is correct.

Q. So tell the members of the jury, kind of connecting this up, what is this patent? In connection with the earlier document you looked at, what does that tell you about the public availability of nitrogen flow information to a chlorinator?

A. All the design details are in this patent. They changed the system slightly in that they put a brick tank in, otherwise it is identical.

Q. And, also, just looking at the patent, you would know to go to Fuller-Kinyon?

A. Yes, I would.

Q. And is that a big secret, Fuller-Kinyon?

A. No, it is not.

Q. What kind of company are they?

A. They are a materials handling company. They specialize in this type of equipment.

MR. GASNER: So let's go ahead and display 1813 previously admitted, if I may, Your Honor.

THE COURT: Yes.

MR. GASNER: And, Mr. Guevara, if you could go to --

Q. What is FLSmidth?

A. They are agents for Fuller-Kinyon.

Q. And then if we go to page 5 of the document, Mr. Guevara, if you don't mind.

Down at the bottom there it says, "Nitrogen Required for Conveying." Do you see that?

A. Yes, I do.

Q. Can you tell the members of the jury what those numbers mean?

A. Those are the nitrogen flows that we've been talking about. These are those numbers expressed as a volume rather than a weight.

Q. And how does this number compare to what was in the Maegerle email?

A. It doesn't. It's different.

Q. So is it fair to say that whatever Mr. Maegerle said back in the email, that USAPTI followed the advice of Fuller-Kinyon?

A. That is correct.

Q. Let me ask you about the fluidization air requirement.

This is another one of Mr. Axelrod's emails. This time Number 82.

(Pause in proceedings.)

MR. GASNER: I seem not to have the original.

THE CLERK: It will be in the box over there.

MR. GASNER: Can you pull 82, the original for me, please?

(Pause in proceedings.)

MR. GASNER: Ms. Ottolini, have we admitted 3171?

THE CLERK: 3171?

MR. GASNER: May I approach, Your Honor?

THE COURT: Yes.

THE CLERK: Yes.

MR. GASNER: It's already admitted?

THE CLERK: Yes. Today.

MR. GASNER: Okay. So, yeah, I think he's got it up there. Thank you.

THE CLERK: He does.

BY MR. GASNER:

Q. Are you looking at Exhibit 82, Mr. Cooper?

A. Yes, I am.

Q. And let's put it up on the screen.

Another email from Mr. Maegerle to Mr. Liew.

And if we go down -- a little further down where it says -- a little further down still, please. Let's just look

at the bottom of the email string.

So here Mr. Liew is saying to Mr. Maegerle, cc to Mr. Patel, that Pangang had sent a calculation of fluidization air at the chlorinator. Do you see that?

A. Yes, I see that.

Q. Tell us, what is fluidization air?

A. When you're starting up or shutting down a chlorinator and you're not using chlorine, you're required to keep the bed fluidized. To do that, you use a mixture, sometimes of oxygen and nitrogen, sometimes air. So it's called fluidization air to keep the chlorinator fluidized so you can cool it down.

Q. And the email suggests that Pangang sent their own calculations over; right?

A. That's correct.

Q. Is that unusual in the TiO2 industry?

A. No. It's a very simple calculation.

Q. But in terms of the process of dealing with a customer, can you tell us a little bit about the interplay between engineers typically in this industry and the front-end engineering firm?

A. There is a definition of what the engineering firm is required to supply as part of its contract. What is called the ISBL, inside battery limits, that is what the engineering contractor is required to supply. There is another term, which is OSBL, which is outside battery limits, that the client is

required to supply.

In this particular case, from what I've been able to review, the supply of air was going to be supplied by the client.

Q. Okay. And is that unusual to have the client doing some things?

A. No. It's very usual.

Q. So this is a dialogue about Pangang's calculations; true?

A. That is correct.

Q. And then a little bit further up Mr. Maegerle weighs in with a bunch of figures that he's recommending; true?

A. That is correct.

Q. And, again, without getting into any specifics here, he's got a flow rate in feet per second. Do you see that?

A. I do.

Q. And that was the subject of your earlier testimony. That particular flow rate, again without talking about what it is, you can figure -- that's in the DuPont patents; true?

A. That is correct.

Q. And from that figure, you can figure out the rest of what's in Mr. Maegerle's email; is that true?

A. Yes.

Q. All right. So let's move a little further down the plant. We talked about, earlier in the case, about tail gas scrubbing. Did you read testimony about that?

A. Yes, I did.

Q. Can you tell us, what is tail gas?

A. These are the gases that are produced in the chlorinator mainly due to the combustion of carbon and oxygen. There's also gases coming back from the oxidation unit, such as nitrogen and HCL, which are formed as part of their product. These gases ultimately are going to end up in the atmosphere.

Q. So this is what goes up the smokestack?

A. That is correct.

Q. So set the stage for us a little bit. Are there regulations in this whole area?

A. They keep changing but, yes, there are.

Q. So Clean Air Act, things like that?

A. Title V, the Clean Air Act, is the one we always cite.

Q. Is this an area of design that is unique to TiO2 or is this part of design of many plants?

A. No. EPA Title V of the Clean Air Act.

MR. GASNER: May I approach with Exhibit 91 previously admitted?

THE COURT: Yes.

BY MR. GASNER:

Q. This is one of the emails that Mr. Axelrod went over with Mr. Dayton and others. Have you had a chance to review this?

A. Yes, I have.

Q. And it talks about tail gas stack velocities; true?

A. Correct.

Q. What does that mean?

A. The gases that you're putting up the stack are -- actually can be quite noxious, not very nice. So in order to get them to disperse into the atmosphere, you have to get a certain velocity out of the stack so they're pushed upwards under all wind conditions, that they don't come down to the ground again.

Q. Did you form any opinions about whether the information in this email about tail gas stack velocities has been publicly disclosed or is readily ascertainable?

A. Yes. There are a number of public documents telling you, basically, how to calculate it.

MR. GASNER: May I approach, Your Honor, with Exhibit 3484?

THE COURT: Yes.

BY MR. GASNER:

Q. What is this, Mr. Cooper?

A. Oh, this is the OSHA manual. OSHA is the Occupational Safety Health Administration of the U.S. Government, and this is one of their advisory documents which tells you basically how to design a stack.

Q. Is this a publicly available document?

A. Yes, it is.

Q. Did you find it in your research?

A. Yes, I did.

Q. Do you use this document in your consulting activities?

A. Yes, and others.

MR. GASNER: Your Honor, I move the admission of 3484.

MR. AXELROD: Objection.

THE COURT: Sustained.

BY MR. GASNER:

Q. Can you tell us, Mr. Cooper, how this document relates to your opinions?

A. It gives you a number of guidances on how to design the stack. One of the guidances is, it has to be a certain height above the nearest building, for instance, so that doesn't affect it.

But one of the other guidances he tells you to use, I believe this one is 1.5 times the wind speed to prevent downwash. And downwash is where the gases come back down again.

Q. So tell us, how does the subject matter of Mr. Maegerle's email on tail gas, how does that relate to wind velocity?

A. In the email, he gives a particular exit velocity from the stack. When you calculate out what that means, it -- because he quoted in feet per second, wind speeds are miles per hour, so when you do 1.5 times miles per hour and convert it to feet per second, you get this answer.

Q. So if you go from the OSHA requirements based on wind speed, you end up in the same place?

A. You do.

Q. Is that a complicated calculation?

A. No.

Q. Let me ask you about another email that the Government... I think this one's the same, so we can skip over that.

MR. GASNER: Ms. Agnolucci, can you give me a hand with Exhibit Number 91, please? I don't seem to have it here.

MS. AGNOLUCCI: It's missing from here.

MR. GASNER: Ah ha. Okay. Thank you.

(Pause in proceedings.)

MR. GASNER: No luck?

(Pause in proceedings.)

BY MR. GASNER:

Q. Do you have Exhibit 91 with you, Mr. Cooper?

A. (Witness examines documents.) 91 you say?

Q. Yes.

A. (Witness examines documents.) Yes.

Q. Fantastic.

MR. GASNER: So this document previously admitted, may we display it, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. This deals with fume disposal systems. And could you look at this email and determine whether there was anything that wasn't nonpublic on it?

A. In fact, there are three systems on this email.

Q. Okay. Perhaps you can give us your analysis of this email.

A. The first at the top of the page 2 drawing is what we discussed as the tail gas system.

Bottom left you have some fume escapes from the process, so you have a maintenance vacuum system which draws these fumes and scrubs them.

And the third one is, actually, in a process upset on the chlorinator. You can get chlorine passing through the process, and this is the chlorine scrubber, I believe.

The chlorine scrubber system going reverse order, that's in many documents, including the Chlorine Institute, the World Chlorine Council, and others. It's standard. You must have one, actually.

The maintenance vacuum system, there's nothing special about that whatsoever. In fact, looking at this particular drawing, it looks to be a piece of equipment that's all very similar to one that DuPont's selling to the public. You can go and buy one because we actually ran this system in our Baltimore plant.

The top system is somewhat different because it has a four-stage scrubbing system, which is not totally typical of most plants. It's -- four stages is one stage more than I'm used to designing, let me put it that way. But that's what

this drawing represents.

Q. Okay. You said a lot there.

Let's go to the email, if we could, Mr. Guevara, at the beginning of this document, and let's blow up the first -- well, let's just grab the first sentence, if we might.

And it talks about DeLisle and Jinzhou, and then it talks about Antioch/Ashtabula. Do you have that in front of you?

A. Yes, I do.

Q. Okay. And what Mr. Maegerle is saying here is that the attached sketch shows DeLisle Line 2; right?

A. Correct.

Q. But if I understand you correctly, that sketch has nothing that hasn't already been disclosed?

A. That is correct.

Q. And it says it's different than Jinzhou. Do you see that?

A. Yes, I do.

Q. Do you agree?

A. Yes, it is different. I've seen the Jinzhou.

Q. Based on your brief visit to Jinzhou, what's the difference?

A. No. From the drawings I saw, the Jinzhou scheme is very simple. This is referring to the Jinzhou design, I believe, by Performance Group, and it's very different to this.

Q. Mr. Maegerle goes on to talk about Antioch/Ashtabula technology. Do you see that?

A. Yes, I do.

Q. Can you tell the members of the jury what's the relationship between Antioch and Ashtabula?

A. Ashtabula 1, Line 1 specifically, was a direct copy of Antioch.

Q. Okay.

A. And --

Q. So Ashtabula 1 was the plant DuPont built for Sherwin-Williams; is that --

A. That is correct.

Q. And that design was Antioch as of that time?

A. That is correct.

Q. Okay. And what was the Antioch/Ashtabula fume disposal technology based on; your long history with those plants?

A. Very simple, a couple of stages. Not the three or four stages we see today. I replaced it.

Q. You mentioned that this four-stage, three-stage business.

A. Yes.

Q. What did USAPTI end up doing for fume disposal for 30K and 100K plants?

A. For the 30K plant, the drawings I saw showed a two-stage system. For the 100K, they showed a four-stage system with two chlorine scrubbers. So they had a process chlorine scrubber and an emergency chlorine scrubber.

Q. Are there patents in this area?

A. Relating to the tail gas, yes. Relating to the scrubbers themselves, not much because they tend to be standard pieces of equipment. You calculate them from textbooks, so you buy them from suppliers.

Q. You mentioned that DuPont actually sells scrubbers?

A. Yes.

Q. What kind of scrubbers are those?

A. They're called DynaWaves.

Q. What kind of technology do those use?

A. Those are reverse jet with a disengagement tower after them, slightly different to the drawings that are shown here in that the specific thing about them is they -- the scrubbing liquid is injected against the flow of gases. This one it tends to show it into the flow of gases. Ashtabula 2 used DynaWaves.

Q. And is that an off-the-shelf system --

A. Yes.

Q. -- that you can buy from DuPont?

A. Yes, it is.

MR. GASNER: May I approach, Your Honor?

THE COURT: Yes. Which exhibit are you showing him?

MR. GASNER: 1247.

THE COURT: Yes.

BY MR. GASNER:

Q. What is 1247?

A. This is the Web printout of the DuPont DynaWave scrubber.

Q. Is that something that you looked up on the Internet?

A. Yes, it is.

Q. And does it disclose details of how that works?

A. Yes. There's a flow diagram on the bottom of page 1.

MR. GASNER: May I approach, Your Honor, with Exhibit 2287?

THE COURT: Yes, you may.

THE CLERK: Sorry. The number?

MR. GASNER: 2287.

Q. There was some discussion in the prior email about the cooling tower. Do you recall that?

A. Yes. Yes.

Q. And can you tell us, what's a cooling tower?

A. I'm sorry. Which exhibit are you referring to?

Q. I think it's in 91. I may have....

(Pause in proceedings.)

MR. GASNER: I may have this patent out of order. May I retrieve it, Your Honor?

THE COURT: Yes, you may.

(Pause in proceedings.)

MR. GASNER: Okay. So let's go back to 2615, if we might, Mr. Guevara.

Q. And let's back up a little bit. We've talked about the chlorinator; and then the structure that looks like a spinning

top, the spray condenser; and we've now been through the next sections, which are the gas scrubbing and fume disposal.

A. The next section is condensation.

Q. Have you seen any allegations in the testimony to date about the condensation part of the system?

A. No, I haven't.

Q. So let's keep going.

The smokestacks are around the gas scrubbing and fume disposal area. We just talked about those.

A. Correct.

Q. So are we now done with chlorination?

A. We are done with chlorination as such. We haven't finished with the TiCl plant yet.

Q. Okay. What else do we have to discuss on the TiCl plant?

A. The purification system.

Q. Okay. Did you figure out anything with respect to the purification system that has been alleged in the trial, or are you referring back to earlier phases of your --

A. I was referring back to earlier phases of my work.

Q. I want to limit our discussion to what the Government has alleged at the trial. So are we done with the TiCl plant as far as you're concerned?

A. Yes, we are.

THE COURT: Let's take a break --

MR. GASNER: Yes. Absolutely.

THE COURT: -- a stretch break.

(Pause in proceedings.)

THE COURT: All right. Please be seated.

You may continue.

MR. GASNER: Thank you, Your Honor.

Q. In terms of the allegations by the Government that you saw in all the transcripts of the trial to date, did you find anything in the TiCl plant, as designed in both the 30K and 100K plants, that you felt was not publicly disclosed or readily ascertainable?

A. No. I found everything in the public that I could work out myself quite easily.

Q. Let's move, then, to the oxidation reactor and the oxidation part of the plant.

And I'd like to focus on the time frame a little bit. 30K project, the drawings started about 2006; is that --

A. That's what I saw from the files, yes.

Q. And you visited Jinzhou in 2005?

A. That is correct.

Q. Did you have an opportunity to observe the oxidation plant at that time?

A. Yes, I did.

Q. And did you review all the drawings that were done by Performance Group in designing the oxidation reactor for the improved Jinzhou plant?

A. Yes, I did.

Q. And how did the improved plant compare to what they had before?

A. It was very, very similar.

Q. Were you able to ascertain any innovations added to the oxidation reactor in the 30K plant that weren't publicly disclosed or readily ascertainable?

A. No.

Q. I want to talk a little bit about some of the emails about the oxidation reactor that the Government has talked about.

MR. GASNER: May I approach with Exhibit 100, Your Honor, previously admitted?

THE COURT: Yes, you may.

MR. GASNER: May we display it, Your Honor?

THE COURT: Yes, you may.

BY MR. GASNER:

Q. So to get oriented, another email from Mr. Maegerle to Mr. Liew in 2009, and it talks about certain metrics that we're not going to repeat about the purge wall insert. Do you see that?

A. Yes, I do.

Q. What are we talking about here?

A. The reactor is composed of a -- the oxidation reactor is composed of a number of components. The front part of the reactor is normally called the insert, quite why I'm not sure

but it is.

Q. Okay. So let's, Mr. Guevara, if we could go to our 3D model for oxidation, 2617 previously admitted.

MR. GASNER: May we display it, Your Honor?

THE COURT: Yes.

BY MR. GASNER:

Q. Okay. So get us oriented here a little bit on this kind of -- we've spent much of the day talking about the TiCl plant. Now we're moving to the second part of all TiO2 factories. This time the oxidation plant; true?

A. That is correct.

Q. All right. Walk us through briefly, if you would, how this 3D model of the 30K design worked.

A. Okay. As I explained earlier on, TiCl liquid is pumped into the process and it's heated. This piece of equipment here is the TiCl4 vaporizer where the TiCl4 is heated.

Q. This is the one that looks like the beer bottle on the right?

A. That is correct.

Q. Okay. Or wine bottle, as the case may be.

And what's that again?

A. That is a TiCl4 vaporizer.

Q. What does that do?

A. It boils the TiCl4 and heats it up to 450 degrees C.

Q. Where does that go?

A. That goes across here (indicating) into the Al chloride generator, this piece of equipment (indicating).

Q. Which one is that?

A. Sorry. I'm getting to it. I put a horrible cross over it.

Q. Okay.

A. That is the Al chloride generator (indicating).

Q. And then where is the oxidation reactor that we've been talking about?

A. Right. Those gases that we've just produced go down into the oxidation reactor here (indicating).

Q. And, so, basically there's heated up oxygen and heated up TiCl that go into the oxidation reactor; is that the way it works?

A. Yes.

Q. Okay.

A. The smaller wine bottle on the left-hand side is the oxygen heater.

Q. Okay. In terms of the TiCl heater and the oxygen heater, what can you tell us about how Performance Group designed those pieces of equipment from your review of the records?

A. They don't design them.

Q. How do they end up with all these drawings?

A. They are a standard piece of equipment that you go to a supplier and buy.

Q. Okay.

A. They are very common in the petrochem industry. The TiO2 chloride route uses relatively a small number of those types of devices. So you would go to a supplier, and they would give you all the information you require.

Q. Okay. And this insert, the O2 insert that was the subject of Exhibit 100, where is that?

A. That's at the front of the oxidation reactor.

Q. All right. And this particular view doesn't show any piping. We're just looking at the vessels; right?

A. That's correct.

MR. GASNER: Okay. Mr. Guevara, can I challenge your 3D skills? Can you add the piping or is that asking too much?

MR. GUEVARA: I believe I can do it.

(Pause in proceedings.)

MR. GUEVARA: Actually --

MR. GASNER: Is that harder than --

MR. GUEVARA: This version does not contain piping.

MR. GASNER: All right. Thank you for trying.

Q. So perhaps you can just verbally say, Mr. Cooper, the front -- let's zoom in a little bit, Mr. Guevara, if you don't mind -- and the front of the reactor is closer to the flue pond?

A. That's correct.

Q. Okay.

A. The gases leave the front of the reactor through the insert and then go directly into the flue pond.

Q. All right. So now that we know where the insert is, let's go back to Exhibit 100, the email.

Okay. And it talks about certain metrics to the purge wall insert. What are we talking about here now that we know a little bit about where we are in the oxidation plant?

A. So you started mixing hot oxygen and hot TiCl. They start reacting immediately; and because of the very high temperatures, they tend to stick to the walls of the reactor, the insert.

So this particular design has holes in the wall through which you pass gases, which keeps the walls from building up titanium dioxide. All reactors have this problem. Some sort it out a different way, but this is one of the ways it is done.

Q. And is this way of doing it, the purge wall insert, is that a way that's been publicly disclosed in the past?

A. Yes, it is.

Q. Where in your research or knowledge do you believe that's been publicly disclosed?

A. There are a number of DuPont patents that tell you that it's got holes in it and other details.

Q. And what about the particular figures here, again without repeating them, are those publicly disclosed or readily ascertainable?

A. They are readily ascertainable. I believe some are actually mentioned in the patents. This is very early relatively in the detail design, and I believe these numbers changed. Here he says they're using Cl2, which is chlorine. Later designs that I saw, in fact, only used nitrogen for this service.

MR. GASNER: Your Honor, may I approach with Exhibit 2299?

THE COURT: Yes.

BY MR. GASNER:

Q. Is this a patent that you relied upon in reaching your opinions, Mr. Cooper?

A. Yes, it is.

Q. Does it relate to the topic we've been discussing on email Exhibit 100?

A. Yes, it does.

MR. GASNER: Move the admission of 2299, Your Honor.

MR. AXELROD: No objection, Your Honor.

THE COURT: Admitted.

(Trial Exhibit 2299 received in evidence)

BY MR. GASNER:

Q. So let's take a look at the title. DuPont patent; correct?

A. That is correct.

Q. Issued back in 1974; true?

A. That is correct.

Q. Okay. And this one talks about "Production of Anatase TiO2 by the Chloride Process." So we're talking about chloride route?

A. That is correct.

Q. And let's go to Column 5 at line 54 and a few lines below that.

Okay. "Immediately downstream of the juncture," it goes on, "dry chlorine gas as a coolant passes into the product stream through a series of holes provided in the sidewalls of the reactor." Do you see that?

A. Yes, I do.

Q. Tell us how, if at all, that disclosure in the patent relates to your opinions about the email 100?

A. That describes the reactor insert precisely.

Q. And then if we go to Column 6, lines 14 through 16, what does that tell us about the various figures that we saw in Exhibit 100?

A. It actually tells you how much chlorine you have to put in through the holes, so many kilograms per minute.

Q. Let me ask you to take a look at previously admitted Exhibit 119.

MR. GASNER: If I might approach, Your Honor.

THE COURT: Yes.

BY MR. GASNER:

Q. This is another email that the Government relied on in its case in chief and was on their summary, and it is again from Mr. Maegerle --

A. I see that.

Q. -- to Mr. Liew. This time in 2010. And it talks about the specified Kuan Yin purge rate to the oxidation reactor perforated wall, and then it goes on to give some numbers there. Do you see that?

A. Yes, I do.

Q. Have those numbers been publicly disclosed?

A. Yes, they have.

Q. In that patent we just looked at or elsewhere?

A. Yes, in that patent and elsewhere.

(Pause in proceedings.)

MR. GASNER: May I approach with previously admitted Exhibit 3507, Your Honor?

THE COURT: Yes.

BY MR. GASNER:

Q. What is this exhibit?

A. These are the process flow diagrams for the 30K, Revision E, which is quite later in the project.

Q. And are we now in the oxidation part of the plant?

A. These relate to the oxidation and finishing parts of the plant.

Q. Okay. So similar structure in terms of the revisions and all of that?

A. Yes, indeed.

Q. So if we look at the first page of 3507, there's a part that talks about the TiCl superheater vendor package. Do you see that?

A. I do.

Q. Is this what you were talking about before that the TiCl oxygen heaters are just bought off the shelf from elsewhere; true?

A. That is correct.

Q. All right. Where in this is the reactor design?

A. On the next page, PFD-102.

Q. If we could turn to that, that would be great, Mr. Guevara. Thank you.

Okay. So this shows the reactor vessel that Performance Group designed with help from Mr. Maegerle?

A. That is correct.

Q. And I believe you said earlier you've studied this design?

A. Yes, I have.

Q. Is there anything in the design of this reactor that you believe was not already publicly disclosed or readily ascertainable?

A. That is correct.

Q. Perhaps if you can just put it affirmatively.

A. It is either in the public or it's readily ascertainable.

Q. Okay. And let's go down, if we could, to the lower left-hand corner.

What is that part of the process flows for the reaction area or the oxidation area?

A. These are just -- it's a table of all the flows, temperatures, and pressures specifically relating to the subject we're talking about, line 426.

Q. What does that tell us?

A. That, in fact, as I stated earlier, USAPTI changed the design and, in fact, specify only nitrogen to be used, not chlorine to be used; and they specify the flow rate as so many kilograms per hour in line 426.

Q. Okay. Can you put that in laymen's terms for us? What conclusions do you draw from what you just said in laymen's terms?

A. Basically, that USAPTI changed the original design that Mr. Maegerle did. Instead of using chlorine, they used another gas called nitrogen; and they calculated the flow rate as the number here, kilograms per hour.

Q. So let's talk a little bit about that generally.

You saw lots of sketches from Mr. Maegerle; did you not?

A. Yes, I did.

Q. And lots of emails between him --

A. Yes.

Q. -- and Mr. Liew and others; true?

A. True.

Q. And then there were all these different pieces of the engineering process?

A. That is correct.

Q. Did you see changes in between the initial sketches and emails and later designs?

A. Oh, very much so. It's typical.

Q. Tell the members of the jury, as you looked through these piles of stuff, tell them what you found in that regard.

A. It was a normal progression in any major chemical design. You start with a set of numbers, which, frankly, sometimes are guesses. Then as you get more and more detail design, you get more and more information from vendors, you revise all these drawings. And that's what I saw as a normal progression of any project.

Q. Was that true on both the 30K and 100K projects?

A. Yes, it was.

Q. Did you find any piece of information conveyed from Mr. Maegerle that you considered to be something that was not either publicly available or readily ascertainable?

A. No. I found it all publicly available or easily got.

THE COURT: Mr. Gasner, would this be a good time to adjourn?

MR. GASNER: Yes, it would be, Your Honor.

THE COURT: All right. You may step down.

THE WITNESS: Thank you very much.

THE COURT: And if you'd like to leave the courtroom, you may, because I'm going to instruct the jury.

(Pause in proceedings.)

THE COURT: All right. So we've locked the doors just for the brief period I can give you your final instruction that I give you every afternoon when we break.

First, keep an open mind throughout the trial and do not decide what the verdict should be until you and your fellow jurors have completed your deliberations at the end of the case.

Second, because you must decide this case based only on the evidence received in the case and on my instructions as to the law that applies, you must not be exposed to any other information about the case or to the issues it involves during the course of your jury duty.

Thus, until the end of the case, or unless I tell you otherwise, do not communicate with anyone in any way and do not let anyone else communicate with you in any way about the merits of the case or anything to do with it.

This includes discussing the case in person, in writing, by phone, Smartphone, or electronic means, via email, text messaging, or in or on any Internet chat room, blog, website, including such social networking media like Facebook, Myspace,

LinkedIn, YouTube, and Twitter, or other feature.

This applies to communicating with your fellow jurors until I give you the case for deliberation; and it applies to communicating with everyone else, including your family members, your employer, the media or press, and the people involved in the trial, although you may notify your family and your employer that you are continuing to sit as a juror in this case.

But if you're asked or approached in any way about your jury service or anything about this case, you must respond that you have been ordered not to discuss the matter and to report the contact to the Court.

Because you will receive all the evidence and legal instruction you properly may consider to return a verdict, do not read, watch, or listen to any news or media accounts or commentary about the case or anything to do with it.

Do not do any research, such as consulting dictionaries, searching the Internet, or using other reference materials; and do not make any investigation or in any other way try to learn about the case on your own.

The law requires these restrictions to ensure the parties have a fair trial based on the same evidence that each party has had an opportunity to address.

A juror who violates these restrictions jeopardizes the fairness of these proceedings and a mistrial could result that

would require the entire trial process to start over.

If any juror is exposed to any outside information, please notify the Court immediately.

So two final things, ladies and gentlemen, before we break.

The first is that, I believe, we're still on schedule to get this case to you next week. We'll have closing arguments sometime next week, and then jury instructions, and then you'll begin your deliberations.

On a housekeeping note, you sent us a note about noon today saying, quote, "More caffeinated coffee (don't need much decaf)."

(Laughter)

THE COURT: We won't say who wrote the note, but Ms. Ottolini has emailed the request to the refreshment providers, so we'll have more caffeinated coffee for you tomorrow, I'm pretty assured.

So have a wonderful evening, and we'll see you tomorrow morning same time.

(Proceedings were heard out of the presence of the jury:)

THE COURT: You may unlock the door. Thank you, sir.

I assume the note was not a commentary on the scintillatingness, if you will, of all the testimony.

(Laughter)

MR. GASNER: I wouldn't blame them if it was,

Your Honor.

THE COURT: Okay. But, anyway, so about how much more do you think you have for tomorrow?

MR. GASNER: I'd say probably three hours.

THE COURT: Three hours.

And do you have any sense of cross at this point?

MR. AXELROD: I don't, Your Honor. I mean, it's going to take, you know, probably a couple hours, but we'll have to just see -- we'll have to see where we are. I'm guessing a couple hours of cross.

THE COURT: All right. And then you've got your paralegal who's going to put in some documents?

MR. GASNER: Yes.

THE COURT: All right. Okay. We'll see where it takes us.

Sort of the two-alternative scheduling possibilities, depending upon when all the testimony is completed, would be either sometime after we finish after a break on Thursday; or the default would be, and I hope we won't go beyond Thursday with testimony, would be Friday morning to have a charging conference so that we'd be ready to go on Tuesday with instructions and final arguments.

And you all can think more about how you'd like to configure the closing argument based upon what we talked about before, but we'll get to that when we get to that.

So it sounds like we'll be at least going through tomorrow, Wednesday, with the testimony and maybe possibly into Thursday; but, hopefully, we'll have time to do the charging conference before the Court has its afternoon calendar, which I need to be start preparing about 1:30. So that will be our point.

And that will determine -- the amount of time we have left will determine whether we do it Thursday or Friday morning.

All right. Any matters from the Government's perspective?

MR. HEMANN: Yes, Your Honor.

We'd like to renew our request for reverse Jencks material for Mr. Cooper. I did some research. I didn't find anything addressing experts. The law is pretty clear that a statement includes final statements only and does not include drafts.

We noticed from looking at Mr. Cooper's bills that there are a number of entries for reports and spreadsheets, and things like that, that were produced during the time he was working for the Defense that don't appear, from the face of the reports, to be lead-up to the final drafts or drafts of what became his final report, but different distinct documents.

We'd make that request. Obviously, the law says that the request is not ripe until after the witness has testified, but the law also then says that the time may be given by the Court in its discretion to review any statements.

So we've done some research. We think that the plain

language of the rule would apply to the extent these are not drafts of what becomes the final report. And we think given the nature of Mr. Cooper's testimony, and in particular some of the conclusory statements he's made about everything in X being publicly available or readily ascertainable, that these sort of statements may be relevant to impeachment at a minimum.

THE COURT: Mr. Gasner?

MR. GASNER: Yes, Your Honor.

I mean, this came up awhile ago and Mr. Hemann, the Court said, needed to come up with -- the burden was on him. And I thought he had abandoned this because, you know, coming up right now to parse through everything would be incredibly burdensome, and I don't think he's met his burden.

I do think that the reverse Jencks Act definition of "statement" would preclude this, because if he's looking for emails or, you know, things of that nature, I'm glad that he's gotten off drafts, but now he's gone back to what's even worse, which are, you know, emails.

And the statement has to be one that the witness makes and signs or otherwise adopts or approves, or a substantially verbatim contemporaneously reported recital of an oral statement or statement to a Grand Jury.

And as we pointed out before, Rule 16 provides for expert disclosure. So the idea that in the guise of reverse Jencks, now we have to, in the middle of his testimony, go back and

find, you know, all these subsidiary statements and the like, it's going to delay the case.

I don't think Mr. Hemann's met his burden as the Court asked him to do many days ago, or we would have -- you know, I think he's springing this on us. And what I hear him saying is that they're -- he's found no law to meet his burden.

And we think the plain meaning of the rule, together with the discovery provisions of the Federal Rules of Criminal Procedure, provide for very limited discovery of expert -- on experts, and that this would really turn reverse Jencks on its head.

THE COURT: Well -- yes, go ahead.

MR. HEMANN: Very briefly, Your Honor.

I'm being candid with the Court about not having found any cases. I haven't found any cases one way or the other, and I'm relying on both the plain language of the rule; and in terms of springing, again, the time to make this request formally is at the close of the witness' direct testimony. We're not attempting to spring because that would be, perhaps, springing.

We're also not talking about emails again. There are things called "DuPont Expert Comment Spreadsheet." That's not what was ultimately provided to us. There's something called "Bill of Particulars Draft Report," and we never got a Bill of Particulars report. And, so, these appear to me to be reports that were prepared by Mr. Cooper at the request of the Defense

that did not end up being part of his final report.

As to the definition, I mean, I can't imagine something more adopted than something that somebody writes.

THE COURT: There is a sufficient -- not sufficient -- I don't know whether it's sufficient, but there is a body of law that may be analogous that actually came up in the Court's last trial, which had to do with 302s and FBI statements. Generally speaking, the notes of the FBI agents are not considered Jencks unless they become substantially a statement of the witness.

And, so, I think -- I mean, I don't want to prolong this trial any more than necessary; but to the extent -- if there is written material that went between the expert and the Defense team that is not subsumed in the final report, because I think the remedy is the final report, and that is the case, then I think it needs to be produced at a minimum, I think.

Because what we're going to get into is -- and I would give the Government wide latitude to cross-examine this witness on the full extent of his writings because there's no privilege here. And also we have 612 to contend with as well. To the extent that the witness has relied on or reviewed or refreshed his memory with any writings, I'm going to order them produced to the Government.

So you may -- the question is, it's sort of like the Fram oil filter guy, "Pay me now or pay me later." I think these

documents are going to have to be produced in a timely fashion, unless you can show the Court, and I'll look at them in camera if you wish, that they were subsumed into his report because I think that is the spirit if not the letter of Jencks.

I'll get to you, Mr. Froelich.

MR. FROELICH: Thank you.

THE COURT: If he sent you and said, "Here is my, you know, report on, you know -- in response to the Bill of Particulars request," or whatever, and that's not in his report, I think that's fair game.

So you can either produce it to the Government or give it to the Court in camera, and I'll look at it; but I think one way or the other it's going to get produced because with an 80-page report and $200,000 worth of work, I think where there's smoke there's fire here. So we'd like to see some of the fire turned over to the Government.

So that's the Court's order. I want it produced and I want it produced by tomorrow morning at 8:00 o'clock.

MR. HEMANN: Thank you, Your Honor.

THE COURT: And that's the Court's order.

MR. GASNER: We would like it reviewed by the Court in camera because I do think that all of this is subsumed in the report.

THE COURT: All right. Then I want it by 7:00 o'clock tomorrow morning. I want all of his writings.

This is what I do when FBI agents testify. I routinely do this. And I want to see what this guy has written for $200,000 because if 80 pages is 200,000, then I think it tells me that there's more.

So I'm not saying I'm going to produce any of it, but I won't know until I see it, and I won't know finally until I hear the cross-examination. Because it may very well be that it's proper cross-examination to ask questions about whether any of the things he's now saying, and I don't know, I haven't seen anything other than the report, is the proper subject of probing cross-examination. That's why we have -- that's why all the cases interpreting *Daubert* encourage vigorous cross-examination.

So that's going to be -- so I want it by 7:00 o'clock tomorrow. I will review it. I will let you make your record, and I will decide whether I'm going to produce it. And part of it's going to depend upon the remainder of his direct examination and possibly even the cross-examination.

So that's the Court's order.

Yes, Mr. Froelich? I didn't want to cut you off.

MR. FROELICH: No, Your Honor, I was just -- what I wanted to say, Your Honor, was one of the things is, and it goes back to the motions I made, and I hate to distract the Court and go to another thing; but, you know, I got limited when the agent, who I see is here, Pattillo I think it was, I

gave her an exhibit and she said that she had reviewed it, that they were the notes, and that's what she was relying on and used to refresh her recollection and prepare for testimony.

And I asked --

THE COURT: I don't think that was -- no, no. I listened very carefully. I happen to be an expert on 612 and, also, as I'm sure Ms. Agnolucci is aware, the Rule in Queen Caroline's Case that has to do with -- that goes back into Anglo-Saxon times that has to do with refreshing recollection, showing a witness her notes; and you didn't make the proper foundation. So I was very careful.

And the Government may not be able to lay that foundation with this witness, but it's a different -- you know, you were in the ballpark, but maybe in the wrong section of the ballpark.

MR. FROELICH: But she did, Your Honor. She said that she used them, that's what she did to refresh her recollection. Not only refresh her recollection, that was the basis of her testimony, that she had taken -- she had taken the 302 and read it before she testified, and that's what she used to testify from; that she took no notes, and that the 302 was prepared by the agent, and she read the 302 to prepare for her testimony.

We don't have to argue it now. I just want to say.

THE COURT: It's in the record. Whatever the Court did, it did, and it's in the transcript and it's preserved for

appeal.

So that's what I want to be done.

MR. HEMANN: Thank you, Your Honor.

THE COURT: And I don't expect, you know, a blanket, you know, data dump of every document this gentleman wrote; but to the extent that there is information that's in writing that was not subsumed within his report.

Because then the Government has the report. The Government can certainly probe the report to see what else is below the surface. But those are the kind of documents I want.

I don't want -- I'm not ordering the Defense to produce every single piece of paper that this witness wrote or -- and especially I don't want anything that's considered privileged or work product. In other words, if it's something that was circulated with the client and it was intended to be privilege, there may very well be a waiver, but I'm looking at something that's a little bit more limited than that.

But, again, this is a preliminary cut from the Court's perspective, and the Court will have to await the remainder of the direct and the cross-examination with respect to these documents and whether any of them is producible.

But I think the Government has made a sufficient showing. And this witness by his own testimony, there are things in his testimony that I don't recall from his report. So, you know, we'll see.

Anything further?

MR. GASNER: Your Honor, in terms of logistics, shall we just bring it into Ms. Ottolini first thing at 7:00 a.m.?

THE COURT: Yes. She'll get it to me. And do it as -- it will be as a sealed document. It will be sealed so you don't have to file it in the public record.

MR. GASNER: Very well.

The other question I have relates to the notebooks that we discussed earlier. These are notebooks in Mr. Liew's handwriting. That's been stipulated that they're in his handwriting. There's a lot of overlap between patent numbers that he wrote down and both things that are in Mr. Cooper's report or otherwise talked about.

This is really central to our defense because our theory of the defense is that Mr. Liew did a lot of patent research, reached his own conclusions about what was generally publicly available; and, you know, didn't enter into a conspiracy to steal trade secrets but, rather, formed a good faith impression that there was a huge amount of disclosure out there.

So I think that a notebook in his own handwriting that lists lots of patents is highly relevant and critical to our defense.

THE COURT: But is every page relevant or is just the list of patents relevant?

MR. GASNER: I would say that the list -- no, not

every page. I mean, I would say that every page that has lists of patents relating to titanium dioxide would be relevant because he doesn't know what the contentions of DuPont are going to be down the line. So the rule can't be that it's just a trade secret killer, just those particular patents are the only ones that are relevant.

THE COURT: Let me hear from Mr. Hemann.

MR. HEMANN: I think there's a lack of foundation for this, Your Honor. Because, first of all, nobody knows when these lists were generated or how they were generated or why they were generated; and that information is in apparently the sole possession of Mr. Liew.

And to have a document like that handed to an expert and saying, "This is a document that is all in Mr. Liew's handwriting, please opine," it's certainly nothing that this expert relies on in the normal course of his business, somebody else's list of a time and a place and a motive unaware, you know, that the expert doesn't have anything to do with.

You know, this is America. If Mr. Liew wants to get up and explain what he did, he has the right to do that and be subject to cross-examination; but cloaking with an expert saying, "Well, Mr. Liew obviously evaluated this, this, this, and this," which is what the implication of the testimony would be, seems to be misleading.

THE COURT: All right. So the question -- the way I

would frame the issue is really authenticity. Authenticity as defined by 901 is it is what the offeror purports it to be, which would be notes made, you know, at a time when, relevant time if you will, with respect to Mr. Liew's research.

So how are you going to prove it's authentic from that perspective?

MR. GASNER: There is -- some of them are dated. So this is also important to rebut the Government's assertion through Yuping who took the stand and they showed her a single set of patent lists and established that those were done in response to the civil litigation.

So I think we need to rebut that because what's in the air is this idea that this is kind of made up. And I think that we can show that, through data documents, through notebooks that circumstantially are obviously earlier than the litigation, that they're in his handwriting. They were seized from his office or not seized and provided to Keker & Van Nest, and we've stipulated to that, that they were basically taken from the sites of the seizures and are in his handwriting. We think we can establish, both directly and circumstantially, that they were done at earlier time frames.

THE COURT: All right. Well, I want -- go ahead. I'll give you the last word.

MR. HEMANN: Very briefly, Your Honor.

That may -- all of that which Mr. Gasner has just said may

be true as to a particular document or a particular list. This is not the witness who can establish any of that stuff.

MR. GASNER: So that ties into Ms. Hernandez or Agent Ho, which is why we've listed them, because this is extremely important to us and we would like three swings at it to get it right.

What I would tend to do with Mr. Cooper is simply to have him go through -- there are many, many patents that he relied upon in his report. And he wrote his report first, found what was relevant, and then he later looked at all the patents that Mr. Liew had where it listed elsewhere, and he's got a chart which shows which ones he found and which ones Mr. Liew had already found.

And I tried to get these notebooks in before with the agent, and the Court said no because there's no foundation and not every page is going to be relevant. But what I think I can show, with either one witness or two or three, is the patents that Mr. Liew wrote down were written down before the civil case, and they showed his work and his state of mind; and they are relevant because they are in the same ballpark as many that the expert has said are relevant, and I think that's vital to our defense.

MR. HEMANN: I'll make two factual observations, Your Honor. The only testimony that's in the record --

THE COURT: Everybody can sit down, by the way, in the

back. You don't have to -- I'm sorry. You don't have to be standing. Thank you.

MR. HEMANN: The only testimony that's in the record with regard to the collection of patents was from Mr. Marinak and Yuping Jiao, both of whom testified that they located patents and provided the list to Mr. Liew.

The problem that I think we have is that there's no testimony -- there would be no testimony under Mr. Gasner's theory as to how these patents were collected, when they were collected, why they were collected, all of the things that then the expert is going to say, "Well, Mr. Liew, according to Mr. Gasner, Mr. Liew collected these patents. I collected this list of patents," and he's going to compare them.

But whether under authenticity, which we agree with, or foundation the expert can't say that Mr. Liew collected the patents unless there's some evidence that Mr. Liew collected the patents, which there isn't.

MR. GASNER: Let's set that one aside in terms of what Mr. Cooper can talk about.

But I think that at a minimum, what we ought to be able to establish, given that the notebooks were seized, they're in Mr. Liew's handwriting, they have lists of patents that we can show are relevant, they're not just random lists of junk, they are right on point, that fact we're entitled to prove.

Now, Mr. Hemann and company can get up and say, "Not much

has been proved. These are just kind of writings that were there. There's no proof about when they happened." But I'd like to be able to show, no, some of these are in notebooks that have dated materials that are pretty old and that -- you know, just to argue the circumstantial evidence.

THE COURT: Well, let's cut this even finer. I don't think it's appropriate for Mr. Cooper to be talking about the notebooks because, again, that gives it some -- I don't think he can lay a proper foundation.

If you want to put in -- let's assume, hypothetically, that the Court were to admit all or part of this notebook, at least the part that shows the patents that were listed. Certainly patents are public records. You can put them in and have -- you know, have, in closing argument, you know, compare, you know, a claim here or a specification here with some note; but I don't think it's appropriate for this expert to do that. I think that's more a matter of argument.

And I don't know that, you know, he should be able to -- he can lay a foundation -- you can lay a foundation for Mr. Cooper being able to say, "Oh, I looked at these notes and here's a chart showing what purports to be Mr. Liew's notes and the patents." You can do that in closing argument, but I don't want to hear that out of this expert.

But I would say I would be inclined to admit some part of these notebooks. I think it is central to the defense. It was

found seized by the Government. So if anything had been fabricated, it would have to have been fabricated, arguably, with knowledge of the civil suit or an upcoming criminal investigation; but I think that really goes more to the weight and not the admissibility of the evidence.

I think it is -- it's relevant. I think it does open the argument, without getting into commentary on the defendants not testifying, about, you know, there's absolutely no evidence in the record to authenticate. I mean, that's a fair argument, but I think it's an argument that the parties should be making to the jury.

And to simply exclude this completely when the notes appear to have been made, you know, before, you know, the Indictment and maybe before there was an actual criminal case is not -- I don't think that's fair -- that's due process at this point.

So that would be my inclination, but I don't -- what I am concerned about is admitting an entire notebook. I don't know if some of it's in Chinese or a different language, but I think we need to be circumspect about what goes on, and the parties need to look at that.

MR. HEMANN: And, Your Honor, I mean, I get what the Court's saying; and it sounds -- it's, in my view, appropriate.

One of the logistical problems we're dealing with is we've got an ocean of about 300 exhibits right now on these lists,

some of which are long notebooks, and I won't even pretend to have read all of them. But if we could get down to these are the lists, this is the date on the -- you know, if we could get to some narrowness on this, maybe we can come to at least a way to get to an answer.

THE COURT: And that's my thought. If there's material in there like lists of patents, I'm just making it up, like other relevant information, then I would be inclined to admit it.

But I think you all need to get together and just -- because what I don't want to happen is have a whole notebook -- not that the jury is going to look at every single page of every exhibit, if they do, it's going to be a very long deliberation -- but looking at a notebook and saying, "I don't know what this means. Nothing was said about it, by counsel or otherwise."

So that would be my thought, and not have Mr. Cooper talk about it. You know, leave it out there with the patents. Let's fine-tune it to that which goes to your defense, not just random, you know, notes; and I'd be inclined to let that in.

MR. GASNER: Thank you, Your Honor.

The one --

THE COURT: However we do it, whether we do it by stipulation --

MR. GASNER: Here's my proposal on how to do it --

THE COURT: Yes.

MR. GASNER: -- is that Mr. Cooper in his report lists many patents. So if we could do a summary exhibit that simply lists all those patents and admit that, because his report is not going to be in, but I --

THE COURT: You mean -- when you say "the patents," which?

MR. GASNER: List the patents that are in his report that he relied upon. Just a list of the patent numbers and maybe title.

THE COURT: Well, okay.

MR. GASNER: Then there are five notebooks that are at issue, so it's not hundreds of things. Mr. Hemann is -- we can trim it way down. There are five notebooks.

And what I would propose to do is introduce the -- I mean, my preference would be the pages that have patents on them because what they are are -- they're really just lists of patents, there's some sketches, and things of that nature, that are on them, and to just introduce those pages.

And then to be able to argue that many of these patents were also ones that the expert relied upon because, otherwise, I've got to take the expert through a hundred patents to make my point.

THE COURT: No. Go ahead, Mr. Hemann.

MR. HEMANN: I think, first of all, we'd object to a

summary chart. There's a time for a summary chart. We've adhered to the rule that we can't do new summary charts; and everybody knew about the deadline, which was admissible summary charts. Demonstrative summary charts, we don't have any objection to.

I think that the problem that, I guess, I keep coming back to, Your Honor, is we ought to be able to have a person to whom we can say, "You don't know when Mr. Liew wrote this. You don't know how he wrote it. You don't know why he wrote it." And we're entitled to have a human being say, "No. No. No."

THE COURT: Well, no. I think you can rely on the record. I mean, I don't know that you have -- I mean, you're kind of stuck in one way with -- it's not stuck, but you face a defendant's constitutional right to remain silent.

MR. HEMANN: Indeed.

THE COURT: And the question is: Some records are self-authenticating in a fashion. I don't mean, you know, to say that these are -- everything that the defendants purport -- these books are what they purport to be, but I think there's enough circumstantial evidence that they should be able to come in.

And I would say, number one, in response to Mr. Hemann's argument, I'm not going to allow a summary in evidence. If you want to use a demonstrative summary, fine. That's fine. You can do that any way. You can draw it on the board, so why not

have it be -- I'm sure your prepared chart is neater than what you would draw on the board. It certainly would be what I draw on the board. So I think in some fashion.

Obviously, there's going to be an argument that, you know, you'll have to deal with in closing; and the Government will be able to, you know, jump right in and say, "There's nothing in the record that -- you know, you didn't hear" -- and, again, I'm not telling the Government how to do a closing. You have to be very careful about --

MR. HEMANN: Indeed.

THE COURT: -- what you say; but, you know, you two attorneys are very experienced. But I think it's fair argument to say, "In the record that we have, what is the evidence of what this means? There's no evidence. There's no evidence of this in the record."

And if you put it up on the board or, you know, you blow it up and you look at it and it's meaningless on its face and the jury finds that to be the case, then it will disregard it. If the Defense position holds any weight, you know, then you'll get whatever mileage out of that you can.

But I don't think it's appropriate for the Court to cut off that entire area just because the defendant is electing not to testify.

I think there's enough -- the Court has to determine overall large due process. Smaller than that would be, really,

is there enough evidence that this was not fabricated, is there some mileage that could be gotten out of this by a trier of fact. I think the answer is yes. How much, I don't know.

But I don't think I could wholesale exclude it; but, on the other hand, I think you all need to work together, and especially initially the Defense, to really hone it down to what -- to me the only relevance to these books are a listing of the patents, maybe some -- something from which a jury could find that some research was done to determine the trade-secret-or-not nature of the other documents or the other processes, and any contextual information or dates that would go to support that.

And it seems to me that's really it, rather than just throw it against, you know, the jury wall and hope that it sticks.

MR. GASNER: We're prepared to do that.

MR. HEMANN: So that --

MR. GASNER: A question in terms of a sponsoring witness.

I'm willing to do it with Mr. Cooper. I was going to take three swings at it, one with Mr. Cooper. It sounds as though I will be shot down if I try to get him to do anything other than be a scribe.

We could also call Ms. Hernandez, our paralegal, who could simply be up there to say, "You know, these are the documents."

And I suppose Mr. Hemann could cross-examine her in the same way that I cross-examine agents, which is, you know, "You don't know where this came from?"

THE COURT: That would be my preference because I think, in fairness, and so as not to run afoul of I think it's *Gilbert versus California* commenting on the defendants not testifying, I think that's the case, then I think it would be fair to require that somebody be put up there and, so, that the negatives, in terms of, "You don't know this; you don't know that; you haven't seen any evidence of such and such," then at least the Government has something to argue, in fairness, that doesn't impinge upon the defendant's right to remain silent.

I understand you don't like any of this.

MR. HEMANN: Indeed, Your Honor.

THE COURT: Does that sound like a feasible solution?

MR. HEMANN: That is a feasible solution. If we can get down to, with these five notebooks, as the Court indicated, the pages that reveal the patents and some evidence of date that would satisfy the Court's authentication observation and then have Ms. Hernandez testify as to the five, I think we'll be good to go on that, Your Honor.

THE COURT: All right.

MR. GASNER: She will not talk about -- obviously, she has been visiting Mr. Liew for a long time, and she's not going to go there.

THE COURT: No, she's not going to go there; and she's not going to -- also, there's not going to be any curve balls the other way --

MR. HEMANN: Correct.

THE COURT: -- when the Government says, "You don't know of anything," and she says, "Oh, no, I saw this other document."

But I think you've got your work cut out for you, Mr. Gasner, which is, to the extent you've made an offer of proof that there is circumstantial evidence of when these entries were made, maybe there's metadata, maybe there's related emails, whatever, but you need to marshal that anyway. And I think you need to discuss that with the Government and come up with a suitable -- and if there's any dispute about a particular entry, you know, I can certainly look at that.

MR. GASNER: So just to frame the issue, I think I have my A material, my B material, and my C material. My A material is anything with a date or metadata.

THE COURT: Correct.

MR. GASNER: My B material is by looking at the age of the document, some of the stuff just looks really old; that by circumstantial evidence I think I have enough to say it wasn't fabricated, or it just doesn't look fabricated, or any number of circumstantial pieces of evidence.

And then my C material, which I still think I'm entitled

to, is that this pre/post litigation distinction in my mind doesn't really matter, and that this shows Mr. Liew getting ready to vigorously defend the civil case, or that he was doing work before. And that, you know, there's --

THE COURT: Well, the civil case is one thing; but if it's after the Indictment, then clearly -- well, he was in jail anyway.

MR. GASNER: That's true. So there's no --

THE COURT: So, yeah, I don't know that -- I think your point is a fair one vis-a-vis the civil litigation.

And I have to say, you know, the Government has the ability, as the Defense does, if they wanted to test these documents for age and ink, I've tried cases where, as a prosecutor, where we were able to get some real mileage out of dating the ink, but the Government hasn't done that. And we're talking about some time, you know, years and years ago.

So I'm not holding that against the Government, but I'm saying it's not totally off the wall what Mr. Gasner is saying. So I won't -- you understand, you know, the letter and the spirit of my ruling, and I'm just trying to get to a point where both sides can fairly present their positions with respect to these matters.

MR. GASNER: Thank you, Your Honor.

MR. HEMANN: Yes, Your Honor.

THE COURT: All right.

MR. GASNER: I don't hold out much hope that I'm going to convince the Government on maybe anything other than my A material, and maybe not even that. So I think the Court needs to be prepared to just rule on it.

THE COURT: I'm prepared. I don't expect huge examination and cross-examination of your legal assistant. I would not want to put her on the spot, and I think it gets into -- it gets a little awkward, I think.

So you all work it out. You've been very good about doing that, and I will see you all tomorrow.

MR. HEMANN: Your Honor, we plan to accuse her of writing the anonymous letter, so you should be prepared for that.

THE COURT: That would be the stuff that movies are made out of.

(Laughter)

(Proceedings adjourned at 1:55 p.m.)

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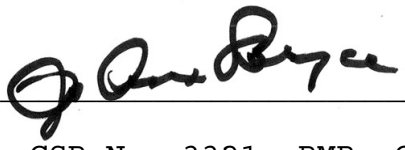
CERTIFICATE OF REPORTER

I certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter.

DATE: Tuesday, February 11, 2014



Jo Ann Bryce, CSR No. 3321, RMR, CRR, FCRR
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