CAUSE NO. 17958-JG01

JAMES BOREN, et al. * IN THE
Plaintiff * DISTRICT COURT OF
vs. * BRAZORIA COUNTY, TEXAS
THE DOW CHEMICAL CO., * 239th JUDICIAL DISTRICT
Defendant *

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Deposition of JOHN W. SPENCER, was taken on Friday, October 8, 2004, commencing at 10:03 A.M., at 1743 W. Nursery Road, BWI Marriott, Linthicum, Maryland, before Susan Farrell Smith, Notary Public.

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APPEARANCES:

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On behalf of the Plaintiff

REPORTED BY: Susan Farrell Smith

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On behalf of the Defendant

REPORTED BY: Susan Farrell Smith

WITNESS INDEX

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(Original exhibits retained by deponent)

JOHN W. SPENCER,

the Witness, called for oral examination by counsel for the Plaintiff, having declared and affirmed under the penalties of perjury to tell the truth, was examined and testified as follows:

MR. BLACK: EXAMINATION

Q. Good morning, Mr. Spencer. My name is Robert Black, and I represent the Borens in this case. Would you state your name for the record?

A. John Spencer.

Q. And where do you live?

A. In Baltimore, Maryland.

Q. And what is your current occupation?

A. Industrial hygienist.

Q. What is an industrial hygienist? Could you explain that, please?

A. It is a profession and a science which evaluates occupational exposures, determines what sort of controls or management techniques are necessary to protect the health and safety of individuals in the workplace.

Q. And I have here a copy of the notice for your deposition. Is this the notice that you received?

A. I don't know if I got a good look at the one that I received. Is this the same one?

Q. That's why I asked that question because that's an amended notice, and I believe the only difference between that one and the first notice was probably the date when the deposition was to take place.

MR. RAVEN: Yes.

MR. BLACK: Is that your recollection?

MR. RAVEN: Yes, this is the notice.

MR. BLACK: I just wanted to make sure that was the one.

We'll mark this as Exhibit 1.

(Whereupon Spencer Deposition Exhibit No. 1 was marked.)

Q. And you understand that -- that you've been hired by Dow Chemical Company as an expert in this case? Is that your understanding?

A. Yes.
Q. Okay. And who did you speak with first?
A. Jonathan Shoebotham.
Q. How long ago was that?
A. I don't specifically recall. I know it was several months ago.
Q. Do you have a long-standing relationship with Mr. Shoebotham?
MR. RAVEN: Objection to form.
A. I'm not sure what you mean by long-standing. I've known Mr. Shoebotham for several years.
Q. So, you have done --
A. But that's -- my relationship goes as far as having worked with him on other issues.
Q. So, you've served as an expert in other cases that he's worked on?
A. Yes.
Q. How long ago -- or strike that.
When was the first time you ever met Mr. Shoebotham?

A. Boy. I can't tell you a specific time. It was several years ago.

Q. To serve as an expert in a chemical exposure case?

A. Yes.

Q. Have you ever done any asbestos work, as an expert in an asbestos case?

A. I'm sorry, for Mr. Shoebotham?

Q. Yes, sir.

A. Not that I can recall.

Q. Have you ever served as an expert in one of Mr. Shoebotham's cases or someone from his law firm, although he's recently changed law firms, but in the past have you ever done any work as an expert for Mr. Shoebotham or Mr. Redman in a silica case?

A. No, not that I can recall.

(Discussion off the record.)

Q. And when you were contacted by Mr. Shoebotham, what did you all talk about as far as your opinions in this case?

A. I mean, I don't have a specific recollection

other than I know generally when I look at any issue, I want to understand the facts of the case, get a preliminary understanding of what occurred, and what materials I might need to review in order to develop an opinion.

Q. What percentage of your income is derived from serving as an expert in litigation?

A. I don't know the answer to that. I don't break down my accounting that way. I will tell you I have testified in the past, and giving this some thought, that it varies, you know, on the day, week, month from none to perhaps 30, 25 percent, 40 percent on some occasions.

Q. Okay. I don't need an exact number. I was just looking for a ballpark figure.

A. Yes.

Q. Have you ever testified at trial in a chemical exposure case?

A. Yes.

Q. And when was the most recent trial testimony?

A. Probably several months ago in New York State.

Q. Was it a benzene case?

A. Yes.

Q. Do you have plans to testify in trial in the next 45 days?

A. When is this supposed to go to trial? It got moved; right? So, no, I don't believe so.

Q. Have you ever testified for a Plaintiff in a chemical exposure case?

A. Yes.

Q. How long ago was that?

A. I've really lost the concept of time, but a few years ago.

Q. Was it a benzene case?

A. I do not believe that benzene was included. There were multiple aromatic hydrocarbons, but I do not believe benzene was included.

Q. Was it on behalf of a worker with cancer?

A. It was several workers who had a whole host of issues, medical issues.

Q. Do you remember where the case was filed?
A. West Virginia.
Q. Was it a Federal case?
A. I couldn't tell you.
Q. Do you remember the name of it?
A. Hall was the, I believe, the lead Plaintiff.
Q. Have you ever testified in a Federal case or a case in Federal Court?
A. You actually mean in a trial?
Q. Or given a deposition.
A. Yes.
Q. So, you've prepared a Rule 26 disclosure in the past?
A. Yes.
Q. Would you -- did you or do you currently have a current Rule 26 disclosure as far as the cases that you've served as an expert in?
A. I believe I brought a list.
MR. RAVEN: I got a list, but I don't know if it --
A. It's not current.

MR. RAVEN: It doesn't necessarily comport with Rule 26, but it's a list of his trial testimony.

MR. BLACK: That's fine.

Q. How much do you charge for your consulting fees, Mr. Spencer?

A. $225 per hour.

Q. And is that for document review?

A. Yes.

Q. Do you charge a flat rate for document review --

A. Yes.

Q. -- versus testimony?

A. Same great work at the same great price.

Q. $225 an hour?

A. Yes.

Q. How many hours would you say that you've put into this case so far?

A. I don't know offhand. I've put in a fair amount of time. There was a lot of documents to review.

Q. I would imagine that's quite a lot of

documents.

A. A lot of testimony that I reviewed. Several -- many hours, but I don't know specifically.

Q. You understand that depositions are going on actually today and there were several yesterday and there's been several this week. So --

A. I've heard some of them.

Q. I'm sure it's going to be -- it would be hard for you to say that you've seen everything, but you have seen a list of what all has been going on.

A. Correct.

Q. But is it fair to say that you've seen depositions, and in fact, we can probably take a look at them just to make sure what all you've seen that -- this certainly occurred prior to September 15th of 2004?

A. I believe so. I can't attest for every deposition that's gone on, but I got the testimony that I believe was relevant to developing my opinion.

Q. You've seen the deposition testimony of Doctor Collins?

A. No. Not Doctor Collins. I don't recall.
Q. He's a Dow epidemiologist.
A. Oh, I may have gotten it, but I really -- it wasn't critical to my assessment.
Q. What depositions did you feel were critical to your assessment?
A. The testimony of Mr. Boren, of Mr. Boren's co-workers, of Dow employees.
Q. And which Dow employees?
A. Let's see. There were several. I think there was Mr. King, Mr. Nomily. There was Mr. Daniels. I think there was also a Mr. Oge. I'm not sure how to pronounce -- Oge, O-G-E or --
Q. Ogel?
A. Ogel. I'm sorry. Those are the ones I recall offhand as far as Dow employees. I think there was also a Mr. Slate as well.
Q. Have you seen the deposition testimony of Marian Phillips?
A. That was the -- she -- epidemiologist or researcher?

Q. I believe --

A. Yes, I have. She has a two-part last name though; right? Like a married name and maiden name that she -- that's just what I recall from the deposition.

Q. Have you ever published an article or a paper on benzene?

A. A peer-reviewed article?

Q. Yes.

A. Not specifically on benzene, no.

Q. Have you published articles that touched on benzene exposures?

A. Yes.

Q. And what would those be?

A. It was an article that really dealt more with indoor air quality issues. It's on my CV.

Q. Indoor air quality issues at refineries or --

A. No, just in general. It had to do with cause and effect.

Q. Do you hold yourself out as an expert in

hematology?

A. No.

Q. Do you hold yourself out as an expert in epidemiology?

A. No, I'm not an expert in that area. But certainly as an industrial hygienist, I have reviewed the epidemiological literature to some extent just to understand, further understand the basis for the development of the health standards, but only to that extent.

Q. As an industrial hygienist, what specifically are you looking for in an epidemiological study?

A. Well, as the industrial hygienist, my role in such a study is to do the exposure assessment component to retrospectively generally look back at tasks, frequency and duration of tasks, products, the nature of the product, the workplace environment. Pool all those elements together in an attempt to determine what the likely levels of exposure were.

Q. So, your role -- you see a role of an

industrial hygienist as being the on-the-ground data monitor for the epidemiologist?

A. I guess that's one way of putting it, yes.

Q. I don't want to put words in your mouth. I'm just trying to understand because aren't there potentially two roles for an industrial hygienist in a chemical plant setting? And one of them would be to monitor data and ultimately get that data to an epidemiologist for a published report, and the other would be to monitor data for the safety of workers?

A. Yeah. But the process is the same, whether it's a retrospective assessment or a current time assessment.

Q. Okay. Have you ever done any work as an industrial hygienist in a chemical plant setting?

A. Yes.

Q. And where was that?

A. I've been all over the country doing that work in my career. When I worked for NIOSH, I worked for the U.S. Coast Guard in my work as a consultant. I've been in various chemical plants and refineries

around the country.

Q. But you were never employed directly by a refinery or a petrochemical company; is that correct?

A. Actually working for them other than a consultant? No.

Q. Right.

A. No, that's correct.

Q. Do you hold yourself out as a neurologist?

A. No.

Q. Are there any other fields or specialties in which you consider yourself an expert other than industrial hygiene?

A. Well, I think there's other areas that are in -- go in tandem with the industrial hygiene for my experience. I have extensive experience in warnings, writing and developing warnings. I have a strong background in toxicology although I'm not a toxicologist. But again, that is as it relates to a portion of industrial hygiene.

Q. Anything else?

A. Those are the primary areas.

Q. Would you consider warnings and labeling to be the same thing?

A. Well, a label is a form of a warning.

Q. Would an expert in labeling also be an expert in warnings, or is that not necessarily true?

MR. RAVEN: Objection to form.

A. No. There may be other types of warnings. There may be something unrelated to the -- I can't quite think of an example right now. I hate to be so broad. Warnings that I deal with specifically are labels and material safety data sheets.

Q. Do you consider yourself an expert in warnings or labels under the Federal Hazardous Substances Act?

A. Yes. I have included that in addition to the Federal Hazard Communication Standard.

Q. So at trial, you would feel -- or you are going to offer an opinion with respect to labels and the Federal Hazardous Substances Act?

A. I do not plan on that at this time, no.

Q. You've not been asked to do that?

A. Correct.

Q. When you worked -- let me go off track here. I do want to ask you about some of your job experience in the past, but while we're on this subject of labeling and the Federal Hazardous Substances Act, I want to ask you real quickly about your experience at NIOSH. Did you ever have any dealings with the Consumer Product Safety Commission?

A. Not at NIOSH, no.

Q. Well, before we get into your opinions in detail in this case, I should probably run through the subpoena. I realize you brought a lot of documents.

We made an agreement with several other experts in this case, since there are so many documents, that if there is specific documents that you are relying on as a basis for your opinions, that you'll go ahead and pull those out and we'll attach those as an exhibit. Because everything, I realize, that you've looked at is relevant to some extent.

But if you have specific documents that you use as the basis for an opinion that says essentially

the exposure levels or whatever aren't what Plaintiffs think they are based on this document, I would like for you to go ahead and pull those out. Does that sound like a fair agreement?

A. (Gesturing.)

Q. Is this all it? There's nothing in these one, two, three, four -- five boxes that you're specifically relying on as the basis of any of your opinions in this case?

MR. RAVEN: Well, objection to form.

A. This is a summary of a lot of materials that are in those boxes.

Q. Are the materials that are summarized in this referenced by Bates number in here, in your summaries?

A. In some cases, yes.

Q. Can we take a short break while we look through this?

A. Sure.

(Whereupon a brief break was taken, after which the following was heard:

MR. BLACK: Back on.

BY MR. BLACK:

Q. Mr. Spencer, we just took a break, and we were looking at some of the documents that you brought in response to the subpoena duces tecum. If you could point these out to me, which documents are responsive to Request No. 1?

A. I'm sorry, what is Request No. 1?

Q. It's for any and all correspondence, pleadings, medical and/or scientific articles, depositions, medical records, written instructions, photographs, videotapes, audio tapes, reports, et cetera, or documents of any kind which you received from Defendant's counsel or any employee, agent or representative of any Defendant in this case.

A. Those are in Box 1 through 5.

Q. They're all over here?

A. Yes.

Q. Which is essentially the, all the evidence in this case is what you're telling me?

A. Yes.

Q. Did you separate out the correspondence with counsel?
A. Yes.
Q. Okay. And where are those documents?
A. They're in Box No. 1, right up front.
Q. Okay. We can take a look at those. And most of these are forwarding letters just forwarding on the documents produced or other evidence, depositions, that sort of thing.
A. Yes.
Q. Is that correct?
A. Yes.
Q. Have you seen or did you get a chance to read Doctor Rose's deposition?
A. Yes.
Q. Okay. Did you -- have you had a chance to read Doctor Snodgrass' deposition?
A. I don't recall that, but I think that I had looked at it. I don't recall reading that.
Q. It was pretty recent.
A. I don't think that I did read that.

Q. Is -- I notice the first letter is dated April 8th, 2004. Would that be around the first time you had contact with lawyers from Thompson & Knight with respect to this case?

MR. RAVEN: Objection to form.

A. Yes. And anticipating your question in that regard, I did search my memory yesterday, and I think that's probably about accurate. But sometime just prior to that.

MR. BLACK: Okay. We'll mark this as Exhibit 2.

(Whereupon Spencer Deposition Exhibit No. 2 was marked.)

Q. Did you receive all the medical records that have been produced in this case, or just --

MR. RAVEN: Objection to form.

A. I can't tell you that I received all the medical records. It's not something I even really spent any time reviewing.

Q. Well, that's why I asked because most industrial hygienists don't particularly care to see

that kind of information. And if they do, they just want to see one page giving the diagnosis. That's been our experience in the past.

I was just wondering -- so, medical records play no role in the basis for your opinions?

MR. RAVEN: Objection to form.

A. I can't say they don't play any role. There's nothing that I can cite you that I have relied upon in any of those medical records.

Q. Fair enough. Could you point out the documents that are responsive to Request No. 2, which is any and all correspondence, pleadings, depositions, medical records, written instructions, photographs, et cetera, in whole or in part -- excuse me, and/or document or any kind which form the basis in whole or in part for any opinions you may render in this case? These are documents that I'm going to ask you that you are specifically relying on to form the basis of your opinions.

A. Again, there aren't any specific medical documents that I'm relying on to form my opinion.

Q. Well, I'm speaking in terms of a broader sense such as industrial hygiene data from specific units out at Dow Freeport. Have you reviewed any of that?

A. I have -- yes. I have reviewed some of the data. I have not completed that review.

Q. So, you're still looking at it?

A. There was hundreds if not thousands of data points and -- which I recently received. Yes, I'm still looking at that.

Q. To date at we sit here, are there any documents such as industrial hygiene data that you've looked at that you know you can specifically point to and say, this document forms the basis of my opinion with respect to benzene exposures at Dow Freeport?

A. From that monitoring data?

Q. Yes.

A. No, not at this point.

Q. So, you haven't formulated your opinion as of today with respect to Mr. Boren's exposures at Dow Freeport?

A. Correct. Well, let me -- well, let me encompass that with, I have generally looked at the data and looked at numbers. There were some data on there, in there that was, I believe, regarding even contractors, there were contractors who were monitoring. All the numbers were for the most part low, below today's occupational health standards.

So, I did look at that. I did take into account those numbers. But I have not completed my assessment, you know, as to the complete relevancy of those values as they relate to Mr. Boren. It was just for contractors in general.

MR. BLACK: Objection. Nonresponsive.

Q. So, do you have any documents responsive to Request for Production No. 2 which are documents that form the basis of your opinion? And perhaps we should save that and maybe come back to it after I ask you what your opinions are in this case, and maybe we can find out which documents there are.

A. Well, there's -- you know, you've -- you list depositions here. Certainly there's multiple

depositions which I rely on in forming my opinions, both co-workers and Dow employees as we already discussed. So, of Item No. 2, that's probably the primary documents I would point to that helps me form the basis of my opinions.

Q. So, primarily the depositions?

A. Yes.

Q. And not medical records?

A. Correct.

Q. And eventually all the industrial hygiene data?

A. Yes.

Q. Is there any other particular category of document that you would find in your experience that you generally rely upon to form the basis of your opinions?

MR. RAVEN: Objection to form.

A. Well, sure, there may be many other documents. I may want to maybe perhaps look at standard operating procedures, safe work permits, how are things down within the facility. Further

description of the tasks and a further description of the process lines and so forth.

Q. Have you seen any of those types of documents in these boxes?

A. I mean, there is a -- yes. A safety and loss prevention manual for contractors that I believe is in that context.

Q. How did you organize your book here in terms of numbers? Is it just divided by number based on --

A. Yeah.

Q. So, they're not in any category?

A. Correct.

Q. Okay. Do you mind if we kind of pull it apart and place them in response to these Requests No. 1 through 16?

A. That's fine. I guess I can rebuild it. Do you want to take this out?

Q. Yeah, if you don't mind. Then we'll go ahead and label this as Exhibit 3.

(Whereupon Spencer Deposition Exhibit No. 3 was marked.)

Q. What is Exhibit 3, Mr. Spencer?

A. The safety and loss prevention manual for contractors dated February 1967.

Q. And how long ago did you receive this document?

A. I can't tell you a specific time. I've had it for some time, but I can't tell you exactly when.

Q. Is benzene mentioned in that document?

A. I do not believe that benzene specifically is mentioned. This is talking about processes in general. No, I don't recall benzene being mentioned.

Q. Okay. Moving on to Request No. 3, any and all notes, memoranda, correspondence, reports, written opinions and/or documents of any kind which you've provided to Defendants, Defendant's counsel or any agent, employee or representative of Defendant's counsel in this case. Do you have any of those documents?

A. I don't think I have any notes or anything as you've just described that I provided to Defendant's counsel.

Q. Okay. And Request No. 4 is the inverse of that. Any and all correspondence, memoranda, notes, reports and/or documents of any kind which evidence, reflect or relate to any communications between you and any other witness in this case, including any other witnesses offered by Defendants. Have you -- in other words, have you written any notes to other experts in this case?

A. No.

Q. Have you talked to any other expert in this case?

A. No.

Q. Not on the telephone nor letter?

A. No.

Q. Or e-mail?

A. No.

Q. So, you have no documents responsive to Request No. 3 or 4?

MR. RAVEN: Well, objection to the form of that question. The way the request is written, it could include everything including the Old Testament

tablets. He has what he has, which is all five boxes and -- I mean, that's what we're producing in response to your duces tecum.

So, I just want to make sure that that's clear on the record. The whole thing is in response to your duces tecum.

MR. BLACK: But not broken out individually?

MR. RAVEN: Well, he has broken it out. He's given you his tablet right here. But I don't want it in the record that he -- because he hands you one piece of paper, you want him to commit to the testimony that this is the only piece of paper in response to a particular number because that's not true.

The whole -- all five boxes that we've brought here for your inspection today are in response to your duces tecum. Because your duces tecum is so broad, I mean, we can't produce a binder. I mean, the way it's written, it could include, I mean, the Holy Grail for all we know.

MR. BLACK: Well, I appreciate that.

Q. But what I'm basically saying is, if there is a document over here that you are going to rely on at trial and say, here's my opinion, I'm using this document as a basis for my opinion, and it's over here, can we at least identify that?

A. There is -- I can't cite you a specific document that's over in that set of five boxes right now that I would pull out that meets the criteria you just established.

I think the things that I'm relying on I tried to condense into this binder here, my notes and review of the depositions, your expert's report.

I did a summary of exposure for Mr. Boren which include your expert's summary of exposure. And then I did a summary of exposure. That's in this binder. These are my notes. And the basis for my opinions and my summary are all attached behind this condensed worksheet.

Q. Okay.

A. Other than what's in here, I can't cite you anything else in those boxes that were over there at

this point in time. There's nothing in particular that -- it doesn't mean I wouldn't want to pull out a particular document at some point, but I can't cite you anything right now.

Q. Well, let me ask you this: Are these documents that have been produced in this lawsuit? I mean, there's nothing in these boxes that is yours --

A. No.

Q. -- that none of the parties have in this lawsuit?

A. Yeah, I believe that's correct. The only documents that, I don't know, you may or may not have are some, are literature that deal with dermal flux rate calculations for absorbed dose through the skin that are in this binder.

Q. And you're producing those today?

A. If you want them.

Q. We want them.

A. You got them.

Q. If they form the basis of your opinion, we want them. Thank you, Mr. Spencer.

Request for Production No. 5, any and all notes, memorandum, reports, correspondence, summaries and/or documents of any kind which evidence or reflect the factual observations, mental impressions and/or expert opinions.

A. Those are the notes that are in this binder, the summary notes primarily that comes from deposition testimony and Interrogatory answers.

Q. Okay. If we can mark those Exhibit 4, I believe. It's going to be several tabs; won't it --

A. Yes.

Q. -- in your book?

A. Start here.

(Whereupon Spencer Deposition Exhibit Nos. 4-A through 4-E were marked.)

Q. Okay. We left off at No. 6. Copies of any and all drafts and memorandum, reports, correspondence, summaries or opinions or other documents which evidence or reflect your factual observations, mental impressions and/or expert opinions in this case. Have you done a report?

A. No.
Q. Not a written report other than your exposure analysis --
A. Correct.
Q. -- in spread sheet format?
A. Correct.
Q. But there's no summary explanation of that?
A. Only what's, you know, attached as footnotes to the table explaining how we derive those numbers. But not in a written -- in what I call a report format.
Q. Okay. No. 7, copies of any and all medical or scientific books, treatises, articles, abstracts or documents of any kind which form the basis in whole or in part of any opinions you may render in this case or upon which you may rely in rendering the opinions?
A. Well, the only things which I mentioned before, articles I do not believe you have are what are attached here that are a part of what we marked as 4-E. So, mark these separately or they are part of 4-E?

Q. That's fine. As long as they're labeled. We don't need to label them twice.

Are there any additional treatises or articles that you would include in that category that are not part of 4-E?

A. No.

Q. We'll go from there and leave them 4-E. And these are articles dealing with dermal exposure to benzene?

A. Yes.

Q. Okay. No. 8, copies of the results of any MedLine, tox line, hazardous substances data bank or similar search, computer system search for medical scientific or regulatory articles?

A. None.

Q. Copies of any and all medical or scientific books, treatises, articles, abstracts or documents of any kind which directly or indirectly demonstrate a causal association or lack thereof between benzene -- or between exposure to any substance at issue in this case and the development of myelodysplasia which

should be acute myelogenous leukemia.

A. Uh-huh.

MR. RAVEN: Objection to form.

Q. That was a mistake.

A. I was going under the premise that it was for the --

MR. RAVEN: We don't have myelodysplasia. Let's go on to the next one.

A. No, I don't have any such articles.

Q. And normally you wouldn't rely on those as an industrial hygienist anyway?

A. Yeah. Normally, no. I mean, certainly it may be literature that I look at and look for information that's important to me as an industrial hygienist, but generally I am not testifying to causation.

Q. Okay. No. 10, any and all correspondence, memoranda, notes, task studies, investigations, reports, data, data complications, et cetera, of any kind upon which you have based any factual observation, mental impressions or expert opinions you

may render in this case concerning levels and duration of exposure to the Plaintiff to any substance at issue in this case. If you'd like, you can take a look at that.

A. Yeah. I'm sorry, which one was that?

Q. No. 10. This one is really kind of right up your alley so to speak. So, I was -- and you may have identified some of those documents already.

A. I've identified some, and I think the other that I identified is also the data that was provided from Dow on industrial hygiene data, which I think, as I think I discussed earlier, I've not completed my review and analysis of all that to fit that into my opinion at this point other than the data I looked at is generally very low.

There was also a document somewhere in those boxes that goes back -- I believe it was a document by Roger Daniels. I believe it was also -- it may have been an exhibit that was produced in the recent testimony by Frank Parker produced by your firm that dealt with some peak levels of benzene exposure, but I

think -- I guess that's not something I'm using in forming my opinions. So, I guess it's not responsive to No. 10.

Q. Okay.

A. I'm sorry, I'm thinking out loud here.

MR. BLACK: I'll object to the nonresponsive portion of that.

Q. No. 11, your most current and complete resume or CV. The CV I have looks like it's dated March of 2002.

A. This is March of 2004.

Q. Perfect.

MR. RAVEN: Is that Exhibit 5?

MR. BLACK: This is Exhibit 5.

(Whereupon Spencer Deposition Exhibit No. 5 was marked.)

Q. And in the past two years, what's new about this, about your CV? Have you published some new articles?

A. No, not that I published any articles. Primarily presentations that I've given to other

industrial hygienists at national conferences. Perhaps some courses that I've taken. Professional development classes. I think that's primarily it. I think I got another certification related to indoor air quality investigations since that time.

Q. Sick building syndrome and that kind of stuff?

A. An old term, but yes, that's one that's still around. I think they changed the name to toxic mold. Of course, all mold is toxic. So, I don't know what you're going to do.

Q. All right. We're almost done with the laborious task, Mr. Spencer.

No. 12, which asks for your entire file concerning this case and your work on this case, including any fee retainer or engagement you have with the Defendants or defense counsel. Do you have a written fee agreement?

A. No.

Q. It's all oral?

A. Yes.

Q. Do you have copies of any checks you've received?

A. No.

Q. Have you been paid yet?

A. You know, I haven't even checked that. I probably should have before this deposition today.

Q. Well, I think they're pretty good about paying.

A. I did bring the invoices.

Q. You did?

A. Yes.

Q. So if you can pull those out, we'll attach those as Exhibit 6.

A. (Complies.)

Q. It looks llike most of them are paid.

(Whereupon Spencer Deposition Exhibit No. 6 was marked.)

Q. I see that there's telephone conferences with client. Your client, which would be Thompson & Knight or Dow Chemical?

A. Thompson & Knight.

Q. I just wanted to clarify that. So to date, you have probably billed almost $30,000 in this case. Would that be a correct statement?

MR. RAVEN: Objection to form.

A. You know, it isn't even added up. Somebody told me it was around 25. Yes, I would agree with what you said.

Q. And your entire file, do you consider all these documents your entire file for this case, or do you consider the notebook you have in front of you your file for this case?

A. Well, that's the five boxes plus this notebook are my entire file.

Q. Your entire file, okay. Did you bring any time sheets or do you keep those in your head?

A. No. The invoices reflect the time.

Q. Okay. How do you keep time? Do you just have a little book that you write in it or --

A. Yes. Well, it's just time that we spend on doing a particular task is turned into our bookkeeper.

Q. So, you have time sheets?

A. Yes. Yes.

Q. But you didn't bring any of those today?

A. No. That's reflected in the invoices.

Q. Did you bring any and all documents of any kind which evidence or reflect any payments made to you by or on behalf of Dow or their lawyers in this case, which I see some of these are marked paid, and that's indicative of some expenses that they paid you?

A. Yes.

Q. No. 15 asks for any and all documents, records and medical records of any kind discussing or concerning the physical medical condition of the Plaintiff. You didn't bring any of those; did you? I mean, those aren't really something that you're, you're relying on as a basis of your opinions?

A. Correct.

Q. What is your understanding of Mr. Boren's medical condition?

A. That he has a form of leukemia. I don't know the current status of his condition, if that's what you're asking.

Q. Well, it was just that, that he was -- that he's been diagnosed with leukemia. Are you aware that he had acute myelogenous leukemia?

MR. RAVEN: Objection to form.

A. Yes. I'm not attuned to the specifics of the origins of that AML, but yes, I'm aware.

Q. And you've not been asked to do that in this case?

A. That's correct.

Q. Do you have documents responsive to No. 16, which would be all documents that refer or relate to tests, studies, research and data which you rely upon for your opinions?

A. I took that to mean that kind of another broad brush at everything else that's already been brought up here. And yes, I think all the things that we've talked about were responsive to that.

Q. If you had to pick a category of documents when you're reviewing a case other than the depositions, which would be essentially the facts of the case, from an industrial hygienist perspective,

which category of documents would be the most informative to you to enable you to accurately assess someone's exposure to chemicals?

MR. RAVEN: Objection to form.

A. To the extent there is specific data from that facility, that's important. In the absence of that data, literature or other studies of similar or the same types of operations in the same conditions is relevant, that kind of data, absent what you've described, the testimony and so forth, the description by the employees.

Q. So in this case, you would classify the industrial hygiene data that you're currently reviewing right now --

MR. RAVEN: Objection to form.

Q. -- as probably the most informative in formulating your opinions in this case?

MR. RAVEN: Objection to form.

A. Well, in terms of looking at my opinions in this case, I don't know that's the most important. I also utilized in this particular case -- because of

the infrequent nature of the activities of Mr. Boren at the Dow facility, I also utilized the data provided by your industrial hygiene expert in this case as a, basically a worst case scenario.

I also had data that your expert has, as I understand it, from an exposure assessment that I had done involving a benzene-containing solvent that -- in fact, the same type solvent Mr. Boren claims to have worked with.

MR. BLACK: Objection to the nonresponsive portion.

Q. And which solvent was that?

A. Liquid Wrench.

Q. Have you done any exposure analysis for Liquid Wrench beyond your earlier assessment of Liquid Wrench in other cases for this case?

That's perhaps a very bad question. But what I'm asking you is: I know historically you've done work on Liquid Wrench cases, and you did a reconstruction of benzene-spiked, I believe were your words, Liquid Wrench. Where you spiked modern-day

Liquid Wrench with certain quantities of benzene.

Have you done an independent analysis of Liquid Wrench separate from that earlier study for this case? Have you basically done another spiking?

A. No, I have not.

Q. Have you done another spiking since that original test that you performed, which I believe was in 2001, if I'm not mistaken?

A. No, I think it was later.

Q. Was it?

A. But to answer your question, no.

Q. That's the only Liquid Wrench test you've ever performed in a clinical environment so to speak?

A. I don't know if I'd call it clinical, but in an actual environment versus, you know, a modeled environment, yes.

Q. So, do you have -- and it's probably been a while since you've looked at your deposition in the Cowey case. Do you remember that case?

A. I remember the case.

Q. It was about a year ago, and it was a

telephone deposition. I believe you were in New York at the time.

A. You didn't do that; did you?

Q. I was present.

A. I don't remember.

Q. Lance Lubel was the Plaintiff's lawyer that did that case.

A. Oh, yes, he did depose me before. I couldn't remember.

Q. And the deposition probably lasted, I don't know, maybe five hours. It was kind of difficult because you were in New York.

A. Okay.

Q. And we talked about your modeling or actually your testing of the Liquid Wrench. Have you reviewed that deposition recently?

A. No.

Q. Have you been asked to look at that deposition?

A. No.

Q. Have you been asked to give an opinion with

respect to Liquid Wrench based on your prior work in Liquid Wrench cases in this case?

A. Yes. To the extent that at the time at Dow, it adds to his -- potentially his benzene dose there, yes.

Q. So, the basis for your opinions on Liquid Wrench are those old studies, and by old I mean just a few years ago, of Liquid Wrench? There's nothing new on which you base your opinions on Liquid Wrench; is there?

A. Well, let me just add. I have done -- I presented this data at a national conference. I think your industrial hygienist, he was there when it was being presented.

Q. Right. He said he saw it.

A. Yes. I understand he liked it. We also did a sophisticated modeling to determine whether that modeling correlated with our actual air sampling, which it did, and we presented that data at a conference last year.

Q. Do you have transcripts of those -- of that

conference, or was -- was there any transcript made, a videotape or --

A. This particular session we did was a technical session that was called a poster session, and certainly we had copies of that.

Q. Is there any way -- they're big posters; correct?

A. Yes.

Q. Would you mind making those available, copies of them?

A. Well, I can get you the information because, sure, we shared it with anybody who wanted the information.

Q. Okay. But if you don't mind getting that to your attorney, we'd love to see that. And was it a new evaluation? Did you reevaluate the data? Did you discover anything new, or was it basically, hey, this is what we did, this is what we found?

A. No, it wasn't new. It was just a presentation of what we had done.

Q. Okay. Well, with respect to your

opinions -- and you understand my job is to find out what your opinions are in this case, and I know it can be a laborious process. You've given depositions before in the past.

I'll let you take a look at your expert designation which -- this was the initial designation which was filed in February of 2004. I'll let you take a look at that real quick and see if that is an accurate assessment of what you've been asked to do in this case?

A. I think generally, yes.

Q. Is there anything on there that you've not been specifically asked to do?

A. No.

Q. So, let me go ahead and read these into the record. So, your opinions in this case, you'll offer opinions on issues of occupational safety. You'll offer an opinion on alleged occupational exposures to chemicals of Mr. Boren.

You will give an opinion on the state of the art for industrial hygiene and the state of the

knowledge at relevant points in time concerning benzene and other chemicals.

You will give an opinion which will address the alleged exposures of Mr. Boren to benzene and other chemicals at the premises of Dow. And you'll calculate the dose or quantity of such alleged exposures.

And you'll also address issues concerning training and warnings provided by Defendants, the safety procedures and policies of Dow. And any personal protective equipment and other means used to protect workers at premises. And, of course, you'll offer rebuttal testimony.

A. Yes.

Q. Are there any other areas that you've been asked to cover in this lawsuit?

A. None that I can think of.

Q. Except perhaps warnings and labels, have you specifically been asked to do that?

A. Well, that's mentioned in there.

Q. Or would you just categorize that in terms

of Federal Hazardous Substances Act?

A. Well, no. The Federal Hazardous Substance Act, no, not so much. That doesn't really relate to industrial operations. The Hazard Communications Standard relates to that.

Q. So, you've not been asked to offer an opinion with respect to the Federal Hazardous Substances Act and labeling required by it for products that contain benzene?

A. Correct.

Q. Do you feel that someone would need to actually work for the Consumer Product Safety Commission in order to be an expert on the labels that are required by the Federal Hazardous Substance Act?

MR. RAVEN: Objection to form.

A. No, I don't think that's the case. There's probably a number of consultants that are very familiar with and work to develop consumer product labeling, which is different from industrial labeling. But they don't have to work -- have had worked for the CPSC.

Q. So, you feel that -- or believe that someone that worked for NIOSH such as yourself would be fully qualified to offer an opinion as to labeling?

A. I'm sorry, I interrupted. It depends on their experience and their background as to whether they're qualified. It's not as much who they worked for, but that plays into it.

Q. The reason I said NIOSH is because it's a governmental agency, very involved. Well, with respect to your opinion regarding occupational safety and alleged exposures to chemicals of Mr. Boren, what is your opinion in that regard?

A. Based on the description of his workplace activities and the frequency and duration of those activities, the workplace environment in which he conducted those activities, his exposure at Dow was generally low, and in fact, his overall dose was in my view relatively low.

Q. And on what do you base that opinion?

A. The testimony that I have reviewed from Mr. Boren, from his co-workers, from other workers at

Dow, from data produced by your own industrial hygiene expert, which again I utilized in a -- as part of a worst case assessment.

Q. Can we take a look at --

A. I'm sorry, and any other literature.

Q. Could we take a look at that assessment?

MR. RAVEN: Let him finish his answer first, Robert.

Q. I'm sorry, I didn't mean to interrupt you.

A. I'm not sure. I think I finished. And you're talking about my assessment or your expert's assessment?

Q. Well, both. Let's start with yours and then we'll take a look at your criticisms of -- and you're speaking of Frank Parker; is that correct?

A. Yes.

Q. Then we'll take a look at your criticisms of Frank Parker's work, which I'm sure you have some.

A. Okay.

Q. Now, this has been marked as Exhibit 4-E, and this is your exposure analysis of Mr. Boren's

lifetime exposure to benzene?

A. At -- no. His work at Dow.

MR. BLACK: Okay. Do you want to take a break for a second while I look this over?

MR. RAVEN: Sure.

(Whereupon a brief break was taken, after which the following was heard:

Q. All right. We just took a little break so I could get a chance to review your exposure assessment. Could you explain how you derived at these numbers, Mr. Spencer?

A. Well, the way we derive numbers is to follow a similar process that Mr. Parker did with, I think, some exceptional differences. We broke down the products that the Plaintiff claimed, that Mr. Boren claimed that he used and the time periods he claimed to have used those products at the Dow facility. And so, you know, based on testimony primarily.

As to the Liquid Wrench, which he claims to use, I believe it was six to eight times a day, five days a week, we factored in results from our study,

which Mr. Parker used the results from our study. I think he indicated that was the best data that was out there. And we used an average benzene concentration. And the criteria for that data is reflected in other parts of this document as to what we chose.

For instance, we used 12.7 percent benzene in the Liquid Wrench. So, we felt that was -- and I believe Mr. Parker did something similar. And came out with the average concentration times the number of years that Mr. Boren worked with that product to calculate a PPM year dose from using that product based on that frequency.

Q. Well, I noticed that for -- in terms of inhalation of Liquid Wrench, you listed exposure time of 4.4 years, which is roughly half of the nine years that Mr. Parker attributes to Liquid Wrench use. How did you arrive at 4.4?

A. And I think that's one of the striking things we did different from Mr. Parker. We refined what you all provided in Interrogatory Answers, and what I mean is the Plaintiff provided in terms of

where he said he was, what contractors he worked for and at what periods of time.

And we went to his Social Security records and looked at the earnings for those contractors within those years and took a very conservative number, basically close to minimum wage for each of those activities to determine his number of hours. We then converted those number of hours into years. And that's why you see a difference in time here.

He wasn't working at the Dow facility in 1969 through 1978 every single day of the week. So, we took the specific records as provided by the Plaintiffs in the case, compared that with his Social Security records to come up with his actual time. So, ours is more refined, and that's why you have less years.

Q. So, this would just indicate his Liquid Wrench use while on the premises of Dow?

A. Correct.

Q. It does not include Liquid Wrench use either at home or at another facility?

A. Correct.

Q. Okay. Do you consider exposures to benzene to be cumulative?

A. It is my understanding that the disease process is based on a cumulative dose, yes.

Q. So if Mr. Boren were using Liquid Wrench at Dow for four and a half years, but he was also using it at other places, would his exposure to the benzene in Liquid Wrench be cumulative in terms of his disease?

MR. RAVEN: Objection. Form. And this is contrary to every position that you all have ever taken in the case. Because when I questioned Mr. Parker, your position was -- is that it doesn't make a difference where he was ex -- where he worked. That all you want to talk about is Dow.

Now you want this witness to opine about what he allegedly got at Dow and what he allegedly got at some other facility, which is clearly -- there's no evidence to support that in the record.

Q. Do you feel qualified to answer that

question?

A. I can't speak to his use of Liquid Wrench at other facilities. I mean, I don't know exactly his use and how he used it and whether those employers were having him follow the warnings that were on the Liquid Wrench can to prevent skin contact, which his contractor employer should have been doing here at the Dow facility.

MR. BLACK: Object to the nonresponsive portion.

Q. Do you have any evidence that -- or have you seen any evidence that Dow required their contract workers to wear chemical resistance gloves?

A. I can't -- no. In this timeframe, all I can speak to is the contractors safety manual that basically provides the criteria. The contractors will do the things that are appropriate to protect the health and safety of their workers. So, that particular document, I think which was -- the version I have is 1967, well before he got there, basically requires -- you know, makes it clear to the

contractors they need to be doing the right things to protect their employees.

MR. BLACK: Objection. Nonresponsive.

Q. Let me get back to your exposure assessment. Could you explain how you arrived at .37 PPM?

A. That is the average of the eight-hour time-weighted averages from our study.

Q. And what is your understanding of how Mr. Parker arrived at .43?

A. He did the same thing. He just -- unfortunately instead of getting a copy of my paper presentation, he wrote down and I think reversed some numbers. So if he did it the same way, he just unfortunately -- he wrote down the wrong number when he was copying down the information from our session.

Q. The oral presentation that you spoke of earlier?

A. No. The technical poster session that we did.

Q. Okay.

A. I would have given him a copy of it. All he had to do was ask.
Q. Can we have a copy of it?
A. You asked and I said sure.
Q. So, you believe that he made a transposition error?
A. Correct.
Q. So, it should be .34 rather than --
A. Well, no, no, no. This is his average based on one of the numbers being transposed.
Q. Okay.
A. So, that's why his average number is different from our average number.
Q. Do you know that for sure or --
A. Yes.
Q. Do you know which number it was that he transposed?
A. I believe it was for the seven percent solution.
Q. Okay.
A. I -- honestly I have to go back and look. I

thought it was for the seven percent solution.

Q. And how did you arrive at that decision, that he had transposed a number from the seven percent readings?

A. From -- it may have been from -- I don't know if it was from this deposition or from an earlier -- another deposition he gave in another case which he had looked at our data. He did the same thing.

Q. So, it's your opinion that his calculations are based on a transposition error from your original study?

A. Yeah. You asked why the difference there, and that's why.

Q. In earlier versions of this, which I believe was given to -- this being your exposure assessment, which is the version that was given to Doctor Snodgrass a couple of days before his deposition, if I can find it here, was also listed as an exhibit to Doctor Nadelson's deposition. Have you read Doctor Nadelson's deposition?

A. No.

Q. The estimated benzene exposure dose is 7.68, and in your new version it's 10.86. How do you account for the discrepancy?

A. Oh, the total dose?

Q. Yes.

A. I went through and there was something -- I can't remember exactly now. I did something different in the dermal dose calculation that I felt wasn't -- that I did wrong. So, I revised it and I caused the number to go up.

Q. So, you revised the dermal dose number?

A. Yes. That's what it was, the dermal dose.

Q. And why did you revise the dermal dose?

A. I can't remember exactly what I did in doing the dermal flux calculation. I had something in my math that was -- I think it was slightly off and that's what changed it. You see the difference here.

Q. On the current version or the newest version, it shows a concentration for dermal exposure of 1.52 PPM, and your earlier version shows .20.

That's quite a big step up. What new information did you find about dermal exposures that would cause that significant increase?

A. It wasn't any new information. It was just I made a -- I had to amend the calculation that I made. It wasn't anything new.

Q. In your earlier version of this, you listed Liquid Wrench exposure times as nine years?

A. Yes.

Q. And then in your newest version it's half of that?

A. Correct.

Q. Why did you decide to revise that?

A. Well, because I wanted to be more accurate.

Q. You just wanted to show Liquid Wrench exposure at Dow?

A. Yes. Well -- yes. At Dow and for the actual number of years that he would have worked there.

Q. How did you arrive at the dermal numbers?

A. It's based on a dermal flux rate

calculation. There are -- the papers that are in -- follow 4-E, Marbach, Anjo, Hanke, Plank discuss based on studies what the flux rate is, the absorbed dose per unit over time per unit area of skin contacted. So, a formula based on actual animal and human studies which shows the absorption rate of benzene through the skin.

Q. Could you point out which article that is?

A. Sure. This article, this article and this article.

MR. RAVEN: Why don't you read the names of those articles into the record?

MR. BLACK: That's what I was just going to ask him to do.

A. Penetration of Benzene Through Human Skin.

Q. And who is that by?

A. That's Blank and McAuliffe.

Q. And that was published where?

A. The Journal of Investigative Dermatology.

Q. In what year?

A. 1985.

MR. BLACK: Do you mind if we mark these as exhibits while we're going?

MR. RAVEN: They're already marked as part of 4-E.

MR. BLACK: Okay.

Q. Absorption of Benzene Through Skin Into Man. This is by Hanke, et al. It is part of the U.S. Department of Labor OSHA Document 1970 -- it's an OSHA dash 76 dash 56 document.

And the last is Percutaneous Penetration of Benzene and Benzene Contained in Solvents Used in the Rubber Industry, Marbach and Anjo, 1981 in the Archives of Environmental Health.

Q. Are there any other articles that you used for dermal exposure estimation?

A. No.

Q. And what was the absorption rate that you used to calculate dermal exposures?

A. 0.1325.

Q. And what -- how is that measured, 0.? Is that a ratio of --

A. No. It's a number of milligrams per cubic centimeter skin per hour, what's called dermal flux rate.

Q. And how is that calculated?

A. It's based on the studies. You have kind of a before and after. You put so much material on a known area of the skin, you measure before, you measure after you apply certain concentrations of a benzene-containing solvent or a benzene solvent.

Q. So, it would vary depending on the percentage of benzene in the mixture?

A. Sure. The dermal flux rate is going to vary on benzene, but it really -- the -- when the studies are done, they look at the number of milligrams of benzene regardless of the percentage in the solvent. It's just a function of the number of milligrams or micrograms of benzene in the solvent.

Q. So, it's monitoring the benzene irrespective of whether it's in a concentration of 30 or 70 percent?

A. Correct.

Q. Or one hundred percent?
A. That's right.
Q. The absorption rate is still going to be the same if you have a given quantity. Is that how it works?
A. Yes.
Q. Okay. Let's attach your earlier version as Exhibit 7.
(Whereupon Spencer Deposition Exhibit No. 7 was marked.)
Q. In both versions of your report -- well, actually first let me ask you, was this done on Microsoft Excel?
A. Yes.
Q. Were the calculations done by the computer?
A. Well, after you put the formula in, yes.
Q. That's what I was asking. Did you create formulas or macros within the data base that would run these calculations?
A. Yes.
Q. Do you have those formulas with you?

A. Well, that's what's presented here.
Q. You just have the final result?
A. Yeah. Well, in terms of -- you know, I don't have the formula that we put into the Excel spread sheet, I mean. But that's the number of milligrams per cubic centimeter per hour. You have to pull that out. That's presented here in this page.
Q. Do you mind if you -- could you provide us the formulas for how you calculated these?
A. Well, they're right here.
MR. RAVEN: They're right there.
Q. How am I supposed to read this?
A. I would get your expert.
Q. To me a formula is X plus Y equals whatever.
A. Well, you have to determine the amount of material --
Q. P equals NRT is a formula; is it not?
A. It is, but this is as well. You just have to plug in the number of milligrams. So, what's the total amount of benzene that's on skin based on -- and how many square centimeters of skin surface are being

covered and for how long are they being covered, the skin, by this material. And that's what gives you your absorbed dose.

Q. How did you calculate this? I'm not the best math student, but I'm looking for division signs or multiplication signs.

A. Well --

Q. Is this --

A. It depends on --

Q. -- the formula?

A. No, no. This flux rate, meaning how much skin -- benzene transmits through the skin at this rate, that's what the flux rate is. The number changes depending upon how many hours that you're inputting into the -- into your formula there.

Q. Well, I understand that, but it's -- would there be a formula written out that would have hours of exposure, the exposed area, the number of square centimeters? I mean, is that hours of exposure times --

A. I don't have exactly here that shows -- I

think what -- you're looking for every single mathematical step here.

Q. Right.

A. I can write that out for you and get that to you. That's not a problem. It's a standard --

Q. Standard formula?

A. Yes.

Q. That's what I'm looking for. My math teacher always used to say, show your work.

A. Right.

Q. And that's just what I was looking for is how --

A. Well, that's here. I'm sorry. But that's here for someone who knows how to do this.

Q. Right.

A. The data is here.

Q. Right. But you appreciate the fact that juries -- the jury is going to be asked to look at this?

A. Right.

Q. Hopefully they'll have had algebra and will

be able to grasp it. I doubt many of them will have had calculus.

A. You don't need that.

Q. Good. Because all we need to be able to do is multiply and divide?

A. Right.

Q. Okay. That's good. Because I think the jury will be able to grasp that.

A. Right.

Q. And for us, we just wanted to see how you calculated this.

A. Right.

Q. We're lawyers. We're not that smart.

A. That's what you have your experts for.

Q. Exactly. I also noticed on both charts that -- Dow on-site inhalation. What does that mean?

A. That was the -- this was some of the data that we talked about earlier that I have not finished going through. This was --

Q. So, these numbers are subject to change?

A. Actually in this particular case since I

have not finished my review of the data, we used the number that Mr. Parker generated.

Q. Okay. Although with half the exposure time?

A. Well, with the corrected exposure time, yes.

MR. BLACK: Objection. Nonresponsive.

Q. Curiously on here there doesn't appear to be any dermal exposure. Why is that?

A. You're talking about washing hands --

Q. Washing --

A. -- in benzene?

Q. -- tools in benzene.

A. Because of -- based on everything that I reviewed from co-worker testimony and Plaintiff testimony, that did not happen.

Q. Mr. Boren testified that he washed his hands and tools in benzene.

A. Well, he testified that he did not know what he washed his hands in, that he was told by some Dow employees that he could not name that it contained benzene. However, the testimony of every single Dow employee and all the co-workers but Mr. Cook indicated

that it was a chlorinated solvent. They would have used a nonflammable material for cleaning hands and cleaning tools.

Q. Well, some of those other co-workers testified that they used solvents that they didn't know the name of it.

A. That's correct. Some did. Some were specific in saying it was a chlorinated solvent. The ones that didn't know what it was had no knowledge that it was a benzene-containing solvent.

So with that testimony and given the fact that Mr. Boren was working as a welder for -- I'm not sure why he would wash welding tools. I know he worked as a pipefitter for some time as well.

But in Plant A, my review of the testimony from his co-workers is that he -- that was the only plant Mr. Cook identified benzene being used as a solvent for cleaning. And Mr. Boren was working in Plant A as a welder. You cannot -- and I believe even according to your own industrial hygiene expert, would not expect a highly flammable solvent being used

around ignition sources like welding.

MR. BLACK: Objection. Nonresponsive.

Q. So, do you just not believe Mr. Boren when he says he washed his hands and tools in benzene?

A. No. That's not -- you're misstating, I think, what Mr. Boren said and also my opinions here. I think Mr. Boren indicated he did not know what solvent it was. He was told by Dow employees that it was benzene. And someone may have said benzene, but not an aromatic. It was not an aromatic benzene.

Q. So, there's -- there's a non-aromatic benzene?

A. Yes.

Q. What is that?

A. It's an aliphatic hydrocarbon, does not contain -- and it was commonly used for cleaning. It was like a Varsol type product.

Q. And it's called benzine?

A. Yes.

Q. How do you spell benzine?

A. B-E-N-Z-I-N-E.

Q. So, it's Z-I-N-E?
A. Yes. But pronounced the same way.
Q. And it's an aliphatic hydrocarbon?
A. Yes.
Q. Who manufactures benzine with an I?
A. There were many companies that did it. It was a generic term for cleaning solvents historically.
Q. In OSHA documentation that you look at and other government sources, they refer to synonyms for benzene with an E as also being benzine with an I. Is that not true?
A. That is not true.
Q. And what is the basis for that opinion?
A. I've never seen that. I think you're incorrect in saying that. I've never seen it produced that way.
Q. So, benzine with an I, it's your understanding benzine with an I has always been an aliphatic hydrocarbon?
A. That's correct. That's what's in the literature.

Q. So in your exposure assessment, you just based -- it's your opinion that Dow employees were mistaken that it was benzene?

A. No. That Mr. Boren was mistaken.

Q. Earlier you said they may well have told him that it was benzene.

A. Well, he may have -- they may have told him. I don't know what happened at that time, other than most of the Dow employees who were deposed in this case indicated they used a chlorinated solvent. That was policy standard practice at Dow. And that's typical for most industrial plants because of the concern for fire.

He may have been told -- I wasn't there; I don't know. He may have been told by some Dow employee or someone else - I mean, he couldn't remember who it was - that it was benzene, but it would not have been an aromatic form of benzene.

Q. Chlorinated solvents are not flammable?

A. Generally that's correct, yes.

Q. What is it about chlorinated solvents that

makes them less volatile?

A. I don't know if I -- I can't -- I don't know that I can sit here and can explain that. It's that their flash point is much higher, meaning it takes a much hotter source to ignite.

All things will burn at some point, but unlike benzene which has a very low flash point, about 12 degrees Farenheit, these materials have a very high flash point, have a very high boiling point. So, they fall outside the definition of a flammable substance.

Q. So, it's your opinion that Mr. Boren's exposure at Dow, Plant A, Plant B and Oyster Creek, his exposure to benzene occurred from Liquid Wrench use, both dermal and inhalation, and inhalation from benzene used in the processes at those plants?

A. Benzene or benzene-containing substances. I mean, really, we just took your expert's summary. I think that -- I think what we'll find once we get through all the data that I have overstated what his exposure is as your industrial hygiene expert has overstated when we apply some more of the factual

data. That's what I'm surmising. I can't say until I finish my review of the data.

Having not finished that review, I simply used the data as presented by your industrial hygiene expert which was based on odor detection. And, of course, there's problems with using that, but I was just trying to be ultra conservative here.

MR. BLACK: Objection. Nonresponsive.

Q. So, it's safe to say that at trial, having finished your review of the industrial hygiene data, your exposure assessment will not include any dermal exposure, any washing of hands and tools in benzene, and it most certainly will be lower than Frank Parker's estimate?

A. Yes. It's certainly lower than Mr. Parker's estimate, yes.

Q. Have you seen -- or strike that.

Did you read George King's deposition?

A. Yes.

Q. Did you read the reference about a Dow document that says, do not use benzene as a solvent?

A. I don't recall specifically that part. I don't know what it was in reference to.

Q. There's a document that was circulated at Dow in the mid-seventies that said benzene is not to be used as a solvent. Do you remember that part of the testimony?

MR. RAVEN: Objection to form. That's a mischaracterization of the testimony.

A. I do not remember that testimony, no.

Q. Well, generally speaking, in terms of your experience as an industrial hygienist, do companies have to tell people not to do something if that kind of behavior is not occurring?

A. You know, it depends on the circumstances. Sure. People go through training, put out procedures and -- as part of a proactive, preventative measure. Sure, that occurs. I've seen that a number of times.

Q. In what respect?

A. In any respect. I mean, if -- in a lot of plants, a lot of facilities, there's training for everybody, that everybody goes through in use of seat

belts and driving vehicles on the plant or off site. A lot of those people have -- you know, use seat belt -- you know, all those people may use seat belts. They don't know who is and who isn't, but they still have this training.

When it comes to a particular solvent -- I'm not sure the context -- or this -- what George King said. Maybe we should look at that. That will help me explain this or understand this better, but I don't recall that specific testimony.

But there are preventative training sessions that are done all the time where it doesn't mean that somebody is doing it or that they're doing something wrong. It's just part of being a proactive employer in having an advanced program.

MR. RAVEN: Do you have the document --

MR. BLACK: Objection. Nonresponsive.

MR. RAVEN: -- that you referenced?

MR. BLACK: I do.

We'll take a break while you review this. I believe this is where it starts, around Page 68.

A. Okay.

MR. RAVEN: I thought you had a document.

MR. BLACK: I don't have that document with me. I just have the testimony.

A. Okay.

Q. Have you seen that document in the documents in these five boxes?

MR. RAVEN: Well, what document are you talking about?

MR. BLACK: I have to get it to you.

A. I'm not entirely sure which document you're referring to.

Q. That document didn't stand out to you if you had seen it. Obviously it didn't.

A. Well, I don't -- if it's a document that relates to laboratory use of benzene, which is what I'm reading here from Mr. King's testimony, this was potentially benzene being used as a laboratory reagent which was common practice in laboratories.

I'm not sure what this has to do with the industrial setting. That's what -- I guess that's

what I don't understand. If there's a document that speaks to that, I need to see that.

Q. Fair enough. We'll get you that document.

A. Okay.

Q. Back to your exposure analysis of Mr. Boren's exposures to benzene. This is it. This is the only report you've produced so far in this case?

A. Well, we call it a report.

Q. Well, your exposure evaluation, I guess is what we'll call it.

A. Yes. A summary of that.

Q. Okay. And you've agreed to provide us the underlying calculations behind your evaluation?

A. Sure. I think most of them are here. But to the extent you need anything else clarified, I am happy to do that.

Q. Well, if you could show us the math, that would be great.

A. Okay.

Q. It would help.

MR. RAVEN: So, it's clear for the record, what you asked him for was the formula that he used.

MR. BLACK: Right.

MR. RAVEN: Which is different from the math so it's clear on the record as to what he needs to produce.

Q. Are you willing to let us see the underlying data, so to speak, of your evaluation?

MR. RAVEN: It's right here.

A. That's here.

Q. That's all the underlying data?

A. Sure. That's all you need. It's right here.

Q. In your final report, you anticipate referencing specific industrial hygiene documents for your assessment of inhalation exposure for Dow on site?

A. I would say that's highly probable.

Q. Okay.

A. There's a lot of good data, and I just have not gotten through it all.

Q. Well, you're not going to issue a new spread sheet like this and just say, you know, based on industrial hygiene records?

A. No. If any change were to be made -- I'm sorry to interrupt. It would be on the last line of Dow on-site inhalation, which we may refine this again. We simply used Mr. Parker's number based on odor, which is not scientific. But if I can use the data, I feel it's appropriate, then it may change that number.

Q. What do you believe the odor threshold of benzene is?

A. From the data that I have reviewed, it varies and it varies according to circumstances. If you're talking about pure benzene and benzene only, the data I've seen is about one and a half parts per million. There's some other data that shows four parts per million or so.

Q. And that's for pure benzene?

A. Yes, in the absence of any other chemical. And if you're in another mixed hydrocarbon

environment, I don't think you can distinguish the odor of benzene.

Q. Have you seen the Dow chemical MSDS that references the odor threshold of benzene as 25 parts per million?

A. Yes.

Q. Do you just think that's not accurate?

A. No. I think that's, you know, within the range. There's a lot of variation. I'm not sure the reference source that that came from and what the circumstances were for that. But, yes, I've seen that document.

Q. And you just don't agree with it; you think it's lower?

A. No. I think there's variations. And it depends on the circumstances and depends on the individual.

Q. Do you have any specific criticisms of Frank Parker's benzene exposure analysis other than what we've talked about already?

A. I don't -- no. Other than what we already

talked about.

Q. You just believe that he's over estimated -- he made the miscalculation or the transposition of one number in the, in your data from the Liquid Wrench studies?

A. Yes.

Q. And you also believe he's over estimated the exposure period?

A. Well, not the period, but the actual time in terms of number of years. He just didn't refine that, that's all.

Q. And you also believe he's over estimated the inhalation on site exposure?

A. Oh, sure, yes.

Q. And he improperly in your opinion included dermal and inhalation exposure for benzene being used as a solvent to wash hands and tools?

A. Yes.

Q. Other than those criticisms, are there any others you have?

A. I cannot think of any others beyond what you

just described.

Q. So, the basis -- or it's your belief that Mr. Boren did not wash his hands and tools in benzene, pure benzene?

A. Based on the testimony I reviewed, yes, that's correct.

Q. Would it surprise you that that procedure was common practice at other facilities?

MR. RAVEN: Objection to form.

A. Yes. I've never seen it at really any other facilities. It's too dangerous a material from the standpoint of flammability.

Q. Would these guys be smoking around it?

A. They could have been. They were certainly welding.

Q. They were welding and smoking?

A. Well, I'm saying, as you're looking for an ignition source, they could have been smoking around it. I don't know. They -- but there was other hot work going on.

Q. I realize you've not seen the testimony yet,

but Mr. Boren was redeposed yesterday and he -- and I do want to let you get a chance to review that deposition, which probably won't be available for a week or so, but I just wanted to let you know that he did clarify some issues about washing his hands and tools in benzene.

He indicated that it occurred at the end of the day. That predominantly it was after everybody had finished working and it was the clean-up period is what these guys call it.

Does that have any bearing on your opinion in this case?

A. No. I mean, other -- so, he's changed his testimony from doing it several times a day then to just one time a day at the end of the day?

MR. BLACK: Objection. Nonresponsive.

Q. No. He's clarified the issue.

A. Okay.

Q. That -- I believe, and I haven't seen the testimony either, I've just been told this, that he said predominantly this occurred at the end of the day

when they would wash -- or at the end of the shift which might have included lunch breaks, or break periods. So, I'm not sure having not seen the testimony.

But would that -- hypothetically, would that type of testimony change your opinion about the use of flammable solvents?

A. No. Again, based on all the other testimony that's in this case, other than Mr. Cook, you know, for specifically Plant A, all the other testimony is that -- is what you would expect. There was a nonflammable chlorinated solvent that was being used to clean tools.

MR. BLACK: Objection. Nonresponsive.

(Whereupon a brief recess was taken, after which the following was heard:

BY MR. BLACK:

Q. Okay. We just took a break. And when we left off, we were talking about your exposure assessment of Mr. Boren's exposures and any criticisms you had of Frank Parker's exposure assessments. And I

had asked you about any of those criticisms and you -- we went over those. Are there any others that we didn't cover with respect to Frank Parker's --

A. None others that I can think of at this point.

Q. Do you have any criticisms of -- well, strike that.

Before I ask you that, since this is on the same vein, you've also -- we'll call that alleged occupational exposures as one of the areas that you've been asked to cover according to your CV, and you've indicated that that is correct, that you've -- or not your CV, your --

A. Designation.

Q. -- expert designation. And you've indicated that that is an area that you've been asked to cover. And we'll move on to state of the art, which is an area that you've also been asked to cover. What is meant by state of the art?

A. I think that's -- it's an issue that retrospective assessments of -- or evaluation of what

the occupational health standards were and the basis for those occupational health standards.

Q. And what is your understanding of the state of the art of benzene in an industrial setting?

A. Well, that the values have changed over time and the understanding of the health effects have changed over time.

Q. And when did those ideas change? Do you have any specific dates that you can correlate?

A. Well, the specific one of the -- I guess -- or I should say more significant recognition of consideration in terms of health effects was probably 1976 when NIOSH recognized the -- leukemia as a form of cancer as a result of benzene exposure.

Q. So, it's your opinion that leukemia was not a recognized consequence of benzene exposure prior to this NIOSH determination?

A. In terms of leukemia as a cancer, that it wasn't -- NIOSH wrote a benzene criteria document in 1974. That was not considered a toxicological effect at that time. They amended their document as more

information became available they felt was more conclusive in 1976.

Q. Are you familiar, obviously you are, I saw it in your book, with the 1948 American Petroleum Institute --

A. Yes.

Q. -- I guess you'd call it a study on the hazards of benzene?

MR. RAVEN: Toxicological review.

A. Right. It was a summary review, that's correct.

Q. Did you notice in there that the American Petroleum Institute notes a consequence of benzene exposure is leukemia?

A. Let's see. Yes.

Q. Wouldn't it be fair to say that member organizations of the American Petroleum Institute or member companies of the American Petroleum Institute should have actual knowledge of what is in American Petroleum Institute publications?

MR. RAVEN: Objection to form.

A. Yes. I would expect that, yes.
Q. Do you know when Dow Chemical Company became a member of the American Petroleum Institute?
A. No.
MR. RAVEN: Objection to form.
Q. They've answered some Interrogatories in this case indicating that they've been a member since the 1920s. Would that surprise you?
A. Not one way or the other, no.
Q. Well, isn't it -- or would it be fair to say that given this publication in 1948 listing leukemia as a consequence of benzene exposure, that Dow Chemical would have that knowledge?
MR. RAVEN: Objection to form.
A. Certainly they could have, yes.
Q. And wouldn't it be fair to say that a prudent company would then notify employees who were exposed to benzene or potentially exposed to benzene that a consequence to that exposure might be leukemia?
MR. RAVEN: Objection to form.
A. It depends on the exposure values, no. I

certainly -- simply because someone may be exposed to some level, and the 1948 document refers to a limit of 50 parts per million or less as being strongly recommended, the standard at the time was a hundred parts per million.

So if somebody is being exposed at levels exceeding those limits, then perhaps yes. I don't know that was a standard practice historically, but I certainly see nothing wrong with that practice. But it's got to be based on some set of criteria, some threshold levels, not -- we're all exposed to benzene.

MR. BLACK: Objection. Nonresponsive.

Q. Well, in 2004, are workers notified that exposure to benzene can cause cancer or leukemia?

MR. RAVEN: Objection to form.

A. Under the Hazard Communication Standard, if they work with benzene or benzene-containing products of greater than one-tenth of one percent, then yes, that is true.

If they work around benzene or benzene-containing product and they are exposed on an

eight-hour time-weighted average of 30 days or more per year at 0.5 parts per million, then yes, they are. Otherwise, no.

Q. So, it's your testimony that workers aren't notified unless their exposure levels are -- meet some threshold; is that --

A. Sure. In other words, you'd have to notify the Boy Scouts every time they're out sitting around the campfire. There's a benzene exposure as a result of that. So, there has to be some basis for that notification. You don't just -- if you over warn, you take away the value of a warning. You have to -- the warning has to have some significance behind it.

MR. BLACK: Objection. Nonresponsive.

Q. Are there not signs currently at chemical plants placed on benzene units or units containing benzene as a feed stock?

A. Sure. There are different reasons for identifying benzene. The labeling process line is part of process safety management. There may be other labeling requirements again where the levels of

exposure are such that it initiates an area to be posted with signs as a regulated area under 1910.1038.

Q. Is it your opinion that The Dow Chemical Company and others in the industry cannot be put on notice that benzene can cause leukemia until NIOSH said so in 1976?

MR. RAVEN: Objection to form.

A. I think various organizations including Dow look to agencies such as NIOSH to determine when a material is going to cause some adverse health effect and what measures may need to be taken or changed to control those exposures. That's the purpose of NIOSH. It's part of the Public Health Service.

Q. What year was the Occupational Safety and Health Act passed? Do you know?

A. 1970, '71, in that timeframe.

Q. And it didn't become effective until '72; is that correct?

A. Well, yeah. I think it was effective prior to '72. I think it was '71.

Q. And what is NIOSH?

A. The National Institute for Occupational Safety and Health.

Q. And how are they related to OSHA?

A. They were set up as NIOSH at the same time OSHA was established as a research organization in occupational health-related issues, health and safety.

Q. Back to the 1948 American Petroleum Institute benzene review, did you notice in there that it said that there was no safe level of benzene exposure?

A. Yes, I did.

Q. Do you have an opinion about that?

A. Do I have an opinion?

Q. Do you think that's still true today?

A. There's no safe level? Are you talking about a mathematical risk or an actual risk?

Q. What does that mean to you as an industrial hygienist?

A. What it means to me is that they had a limit of 50 parts per million, and that's what they established as a safe level. They recommended as --

it's just a general practice to keep exposures as low as possible.

1948, 50 parts per million for all intents and purposes was zero. It was very difficult to measure down to that level given the analytical techniques that were available at that time.

MR. BLACK: Objection. Nonresponsive.

Q. But isn't it fair to say that Doctor Drinker, the author of this article, understood that permissible exposure levels or thresholds were inaccurate based on that statement --

MR. RAVEN: Objection to form.

Q. -- and not protective of all exposed persons?

MR. RAVEN: Objection to form.

A. I can't -- no, I don't believe so. In fact, the occupational health standards of today are based on eight-hour time-weighted average exposures. It's based on dose. It's not based on some single exposure as being causative of disease.

So, I can't presume to know what he was

thinking if he in fact is the one that made that statement. They had a limit of 50 parts per million in 1948. When they did the document again in 1961, they didn't have that language in there about no exposure. They had a threshold limit value published just like they did in 1948.

Q. Why do you think they took out the language about no safe level of benzene exposure?

MR. RAVEN: Objection to form.

A. I don't know specifically. I can only presume because they didn't have any data to back that up. Just like there's no data today to back that up.

Q. Well, isn't it fair to say that someone could get cancer from smoking one cigarette?

MR. RAVEN: Objection to form.

A. Oh, god. Mathematically, sure, you can compute that. In reality, if that's the case, everyone in the -- probably 99.9 percent of the population dies from cigarette smoke.

MR. BLACK: Objection. Nonresponsive.

Q. With respect to other state of the art

issues, the state of the knowledge at relevant points in time concerning benzene, you spoke of the NIOSH listing of leukemia as a consequence of benzene exposure. I believe you said 1976, is that when that was finally determined?

A. Yes.

Q. By NIOSH?

A. Yes.

Q. Do you have any other opinions in terms of times about the knowledge of the hazards of benzene?

A. Other than to say, generally benzene was recognized as a poison for -- from the 1930s. It was clear that in high doses -- excuse me, high doses that benzene was capable of causing blood changes. It was considered poison. It was labeled as a poison.

Q. Have you seen testimony in this case or documents concerning toxic grams --

A. Yes.

Q. -- from Exxon or Esso?

A. Yes.

Q. Did you see on there where they reference no

safe level of benzene exposure?

MR. RAVEN: Excuse me. Do you have a document where you can show him?

MR. BLACK: I don't have it with me. Do you have it over here?

MR. RAVEN: Yes.

A. Yes. I believe it's in there.

Q. Could you find it for us?

A. Let's see if we can find it.

Q. Were those attached as exhibits to --

A. No, do you know where they are?

Q. -- Rose's depo?

A. No. To Parker. I think you all submitted them in the testimony of Frank Parker --

Q. I think so too.

A. -- that you did the other day.

MR. RAVEN: Do you have that?

A. That may have been where I saw it. It may not be in my documents here. I'm sorry. I just saw them as result of Parker's testimony.

(Discussion off the record.)

Q. But you do remember seeing that in testimony?

A. I remember seeing something with Esso on it, yes, on something.

Q. Do you have an opinion about those documents?

A. No. I mean, nothing in particular as related to this case, no.

Q. You don't -- you don't have any reason to discount that Dow received those from Esso?

MR. RAVEN: Objection to form.

A. I have no idea what Dow received. I don't know whether they were internal documents or --

Q. So, you have no opinion one way or the other?

A. Correct.

Q. Have we talked about all of your opinions with regard to state of the art just to -- do you agree with Doctor Rose's deposition? Do you have any criticisms of his testimony with respect to state of the art and the knowledge of benzene hazards?

MR. RAVEN: Objection to form.

A. I need to go back and look at it from that standpoint. I was really looking at his testimony more from the exposure standpoint which he said nothing.

What did he say about state of the art? I mean, he talks about cytogenic studies that are tools used by --

MR. RAVEN: What's the question?

MR. BLACK: If he had any criticisms of Mr. Rose's -- or Doctor Rose's testimony specifically.

MR. RAVEN: Well, ask him a specific question about the testimony.

Q. Is there anything you disagree with regards to the --

MR. RAVEN: No, no.

Q. -- the timing of the knowledge -- of the hazards of benzene?

MR. RAVEN: No. I mean, if you got a specific question about Vernon Rose's deposition,

that's fine. But the witness isn't going to testify about what -- about -- I mean, you're asking him to give you a specific response to a question that I'm not sure that is a question. I mean, do you have a specific area you want him to focus on?

MR. BLACK: Yes.

MR. RAVEN: Ask him a specific question --

Q. State of the art.

MR. RAVEN: -- about the opinions, Vernon Rose's specific opinion on state of the art.

Q. Vernon Rose says in his deposition that he believes Dow Chemical and a company like Dow Chemical should have known of the hazards of benzene well before NIOSH came out with their leukemia reference in 1976. Do you disagree with that?

MR. RAVEN: Objection to form.

A. I agree to the extent that certainly Dow should have known, would have known of the known hazards associated with benzene. I think in -- generally in his deposition, he doesn't know much of anything about what Dow did or did not know. So,

there's really -- I don't know. There's not much there to agree or disagree with. He didn't really know anything as it relates to Dow.

MR. BLACK: Objection. Nonresponsive.

Q. So as we sit here today, you have no specific criticism of Doctor Rose's testimony?

MR. RAVEN: Objection. Mischaracterization of his testimony. Form.

A. My specific testimony would be that in reviewing the testimony of Vernon Rose, he has no specific knowledge of what Dow did and what their knowledge was. A lot of "should have"s and "could have,"s but nothing definitive as to what Dow did know. He doesn't know that.

MR. BLACK: Objection. Nonresponsive. All right. Moving on.

Q. Have you read Doctor Levy's deposition?

A. Yes. I did go through that, but it's not something I focused on.

Q. That's what I was going to ask you. I mean, this is moving into the medical aspect of it. You've

not been asked nor will you provide an opinion as to causation in this case; is that correct?

A. Correct.

Q. So, you read Doctor Levy's deposition just to be more familiar with the facts of the case; is that an accurate statement?

A. Yes. And to understand what he was relying on in terms of forming his opinion.

Q. Okay. But at trial, you will not take the position that you'll call into question any opinion that Doctor Levy has with respect to causation?

MR. RAVEN: Objection to form. Mischaracterization of his testimony.

A. From a medical causation standpoint, I would agree.

Q. Okay. And I take it your opinions concerning training and warnings provided by Dow and the safety procedures of Dow, at trial your testimony is going to be centered around things such as Dow did this to protect their workers, here's safety manuals that were in effect, that kind of information?

A. Yes. And the testimony again of Dow employees that speak to the process that they had instituted there to protect workers and to protect the process.

Q. So, it's your opinion that, generally speaking, Dow Freeport was a safe place to work?

A. From -- sure. From my review of these materials and looking at the testimony and my experience with many other facilities, I think this was a good facility to work at.

MR. BLACK: Objection. Nonresponsive.

Q. So at trial, that's the position you're going to take is Dow is a safe place to work, there's no way this could have happened to a worker on -- out at Dow?

A. No. I would not say there's no way -- you mean by this, someone developing AML?

Q. Correct.

A. No, I can't say that. I reviewed Mr. Boren's case, and I reviewed the details behind his exposure, and I would say for that Mr. Boren. I

can't say with absolute certainly it's going to happen and that's true for everybody that's ever worked at that facility.

Q. Okay. Are you familiar with how many units at Dow Freeport from '69 to '93 contained benzene in measurable quantities?

MR. RAVEN: Objection to form.

A. I do not have a specific number of units, no. I know Plant A was the focal area and the units within there for benzene.

Q. After you review all of the industrial hygiene documents, will you have a -- would it be fair to say you'd have a better understanding of how many units out there had benzene in measurable quantities?

MR. RAVEN: Objection to form.

A. Yes, but I'd have a better understanding. I'm not sure that the data that's been provided me may be limited to those areas where Mr. Boren was allegedly working. I haven't done that assessment yet.

Q. Do you plan on doing that assessment?

A. Sure. That would be part of it in trying to understand what the data is and where it was located, sure.

Q. With respect to safety equipment, what is your opinion in that regard?

A. I guess I need --

MR. RAVEN: Objection to form.

A. I need a point of reference there. I'm not sure what you're asking me.

Q. Well, is it your opinion that Dow at all times followed the safety procedures that were in effect for the time period? Is that essentially what you're going to say at trial?

MR. RAVEN: Objection to form.

A. My understanding of Dow's safety and health practices and procedures is that they're -- and this is based on testimony from Roger Daniels and perhaps -- and others, of Dow employees that they were certainly following standard industry practice and in many cases were in advance of those practices and procedures to protect workers.

MR. BLACK: Objection. Nonresponsive.

Q. So, it's your opinion that they were a leader in the industry in terms of worker safety?

MR. RAVEN: Objection to form.

A. Yes. I would -- certainly as an industrial hygienist that's done thousands of assessments at hundreds of plants around the country, I would say that they -- I would qualify them as a company I would refer to in looking at good health and safety programs.

Q. Do you know what year video cassette recorders became readily available?

A. Let's see. I had my first Beta unit in --

Q. About 1976; wasn't it?

A. No. Well, I don't know. I couldn't afford it until about 1980 or so.

Q. Right.

A. I don't know.

Q. They were really expensive.

A. Yeah. They were really big guys prior to that.

Q. Would it make sense that there was -- Dow had training videos in 1970?

MR. RAVEN: Objection to form.

A. Boy.

Q. Did you see Roger Daniels' testimony about that?

A. I don't recall the videotape discussion, no.

Q. Generally speaking from an industrial hygiene standpoint, would training videos be an adequate means of communicating safety information?

MR. RAVEN: Objection to form.

A. I mean, it depends on the video and what is -- what else is presented in tandem with that video. It's a common technique used today for training workers.

Q. Do companies generally require workers to sign some sort of acknowledgment that they've undergone training, safety training?

A. Some companies do. All of them don't, you know, don't keep a record of that. It varies depending on the organization and the time.

Q. If you were asked to be a consultant for a petrochemical company and they would ask you to help design a safety protocol for their employees and their contract employees, would you recommend that all safety training be acknowledged in writing by the employee?

MR. RAVEN: Objection to from.

A. Quite possibly, yes.

Q. Why would you do that? Why would that be something that would be important to you?

A. I hate to say, in large part it's just for litigation purposes to cross your Ts and dot your Is. Does it have an effect on being a better safety health program? No, I don't believe so. It just speaks to the liability issue.

Q. So, the only reason you'd want to do that would be to -- for possible litigation down the road?

A. That -- liability reasons would be a big reason. If someone wants to lie to me and says that they've done their work and they understand this verbally versus signing their name, I don't see a big

difference in that.

Q. So, your experience with workers in the field has been that workers irrespective of whether they have to acknowledge something in writing or verbally, they don't take it more seriously either way?

MR. RAVEN: Objection to form.

A. Oh, correct. Putting it in writing doesn't have any impact. I have been down that road a number of times and have my own experiences with that, yes.

Q. Could you give us an example of one of those experiences?

A. Sure. I spent an entire week training asbestos abatement workers how to safely handle and remove friable insulating materials. Training after training after training, signing after signing after signing. And they still would remove respirators inside of containment areas that were full of asbestos. And smoke cigarettes and drink coffee. You know, the hazard and all the training wasn't important to them.

Now, that's for certain groups of workers. I certainly don't believe that's the case in the majority of workers. But I have seen that and that's why I'm saying from my own experience, signing a piece of paper has little value. I think it's good from a liability standpoint, for a recordkeeping standpoint.

Q. In those instances, were workers told that they could actually get lung cancer from asbestos?

A. Absolutely. Lung cancer, mesothelioma. That this could kill them. That they could die from this exposure. Especially since they were all smokers and then tandem to smoking, their risk was exponentially increased.

Q. And they just didn't care?

A. It's unbelievable. And I have pictures.

Q. Is it your opinion that Mr. Boren didn't care?

A. No.

Q. Have you seen any evidence that Dow required workers around benzene at Dow Freeport to wear respiratory equipment?

A. Not for Mr. Boren. For other Dow workers? For any Dow workers?

Q. Well, for workers like Mr. Boren, contract workers.

A. No. I've not seen any information that would indicate that they wore respirators and they were required to wear respirators based on exposure levels.

Q. So, it's your opinion that respirators are not required unless there's measurable exposures or you -- benzene reaches a certain threshold. Is that your opinion?

A. That's absolutely correct. I believe they were provided respirators, but those were for other -- those were emergency escape respirators they clip on their belt. Those were for other purposes. But yes, I agree with what you just said.

Q. As an industrial hygienist, if you were providing data to an epidemiologist and he asked you for air monitoring data or industrial hygiene data from workers exposed at a particular plant, and you

gave that information to him, and he said, well, thank you for the information from -- let's just call it Plant A, not in any reference to Plant A in Freeport.

Thank you for the information from Plant A. I would like you also to give me industrial hygiene monitoring data from Plant B, workers that are exposed in the same way that they're exposed at Plant A.

From an industrial hygiene perspective, is it acceptable to equate the exposures from Plant A and B together and essentially not look at industrial hygiene data from Plant B and deem the exposures from Plant A so similar that you don't need to look at Plant B --

MR. RAVEN: Objection to form.

Q. -- or would you want to look at Plant B?

MR. RAVEN: Objection to form.

A. Well, you can use data from other operations if you can demonstrate that the task, the activity, the products, the conditions were all similar such that they fall into a similar exposure group. So, yes, you can do that.

Q. Would it be --

A. But I think you need more information than what you just described to me.

Q. Well, let's take, for instance, something that really happened. Let's say Dow does a study of workers exposed to benzene at their Midland, Michigan facility. And confronted with the option of doing a separate study on benzene workers at Freeport, they decide not to do the Freeport study because they believe the exposures are sufficiently similar to the Midland exposures.

Does that sound like an acceptable practice in the field of industrial hygiene?

MR. RAVEN: Objection. Form. And if you're going to talk about a Dow study that Dow did, why don't you show it to him and let him look at it so -- I mean, it's fair to the witness that he look at the study before he answers the question.

MR. BLACK: It's a 1985 study by Ott, I believe.

Q. Have you seen that study?

A. I'm sorry, say the last name again.
Q. Ott, O-T-T.
A. Yes.
Q. A study of workers exposed to benzene at Dow Midland. I'm not sure about the year, but I know it was -- are you familiar with these studies? Here they are.
A. You mean everything in here or the ones you --
Q. Well, they're after, I believe, some of the other toxs?
MR. RAVEN: Was that the Ott study that you asked him a question about?
MR. BLACK: Yes. Is that not the Midland, Michigan?
MR. RAVEN: Oh, no. I mean, you showed him some papers. I just want -- I want you to make sure that he's got the one in front of him that you asked him the question about.
MR. BLACK: I think there are multiple copies of it.

A. Well, this is Ott. I mean, this is --

Q. And I'm not asking any specifics about the study. I'm just asking, generally speaking as an industrial hygienist, is it an acceptable practice to not -- strike that.

Let me ask it this way. If studies -- if exposure data is deemed similar enough based on some criteria that we know nothing about, is it acceptable to disregard that industrial hygiene data in making an evaluation of workers exposed to benzene?

MR. RAVEN: Objection to form.

A. I don't think I'm following you. To disregard -- I'm not following you.

Q. I'm having a hard time understanding why -- if Dow wants to know, okay, what's the effect of benzene on our workers, why wouldn't they study all their workers exposed to benzene?

MR. RAVEN: Objection to form.

A. Well, you don't have to study every worker that works with benzene to understand the effects of benzene. What you're looking for is a -- if it's an

epidemiological study you're talking about, you look for a substantial population such that you have statistical validity to your findings.

Q. Wouldn't you want the most in order to get statistical validity?

MR. RAVEN: Objection to form.

A. You want to draw -- you have to draw some line. I'm being reasonable here. I mean, you can't -- it's not necessary, no. And it just -- it doesn't -- you're just not required -- it doesn't -- it's not a scientific necessity to look at every single individual that may be exposed.

Again, you want a population sufficient that your outcome has some statistical validity. That's what you're looking for.

Q. Based on your experience as an industrial hygienist, would you say the laws in Michigan are stricter than the laws in Texas with regard to chemical plants?

MR. RAVEN: Objection to form.

A. Texas had a -- no, I can't say that there's

any -- I can't say that there's any difference. You have one -- I haven't looked at that to tell you the truth. I know Michigan had a state program and so did Texas.

But I -- my view is -- looking at plants around the country both as a consultant and working for the Federal government is, it's not so much the state you're in, it's the organization that you work for as to the overall performance of a program.

Q. Don't some states have better records of environmental enforcement?

MR. RAVEN: Objection to form.

A. Again, I haven't done that analysis. I don't want to accuse any state of having poor environmental records. But because a state perhaps has more infractions than another state doesn't mean that a particular organization within that state has more infractions than that same organization in another state.

Q. Well, you realize the Dow Freeport facility is Dow's largest in the world?

MR. RAVEN: Objection to form.

A. I think that was my understanding, yes.

Q. It's the mother -- it's the flagship. I mean, it may not be the headquarters, but it's the flagship.

MR. RAVEN: Objection to form.

Q. Why -- if you really wanted to know what your workers -- what was going on with your workers, why wouldn't you study the flagship plant?

MR. RAVEN: Objection to form.

A. I do not know the specific answer. One thing that comes to mind, you may want to study in Michigan over Texas and particularly in South Texas because of the weather. You may have more indoor operations, thus a more worst case scenario to study in Michigan than you would in Texas. I don't know.

I'd have to -- you know, that would require me to do more research. But that's one thing that comes immediately to mind.

Q. So, the units wouldn't be open air units, particularly in Michigan; is that --

A. Certainly it's my experience there's more parts of the processes that are more protected from the weather and are enclosed in the northern states than they are in a place like South Texas.

Q. Couldn't a reason for that be lax air standards?

MR. RAVEN: Objection form.

A. No, no. Enclosing it in a building doesn't -- it's not doing anything to preclude emissions from the process lines.

Q. It still escapes?

A. It's just containing whatever is being released temporarily.

Q. Okay. I was just checking to see if you had any opinions about that.

A. I have not looked at that.

Q. Okay. Do you have any opinions concerning the causes of acute myelogenous leukemia? You stated earlier you are not going to give any opinion about causation, but do you recognize the fact generally as an industrial hygienist that benzene can cause --

MR. RAVEN: Objection to form.

Q. -- lung cancers?

MR. RAVEN: Objection to form.

A. I understand that for some forms of AML for that to be a potential cause as are certain medications and perhaps radiation.

Q. Do you have any opinion with respect to latency of benzene-induced blood disorders?

A. That's going more into -- I recognize there is a latency associated, but that's more of a medical issue.

Q. So, you're not going to offer an opinion on the latency period of acute myelogenous leukemia?

A. Correct.

Q. Are you going to offer an opinion with respect to certain exposure levels for benzene-induced acute myelogenous leukemia?

A. Yes. I mean, I -- as an industrial hygienist, I rely upon the occupational health standards as being set at a level that is protective of human health. So from that standpoint, I would

certainly provide an opinion in that regard.

Q. And what is your opinion with respect to the exposure levels sufficient to induce benzene-induced AML?

A. Well, it's more of a dose dependent function. If you look at the OSHA permissible exposure limit, one PPM eight-hour time-weighted average, that is equivalent to a 45 PPM year dose. So, below that level, as an industrial hygienist, I wouldn't expect to see disease.

Q. And what do you base that opinion on?

A. The occupational health standards.

Q. Published by the U.S. Government?

A. By the U.S. Government and other researchers.

Q. Did you bring any of those with you?

A. I have the permissible exposure -- the standard, 1910.1028.

Q. You brought that with you?

A. Yes.

Q. Can we go ahead and mark that as an

exhibit? And these are the current standards?

A. Yes.

Q. What is the current standard for benzene?

A. Well, it's one part per million, eight-hour time-weighted average, five parts per million for short-term exposure limit. And then for certain operations, it is ten parts per million as an eight-hour time-weighted average.

Q. And when did these standards become effective?

A. This came into effect in 1987, I believe. I'm sorry, you wanted to mark this.

Q. Yes.

(Whereupon Spencer Deposition Exhibit No. 8 was marked.)

(Discussion off the record.)

Q. Okay. Were these -- are these levels the levels that were proposed in 1977?

MR. RAVEN: Objection to form.

A. You know, I need to go back and look at the '77 documents. I'm not sure that they fell out

exactly the same way as they are today.

Q. But the big one, the one part per million was the 1977 proposed emergency standard, is that your recollection? Or do you know?

A. I'm not absolutely certain. I need to go back and look.

Q. You weren't a practicing industrial hygienist then; were you?

A. I was.

Q. Oh, were you?

A. Yes, believe it or not.

Q. You must have been a 15-year old industrial hygienist.

A. No. Unfortunately I was not.

Q. Yes, you were actually. You received your BS in '76; is that correct?

A. Yes.

Q. Do you have an opinion concerning cytogenetic testing as an industrial hygiene tool?

A. Yes.

Q. What is that opinion?

A. Never heard of an indusrial hygienist using that as a way to evaluate exposure. No, it's not done.

Q. Just not information you'd want to know?

A. I wouldn't say that. I want to know a lot of things. But as it relates to an industrial hygiene evaluation of an individual's exposure, it's not -- certainly not critical to me. It may be incorporated into the basis of an occupational health standard, but that's a little different.

Q. So, it's not something you'd recommend that companies do today?

A. No.

MR. RAVEN: Objection.

Q. Is that your opinion?

A. No. That's not what I'm saying.

Q. What are you saying?

A. I'm saying -- you asked me as an industrial hygienist, do I use it as a tool. And my answer is no, as an industrial hygienist, I do not. Certainly any -- you know, doing cellular in vitro or in vivo

studies is generally a good thing for well done studies.

Q. Did you see Doctor Snodgrass' testimony that he felt in the hands of an industrial hygienist with a Ph.D. that that would -- that it may be something that an industrial hygienist would want to look at?

MR. RAVEN: Objection to form.

A. What is that industrial hygienist's Ph.D in?

Q. That was my question. I have a lot more faith in you guys than Doctor Snodgrass does, I think. But I just found that kind of interesting that he would say that.

MR. RAVEN: Objection to form.

A. As an industrial hygienist, none of the -- when I'm evaluating exposure, that does not come into direct play. The health standards are what I use as my guidelines.

Q. So at trial, you're going to take the opinion that it's irrelevant? I mean, certainly if the data exists, you'd like to look at it as an

industrial hygienist, but it's not something you'd go out and demand that you have to have?

MR. RAVEN: Objection to form. A mischaracterization of testimony.

A. It's not something that I would require to do my assessment, that's correct.

Q. But if the data existed, you'd like to see it?

MR. RAVEN: Objection to form.

A. Again, it's not really necessary for me to see that in terms of doing an occupational health hazard assessment.

Q. Have you seen the cytogenetic testing that was done in the seventies at Dow?

MR. RAVEN: Objection to form.

A. I probably have at one time or another. I really did not evaluate it for this case.

Q. You've not looked at that for this case and you're not using that as a basis for any of your opinions in this case other than what we've just talked about?

MR. RAVEN: Objection to form.

A. Correct.

Q. Do you recall what those studies found amongst benzene-exposed workers at Dow Freeport?

MR. RAVEN: Objection to form.

A. No, I do not.

Q. Would it surprise you that the conclusions that they reached showed chromosomal aberrations in workers exposed to less than 10 parts per million of benzene?

MR. RAVEN: Objection. Do you have a copy of the study, Robert, you can show him? I mean, I just think it's unfair to ask him --

MR. BLACK: I think it's weird you all didn't give him one.

MR. RAVEN: Well, no, you're here; you noted the deposition. I just think it's unfair to question a witness about a report and you don't let him look at it before you ask him a question. That's all I'm saying.

MR. BLACK: Generally speaking. That was a

general question.

MR. RAVEN: Well, no, it's not generally speaking because he's here as an expert. Every word he says, you're going to use against him. And my position is that if you want the witness to elicit some opinions, give him the record that you -- the report that you want him to talk about, but don't --

MR. BLACK: I agree. My question is: Why didn't you give it to him? Doctor Snodgrass had seen it.

MR. RAVEN: That's -- what I do with him is my business. You're here asking him questions. So if you want to ask him a question about a report, let him look at it.

MR. BLACK: All right.

Q. You haven't seen it?

A. Like I said, I have looked at it at one time. I did not study it for this deposition because I -- it just wasn't relevant in forming my opinions in this case.

Q. Okay. You've -- you looked at it in this

case, or was it for another case?

A. You know, I am not -- I just don't know. I know I looked at the studies done, and I think it was Peachione or --

Q. Correct.

A. I don't -- so, yes, I am aware of that, but I did not look at it specifically for this case.

Q. I was just exploring to see if you have an opinion on that.

A. I understand. That's your job.

Q. And we talked about your criticisms of Frank Parker's work and your assessment of Mr. Boren's exposures. Are you familiar with Doctor Irons?

A. Yes.

Q. Are you familiar with Doctor Rabe?

A. Yes.

Q. Have you worked with those guys before?

A. Yes.

Q. In chemical exposure cases?

A. Yes.

Q. Do you know what Doctor Irons is currently

doing other than serving as an expert in litigation?

MR. RAVEN: Objection to form.

Q. Do you know where he is physically?

A. Well, not today. I know --

Q. In the past six months, do you know where he's been?

A. It wasn't my turn to watch him today. I do know he was involved in some fairly extensive studies in China doing benzene-related, epidemiological health-related studies.

Q. And what do you know about those studies specifically, if anything?

A. I don't have a lot of detail. I just know he was there. He and others were there following up on, I think, previously conducted studies in China.

Q. Why the fascination with Chinese epidemiological studies?

MR. RAVEN: Objection to form.

A. Wait. Fascination? I'm not sure that's a good word.

Q. Why -- I'm sure you've seen testimony in, if

not this case, other cases where Doctor Rabe has talked about traveling around the country to petrochemical companies and oil companies and soliciting funding for these new Chinese benzene studies. And my question is to you as an industrial hygienist is, why China?

MR. RAVEN: Objection to form.

A. I don't know the specific answer to that. There were a series of studies that came out of China related to industries using benzene products. They may have processes that were still utilizing tasks that produce higher levels exposure than we see today in this country. I don't know. That's a better question for Doctor Irons.

Q. So, you don't have an opinion one way or the other regarding the Chinese benzene studies?

MR. RAVEN: Objection to form.

A. No. Interesting question, but I'm probably not the right guy to ask it of.

MR. BLACK: Well, I think I'm just about done. Can we take just a quick break?

(Whereupon a brief recess was taken, after which the following was heard:

Q. We're back on the record after a quick break so everybody could review their notes. Do you feel that we have covered -- or do you believe we've covered all your opinions in this case?

A. Yes.

Q. Are there any other opinions that we haven't discussed?

A. In this case?

Q. In this case.

A. I think we've covered everything.

Q. Well, I sure do appreciate your time. It was very nice to meet you.

A. Good to meet you.

Q. And I look forward to seeing you in the future in different circumstances.

A. We'll play tennis.

Q. Absolutely.

(At 1:31 the deposition was concluded.)