IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

CHARLES WILSON and LAURA WILSON Plaintiffs,	)	
VS.	)	Case No. 2:06:CV-286
RYCOLINE PRODUCTS, INC.; et al., Defendants.	)	

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ORAL DEPOSITION OF
DR. ETHAN NATELSON
SEPTEMBER 17, 2007

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ORAL DEPOSITION of DR. ETHAN NATELSON, produced as a witness at the instance of the Plaintiffs, and duly sworn, was taken in the above-styled and numbered cause on SEPTEMBER 17, 2007, from 2:16 p.m. to 5:07 p.m., before Denyce M. Sanders, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of THOMPSON & KNIGHT, 333 Clay Street, Suite 3300, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed before any notary public.

A P P E A R A N C E S

FOR THE PLAINTIFFS:

SCHMIDT & CLARK
2911 Turtle Creek Boulevard, Suite 1400
Dallas, Texas 75219
Mr. Keith Patton

FOR THE DEFENDANT ASHLAND, INC.:

THOMPSON & KNIGHT
333 Clay Street, Suite 3300
Houston, Texas 77002
Mr. Kevin Parks

EXAMINATION INDEX

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DR. ETHAN NATELSON,

having been first duly sworn, testified as follows:

E X A M I N A T I O N

BY MR. PATTON:

Q. Please introduce yourself for the record.

A. My name is Ethan A. Natelson.

Q. You are a doctor, correct?

A. Correct.

Q. Tell us what kind of doctor you are.

MR. PARKS: Before we get into that, we'll agree that the deposition is pursuant to the Federal Rules and the witness will read and sign the transcript?

MR. PATTON: Agreed.

Q. (BY MR. PATTON) Please introduce yourself.

A. I'm -- as I said, my name is Ethan A. Natelson. I'm a hematologist.

Q. And how long have you been a hematologist?

A. I did a fellowship in 1969; and since that time, I've more exclusively seen hematology-type patients.

Q. As we sit here today, do you have a clinical practice where you see hematology patients on a daily and weekly basis?

A. Yes.

Q. And where is your practice at?
A. At the Methodist Hospital. The address is 6550 Fannin Street.
Q. You are a hired expert in this case, correct?
A. Yes.
Q. Hired by Ashland, correct?
A. Indirectly. Hired by Ricky Raven, but Ashland is the company of record.
Q. Okay. How much are you being paid for your time on the case?
A. I normally charge $250 an hour to review records and $400 an hour for deposition testimony.
Q. And as we sit here today, we marked some exhibits before we started; and Exhibit 50 appears to be your invoicing and billing records, correct?
A. Yes.
Q. How much time did you spend on this case prior to writing your report?
A. I can't tell you that exactly. It's not noted on here, but the total hours are about 15 hours that are listed here; and probably between 10 and 15 hours, I would say, when the report was actually written.
Q. Before September 8, appears you've had ten hours total in the case?
A. Yes.

Q. And since September 8, you've spent about five hours before coming here for your deposition?
A. Yes.
Q. And that includes four hours to prepare for your deposition?
A. Yes.
Q. Have you been asked to testify at trial in this case?
A. I don't recall that. But that's, essentially, a given. In other words, if I agree to be involved in a case, I typically agree to testify at trial.
Q. Do you know when this case is set for trial?
A. No.
Q. You have served as an expert witness in benzene cases before, correct?
A. Yes.
Q. Have you ever testified in any cases involving MDS or myelodysplastic syndrome?
A. I have to look at the list to be certain about that.
Q. Okay. We can go over that a little bit later. Before we go on to it more later, have you ever testified on behalf of a plaintiff in a chemical exposure case?
A. No.

Q. Have you ever given the opinion in any litigation that benzene caused a person's given disease, whatever that disease may be?

A. No.

Q. Is it your opinion in this case that Charles Wilson's MDS is not related to any benzene exposure?

A. He has a form -- he has an illness that can be classified as a form of MDS. I don't believe that particular illness can be caused by benzene.

Q. Just so I have your opinions clear. It's your opinion in this case, that Charles Wilson's MDS/RARS is not related to any exposure to benzene?

A. Yes. That's correct.

Q. Stated another way, you will testify at trial in this case that benzene exposure played absolutely zero causative factor in Charles Wilson's MDS or RARS, correct?

A. There's no "or." He has one illness, which is RARS; and I don't believe that benzene is related to that illness.

Q. Okay. My question is a little more specific. Do you believe that benzene in any way caused or contribute or played any causative factor in Charles Wilson's RARS?

A. No.

Q. Do you, as a clinical physician, ever use a differential diagnosis as a tool for analyzing causation?

A. Yes.

Q. What is a differential diagnosis?

A. Well, we look at the evidence from the case and that could be historical information from the patient, physical findings, laboratory studies, and we try to find a best fit. In other words, illnesses might cause the constellation of findings that we see and then we try to prove that by a particular test or study.

Q. Did you, in examining and preparing your opinions in this case, do any sort of differential diagnosis analysis?

A. Well, in a sense, someone has an illness like RARS, what you're looking for, are there any, let's say, factors that might give you ringed sideroblasts in the bone marrow, for example, that might suggest that diagnosis is due to an alternate cause than what we consider idiopathic.

Q. Okay. And did you do that in this case?

A. Yes.

Q. And what are the possible causes of RARS?

A. Well, one can see large numbers of ringed

sideroblasts in people who have lead poisoning. And it's -- the bone marrow is not exactly similar. It's similar in the respect that there can be large numbers of ringed sideroblasts, but lead poisoning is more of what we call a hemolytic anemia. And -- but superficially it might be confused with RARS.

Q. Do you think lead poisoning caused Charles Wilson's RARS?

A. No.

Q. Do you have any studies you can point us to that say lead poisoning causes RARS?

A. Not that I bring today. As I said, lead poisoning causes ringed sideroblasts in the bone marrow. That's a well-known phenomenon.

Q. Benzene causes different forms of MDS; isn't that also a well-known phenomenon?

A. Benzene can cause certain forms of MDS, yes.

Q. Which forms of MDS can benzene cause?

A. Well, the literature tells us that the -- the myelodysplasia that one can see from benzene is very similar to the myelodysplasia that one sees from chemotherapy drugs and, that is, in most instances, it's what we call a hypoplastic form of MDS, meaning that the cellularity of the bone marrow is reduced.

And in all forms of MDS, as time goes by, the

bone marrow can slowly convert to an acute leukemia picture; and so under the MDS classification, if one uses that classification, there are sort of weigh stations on the way; and the normal bone marrow might have, let's say, 1 or 2 percent blast cells. If the bone marrow starts to go bad and develops at least 5 percent blast cells, it's sometimes referred to as refractory anemia with excess blasts under the type 1.

Under the current modification of that system, if the blast count comes up to close to 19 percent, it's RAEB type 2. If it gets to 20 percent blasts, we call it acute leukemia. So the -- I would say that looking at it purely on a morphologic basis, benzene could form a hypoplastic type of myelodysplasia. It can form a refractory anemia with excess blasts, RAEB situation, and that could progress to an acute leukemia.

Q. So you would agree with me that benzene can cause RAEB?

A. Yes.

Q. Benzene can cause RAEB in transformation?

A. Well, that term isn't used anymore, but it -- I would say yes, in general terms, although that term is now obsolete.

Q. You believe benzene does not cause refractory

anemia, that subtype of MDS, correct?

A. Oh, primary refractory anemia, I -- I don't know the answer to that. I would think it might.

Q. But benzene does not cause RARS, correct?

A. It does not cause RARS.

Q. If a patient has RARS, could their disease turn into RAEB?

A. Yes.

Q. Okay. So as they have RARS, your opinion would be, there's no way benzene could cause that RARS, correct?

A. If the illness began as RARS, that is not a benzene-caused illness; and you get into a difference in the way hematologists and sometimes epidemiologists look at things. To me, RARS is a disease continuum. And in some people, it will pass through stages where it -- there's a blast accumulation stage, there might be, let's say, a honeymoon stage, in which the bone marrow shows no increase in blasts. It might pass through a blast stage, it might pass into an erythroleukemia stage. It's still the same illness. It's one illness. I guess the best example would be someone with hepatitis C, may have acute hepatitis, then they may get a chronic hepatitis and then they may get cirrhosis. It's still hepatitis C. It's the same

illness. You're just looking at different phases of the same process.

Q. RARS is one form of the MDS process, correct?

A. RARS can be classified as a type of MDS.

Q. Is itself a form of the -- of the MDS process?

MR. PARKS: Objection. Form.

A. Process. That would be -- it is a disease that can be classified as myelodysplasia.

Q. (BY MR. PATTON) Okay. Two patients walk into your office -- you have a clinical practice, right?

A. Yes.

Q. And you have treatment rooms, correct?

A. Yes.

Q. Okay. And sometimes you'll have one patient in one room and one patient in another room and you'll go back and forth or see one before the other, right?

A. Yes.

Q. Okay. Let's say we have a patient in room 1, okay, and the patient in room 1 comes to you and just came in, just diagnosed him, he has RARS. Okay? You would tell that patient -- or you could tell that patient, if the topic came up, that patient number 1, benzene played no causal role in RARS because benzene doesn't cause RARS; you can tell that person that, right?

A. Correct.
Q. Okay. Less go to over to room 2, okay? Patient in room 2 has RAEB. Okay?
A. Yes.
Q. You can tell the patient in room 2, hey, you have RAEB, which is caused by benzene exposure, correct -- possibly caused by benzene exposure?
A. Possibly. You know, I have to qualify that because let's assume I looked at the bone marrow under the microscope, all right? And in that bone marrow, I saw 15 percent ringed sideroblasts but I also saw 5 percent blast forms. That diagnosis, by the MDS classification, would be RAEB; but I wouldn't know the real diagnosis is RARS.
Q. So, wait a minute. How is it somebody could have RARS or RAEB and you don't know?
A. It's because of the fact that that's one of the -- one of the bad features of the MDS designation is that it's purely based on morphology, not on the clinical history of the patient. In other words, when a person gets refractory anemia with ringed sideroblasts, generally speaking, the bone marrow avidly holds on to those ringed sideroblasts, even as it passes on into RAEB classification; and sometimes even if it passes into erythroleukemia. But we see the

fingerprints, the ringed sideroblasts at each stage.

So if I looked at a bone marrow that had 5 percent blast cells and was MDS-type bone marrow, technically, that's classified as RAEB. But I would know that it's different than an RAEB that I saw with no ringed sideroblasts in the bone marrow because I see the fingerprint.

Q. Somebody could come in your office, the patient in room 2 with RAEB and he could have RAEB with no ringed sideroblasts, correct?

A. Correct.

Q. And you could look at his bone marrow and you could say, all right, there's no way patient number 2 here ever had ringed sideroblasts and there's no way he's ever going to have ringed sideroblasts; is that a fair statement?

A. That's correct.

Q. Okay. So someone with RAEB would never develop -- he would -- patient number 2, with RAEB, could never come back into your office six months later and all of a sudden show some ringed sideroblasts; is that your testimony?

A. Could not show 15 percent or greater of ringed sideroblasts.

Q. What's the significance of 15 percent or

greater?

A. Because it's a large number. 15 percent is the general number that the World Health authority has put that minimum criteria to make a diagnosis of RARS. Actually, when you see RARS bone marrows, sometimes they'll be 30 percent ringed sideroblasts, sometimes virtually every cell looks like a ringed sideroblast.

But the official criteria, just like we talked about 5 percent blast cells to make you RAEB, you need to have 15 percent ringed sideroblasts to make you an RARS.

Q. Is it possible for a patient to present with RAEB and then come back later and have RARS?

A. No.

Q. Impossible?

A. Well, I've never seen or read of such an event.

Q. Can someone start with RARS and develop into RAEB?

A. Yes.

Q. Once somebody starts with RARS, the patient in room 1, who you would say no way benzene played a possible causative factor, once they transformed into RAEB, would you then tell that person, hey, I know you used to have RARS, no benzene relationship there,

however, now you have RAEB which could be caused by benzene; could you tell that patient that?

A. No.

Q. Why not?

A. Because I know that they had RARS and I know that they're just going through the natural history of the illness.

Q. And the natural history of the illness is to do what?

A. The natural history of the illness, in most people with RARS, the first manifestation is severe anemia. And as time goes by, in certain of the patients, you get into a proliferative stage where you start growing bad looking white cells, not just bad looking red cells, and you may start to accumulate blast cells; and then you may further deteriorate your marrow function and accumulate large numbers of blasts and be classified as acute leukemia. Those three stages of RARS have been recognized for 50 years.

Q. Before we started your deposition, you and I marked Exhibits 1 through 42 and those are all the references you cited in support of your opinions in your report, correct?

A. Yes.

Q. Where is the piece of authority in there that

says RARS can turn into RAEB and because it keeps the ringed sideroblast fingerprint, there's no way it's related to benzene. Which study are we relying on in support of that contention?

A. There are some articles that say that it's a continuum illness. But I don't know of any article that says, that this continuum illness, as it passes through these stages, is -- is -- has anything to do with benzene. In other words, that's not typically addressed.

Q. Benzene as a causative factor of the subtypes of MDS is not typically addressed in the scientific literature, correct?

MR. PARKS: Objection. Form.

A. Yes, it is.

Q. (BY MR. PATTON) You're talking about Strom 2005?

A. No. In other words, for example, Linet's article talks about what -- what -- what myelodysplasia from benzene might look like. Let's find what she says here.

In Linet's article, which is entitled, "Clinical Features of Hematopoietic Malignancies and Related Disorders among Benzene-exposed Workers in China, she says, "Overall, findings for benzene-exposed

workers with myelodysplastic syndromes, included bone marrow hypocellularity and marked dyserythropoietic features such as multinuclearity, megaloblastoid changes, impaired hemoglobinization, abnormal nuclear shape, and dimorphic morphology of red cells."

She, as others have said, that the usual finding in benzene-related marrows with myelodysplasia, as it is for chemotherapy-related myelodysplasia, is hypoplasia reduced cellularity. And no one has shown ringed sideroblasts in benzene-poisoned bone marrow.

Q. What you just said was from page 1355 of the Linet study, correct?

A. Yes.

Q. And it starts off -- the portion you were reading from, the portion you highlighted, correct?

A. Yes.

Q. And it starts off in the left-hand column, "Myelodysplastic syndromes, evident among seven patients based on review of histopathologic tissue or reports, included refractory anemia, refractory anemia with excess blasts, and chronic myelomonocytic leukemia, with subclassification not possible in three cases.

"Overall, findings for benzene-exposed workers with MDS included" -- and then you went through that

with the big words that the court reporter enjoyed.

So this revealed -- this Linet study revealed that benzene-exposed workers did have refractory anemia, correct?

A. Well, this is -- when you have 74,000 people, and you find one case of something, to demonstrate that that's epidemiologic related, you can't get very far. In other words, the incidences of CMML, for example, is such, that if you took 74 members of the -- 74,000 people of the general population, you'd find at least one case.

So the fact that she saw a case there, doesn't prove it was related to benzene or not, it just shows what she saw; and what she saw was no case that had ringed sideroblasts.

Q. Okay. So she saw one that had, for instance, refractory anemia or RAEB, that doesn't really mean anything because it's 1 in 74,000, right?

A. That's correct. The numbers aren't there to tell you anything.

Q. But the fact she found zero with RARS, that doesn't mean anything either, does it?

A. It doesn't support the proposition that RARS can be caused by benzene.

Q. Does this -- does this paper support the

proposition that benzene causes any bone marrow disease?

A. Yes. Because she says that the typical benzene-induced disease is reduced cellularity in marrow. It damages the bone marrow. And the purpose of their report was to indicate that they had a high number of -- they believe they had an increased incidence of AML.

Q. So this study confirms what we all know and that's that benzene damages the bone marrow, correct?

A. Yes.

Q. And your testimony is the Linet study here tells us that benzene damages the bone marrow by virtue of reducing cellularity, correct?

A. Yes.

Q. And RARS, what's happening with the cells there? Are they being reduced or increased?

A. Usually they're either normal to increased.

Q. Is it your opinion that when benzene damages the bone marrow, the only way it damages it is to reduce cellularity?

A. No. Benzene -- we -- it causes dyspoiesis, in other words, difficulty of maturation, it can cause chromosome abnormalities in the myeloid cells. So it produces a number of types of changes in the bone

marrow.

Q. Okay. Let's talk about the types of changes that benzene causes the bone marrow. Okay?

If benzene were to attack and injure the bone marrow -- you agree with me benzene does attack and injure the bone marrow, correct?

A. In high enough dose, yes.

Q. Okay. If we can talk about dose later. But as far as benzene generally being a damaging agent, so to speak, or an attacker on the bone marrow, if benzene were to attack bone marrow, tell us the ways in which it would attack it. You already said it would decrease cellularity, right?

A. Yes.

Q. And what does that mean?

A. Well, benzene used to be used as a chemotherapy agent for people with chronic leukemias. When they had a very high white cell count, you would put some benzene in a capsule. They would swallow it and the white count would go down because it would reduce bone marrow function.

Q. So at some time in the past, doctors would actually treat increased cellularity by giving people a little bit of benzene in a pill and that would automatically knock down the cells?

A. It would be about a gram of benzene to two grams, so it is a fair amount, but it could reduce the cellularity, yes.

Q. Okay. So benzene decreases cellularity, meaning less production of cells?

A. Less production of cells.

Q. And does that go for red cells and white cells?

A. Yes.

Q. Bone marrow attacking the -- I'm sorry, benzene attacking the bone marrow. What other ways can it do it?

A. Well, the bone marrows in people with benzene toxicity frequently have been cited as having increased numbers of eosinophils.

Q. What are those?

A. They're a type of reddish granulated white cell that we sometimes associate with allergic reactions. It's a nonspecific finding. But several reports suggest that an increase in eosinophils is seen in the bone marrows of benzene-related people.

Q. So benzene can increase certain types of red cells?

A. White cells.

Q. White cells?

A. Yeah. Eosinophils are white cells.
Q. Okay. So what else can benzene do to the bone marrow?
A. Well, is -- benzene is a mutagenic agent.
Q. What does that mean?
A. Meaning that it can damage chromosomes.
Q. Okay. And chromosomes, that's DNA, right?
A. That is DNA.
Q. So benzene is known to damage chromosomes?
A. Yes.
Q. And chromosomes are part of our cells, right?
A. Yes.
Q. Okay. What else can benzene do to the bone marrow?
A. Well, if the chromosome damage is substantial enough, it may result in ultimately acute leukemia.
Q. And what is acute leukemia?
A. Well, acute leukemia is an unrestrained growth of abnormal white cells.
Q. And what effect does that have on the body?
A. Well, the leukemic cells typically fill up the bone marrow and they're essentially blanks. They don't have any beneficial function; but by filling up the bone marrow, they prevent the bone marrow from making good cells which fight infection, fight bleeding and

carry oxygen. So a person with a bone marrow full of blast cells or leukemic cells essentially has a nonfunctional bone marrow.

Q. Okay. What else does benzene do to the bone marrow?

A. Well, it can produce in high doses what's called aplastic anemia, where the bone marrow stops working for a long period of time or possibly an indefinite period of time.

Q. Meaning the blood cell machine or factory in the bone marrow absolutely shuts down?

A. Yes.

Q. Okay. What else can benzene do to the bone marrow?

A. Well, it can produce morphologic abnormalities, in other words, by interfering with cell division, you can get abnormal looking cells under the microscope.

Q. Interferes with the way cells divide and reproduce?

A. Yes.

Q. Okay. What else can benzene do to the bone marrow?

A. Those are the things that come to mind.

Q. Okay. If someone has RARS, what is going on

with their cells or their chromosomes?

A. Well, the typical patient with RARS, has what we call ineffective erythropoiesis. In other words, they're making plenty of cells in the bone marrow, but the cells aren't maturing properly; and so what gets out of the bone marrow to circulate is less than the production that you would see it would suggest.

In other words, if I -- just to give a typical example, if I give a normal person a small amount of radioactive iron and I inject that into the blood, within about 30 minutes it disappears and it goes into the bone marrow.

Now, over the course of the next week, that radioactive label appears in the circulating blood inside newly-formed red cells, at about 90 percent of it plus comes back out in labeled red cells. If I do the same experiment with someone with sideroblastic anemia, oftentimes about 10 percent of the label comes back out. In other words, the cells are made and break down and remade and break down, but my label -- but they don't come out in the sense of well-formed blood cells. So we call that ineffective erythropoiesis.

Q. When we're talking about MDS generally, that classification of diseases, what are the cells or the chromosomes doing or not doing in a patient with MDS?

A. Well, if you look at MDS in general -- on some of the papers I cite give the numbers -- but there are varying frequencies of chromosome abnormalities, depending on the type, the subgroup of MDS. RARS happens to have the lowest frequency of chromosome abnormalities of any of these syndromes. They can certainly have chromosome abnormalities and a number of have been described, but most people with RARS have normal chromosomes.

Q. Okay. What's happening to the cells of a person with MDS?

A. Well, in a general sense, the cells are being prevented from maturing properly and undergoing their normal growth potential.

Q. If someone has refractory anemia, which is a form of MDS, you would agree with me that their cells are being prevented from maturing properly and/or not growing to their potential, correct?

A. That's correct.

Q. Same with someone with RARS?

A. Similar, yes.

Q. Okay. And how is it different for RARS?

A. Because of the fact that we see large numbers of ringed sideroblasts in the cells suggesting that there's some primary defect in iron incorporation, that

iron is piling up in the red cell precursor and not being manufactured into hemoglobin.

Q. So someone with RARS, just as someone with RA, the RARS patient is showing you cells which are prevented from maturing properly, they're not growing to their potential, plus they have this little extra signature that deals with iron, correct?

A. Yes.

Q. Okay. And then what about someone with RAEB? Are their cells prevented from maturing properly and/or not growing to potential?

A. Yes. But in RAEB, you're now developing a measurable increase in the population of what we call blast cells or blanks, as I referred to them before, very immature cells that are not functioning.

Q. So when you look at RAEB under the microscope, it shows you a little bit different signature than RARS as far as what the cells are doing?

A. It's a different signature, yes.

Q. Okay. And then someone with RAEB-T or RAEB-transformation to AML, what's the difference there?

A. Simply it's a difference in more blast cells.

Q. And then CMML, that's a form of MDS, too, right?

A. No. CMML is another disease like RARS that's been known about for many, many years. In 1982 it was put into the MDS category. It's since been taken out. Most hematologists never thought it belonged there. It's a myeloproliferative disease. There's tremendous overproduction inside the bone marrow.

Q. Overproduction of cells in the bone marrow is what characterizes CMML, correct?

A. Yes. Overproduction of particularly normal looking granulocytes, and in a particular, monocytes, another type of white blood cell.

Q. One with refractory anemia would be showing you decreased cellularity; true?

A. No. People with refractory anemia could have reduced cellularity or normal cellularity or even occasionally slightly increased cellularity.

Q. Someone with RARS, their cells would be showing you decreased cellularity?

A. No. There are usually increased numbers -- normally -- well, overall cellularity of the bone marrow is usually to normal -- normal to moderately increased; and the increase is typically in red blood cell precursors that contain the ringed sideroblasts.

Q. Benzene causes refractory anemia, correct -- can cause?

A. I think so, yes.
Q. Can cause RAEB, right?
A. Yes.
Q. Can cause CMML?
A. There's no evidence for that.
Q. Okay. But that's not a myelodysplastic syndrome?
A. No. It's a myeloproliferative disease.
Q. Okay. And benzene does cause RAEB?
A. Yes. It does cause RAEB.
Q. Benzene causes AML?
A. Yes.
Q. Someone with RARS could develop into AML?
A. Yes.
Q. If Mr. Wilson, his disease of RARS developed into AML, would your opinion be no way it could be caused by benzene exposure because it had the RS signature on it, therefore his AML could in no way be caused by benzene exposure, would that be your opinion?
A. My opinion would be that this is part of the natural history of the illness.
Q. What if someone came into your office and went into the exam room and you looked at -- you visited with the patient, you looked at all their data, you looked at all their labs and they had AML. Could you

tell from looking at their AML whether they went through a ringed sideroblasts phase of refractory anemia?

A. Usually not.

Q. Okay. So someone -- let's say Mr. Wilson, for example -- no. Let's not use Mr. Wilson. Let's say patient number 3. Okay?

Patient number 3 comes into your office, presents with AML, and you look at the data and you can't tell whether or not he went through an RARS phase before he got to AML; true?

A. Well, when you say that, in other words, RARS is going to cause certain things. In other words, if we know and have blood counts from six months ago or a year ago that were perfectly normal, we would know he didn't have RARS. Now he's got acute leukemia. So part of that would be the history and the records we have.

Q. What if a patient came into your office, never saw a doctor before in his life, okay, no prior blood test, no -- no nothing, okay, and he had AML. Is it possible that his body went through an MDS phase before becoming AML?

A. Yes.

Q. Is it possible that his body went through an

MDS phase such that for one reason or another, he didn't get treated for it and all of a sudden here he is with AML; possible?

A. Yes.

Q. What about someone who has RARS, untreated, doesn't go to the doctor, no lab work, shows up with AML. Is it possible that that AML patient that you saw could have RARS before they got to AML, correct?

A. Yes.

Q. And so in that instance, if someone has AML and you don't know what they had before, you can't exclude benzene as a cause, right?

A. Well, in anybody with AML, we can't say with certainty of what the cause was. We can only talk about in probabilities. And so when I see a case of AML, I can't say with 100 percent certainty what the cause is. I can only talk in what is likely and what is not likely.

Q. And what is possible?

A. And what is possible.

Q. So if someone comes in with RARS, you can say with confidence that you believe that there's no way benzene played any causative role in RARS, correct?

A. Correct.

Q. Someone could come into your office and their

RARS developed naturally into AML, and you would tell them, your AML is possibly related to benzene exposure; true?

MR. PARKS: Objection. Form.

A. Well, it would depend on their history. In other words, if they had a -- a heavy benzene exposure history and they have AML, that's always a consideration depending on a number of features.

Q. (BY MR. PATTON) How many people in your career have you diagnosed with MDS? Approximately.

A. Well, it's a fairly common illness. I could say easily 100 or 150.

Q. 100 to 150 patients with MDS who you diagnosed, right?

A. Yes.

Q. Can you estimate of that number approximately how many had RARS?

A. Well, I think my figures would be not much different than that's in the literature. I'd say probably 15 to 18 percent.

Q. Okay. My question is a little more specific, though. How many did you diagnose with RARS?

A. Well, I thought I answered that. Let's assume I saw 100 people with RARS. Probably 15 to 18 of them -- 100 people with MDS, 15 or 18 of them would

have RARS. That's the usual percentage. It's not a common form of myelodysplasia but it's not rare either.

Q. Every MDS patient you've seen, have you told them, hey, you have MDS and you have a certain subtype of MDS?

A. Typically, yes, if I can. In other words, MDS frequently is unclassifiable. The -- the illness doesn't neatly fit into one category or another.

Q. Someone could come into your office and into a treatment room -- we'll call them patient number 4 -- and patient number 4, you can say you have a myelodysplastic syndrome. And they would say, well, what is a myelodysplastic syndrome and what would you tell them?

A. I'd say it's a disordered blood cell production in the bone marrow.

Q. You have a disorder -- patient number 4, you have a disordered blood cell production?

A. I would tell them they have a sick bone marrow or disorder of bone marrow function. That might venture into acute leukemia.

Q. Someone with MDS has a sick bone marrow, right?

A. Yes.

Q. Could you tell patient number 4 which subtype

he has?

A. Patient number 4 is someone who just came off the street with AML?

Q. With MDS.

A. Oh, with MDS. Well, it would depend on the characteristics of the bone marrow.

Q. You could look at his bone marrow and for sure class him as RA, RARS, RAEB or RAEB-T, right?

A. Or none of those. Just like the article from the Chinese of benzene study. They said some were unclassifiable.

Q. What makes a MDS unclassifiable?

A. Well, generally we -- where we have sometimes trouble classifying them is when a bone marrow has very reduced cellularity but the cells are maturing, that's to say they look normal, there just aren't enough of them; and sometimes is very difficult to separate MDS from what we call aplastic anemia. It depends on a number of features and we look for other things that might suggest MDS, such as a chromosomal normality or responds to a particular form of treatment.

And -- but hypoplastic -- severe hypoplastic MDS is very difficult to separate out from aplastic anemia.

Q. What's hypoplastic mean again?

A. Very reduced cells. In other words, it's not unusual to see a myelodysplasia bone marrow that only has, let's say, 20 percent of normal cellularity. An aplastic anemia bone marrow may have 5 percent of normal cellularity.

Q. What percentage of normal cellularity did Charles Wilson have?

A. I've never seen his slides. I've asked Mr. Raven to get me his slides, but we could look at his bone marrow report and see what they said.

MR. PATTON: Let's take a break. Off the record.

(Break.)

Q. (BY MR. PATTON) Dr. Natelson, which of the 42 references to your report says, in effect, benzene does not cause or cannot cause RARS?

A. Well, the paper I wrote says that.

Q. Okay. Where is your paper at?

A. It's in here. It's in here. Okay.

Q. You wrote this paper in 2007?

A. I don't remember when I wrote it. Probably could be early 2007 or late 2006. This journal has had it for a long while. They -- they accepted it, but then I never got the galley proofs and finally they said it's going to go into a particular issue.

Q. And this is Exhibit 14, your paper?
A. Yes.
Q. You testified in litigation on a couple of occasions before drafting this paper, that benzene did not cause a given person's RARS, right?
A. Yes.
Q. You say here on page 2, "A critical review of the refractory sideroblastic disorders strongly suggests that benzene exposure is not a potential cause of this distinct and still-evolving subset of MDS."
A. Yes.
Q. You said that, right?
A. Yes.
Q. RARS is a type of -- I'm sorry. RARS is a type of refractory sideroblastic disorder, right?
A. Yes.
Q. Are there additional subtypes of -- let me ask my question more clearly.
Are there -- how many different types of refractory sideroblastic disorders are there?
A. Well, I suppose it depends on who you ask; but generally there are three types now that people like to talk about. The first type is what has undergone several different names. Currently it's RARS. And what that refers to is a bone marrow that has the

ringed sideroblasts in there, but very little dyspoiesis or abnormal cells outside the red cell line. Some people call this pure sideroblastic anemia or RARS.

And in recent years, the -- the World Health authority has separated this form of RARS from patients with RARS who have funny looking white cells or platelets, and that's referred to as RARS with -- I have to look at my paper -- with -- morphologic abnormality. They have a euphemism for what it is. But it's a type of RARS where there are morphologic abnormalities in multilineage cells; in other words, it's not just the red cell precursors.

Personally, I think what they're doing is describing two different ends of a bell-shaped curve. But some people set great store by this.

Q. And what's the third type?

A. The third type -- it's been known for many, many years that some patients with RARS have an extremely cellular bone marrow with some degree of myelofibrosis in it and very large numbers of platelets.

Q. So what do they call this one?

A. RARS-T for thrombocythemia. And that particular one is of interest because a newly-described

molecular marker, may be called the JAK-2 marker may be positive in that form, and the JAK-2 marker is possible in many patients with myeloproliferative diseases. In other words, 95 percent of people with polycythemia vera have a possible JAK-2 study, and it's become a standard way of confirming that diagnosis.

That was the illness in the Mielke case you mentioned. In -- in this situation, this is sort of a crossover. There are people with RARS who have the JAK-2 abnormality, and so they're put into a category of RARS-T. So those would be the three distinctions.

Q. Okay. Does RAEB have further distinctions?

A. No.

Q. Does --

A. Excuse me. I take that back. The original RAEB did not. The current modern one has a type 1 and a type 2 based on the presence of -- the frequency of blast cells. In other words, with -- with small increase in blast cells is RAEB 1; with a larger increase, it's RAEB 2.

Q. Does AML have subtypes?

A. Yes.

Q. How many different subtypes of AML are there?

A. Well, generally seven types of subtypes you have under the -- what's called the FAB or

French-American-British classification.

Q. What are the seven subtypes of AML under the FAB?

A. Well, the -- the distinctions are -- some of them are quite distinct. The M-3 is the -- what we call promyelocytic leukemia. And the M-7 is the -- I believe erythroleukemia, and then some people say M-8 for megakaryocytic leukemia. And the remainder are various forms of AML with little differentiation in the -- in the blast cells or sort of a monocytic designation, I believe, M-5 is a pure monocytic leukemia and M-0 are leukemias that are very primitive looking and so on.

So the distinctive ones, really, are promyelocytic leukemia, which actually may not have much increase in blasts and, of course, erythroleukemia and megakaryocytic leukemia.

Q. And there's an M-4 type of AML, right?

A. M-4, myelomonocytic leukemia, and it's interesting because today, the -- this FAB distinction is less and less of importance and we're looking more at chromosome abnormalities; and treatment is predicated a little differently than it used to be.

Q. Is there an M-1 or a M-2 type?

A. M-0, M-1, M-2, they're all AMLs with a small

amount of differentiation. M-0 has virtually none, M-1 a little more and M-2 a little more and so on.

Q. Let's take an example of M-4 AML.

A. Yeah.

Q. Are there further subtypes of AML M-4?

A. No.

Q. Are there further subtypes of M-3?

A. Yes. In promyelocytic leukemia, sometimes one form is large granular-type and the other is sort of normal granular type.

Q. So there's two subtypes of M-3 AML?

A. Yeah.

Q. How about M-7 AML?

A. Erythroleukemia, no. Usually erythroleukemia is a erythroleukemia.

Q. What about M-8? Are there any subtypes with M-8?

A. Well, it depends on who you look at. Some people with -- have a very peculiar form of leukemia that's called acute myelofibrosis and some people believe that's an M-8 leukemia and some believe it's not. It's an unusual leukemia where the bone marrow very quickly fills up with fibrous tissue and blasts and runs a very acute course. It clearly is an acute leukemia, but it's distinct from many of the other

forms of acute leukemia.

Q. So there are a couple of subtypes within M-8?

A. Yes, I think so.

Q. What about M-5? Are there subtypes within that?

A. Pure monocytic leukemia, no. That's generally the same. I mean, there -- there are, of course, different chromosome arrays in their leukemias, but that doesn't change the FAB classification.

Q. But if we wanted to stratify and look at each possible smaller layer, we could look at, for example, in M-8 -- we could look at an AML, M-3, subtype 1 with certain chromosomal features; and we could further --

A. You could, although in M-3, there's a particular translocation that's very common, the 1517 translocation that's characteristic of both morphologic types. So they're not -- that particular illness isn't segregated by chromosomes, but it is by morphology.

Q. What about M-0 leukemia? Any subtypes in that?

A. No.

Q. M-4?

A. No.

Q. There are no subtypes of M-4?

A. Well, all leukemias may have a different

chromosome array; and in leukemia, the feature that is most prominent about determining prognosis is the chromosome array. And so certain chromosomes are considered good. Like inversion 16, for example, or the 8 to 21 translocation or promyelocytic leukemia, those are all -- the treatment is highly effective; whereas, leukemias that have loss of the seventh or part or all of the seventh chromosome are less favorable.

Q. What about M-1 or M-2? Are there any subtypes within those?

A. Well, they would have different chromosomes; and, again, the prognostic subdivision is, these days, more in order of what the chromosome analysis is.

Q. Benzene causes -- or can cause AML, correct?

A. Yes.

Q. You've never testified in litigation that benzene caused a certain plaintiff's AML?

A. That's correct.

Q. And opining in AML cases, that benzene was not a cause of the worker's AML, did you ever give that opinion based on the type of subtype or the type of chromosomal array that was present for that given worker?

A. I may have, yes.

Q. So that's to say that in opining in AML cases that benzene did not cause this worker's AML, you might have opined in that regard based on -- based on the amount of exposure, right?

A. Only in part. A typical example might be an acute leukemia with inversion 16. And that's never been described from benzene exposure at any dose level. And so that doesn't mean that it can't cause that, it just means that it's not very likely. And as I said, I can only talk in probabilities. So faced with someone with, let's say, an inversion 16 leukemia and we know that 80 or 90 percent of them are de novo, not caused by any benzene exposure and we know it's never been described with benzene exposure, obviously more commonly than not, it's going to be not benzene exposure. And then, of course, you add in what is the exposure and that has some pertinence, too.

Q. What kind of AML does benzene cause?

A. Well, the AML that benzene causes is really no different than AML that can be caused by modern day chemotherapy. It's -- it's a kind of a leukemia that typically has chromosomal abnormalities. Most of them involving the fifth and the seventh chromosome. There could be others.

It's a person who has very high exposures to

benzene, very high cumulative part-per-million exposure. And it's a form of acute myeloid leukemia, as opposed to acute lymphoblastic or chronic leukemia. So it's an acute myeloid leukemia in the setting of a very high benzene exposure that -- that might be characterized by a 5 or a 7 chromosome abnormality.

Q. What if a patient has a 5 or a 7 chromosomal abnormality and an inversion 16 and exposures, let's say they have 400 ppm years of cumulative exposure, would you give the opinion that benzene was a possible cause of that person's AML?

A. It depends on the sequence, for example. You see, chromosome abnormalities beget other abnormalities. So what you commonly see is someone may come in with a single chromosome abnormality; and as they're treated with chemicals and go into remission and relapse, they start to accumulate more and more abnormalities.

Well, that's simply -- those abnormalities are sort of not the primary event. They're secondary phenomenon. The key phenomenon is what is the original abnormality. So if someone presented with an inversion 16, regardless of what happened down the line in their chromosome array, that's not likely to be benzene induced.

Q. You've never testified that benzene caused a given person's AML, correct?

A. Yes.

Q. Okay. Would you ever testify on behalf of a plaintiff in a benzene exposure case?

A. Would I? I've never been asked to.

Q. If I wanted you to testify on behalf of a plaintiff that I represent, what type of AML and what type of chromosome abnormalities and what type of exposure would I need to be able to present to you for you to support causation?

MR. PARKS: Objection. Form.

A. It would have to be an AML. It would have to be a person who had a very high benzene exposure.

Q. (BY MR. PATTON) How high?

A. Probably at least 100 part per million, preferably 200 part per million. Very high exposure. It would have to be an exposure that bore certain time frame relevance to the leukemia. In other words, if you showed me someone that 30 years ago had an exposure and today has leukemia, I would say that doesn't fit because benzene is a disease of short latency as is our modern day chemotherapy.

So I would be looking at the latency involved, the chromosome array, the benzene exposure, and when

you got all done with all of that, I could only say it's possible this was due to benzene because in any given case, there is no side in the leukemia that proves one etiology over the other.

Q. Before we started talking about AML subtypes, we were talking about your paper, Exhibit 14.

A. Yes.

Q. Besides your paper, Exhibit 14, what other citations or authority do you have that say effectively benzene does not cause RARS specifically?

A. Well, there are many such papers. I list them in my paper and many of them are here. You can start back with Wintrobe, whose textbooks we have here. Dr. Wintrobe had a large personal series and an interest in RARS; and he concluded, by carefully questioning his patients, that benzene was not associated with RARS.

Q. And is that in your exhibits?

A. That's in these first two articles dealing with his situation. Then we talked about the fact that in the Chinese, a benzene study of Hayes, there were a large numbers of people, they had their bone marrow slides reviewed. None of them had RARS.

In the work by Aksoy, Aksoy was a Turkish hematologist, but he trained in the United States. And

he looked at people in the '70s; and at that time, iron stains on the bone marrow and sideroblastic anemia was well-known; and he carefully analyzed all the people he saw with benzene exposure. There was no RARS.

In the Pliofilm study -- it's primarily on death certificates, we don't have the original slides -- there was no description of anybody with RARS. So those are three studies where no one identified anybody with RARS.

Then we have Dr. Irons' study in which he looked at heavily exposed benzene people. Found bone marrow abnormalities, specifically looked for RARS and it wasn't there. And then we have the article by Ruiz, who also had about 33 cases of people with heavy benzene exposure that had sick bone marrows. He specifically looked for RARS and said there were no ringed sideroblasts. So all of these studies are people exposed to high levels of benzene with documented abnormalities in their marrow but no ringed sideroblasts.

Then we have indirect evidence --

Q. Let me stop you real quick. Hayes, Aksoy, the Pliofilm study, Irons and Ruiz --

A. Yeah.

Q. -- all looked at chromosome abnormalities?

A. No. They looked at morphology. They looked to see if there were any ringed sideroblasts identified, and they didn't find any. I believe Irons did look at chromosomes and but -- and some -- some patients in the Chinese study had chromosomes but not many.

Then there are sort of indirect articles. For example, one of those articles in here is a person took 84 people with RARS and he carefully questioned them as to whether or not they had any benzene exposure. And only one person did and that person also was radiated. And so, essentially, benzene didn't look to be a prominent factor in that group of 84 people with RARS. Then we have the Strom article, and he (sic) did much the same, questionnaire studies of people with RARS compared with other forms of MDS.

And in that study, she concluded that -- that there was no relationship with benzene exposure among the group with sideroblastic anemia or CMML. And so all of those studies -- when you come right down to it, there isn't a single article in the world's literature, not a case report, not an epidemiologic study, that says RARS can be caused by benzene.

Q. You believe that benzene causes RAEB, right?

A. It may.

Q. Is there a single epidemiological study or even an isolated case report in the world's medical literature that shows RAEB may be related to or a consequence of benzene exposure?

A. I believe in the Strom article they felt that there was a relationship in their RAEB patients.

Q. What about unspecified types of MDS? Isn't there support in the literature that benzene causes MDS when MDS is not viewed in terms of subtypes?

MR. PARKS: Objection. Form.

A. Well, we -- there -- there isn't really epi -- if you -- if benzene has to stand on its own feet, there is no epidemiologic proof that benzene causes myelodysplasia. We only assume that it does by analogy to the fact that our chemotherapy drugs can cause myelodysplasia, certain forms of it. So we have some basis to think that benzene can.

So by analogy, we think benzene can because our chemotherapy drugs, the modern day drugs can. When we look at our modern chemotherapy drugs, they don't cause RARS. So the plausibility disappears with respect to RARS.

Q. (BY MR. PATTON) Based on the absence of --

A. RARS from modern chemotherapy drugs.

Q. You said in your report that -- in bold that

you're unaware of any epi studies or even an isolated case report. What about the cases you testified involving RARS; those cases were before the Strom study, correct?

A. Yes.

Q. Okay. And did you opine in those cases that benzene was in no way any causative factor of the person's RARS?

A. That's correct.

Q. Would you consider those prior cases that you testified in -- certainly they're -- obviously they're not case reports but aren't those incidences where a person was exposed to benzene and it could have been a causative factor?

A. Well, their alleged exposures, which have not been subjected to peer review in a journal, where the reviewers had a chance to look at the data to see if they were realistic; and so the bottom line is, they're not published.

Q. And if someone were to submit that type of case report in a journal, would you act as a critic of it and say, well, there's no way benzene causes RARS?

A. It depends on the case. For example, I don't recall all of those cases, but if it's a person that had nonmeasurable alleged benzene exposure 30 years ago

and now when he's 70, he has RARS, I wouldn't accept that as a relationship.

Q. You call Charles Wilson's RARS -- you also call it by the name AISA. What is that?

A. Well, over the years, people have used different titles for this illness and sideroachrestic anemia is an early one. Sideroachrestic means "iron loving." Then people used to call it "acquired sideroblastic anemia," meaning you didn't have it and now you do. Then people used the term "idiopathic acquired sideroblastic anemia," meaning we don't know the cause. And then people have used the term "pure sideroblastic anemia" and people have used the term "RARS," or refractory anemia with ringed sideroblasts. So this is an illness that is many, many names over years; but to a hematologist, we -- we know what it is.

Q. What is a hematologic illness?

A. I would say it's a blood related illness.

Q. Which would include a bone marrow related illness?

A. Which could include a bone marrow illness, yes.

Q. How many different types of hematologic illnesses are there?

A. Almost an infinite number. I, you know,

through my career, I've seen many, many different kinds of hematologic illnesses.

Q. Thousands? Hundreds?

A. I've certainly seen probably in the -- I've done, for example, I would say, somewhere between 5 and 7,000 bone marrows in my career.

Q. And they're all different?

A. Well, they're not all different, but the they're all people with hematologic disorders.

Q. How many different types of hematologic disorders are there?

A. I -- I've never stopped to count them. In other words, there are three basic cell lines -- the red cell line, the platelet line and the white cell line. And each one of those cell lines has a myriad of disorders that can be associated with it. And so there would be a lot.

Q. Would you agree with the statement that benzene generally is a possible cause of hematologic illnesses?

A. Yes.

Q. How many different types of myelodysplastic syndromes are there?

A. It depends on who's classification you look at, and it keeps changing. And the original

classification was fairly simple, but it -- every few years it's changed; and there are some proposed new changes.

We look at the unclassified type, as we talked about; two different -- or three different types of sideroblastic anemias, two different types of refractory anemia with excess blasts. Those are some of the types.

Q. Are you familiar with, generally, the world's literature on benzene as a cause or possible cause of hematologic illnesses?

A. In general terms, yes.

Q. Could you estimate in general terms how many different articles have been written on benzene as a cause of hematologic illnesses?

A. I -- I couldn't hazard a guess.

Q. Over 10,000?

A. I doubt that.

Q. Over a thousand?

A. I don't know.

Q. How many articles are you aware of that examine RARS in the context of what causes RARS specifically?

A. Well, all of these articles that I cited are -- are -- involved in some form or fashion like

that.

Q. Okay. Let's go through the articles that you cite.

A. Yes. And let's start with first one. The Kushner, 1971 article, yes.

Q. What does that have to do with your opinions?

A. Well, Dr. Wintrobe and his associates looked at 17 of their own patients and they reviewed the world's literature at that time on this illness; and they concluded the pathogenesis of RARS remains unknown. And he specifically talks in the article about benzene, and they couldn't relate any of their -- the illness in any of their patients to that. So --

Q. What page does he talk about benzene?

A. It's either this or the other article, but I may have highlighted it. Let's see. He says, there -- in his discussion, he says, lack of evidence for an associated inflammatory or neoplastic disease, nutritional deficiency or a well-defined exposure to drug or toxins, which produced this. So I would put benzene under the toxins in that particular article.

And then later, last, he talks about no particular pattern of exposure -- talking about toxin -- emerges from the histories of the patients reviewed.

Q. The 17 patients?

A. No. He's also reviewed all of the other ones in the literature to that point. 61 patients in total. And -- so he couldn't find any evidence of benzene as a cause in his or other patients at that time. And this is in 1971.

Q. We also cited or marked as an exhibit later on, Wintrobe's textbooks, correct?

A. Yes.

Q. Can we pull those out for a second.

A. Sure.

Q. Does Wintrobe's 10th edition talk about what causes RARS?

A. They have a section in etiology on there and I Xeroxed it and also in the 11th edition. They're written by the same person.

Q. Where in the 10th edition or 11th edition does it talk about what causes RARS?

A. Well, it says idiopathic acquired sideroblastic anemia, and it says etiology and pathogenesis. And then this is the -- those pages have to do with etiology, the cause and the pathogenesis. This is the other, same thing in the other chapter. It just says etiology and pathogenesis.

Q. Okay. Exhibit 2, that is the Cheng, 1979?

A. That's also a Wintrobe article. And by this time, it's several years later. Now he's got 29 patients he's been studying personally, and he's come to the same conclusion that -- that there's no -- no well-defined exposure to drugs or toxins.

Q. Where is that at?

A. Under discussion. "By definition, there is no recognized associated inflammatory or knee plastic disease, nutritional deficiency or well-defined exposure to drugs or toxins."

Q. Does he explain what he means "by well-defined exposure to drugs or toxins"?

A. Well, he does in one of these articles, he talks about that because he mentioned the term "benzol." I'm not sure if it's this review. He doesn't specifically mention what toxins he sought.

Q. So Exhibit 2 doesn't specifically examine benzene as a causative factor of RARS; true?

A. Well, he examines what he thought might cause it and he talks about toxins and he was certainly well aware of -- of benzene as a toxin to the bone marrow.

Q. Okay. What is the value of Exhibit 3, the Cazzola 1988 article?

A. And this is continuing on. In other words, these are sequential by years, this is now -- we're up

to 1988. And the title starts, "Idiopathic refractory sideroblastic anemia is a disorder of unknown etiology." So by -- nothing has changed, when you get up to 1988, that doctors are still taking histories and physicals and looking for causes, and no cause is identified.

Q. May I see that? And then Exhibit 4, what is the value of that and your opinions in this case?

A. Well, only in this way, these are some of the authors who attempted to divide RARS into a good prognosis and bad prognosis group. And talking, for example, about pure idiopathic acquired sideroblastic anemia as opposed to those that had bad looking cells. And from the description of the marrow, Mr. Wilson fits into the good group.

Q. So that talks about prognosis, not about causation?

A. Talks about prognosis, not about causation. I -- he talks about the fact that we excluded other causes, looking for alcoholism, lead poisoning, drugs, blah, blah, blah, metabolic disorders. And so, and he -- he does talk about benzene. He says in this technical group, of their 84 patients, he identified one patient who claimed to have had benzene exposure and that person had radiation therapy.

Q. Okay. And then what Exhibit 5 and its value in your opinion in this case?

A. Similar in that -- this is another group that claimed on cytomorphologic grounds, the sideroblastic anemia can be divided into pure sideroblastic anemia, PSA, or RARS, which he thought was a preleukemic state. And so, again, it's suggesting that someone with a -- with problems like Mr. Wilson, that are only evident in the red cell line, they generally do better than those who have multilineage dysplasia.

Q. This Exhibit 5 does not examine causation of RARS; true?

A. Correct.

Q. Exhibit 6, what is the value of that in your opinion?

A. This is a general discussion on sideroblastic anemia, and the -- one of the things that's useful about this is, they talk about the problems with iron overload which often is a major problem in people with this situation.

Q. Does it discuss causation?

A. I don't know if it does or not. They say at the end, sideroblastic anemia is talking in the general category of sideroblastic anemias, vary in etiology and pathophysiology; but under the -- under the RAS group,

they don't offer any -- in other words, they -- they talk about the fact that their history looked for possible toxin or drug exposures and blah, blah, blah but they don't -- they don't suggest anything.

MR. PATTON: Let's take a short break. Off the record.

(Break.)

Q. (BY MR. PATTON) Doctor, what is the value of Exhibit 7 as it bears on your opinions in this case?

A. Well, this is an article by Dr. Lynch, who used to be my partner many years ago; and I'm, again, reunited with him in the Department of Medicine at Methodist, and I saw many of these patients. And it's a study of sideroblastic anemia of the group that were seen in the Baylor experience.

And they had 85 with RARS and they discussed the frequency of survival and conversion to AML and so on in that particular group.

Q. Does it discuss causation of RARS?

A. No, it does not. Primarily was concerned with incidences and progression of disease and so on.

Q. Would you agree with me that most of the literature specific to RARS does not examine causation?

MR. PARKS: Objection. Form.

A. No, I wouldn't agree with that. Because when

you see a patient with any hematologic disease or any other disease, causation is part of what you learn in medical school. You try to look for the cause. And you may do that by history taking, looking at the drugs the patient has, the occupational history. So all doctors, to a certain extent, are trained to look for causation.

Q. (BY MR. PATTON) What is the value of Exhibit 8 in your opinions in this case?

A. Well, I think as I mentioned, the bone marrow avidly holds on to ringed sideroblasts, but they do decline with time. And this is a study that looks at the percentage of ringed sideroblasts over time as the disease progressed from RARS to RAEB.

Q. So Exhibit 8 examines the incidence of RARS evolving or changing somehow into RAEB and discusses the way the RS signature goes away?

A. Well, it changes. It doesn't go away. It's reduced, in other words. But they -- they do discuss that; yes. And, of course, one would expect that to occur. They show that, for example, in 20 percent of patients with RAEB, they still show ringed sideroblasts accounting for greater than equal to 20 percent of the bone marrow.

So, in other words, they hang onto those ring

sideroblastics pretty well. So in many cases of RAEB, you can still see the 15 or 20 percent ringed sideroblasts that I mentioned earlier, even though it is now moved by virtue of the increase in blast forms into an RAEB classification.

Q. Although in some cases of RARS transformed into RAEB, the RS signature goes away, right?

A. Correct.

Q. What's the value of Exhibit 9 in your opinions in this case?

A. Well, this was -- is a general discussion on a myelodysplasia and talks about the original category. It talks -- it's really a general article.

Q. Does this general article, Exhibit 9, talk about the cause of RARS?

A. I don't recall what it says in there, if it has a section on etiology.

Q. Okay. Exhibit 10, what is the value of that in your opinion?

A. Another general discussion on the etiology and epidemiology of MDS. And this particular article, the author says the precise mechanisms responsible for the initiation of MDS are currently unknown.

Q. What does that author mean by "precise mechanism"?

A. Well, how -- how illness is -- is caused.
Q. Does it acknowledge benzene as a possible causative factor?
A. It talks about radiation, chemotherapy agents, cigarette smoking. He mentions benzene in the form of cigarette smoking; occupational and environmental carcinogens. "An increased or possible odds ratio was found for MDS patients exposed to radiation, halogenated organics and metals." Elevated odds ratio were found for copper, arc welding fumes and hydrogen peroxide, with borderline agents for -- for degreasing agents. And it talks about fertilizers as well as petrol and diesel derivatives.
Q. Okay.
A. It says, "In addition, it is clear that an association between exposure to an agent and the development of MDS is a long way from establishing cause and effect."
Q. What is the value of Exhibit 11 in your opinions in this case?
A. Well, it points out that the natural history of these diseases ranges from a chronic course that may span years to a rapid course toward leukemic progression; and specifically, "Unfortunately, the nomenclature and classification systems used to

describe these conditions are cumbersome and contentious." And I would certainly endorse that statement.

Q. And does that discuss causation, Exhibit 11?

A. No. This is just a classification.

Q. What is the value of Exhibit 12 in your opinions in this case?

A. That's the next one we're up to?

Q. Yes.

A. In this case, it would point out what I've said, is that MDS may develop after exposure to toxins, such as benzene, chemotherapy drugs or high doses of radiation, although its etiology is unknown in more than 80 percent of patients. And he talks, in this case, about the prior terminology for this illness.

Q. Okay. What about Exhibit 13?

A. Again, it does talk -- this is a classification of MDS -- and they talk about causation, unless associated with prior chemotherapy, radiation or toxic exposure eludes discovery. Indicating that in most of those patients we don't know the cause.

Q. And then Exhibit 14, this is your article, correct?

A. Yes.

MR. PATTON: Can I get a copy of Exhibit

14 before we leave today?

MR. PARKS: Yeah. Remind me.

Q. (BY MR. PATTON) Exhibit 14 speaks for itself?

A. Speaks for itself, yes.

Q. Exhibit 15, what is the value of that in your opinions?

A. This one points out, as we've talked about, "The myelodysplastic syndromes represent a heterogeneous group of disorders with different biology and prognosis," that they're different diseases. And in specific, this patient is being treated with erythropoietin to try to stimulate red cell production. And this article discusses how effective that might be, as well as other remedies to try to improve the blood counts.

Q. Exhibit 15 is mostly about treatment --

A. Yes.

Q. -- differences amongst the different types of MDS?

A. Yes.

Q. Exhibit 16?

A. This is an article looking that -- looking at chromosomes and other things in these -- in these patients. And it points out, "From clinical cytomorphologic, cytogenetic and molecular aspects, the

myelodysplastic syndromes are heterogenous diseases."

Q. Meaning different?

A. Yeah. There are many different diseases classified under this rubric.

Q. Exhibit 17 and 18 say pretty much the same thing?

A. That's correct.

Q. And do 16, 17 or 18 look at causation?

A. No. They mention incidents -- well, they -- they do comment. It says that some were therapy related, can be caused after exposure to alkylating agents, radiation or both. But that they're mostly idiopathic and it also a -- one of the more current WHO classification schemes.

Q. What about Exhibit 19? What's the value of that in your opinions in this case?

A. Well, I think we discussed this. This is sort of a blue ribbon panel looking at Gulf War exposures to pesticides and solvents; and this group which was composed of many different epidemiologists, pointed out when you're looking specifically at etiology via epidemiologic studies, that there's inadequate evidence to determine whether an association exists between chronic exposure to benzene and myelodysplastic syndromes.

Q. May I see that? Exhibit 20, what is the value of that paper in your opinion?

A. Well, in Dr. Haas' deposition he was asked questions and it got confusing because he was talking about two different classification systems as if they were the same one.

And we talked about there's a classification system for MDS, which is strictly morphology based. Then there's a scoring system for -- involving prognosis; and in his -- in his discussion he was talking about low risk, intermediate risk and high risk as though that's a classification. It is, but it's different than the other classification that we used of the separate diseases.

And he also indicated that -- that people who have low risk disease, where he put Mr. Wilson in, might have an average survival of ten years, I think is what he said. And that's not borne out by these articles. In this particular one -- there are two of these articles -- it says median survival was respectively 6.5 years in the low risk group.

Q. And that's Exhibits 20 and 21?

A. Yes. The next one has to do with what we mentioned, RARS-T, "Ringed sideroblasts with thrombocytosis."

Q. Mr. Wilson doesn't have that, correct?
A. He does not have that.
Q. That's Exhibit 22?
A. Yes.
Q. Exhibit 23?
A. Same with 23. Same with 24.
Q. And what about 25?
A. 25 is the way this is treated because, in his particular situation, he's occasionally got some blood transfusions; but Dr. Haas has been watching his iron levels and they're not particularly elevated; and if they get elevated, we have mechanisms of getting rid of the iron. And so he's following him from that standpoint. And this discusses that.
Q. And 26 is the Linet article?
A. Yes.
Q. And this looked at the 74,000 or so workers and did not find a case of RARS, correct?
A. Correct.
Q. Any other value to Exhibit 26 in your opinions in this case?
A. No. As we discussed, she comments on what the usual finding is in a MDS marrow from people with benzene exposure.
Q. Exhibit 27, what is the value of Dr. Wong's

study?

A. Dr. Wong's study is really sort of a critique of the Hayes article and comments about what he thinks are -- are dose response observations; and in this -- in this study and his opinion that the exposures in the Chinese benzene studies were not much different than what they were in the Pliofilm study.

Q. Does he examine RARS specifically?

A. No.

Q. Does he look at MDS?

A. I don't believe so, no.

Q. So what is the value in that? Cumulative dose?

A. Yeah. This is an article and so is the following on what -- on risks of AML after cumulated doses.

Q. Do you have any opinions as to what cumulative dose of benzene Mr. Wilson experienced?

A. Well, your expert, I think, said he had 18.1 part per million levels; and in one of these recent depositions, the counter from the defense side was he had around 5 part per million, I think, something like that. That was the differential.

Q. What about your opinion, based on that information and from what you know on working on these

cases, do you have any opinion as to how much benzene he would have been exposed to?

A. I wouldn't be able to calculate that.

Q. Do you believe that the printing solvents that he used from Ashland would have contained benzene?

A. They might have contained small amounts of benzene, yes.

Q. What's the basis of your opinion that the Ashland solvent blends may have contained small amounts of benzene?

A. Well, various forms of mineral spirits are well known to have trace amounts of benzene in them. And so that's been looked at. I think I referenced two articles that had to do with similar types of solvents; and so, it wouldn't surprise me if there were very small amounts of benzene in the materials he worked with.

Q. So is it your opinion in the case that Charles Wilson did work with or around benzene on a daily basis when using the Ashland solvent blends?

MR. PARKS: Objection. Form.

A. I can't dispute or comment about that. I -- I'm not an expert on those solvents and -- and couldn't make estimates on how much he worked with --

Q. (BY MR. PATTON) Did you speak to anyone from

Ashland in the course of reviewing materials and formulating your opinions in this case?

A. No.

Q. Did you ask to speak with anyone from Ashland?

A. No.

Q. Did you see any documents from Ashland that indicated how much benzene was in these products?

A. There is a document in there to that effect that I recently received that talks about some of these products.

MR. PATTON: Kevin, do you know what documents he's talking about?

MR. PARKS: The produced stuff Friday.

MR. PATTON: Documents produced this past Friday?

MR. PARKS: I'm not sure if that's what he's talking about.

THE WITNESS: Yeah. I just received that.

MR. PATTON: Is that in the pile I have here today?

THE WITNESS: It's here, yeah.

MR. PATTON: Can we find that? Let's go off the record.

(Break.)

Q. (BY MR. PATTON) Dr. Natelson, the documents which you referenced to talk about, the benzene content of the Ashland solvent blends, you're referring to the documents marked as Ashland-Wilson 4029 through 4051, correct?

A. Yes.

Q. These are 2004 or 2005 documents. Actually, one appears to be 2000. Let me ask it this way.

None of these seem to date back to the pre-2000 time period, do they?

A. I didn't notice that. We can quick -- it's not a long document. We can look through that. This says 2005. 2005. 2005. 2005 again. 2005 again.

Q. In any event, Doctor, you have not seen any documents in this case that would tell us the benzene content of the Ashland solvent blends, which Mr. Wilson is alleged to have used, that talk about benzene content between 1978 through 2000, right?

A. Correct.

Q. Okay.

MR. PATTON: Kevin, did you also produce earlier pre-2000 specifications?

MR. PARKS: Today. That's in the stuff I gave you today.

Q. (BY MR. PATTON) Exhibit 28, what is the value

of that document and in forming your opinions?

A. That's, again, another article by Dr. Wong talking about the cumulative dose of benzene necessary to cause AML.

Q. Doesn't talk about MDS, right?

A. Correct.

Q. And 29 and 30, those are the Aksoy articles?

A. These are Aksoy articles discussing the hematologic effects of chronic benzene poisoning.

Q. And what are those effects?

A. Well, he has lists of all of the things that he saw here, low white count, low platelet count, pancytopenia, what's called a Pelger-Huet anomaly. It's a funny looking white cell. Large platelets, eosinophilia, we mentioned earlier.

Then he has results of bone marrow studies and 11 people who were using a lot of benzene, and so it demonstrates what he said in his article, that he's commonly seeing these patients. He was doing bone marrows on them and he doesn't describe any RARS.

Q. And then what about Exhibit 31?

A. That's the same thing. In other words, he -- he talks about the type of leukemia that he saw in some of those people.

Q. You're talking about Exhibit 30, right?

A. Yeah. 30. Yeah. 31 is Dr. Irons' study; and he says much the same thing that Dr. Linet said, distinguishing features of benzene-induced dysplasia, include marked dyserythropoiesis, meaning a lot of funny looking red blood cells, eosinophilic dysplasia and abnormal granulation of the white cell precursors; and that's the thing that he saw. And he did iron stains in this marrow and did not find any ringed sideroblasts, and he shows pictures of some of these cells.

Q. May I see that?

A. (Hands over document.)

Q. Who funded this study by Irons?

A. I don't know.

MR. PATTON: Off the record.

(Discussion off the record.)

MR. PARKS: I just wanted to indicate -- Keith had asked earlier about whether we had produced documents showing benzene contents for dates earlier than 2000 and indicated those were produced today. Those may have been produced on Friday, September 14th. I'm just not sure. I'd have to go back and look at the production records on that. I just didn't want there to be any confusion on that. Thanks. Sorry about, Keith.

Q. (BY MR. PATTON) Dr. Natelson, what is the value of Exhibit 32 on your opinions in this case?

A. Again, this shows what happens to a bone marrow when you have chronic benzene poisoning; and it shows that the bone marrow cellularity is reduced, there's lots of fat in here. And he specifically states, in none of the patients ringed sideroblasts were observed. And so he did iron stains on all of these people. There were like 33 patients or so.

So his description of the bone marrow, Irons' description of the bone marrow, Dr. Linet's description of the bone marrow, they're all quite similar in three different groups of people with benzene exposures.

Q. What about -- what would the description be of people with AML in terms of cellularity?

A. Well, AML, there's a lot of cellularity in most cases. The -- the bone marrow is often what we call packed, meaning it's 100 percent cellular.

Q. So it would look different than what Ruiz and Irons and others observed, right?

A. Yes. Yes.

Q. So Exhibit 32 isn't the end all, be all to what benzene-affected cells look like; fair statement?

MR. PARKS: Objection. Form.

A. Well, it is. In other words, it's what they

look like before one has acute leukemia, you might say.

Q. (BY MR. PATTON) Okay. What's the value of Exhibit 33? This is the Strom study, right?

A. This is the Strom study. I think I described him earlier as a "he" but it's actually a "she," I believe.

In any event, she said that among refractory anemia and ringed sideroblast cases, smoking and agricultural chemical exposure were the only risk factors identified.

Q. Strom examined some 105 patients with the combined category of RA and RARS, correct?

A. Yes.

Q. This is reflected in Table 6?

A. Yes.

Q. It talks about benzene/solvent/gasoline exposure, right?

A. Yes.

Q. What is the amount of low/medium benzene/solvent/gasoline exposure that's reflected in the Strom study? How much benzene are we talking about in that category?

A. I have no idea.

Q. What about high?

A. I have no idea.

Q. What did the questionnaire look like that asked these 105 people whether or not they were exposed and how they were exposed to benzene/solvent/gasoline?

A. I don't know that.

Q. Is this the primary study upon which you rely in opining that benzene does not cause RARS?

A. No. As we've gone through, there are many other studies. This is just one more study.

Q. And this is the only recent study to look at benzene as a cause of various forms of MDS by subtype; true?

A. Yes. I believe that's correct.

Q. And, in fact, the Strom study looked at 37 patients at MDS who had RARS from '99 to 2004, correct?

A. Yes. They have 37 patients in that group.

Q. Did they deal with or did the Strom study address which patients maybe had RARS then transformed into RAEB?

A. No.

Q. Does it talk about how many of these people had RARS and then transformed into AML?

A. No.

Q. You would agree with me, Doctor, that it's possible that MD Anderson had a patient from '99 to 2004, who had RARS and then later developed into AML

and, therefore, was not examined in the context of MDS marrow, survived from '99 to 2004 for this study; true?

A. No. I would say, no, that's probably not true. Because likely, if they had -- she's looking through the records, I'm assuming, and trying to pull out anybody who ever had a diagnosis of RARS at MD Anderson. I'm guessing that's what she did. And that would give her her 37 people. What later transpired with those 37 people is sort of not what this article is looking at.

Q. And you certainly don't know the background of these 37 people, do you?

A. No.

Q. How would you find that out if you had to?

A. If I had to, I guess I could call Dr. Strom up and ask her what, you know, could she make available who these patients were or their case histories and things of that nature.

Q. And, again, you don't know what Dr. Strom asked for in context of what the nature and duration or amount of benzene exposure that this category of 37 RARS patients experienced; true?

A. Correct.

Q. And in fact, Table 6, combines the RA and RARS category, right?

A. Yes. They are unbound in one of the tables that deals with smoking. I don't know if that's the one -- let me look at the situation here.

Yes. In this particular table, she's got them separated and it looks as though the group with the least amount of smoking history is the one in the RARS category. Excuse me. The least amount of never smoking, in other words, that the smokers were -- were in this category.

Q. Okay. Let's look at Exhibit 34, the Zhang article.

A. This is a general article about the nature of chromosomal aberrations detected in people exposed to benzene.

Q. Does it talk about MDS?

A. It does not specifically talk about MDS.

Q. Does it talk about RARS?

A. No.

Q. And Mr. Wilson had no chromosomal abnormalities, right?

A. Correct.

Q. Exhibit 35, what is the value of that document for your opinions?

A. Well, in this article it talks about chromosome abnormalities and the treatment of MDS. And

as I said earlier, we -- or I opined that benzene can cause MDS by its comparison with modern day chemotherapy drugs; in other words, that would be the reason to think that it might. And the author says a diagnosis of chromosomal abnormalities are present in 40 to 60 percent of patients with primary MDS and greater than 90 percent of people with therapy-related MDS.

So, in other words, if I equate benzene and therapy-related MDS, I would expect most all of them would have chromosome disorders, and he doesn't.

Q. What is the value of Exhibit 36 on your opinions in this case?

A. Pointing out that this is a significant disease, and this author indicates that approximately two-thirds of patients succumb to the disease about three to four years after presentation. He also gives incidence figures and also the classification system.

Q. Speaking of the severity of disease and the treatment of MDS, you read Dr. Haas, the treating physician's deposition, correct?

A. Yes.

Q. Is there anything besides the severity part that we talked about earlier?

A. Well, I think the two things in there is he

thought that CMML was still --

Q. A subtype.

A. -- a subtype of MDS, which it isn't. He talked about those two classification systems which were blurred. We'd have to look specifically -- I don't remember anything else that hit me in the face when I looked at it.

Q. Did you see where he talked about the future treatment that Charles Wilson will require for his disease?

A. I don't remember what he said about that. But -- but if he survives for a long period of time, he will likely have -- need other treatment.

Q. Did you have any -- well, did you look at the testimony by Dr. Haas as to the reasonableness and necessity of the treatment required for Charles Wilson's continuing treatment?

A. Well, yes. I don't remember exactly what he said. But in general, what one tries in this illness is to reduce the number of units transfused and yet maintain a stable blood count. So he's giving him Aranesp, which is a form of erythropoietin, to try to improve his blood counts.

Q. Now I think he said he's getting Procrit.

A. Same thing. It's just a different

formulation.

Q. Procrit and Aranesp are, essentially, the same treatment?

A. They're identical.

Q. Okay. For all practical purpose, they're identical?

A. For all practical purposes. The difference was Procrit came out first, and Aranesp is a long-acting preparation and it was assumed that it would be better because you got a shot and it would stay in your system longer. That's never turned out to be true. The response rate to Aranesp and Procrit are essentially identical.

Q. On page 5, I want to turn to your report now. Turning to your report, I want to ask a few questions. On page 5 --

A. Yes.

Q. The portion beginning "In summary."

A. Yes.

Q. You say that "the cause for RARS/AISA Mr. Wilson remains unknown, as it typically occurs in members of the general population without any history of toxic chemical exposures," correct?

A. Yes.

Q. You would agree with me that RARS -- strike

that.

You would agree with me that cancers in general occur among the general population without any history of toxic or chemical exposures, correct?

A. Certainly.

Q. And you would also agree with me that chemical exposure can cause certain types of hematologic disorders, right?

A. Yes.

Q. You would agree with me that toxic chemical exposures cause some forms of MDS, right?

A. Yes. I believe that's true.

Q. And you agree with me that toxic exposures, including benzene exposures, can cause AML?

A. Yes.

Q. Turning to page 2 of your report at the top of the page. Do you believe Mr. Wilson's heart disease or the treatment for his heart disease played any causative role in his MDS?

A. No. I wouldn't see any relationship.

Q. Do you have any other opinions as to what might have played a causative role in Charles Wilson's MDS?

A. I don't know why he has MDS.

Q. Just know it wasn't related to benzene, right?

A. Well, this form, as we've talked about. This form has never been shown related to benzene.

Q. And so it's your opinion that no matter what other forms his disease might take, because he has the RS ringed sideroblast signature, there's no way his future diseases could in any way be related to benzene; true?

A. Well, I think with that diagnosis comes the natural history of that diagnosis. And the natural history of that diagnosis is to have progressive hematologic problems, even leukemia, although that's not a big number in his case.

And so I -- it wouldn't surprise me if he went on to develop acute leukemia. And I don't see why anybody would need to implicate benzene or anything else, now that he's got RARS.

Q. Turning to your CV which is marked --

A. Yes.

Q. -- as Exhibit 48. Turning to your -- the list of your publications.

A. Yes.

Q. Do any of the publications that you've written discussed benzene, besides Exhibit 14?

A. Yes. This article, article 74, deals with benzene.

Q. What's article 75 about?
A. Well, that's the one you looked at. That's the sideroblastic anemia one.
Q. Okay. What's the general opinion or conclusion set out in -- in article number 74?
A. It's a general discussion of what is known about benzene-induced AML and comments on things such as latency, cumulative part per million years, incidents. It's just a general review of the literature in this subject.
Q. Who paid you to write exhibits -- or articles 74 and 75?
A. Nobody paid me to do that.
Q. What is the horticulture stuff in your study -- or your CV?
A. Oh, is just a hobby. I'm president of a couple of larger organizations.
Q. Marked as Exhibit 49 is a list of your cases. Starting on the front page, item number 1, that was a benzene case, right?
A. Yes.
Q. And you testified on behalf of the defendant?
A. Yes.
Q. Did you testify as to what did cause that worker's disease?

A. No.
Q. You just testified that benzene did not cause it, correct?
A. Correct.
Q. And were you retained by Amoco on that case?
A. I don't know. I was retained by Mr. Shoebotham, who works in this law firm. I don't know what the company was.
Q. Back in 1992, you were also hired by Mr. Shoebotham?
A. Yes. That's the first -- that was probably the first time I ever had anything to do with benzene-related testimony.
Q. And then item 4, who hired you in that case?
A. You know, I'm not sure about Mims. Smothers was the case that -- that Mr. Shoebotham asked me about. I can't remember who asked me about Mims. But it was definitely Smothers. And this is the one that Jon Shoebotham asked me to look at.
Q. And you opined that benzene did not cause that worker's ALL?
A. Well, I opined he had ALL. In other words, the allegation was he had AML and, therefore, could have been caused by benzene but, in fact, he had ALL.
Q. What about number 5? Who retained you in item

5?

A. It's been too long ago for me to remember.

Q. You testified in that case, though, that benzene exposure did not cause the worker's disease, right?

A. Yes. I testified that benzene did not produce multiple myeloma.

Q. As we sit here today, are you still of the opinion that benzene does not cause or cannot cause anyone's multiple myeloma?

A. Yes. That is my opinion.

Q. What is multiple myeloma?

A. Well, it's a bone marrow disease characterized by overproduction of what are caused plasma cells. And those cells replace the bone marrow that cause tremendous bone destruction, kidney failure and eventually death.

Q. Item number 8, Hodgkin's disease and causation with Fulbright & Jaworski. Did that deal with benzene?

A. You know, I think it had to do with radiation. I believe this was a man who worked for Schlumberger, and he claimed he was exposed to a radiation machine about 100 yards away from where he worked.

Q. Following page --

A. Yeah.

Q. -- item 10, Frias case?
A. Yes.
Q. That involved gasoline, correct?
A. That involved gasoline. Well, the allegation was benzene in the gasoline caused aplastic anemia.
Q. Is it your opinion that benzene, when a component of gasoline, can never cause a bone marrow disease?
A. Well, that -- that is what the literature states. In other words that, there's no evidence that gasoline exposure can cause cancer.
Q. So, therefore, even though there's benzene in gasoline, someone exposed to benzene via gasoline can never experience a resultant bone marrow disease, would that be your opinion?
A. Certainly the gasolines of today which contain small amounts of benzene. I think in -- in England, the gasolines contained at one time much more benzene than we had. But in the United States, yes, I don't believe gasoline can cause problems.
Q. Were you retained or working on behalf of Shell Oil in that company -- or in that case?
A. That's what it indicates.
Q. Item 13, benzene exposure, again, is the cause of aplastic anemia. It was your opinion that benzene

did not cause the worker's aplastic anemia?

A. Yes. That was an easy one because this was my patient. And I had questioned him in great detail, as had other doctors, and he always denied any benzene exposure. So -- so therefore, it was kind of a no-brainer.

Q. What about exhibit -- or item 15?

A. This had to do with allegation of benzene causing non-Hodgkin's lymphoma.

Q. Do you believe that benzene can cause non-Hodgkin's lymphoma?

A. No, I do not believe that it can.

Q. Number 17, once again, chemicals did not cause cerebral NHL?

A. That's correct. This was -- in one of these cases, I think there were either two -- maybe there were two patients in this; and in one of them, the records clearly showed that the patient had the cerebral lymphoma before he went to work in this company. And I don't recall the details of the other case, but I don't believe that benzene exposure causes non-Hodgkin's lymphoma whether is in the brain or anywhere else.

Q. What was the disease in item 18?

A. That was acute lymphoblastic leukemia, ALL.

Q. What were the details of case 19?
A. The details of that, this was a ship captain, as I remember. And he had what I thought, by looking at the mirror, was a myeloproliferative disease. Of course, myeloproliferative disease can eventuate into AML, as in our Mielke case. And he did develop AML. But the allegation was that the basic process was exposure to benzene, and I thought the basic process was myeloproliferative disease, which is not benzene related.
Q. Item 22?
A. I don't remember any of the details, but this was a case of idiopathic sideroblastic anemia. Similar to the one today. And I testified that there was no known chemical causation. I don't remember anything about the latency or anything else about this case.
Q. Has your testimony ever been excluded by any court?
A. No.
Q. What about 23?
A. This was an AML case, but I -- I don't remember any of the details about that one.
Q. 24, is that RARS --
A. That's also RARS.
Q. And your opinion was, just like in this case,

benzene cannot cause RARS, right?

A. Correct.

Q. What kind of exposure did that worker experience?

A. I can't remember with any accuracy.

Q. 27 and 28 deal with CLL and NHL, right?

A. Yes.

Q. You believe benzene does not cause CLL or NHL?

A. Correct.

Q. And case number 30, the Cowey case, what subtype of MDS did that person have?

A. It could have been RARS. I don't remember. It was form of myelodysplasia all right. I just can't remember the details of that.

Q. What about 31?

A. Can't remember details about that one either.

Q. So as we sit here today, you're unsure of the subtype --

A. I'm unsure --

Q. -- of MDS?

A. -- of the subtype of these two cases.

Q. Number 34, do you believe benzene can cause APML or APL?

A. There isn't really a lot of evidence for that. I think it's possible.

Q. What about in 35? That person also had RARS, right?
A. Yes.
Q. What was the nature of exposure in that cause?
A. I don't remember the details of that.
Q. Do you remember who deposed you in that case?
A. No.
Q. 36, the Minnehan case?
A. The famous Minnehan case. That was an inversion 16 case.
Q. And so whenever someone has inversion 16, that means it's not benzene related?
A. It's never been reported in the world's literature and so it makes it unlikely. In other words, I can't prove what it didn't. But I would say in all medical probability, it's not likely to happen.
Q. 42, what were the various lymphoproliferative disorders?
A. There must have been multiple defendants in this case, but they were either CLL or non-Hodgkin's lymphoma.
Q. And what about 43, benzene as a cause of AML?
A. I don't remember the details of that.
Q. 44, again, CLL?
A. That was a CLL.

Q. Again, you don't believe that was caused by benzene?

A. Correct.

Q. Same with 45?

A. Same with 45.

Q. Does CLL have subtypes?

A. Well, just like there is a risk assessment, low risk, high risk, intermediate risk, CLL has that. We have certain markers that we apply to CLL. One is called CD-38 and the other is ZAP-70. And with those prognostic markers, you can predict what their course is going to be. So I would say, yes, there probably are subcategories of CLL.

Q. And in opining against causation in the two CLL cases, 44 and 45, did you rely on that further stratification or that additional subtyping?

A. No. I'm not certain that either one of these people had that subtitle. I don't recall that in any event.

Q. 46, that was also an NHL and CLL case?

A. Well, 46, one of them has Hodgkin's disease and the other one has chronic lymphocytic leukemia; and I don't think either of those illnesses are going to be benzene related.

Q. Let me finish this one and we'll take a break.

A. Yeah.
Q. 47 is an AML case?
A. Yes.
Q. What was the problem with causation in that case?
A. Well, that's an 8 to 21 translocation case; and 95 percent of those cases are idiopathic and 5 percent are chemical related. So, yes, it's theoretically possible that benzene could cause it, but in all medical probability, it would be pretty weak. And this person had very limited exposure.
Q. What about 48?
A. 48 -- interesting. I guess that's -- I don't remember the name, but that's a Dallas -- case in Dallas that actually went to trial. And I think -- could that be taken -- I can't remember if that's page -- is that right?
Q. Yes.
A. I don't -- too many cases, I don't remember all the details of that. But anyway, I mean, we -- that case was won by the defendants.
Q. 49, I'm familiar with. You testified against causation for Mr. Mielke, right?
A. Yes.
Q. Number 51, this was your most recent

deposition?

MR. PARKS: I've got the updated list. I gave you a copy of it. It has two more on it.

A. Okay.

Q. (BY MR. PATTON) What was the problem with 51 in terms of benzene as a causative factor?

A. Well, it wasn't really clear this man had any benzene exposure at all. He worked as sort of a roustabout on a ship and -- and he mainly lowered -- lowered cables down on a rigging and pulled them back up; and it was very hard to figure out where in the world he got any benzene. They had no benzene on the boat anyplace. And also, the exposure was -- alleged exposure was extraordinarily remote to his AML.

Q. And then 52?

A. Yes.

Q. What was the problem with causation? Well, first of all, what was that disease?

A. Well, he had -- he had RARS that involved into erythroleukemia; but this man had like about an 80-pack year history with smoking and smoking is related to RARS. And his alleged exposure to benzene were extremely remote to the diagnosis. I can't remember how, but they were many years remote.

Q. Who deposed you in that case?

A. I don't remember.
Q. And 53, was that a benzene case?
A. Yeah. That's a benzene case that has to do with a man who worked in a bagging factory.
Q. And you testified on behalf of Ashland in that case?
A. Yes.
Q. You've testified on behalf of Ashland in the Wilson case, in the Vettrus case, number 53; you also testified in behalf of Ashland in item 49, the Mielke case.
Are there other cases that you testified on behalf of Ashland for?
A. I wouldn't know because many of these cases, as you well know, they'll have 125 defendants and I don't pay any attention to who those are. I look at the facts of the case.
Q. In either event, when you take the 53 cases you've testified in since 1992, 31 of those dealt with benzene and you testified against causation in each of those 31 cases, correct?
A. Correct.
MR. PARKS: Objection. Form.
Q. (BY MR. PATTON) Did you testify in any of those cases that benzene was a possible causative

factor in the worker's disease?

A. I'm sure in all of those cases if I wrote a report, I said what I normally say, is that in no form of leukemia can we be absolutely certain as to the cause, but we're looking at probabilities, which is more probable. And -- so I -- I -- certain I didn't say benzene could not possibly cause this acute leukemia.

Q. For the Wilson case, are you looking at benzene as a possible cause in terms of a black and white type of picture or there's just no way benzene causes RARS or is it a little more gray to you, that benzene is a possible cause, however, it's just not strong enough for you to have that opinion?

MR. PARKS: Objection. Form.

A. I would say it's a black-and-white issue. In other words, there have been enough papers looking at this issue in populations with heavy exposure to benzene to know that it's just simply not --

Q. (BY MR. PATTON) Did Strom look at populations heavily exposed to benzene?

A. I don't know how heavily those patients were exposed.

Q. For record, Exhibits 1 through 42, plus 43 through 46, are the references from your report, plus a

couple hematology texts, correct?

A. Yes. I think there's one reference we didn't cover that I added, I think, at the very end, the Silver reference. I don't think we discussed that.

Q. What's the value of the Silver reference?

A. Well, it has to do with a conference on myelodysplasia, myeloproliferative diseases and the importances that -- talking about frequency and causation of these illnesses. And the experts, including Dr. Bennett, who invented this classification, said very few instances of environmental toxins have been identified.

MR. PATTON: All right. Let's take a short break. Off the record.

(Break.)

Q. (BY MR. PATTON) Dr. Natelson, you reviewed the report and the deposition of Dr. Infante, correct?

A. Yes. I don't recall the deposition but I think I read his report but it's been sometime ago I looked at it; but whatever is here, I looked at it.

Q. What criticisms, if any, do you have of Dr. Infante's opinions in this case?

A. Well, he's testifying as an epidemiologist, and he is not familiar with refractory anemia and ringed sideroblasts from a treatment or diagnosis or

clinical interaction standpoint. So he's looking at -- when he looks at numbers, he's looking at it from a totally different aspect than I am.

Q. But he looks at it in terms of the body of benzene literature, so to speak, dealing with benzene and MDS rather than dealing very often with benzene and the subtype of RARS; fair statement?

A. Well, as I've said, there is no -- there is no epidemiologic evidence in the world's literature that suggests that the RARS can be formed from benzene; but as to critiquing his comments, it would be better for another epidemiologist to do that. In other words, I -- I'm more comfortable talking about what the treating physician says because we're both treating physicians.

Q. But isn't there sufficient evidence in the literature that benzene causes MDS when not viewed by subtype?

A. Well, not according to this large expert panel of people; but as I've said, I accept that it does by analogy with the chemotherapy literature; but according to many experts in the field, one can't do that if it has to stand on its own.

Q. All of the chemotherapy literature related to MDS doesn't necessarily look at chemotherapy as a cause

of, say, RARS or a cause of RAEB; true?

A. Well, I think frequently it does, because chemotherapy literature, you're talking about people who get exquisite follow-up. And all of those people have had bone marrows; and certainly if RARS were -- were what one saw, one would know that, and we don't see that. I've seen many people with chemotherapy-induced acute leukemia and MDS, and I haven't seen any with refractory anemia and ringed sideroblasts.

Q. You have seen people reflected in the literature who have MDS and which was caused or believe to be caused by benzene exposure; fair statement?

A. Say that again.

Q. You would agree with me that there are instances in the literature where benzene was shown to cause MDS, right?

A. Yes.

Q. And that points us to the conclusion that benzene caused a given person or a handful of people, however many people, it caused their MDS; fair statement?

A. That's a strong possibility, yes.

Q. Okay. And there's also at least a possibility that in some of those case instances where it wasn't

looked at as -- where it wasn't examined by subtype, that the person could have had RARS, which is the type of MDS reflected in the study, and that was caused by benzene?

MR. PARKS: Objection. Form.

Q. (BY MR. PATTON) It's at least possible?

A. I have no idea, in other words, we have a enough cases -- as far as I am concerned, we have enough cases that were studied to suggest that's not going to happen.

Q. What about Dr. Aparent? Did you review his report and/or his deposition?

A. I -- what -- I'm not certain if I did or didn't.

Q. Dr. Aparent was a toxicologist retained on behalf of the plaintiff in this case. Did you review his report or his deposition?

A. I may have looked at it. I can't recall any details of that.

Q. Besides Exhibits 1 through 42, plus the handful of other pieces of authority as I've been calling them, are there any other -- is there any other peer reviewed literature or any other authority upon which you may rely on in expressing your opinions against causation in the trial of this case?

MR. PARKS: Objection. Form.

A. No. I think in terms of literature, my article and these references are sufficient.

Q. (BY MR. PATTON) Are these the same references, generally speaking -- obviously with the exception of Strom because of the year -- are these the same references that you relied on in your earlier MDS/RARS cases?

A. Some of these certainly would be, yes.

Q. Did you draft the report all by yourself?

A. Yes.

Q. Did anyone help you in terms of looking for literature or typing?

A. No.

Q. Are there any other copies of your report?

A. No. I mean, have it on my computer at home. That's it.

MR. PATTON: Thank you for your time. I know Mr. Parks has a couple questions for you so we'll go from there.

E X A M I N A T I O N

BY MR. PARKS:

Q. Dr. Natelson, I'm Kevin Parks representing Ashland in this case. And I just want to ask you a few questions about some of the testimony you've provided

to Mr. Patton today.

He asked you several questions about the reasonableness and necessity of Mr. Wilson's medical treatment. Do you recall those questions?

A. I don't recall in detail what they were.

Q. But you recall testifying about that?

A. Yes.

Q. And when he was asking you about the reasonableness and necessity of Mr. Wilson's future treatment, you were talking -- your answers were in terms of what form of the treatment he would likely need in the future as opposed to the reasonableness and necessity of any expenses for those treatments?

A. Right. The expenses are not my field. Many treatments for hematologic diseases are very expensive.

Q. And, in fact, you've mentioned to me that the charges reflected in Dr. Haas' medical records appear to be excessive, though you would have to go do some investigation on billing expenses to really opine on that?

MR. PATTON: Objection. Form.

A. Well, it's a little bit of a game. In other words, when you have a service done at a hospital, there is a very large charge applied. Then the insurance company gives another figure, which is

usually about a third as much as the -- what they allow; and then there's a lesser figure of what they're going to pay.

So when you finally get into what gets paid for a service, it seems to bear very little relationship to the original charge, which is very high; but that's not my field but it just an observation.

Q. (BY MR. PATTON) Okay. You also reviewed Dr. Haas' recent testimony in relation to this case, and do you recall where he talked about the Wintrobe text?

A. Yes.

Q. And Dr. Haas indicated that he relied on the Wintrobe text for his belief that benzene can cause MDS?

A. Yes.

Q. And, in fact, didn't you -- or have you gone and looked at the Wintrobe text and brought some of those excerpts with you today as far as observations made in that text on causation and RARS?

A. Yes.

Q. And is there a separate section of that text that deals with causation of RARS?

A. Yes. A subset. There's a chapter that has to

do with sideroblastic anemia; and then within that chapter, RARS is a subheading.

Q. And in the Wintrobe text, is benzene identified as a potential cause of RARS?

A. No.

Q. The article that you've written that is planned for publication, when -- when do you expect that will be published?

A. Well, it's listed as November -- in the November edition.

Q. And was that article peer reviewed?

A. Yes.

Q. What was your purpose in writing that article?

A. Well, my purpose was this: I don't think this is a question that has been discussed much in the hematologic literature. In other words, there are a number of articles out there that deal with the subject; but I don't think anybody, since the time of Dr. Damashek, has written a general discussion about this situation.

Q. And by this general subject, do you mean whether benzene can cause RARS?

A. Yes.

Q. And what is the conclusion in your article?

A. Well, my conclusion is that there's no

epidemiologic evidence or case report data to suggest that benzene can cause RARS and considerable data that would suggest that it can't.

Q. Mr. Patton also asked you questions, for instance, as to whether benzene can cause AML?

A. Yes.

Q. And you agreed that it could?

A. Yes.

Q. And then he asked you questions about the fact that RARS can develop into AML as the natural -- in the natural history -- in the course of the disease, if you will?

A. Yes.

Q. But if you have a patient who has been diagnosed with RARS who then develops AML, wouldn't you rule out benzene as a potential cause because you know that benzene does not cause RARS?

A. Both situations. We know that AML is the natural progression of a number of cases of RARS, and we also know that there is no relationship between benzene and RARS. So if a person with RARS develops AML, I would think that's just simply the natural progression of the illness.

Q. So even if Mr. Wilson does proceed on to develop AML, your opinion would remain that benzene did

not cause that?

A. That's correct.

MR. PARKS: Thank you for your time. I'll pass the witness.

F U R T H E R E X A M I N A T I O N

BY MR. PATTON:

Q. Dr. Natelson, what is the multiple hit theory as it relates to bone marrow diseases?

A. Well, the notion is that, for example, someone gets, let's say, damage to a chromosome. It may be minor damage or major damage. And that changes the milieu, for example. It produces a growth factor or a growth factor that has a certain advantage and starts proliferating cells in the bone marrow; and then a second genetic event occurs which takes those proliferating cells and makes them leukemic.

And so it takes multiple hits to drive a normal bone marrow to a leukemic bone marrow because of the fact that the bone marrow has tremendous reparative processes. And it's very difficult to -- to sustain damage in the bone marrow because of the fact that even chromosome defects can be repaired.

Q. Would you agree with me that some individuals are more susceptible or more likely to take those hits to the bone marrow, so to speak, a little harder than

others?

A. That's theoretically possible, yes.

Q. Is it theoretically likely, as far as the concept of susceptibility goes, for people who have different forms of cancer. Some people are more likely to get cancer than others for one reason or another, right?

A. That is so. We don't know the reasons for that. But that is true, that in some instances there's genetic predisposition, but -- but those -- the research in that is really in its infancy.

Q. But you agree with me that some people have a genetic predisposition to be more susceptible to contracting, say, leukemia or a bone marrow disease from exposure to benzene than other people would be; fair statement?

A. Well, certainly. I don't know the answer to that. I would say it's quite -- it's possible. I don't know that for a fact.

MR. PATTON: All right. Thank you for your time.

MR. PARKS: Reserve the rest of our questions until the time of trial.

MR. PATTON: And for the record, can we have the agreement, Kevin, that you will, for cost

sake, take the exhibits, copy them, return the original to Dr. Natelson, send me a copy within, say, five days; is that fair?

MR. PARKS: That's fair.

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

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DR. ETHAN NATELSON

S I G N A T U R E O F W I T N E S S

I, DR. ETHAN NATELSON, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s), and that I am signing this before a Notary Public.

_____

DR. ETHAN NATELSON

STATE OF T E X A S *

COUNTY OF _____ *

SUBSCRIBED AND SWORN TO BEFORE ME BY _____ on this, the _____ day of _____, 2007.

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Notary Public, State of Texas

My Commission Expires: _____

Job 2-64038

THE STATE OF TEXAS :
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I, DENYCE SANDERS, a Certified Shorthand Reporter and Notary Public in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, DR. ETHAN NATELSON, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose behalf this deposition is taken, nor in the regular employ of this attorney; and I certify that I am not interested in the cause, nor of kin or counsel to either of the parties.

That the amount of time used by each party at the deposition is as follows:

Mr. Keith Patton - 02:28:54

Mr. Kevin Parks - 00:05:48

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 25th day of September, 2007.

_____

DENYCE SANDERS, CSR, RPR
Notary Public in and for
Harris County, T E X A S

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