1990.

Q. And have the prior cases involved General Motors pickup trucks?

A. Quite a number of them have. The majority of the cases have been associated with the General Motors light truck fire issues.

Q. The CK.

A. The CK truck, yes. There are some exceptions.

Q. Do you recall what those other vehicles were?

A. This one, of course. There was a Butler matter, Nelda Sue Butler.

Q. That was a full-size van?

A. Van.

That was -- there was a couple of others, three, maybe four. A couple Ford fire cases, and --

Q. And did you say "Ford"?

A. Yeah, Ford. Yes, Ford.

And there may have been another General Motors -- I think could have been the X Car case, fire. They've all been fire-related cases. That's the best of my memory.

Q. Did any of the prior cases with the Butler firm involve a midship tank design?

A. No.
Q. Besides yourself and Don Stevens, has anyone else from SEFA worked on this file?
A. From a technical point of view, no. Obviously, there's some office support for filing and that kind of activity.
Q. Okay.
A. Only that.
Q. Other than the witness statements contained in the police file and the summary of witness statements that has been provided to you by the Butler firm, have you had any other access to witnesses in this case?
A. I have not.
Q. So you have not personally spoken to any witness in the case?
A. I have not.
Q. Have you talked to other experts for the plaintiffs in this case?
A. I had some conversation with Ron Kirk. I believe the first of it, May 1st or May the 2nd -- I can't remember the precise date, but one of those two -- when we had a general meeting about a variety of things, and the Belli matter was part of that discussion.

Q. And that meeting was in Atlanta?
A. That is correct.
Q. At Mr. Fryhofer's office?
A. That is correct.
Q. Who was in attendance besides yourself and Mr. Kirk and Mr. Fryhofer or other people from the firm?
A. Good question. There were other people, but I can't tell you.
Q. Was Mr. Stevens there?
A. Yes, Don Stevens was there.
Q. Was Belli the only case discussed that day?
A. No. There were a number of other matters.
Q. Did you take any notes of what happened at that meeting about Belli?
A. No.
Q. Have you spoken with Mr. Kirk since that meeting?
A. I have not.
Q. Did you speak with him before that meeting about the Belli case?
A. I don't believe so.
Q. Have you spoken with Dr. Burton?
A. No.

Q. And you have not spoken to Mr. Gilberg, I take it?

A. I have not.

Q. Have you spoken to any of Mr. Kirk's assistants, such as Mr. Brady?

A. I have not.

Q. Okay. Mr. Arndt, have you visited the scene of this accident?

A. I have not.

Q. Have you relied upon other data by other individuals about the scene in your work in the case?

A. I have.

Q. And what specific information from others have you relied upon?

A. I have relied upon the aerial photographs. There were two of them. I've relied upon the information, I think, that, in part, was gathered by Ron Kirk. I have relied upon the numerous photographs which were taken at different times of the scene, both at the night of the accident and later on, I think primarily by Ron Kirk. I have examined all of the media information that was on the VHS tapes that were provided by Mr. Fryhofer's office and the officer's description, general data and presentation.

I believe that -- I think that's the bulk

of it. There could be some other little pieces in it, but they aren't very distinct at this moment.

Q. Is there anything about the scene which is unusual or which you believe contributed in any way to the accident or resulting damage?

That's two questions. I'll break them up, if you like?

A. No, that's okay.

So when you say "the scene" --

Q. The character of the roadway, the curvature of the roadway, any --

A. Geometric architecture of the bend of the road?

Q. Yes, sir.

A. Nothing that I can determine.

Q. Okay. Have you inspected all three of the vehicles -- principal vehicles which were involved in this accident?

A. Yes.

Q. How many occasions have you examined the Cherokee vehicle?

A. Three occasions.

Q. And we have marked previously as Exhibit 12 to your deposition a dictated set of notes dated September 26, 2001, which, I believe, are your

notes of your -- one of your inspections of the Cherokee?

A. They are my notes of the first inspection of the Cherokee.

Q. Do you have notes related to any other inspections of the Cherokee?

A. No.

Q. What were the other dates of inspection of the Cherokee?

A. The 30th of April, 2002. That was for the purpose of gathering damage information for the Cherokee and for the Ford Thunderbird. We examined the Thunderbird at that time, which was the first opportunity to do that, and then in July, I believe it was, which was a joint inspection and removal of the fuel tank.

Q. Okay.

A. And I believe -- by the way, I think it was the April inspection that I also had an opportunity to see the Camry at a different location. I believe it was actually -- I believe it was in Atlanta, if I remember correctly.

Q. So you've looked at the Thunderbird once?

A. Looked at the Thunderbird once. I've looked at the Camry once. I have examined the Belli

vehicle on three different occasions.

Q. And the only notes you have of any of those inspections or examinations of the vehicles are the notes we've marked as Exhibit 12?

A. That is correct.

Q. Who accompanied you on your visit of September 26, 2001, to inspect the Cherokee?

A. I think George Fryhofer was with me.

Q. Anyone else from your office?

A. No.

Q. What about the April 30, 2002 visit to the Jeep and the Thunderbird and the Camry, anyone else accompany you?

A. Don Stevens. There may have been somebody from Mr. Fryhofer's office. I don't have a specific recollection about that anymore.

Q. Do you know if Mr. Stevens took any notes?

A. There are no notes in the file. Therefore, no notes were taken.

Q. Is that the visit during which the digitization of the vehicles took place?

A. No. That occurred separately, and that was accomplished by Gary McDowell and arranged and worked out by him. Our office only coordinated that effort but did not attend that effort.

Q. So what did you and Mr. Stevens do on the 30th of April?

A. We looked at the Ford Thunderbird, and we prepared the plastic, which we spoke about earlier, of the damage on the Belli vehicle.

Q. And did you make any measurements of the Thunderbird at that time?

A. I believe that some measurements were made of the Thunderbird.

Q. Do you have any record or note of what measurements there were?

A. We either did a plastic or they're in the file. I'm not certain. As I said, that was an intermediate step, because we ultimately decided to digitize the vehicles, and that really provided the information that we were looking for for the final analysis. But let me look to see if there were any measurements of the Thunderbird.

None of the -- apparently, none of the damaged Thunderbird. At least I don't see them in the file. We must have not taken them.

Q. And on the July visit related to the removal of the fuel tank, did you document that in some form or fashion, either through photographs, notes, or video?

A. I documented it through digital photographs only. It was, I believe, documented by video -- by some videographer. I do not recall the name anymore.

Q. Do you recall which of the CDs has the tank removal data on it?

A. Should be labeled.

Q. June 18, 2002, tank removal, which has been marked as Exhibit 8?

A. That is correct.

Q. Were any other experts for the plaintiffs present at any of your inspections of these vehicles?

A. No.

Q. Have you also had occasion to inspect exemplar vehicles in this case?

A. I don't recall that I have.

Q. Have others working for you done anything about documenting exemplar vehicles?

A. Gary McDowell has, at our direction, documented exemplar vehicles.

Q. So, Mr. Arndt, am I correct that the only thing you, yourself, have generated in the way of notes or dictation is Exhibit 1, which is your handwritten summary of opinions and related materials, and your dictated notes regarding the first vehicle inspection,

which are Exhibit 12?

A. That's correct.

Q. Other than what may have been marked as exhibits to the depositions of Dr. Burton, Mr. Kirk, or Mr. Gilberg, do you have any notes from them related to their work in the case?

A. I don't recall anything attached to either Dr. Burton's or Mr. Gilberg's deposition. There was quite a number of exhibits attached to Ron Kirk's deposition, so I think that's the only material that I have is that from Ron Kirk.

Q. Mr. Stevens told us yesterday that he has done additional work to that done by Mr. Arndt in order to understand the vertical motion of the vehicles following the initial impact. Have I described that in a way that you understand my question?

A. Well, I know the question. But I think what you meant to say was "in addition to Mr. Kirk," rather than me.

Q. You're right, I did. I did it all day yesterday, too. I got y'all mixed up yesterday, too.

A. No, I understand the question correctly. I just wanted to make sure that we were talking about the same person.

Yes. Don Stevens, as a result of a number

of conversations we had, did do additional work relative to the dive and lifting phenomenon associated with the collision.

Q. Did he do that at your request?

A. Yes, and kind of fell out of our conversation. Sometimes it's not real clear that requests get made, we just know that we need to do the work.

Q. Did you do any of the hands-on work in generating the data that he used to establish his opinions regarding the vertical motions of the vehicle?

A. No. I discussed with him the ongoing process that he went through to come to his final calculations.

Q. And have you reviewed those calculations?

A. Briefly.

Q. Do you know if those calculations have been provided to Mr. Kirk?

A. I have no idea.

Q. You haven't provided them to him, I take it?

A. I have not.

Q. Do you intend to offer any opinions, Mr. Arndt, about the reconstruction of the accident that occurred that forms a basis of this case?

A. That's hard to know. If I'm asked some questions about it, I might.

Q. Have you done an independent reconstruction from that done by Mr. Kirk?

A. I haven't done the reconstruction work that Mr. Kirk has done.

Q. Have you done anything that you would include within the general umbrella of accident reconstruction work?

A. Yes.

Q. What have you done?

A. I've attempted to understand the nature of the damage of the respective vehicles. I have analyzed that and interpreted what it means. I have examined -- in light of the witness statements, I have examined the scene -- the many photographs of the scene taken at the night or early morning of the accident and attempted to understand the evidence that's at the scene and to reconstruct the fire in light of that evidence, in light of the reconstruction work that Ron Kirk has done, and in light of my general understanding of the events of that evening.

Q. Have you done any calculations related to a reconstruction of the accident?

A. No.

Q. Do you rely on Mr. Kirk's calculations?
A. Generally.
Q. What is your understanding of Mr. Kirk's opinions regarding the reconstruction of the case?
A. I think the core of his opinions are as follows: That the Camry was moving slowly at the time the impact occurred. I think he indicates 10 to 15 miles an hour --
MR. FRYHOFER: You said "Camry."
Q. BY MS. OWENS: You mean the Jeep?
A. I apologize. Start over so we eliminate the confusion.
The essence of Mr. Kirk's reconstruction is: That the Camry was stopped at the time this accident was unfolding; that the Belli vehicle was traveling slowly, 10 to 15 miles an hour at the time of impact; that the striking vehicle, the Thunderbird, was braking sufficiently to leave substantial skid marks from the front wheels for nominally 64, 65 feet, on the average, prior to impact; that the Belli vehicle left the collision area around 40 miles an hour -- that is its post-impact speed is 41, 42 maybe, something on the order of 40 -- and that it rotated clockwise; that its left rear corner struck the rear of the stationary Camry, which, in turn, drove it forward to its rest

position; and that the Belli vehicle then spun out counterclockwise to its rest position.

With respect to the Thunderbird, that the closure speed was in the range of 60 to 70 miles per hour, and that the Thunderbird continued down the roadway southbound on I85, coming to its rest position adjacent to the Camry.

Q. Do you have an understanding about what the principal direction of force of the impact was to the Jeep?

A. Yes.

Q. What is it?

A. It's six o'clock.

Q. And was there any overlap, or was it center-line-to-center-line impact?

A. It was not center-line-to-center-line impact. It was offset somewhat to the driver's side.

Q. Now, your inspection notes from your initial vehicle inspection, which we've marked as Exhibit 12, on the first page, there's an indication of, in your dictation, that there may be some slight angular component to the impact?

A. Yes.

Q. Is that still your view?

A. That was an impression from the damage. I

do think that Kirk, in his reconstruction, did end up with some shallow angle. I don't remember the number anymore.

Q. So I take it that if there was an angle, and how much the angle was, that's not important to your opinions in the case?

A. It's small. It's an observation of the damage. It's a conclusion from that observation. I don't think on the final analysis it matters very much.

Q. Do you have an understanding about what the delta V of the Thunderbird was at the time of impact?

A. As a result of impact, the Thunderbird slowed down about 35 miles an hour.

Q. So the delta V of the Thunderbird would be about 35 miles an hour?

A. Yes.

Q. What about the delta V of the Jeep?

A. Approximately the same. It accelerated approximately 35 miles an hour.

Q. Have you --

A. I think, actually, Ron Kirk said in the range of 30 to 35 for both vehicles, now that I reflect a little more on that.

Q. And have you attempted to translate that

delta V into a BEV?

A. I haven't. But given the nature of the collision, it would be in the range of 30 to 35 miles per hour equivalent barrier velocity for each vehicle, separately.

Q. And is that assuming a moving barrier or a fixed barrier?

A. It's assuming that the vehicles reached a common velocity during the collision, that is, it was synchronous, and that the damage that is reflected is related to a rigid barrier impact velocity equivalent.

Q. Do you have any opinion about what the -- well, strike that.

Do you have any disagreements with Mr. Kirk's opinions about the reconstruction?

A. Not fundamentally, no.

Q. What about other than fundamentally?

A. Well, they're -- it's a planar model, so it has some limitations in that respect. And the underride diving effect does have some impact on the respective vehicle skid paths. But in the final analysis, all said and done, as I look at that, a number of factors around this accident, I don't disagree in any basic way with Mr. Kirk's reconstruction.

Q. Do you have an understanding of what the relative bumper heights of the Thunderbird and the Jeep are in a non-braking situation?

A. Yes. There are some exhibits that depict that.

Q. Okay. Let me show you what's been marked as Exhibit 17A and ask if that's one of the exhibits you're talking about?

A. Yes.

Q. And what does it tell us about the relative bumper heights of the vehicle?

A. This exhibit demonstrates that the bottom surface of the Jeep Cherokee is 19.6 inches above ground level in its normal ride height. This would be curbed, not with any occupants or other --

Q. Curb weight?

A. Yes, it's curb weight.

Q. Okay.

A. And that the top of the bumper of the Thunderbird at -- just above the bright trim piece, at the top of the bumper is 22-1/2 inches high.

Q. Can I see the sketch?

Thank you.

A. Those dimensions do not, however, provide any specific information or understanding of the impact

of the shape and form of the bumper at engagement.

Q. Well, tell me what impact the shape and form of the bumpers would have.

A. Well, one looks at that exhibit -- I forget the number --

Q. 17A.

A. -- 17A, one can observe that the bumper of the Thunderbird has kind of a contour or wedging shape at the top, which provides a ramp -- if that's the right word -- should engagement occur, a ramp that tends to disengage initial engagement. Or if we look at that diagram specifically where the Thunderbird's aligned with the -- that is, the front bumper of the Thunderbird is aligned with the rear bumper of the Cherokee, and these are both at curb weights, that there is an innate or inherent tendency, just based on shape and form, heights considered, for an underride to occur relative to the rear of the Cherokee in a collision -- rear collision event.

Q. Do you hold any opinion that the design of the rear bumper of the Cherokee is defective?

A. No.

Q. Do you have any opinion about the crash pulse in this case, in this accident, either its duration or its shape?

A. I haven't formed an opinion. I would say that the primary pulse duration is around 100 or 110 milliseconds in length.

Q. And is that the --

A. That's fairly typical. The average pulse duration, there's average pulse level, that is, the average g level of that pulse could be computed. I think there's enough information to do that. I haven't done it.

Q. Okay. There was a secondary impact of the Cherokee with the Camry?

A. That is correct.

Q. And do you have an understanding from Mr. Kirk's testimony about what the delta V was that was experienced by the Jeep at the time of that impact?

A. I may have highlighted it in his depo. I don't recall at this moment.

Q. Is that secondary impact important or significant to any opinion that you intend to express in the case?

A. It is reflected in some of my opinions.

Q. Do you believe that the secondary side impact between the Cherokee and the Toyota caused any damage to any of the fuel system components?

A. Of what?

Q. Of the Jeep.

A. No. The fuel system components had already been damaged. May have rearranged the damage somewhat.

Q. Did it cause any damage to the Toyota fuel system?

A. No.

Q. Did any of the fuel which was involved in this fire come from any vehicle other than the Cherokee, in your opinion?

A. We would have to examine the time line on that to fully answer the question.

To begin with, the initial cause and origin fuel, that is, that fuel which started the initial fire, that fuel which fueled the fire initially at rest after the vehicles came to rest, the only source of fuel for that fire was the Cherokee. As a fire ensued and the heat built up substantially, both the Camry and the Thunderbird -- there's likely some fuel in the later-on fire from both of those vehicles. I think if one examines my opinion, if one examines the -- we looked at one still photograph -- aerial photograph of the fire, and there's quite a bit of news coverage video that it's clear that there are significant other sources of fuel later on in the fire,

likely from the Thunderbird -- my opinion -- from the Thunderbird and from the Camry.

Q. From what you've said, I understand that it's your opinion that any injuries which may have resulted to any of the Jeep occupants from fire were caused solely by consideration of fuel from the Cherokee itself?

A. On the Cherokee, and even a bit more specific, from the initial -- the very early fire, the initial fire that started with the Cherokee.

Q. Have you done any calculations in an attempt to quantify the crush energy that was involved in this accident, the initial accident between the Thunderbird and the Cherokee?

A. I have not made any specific calculations, but I believe that we have already implied it from talking about the rigid barrier equivalent velocities. It would be a fairly straightforward task to convert those to energies, combine those energies, and we'd be looking at the approximate order of magnitude of the initial collision energy.

Q. Do you have or intend to offer any opinions about medical causation?

A. No.

Q. You will rely on Dr. Burton -- or defer to

Dr. Burton on that topic?

A. I do.

Q. Do you have an opinion about how much fuel was contained in the fuel tank of the Cherokee before the collision occurred?

A. I don't know the specific amount, although my opinion is that there was not a lot of fuel in the tank.

Q. That's a 20-gallon tank, correct?

A. That is correct.

Q. How full would you estimate -- or would you opine that it was?

A. Possibly significantly less than half full. My sense is it's a quarter full, maybe even a little less than that.

Q. And why do you say that?

A. The lack of fuel spill handling evidence on the road at the crash scene. That is, the initial impact scene, number one.

Second, the extensive amount of damage to the fuel tanks. Had there been a lot of fuel in there, I would have expected to see signs of overpressurization of the tank, or even other types of failures associated with overpressurization.

And the lack of a fire trail from fuel

leak. It's kind of a collateral opinion. There just isn't any fuel on the road there from point of impact to point of rest.

Q. So no ground fire?

A. No ground fire in the -- in the period or time or distance span from initial impact between Thunderbird and Belli to rest position. There's probably some ground fire from sometime after the impact between the Belli vehicle and the Toyota Camry. There's an expansion of the fire at that second impact, but none other than that. The Camry's probably the one that initially ignited on fire by the impact between the Belli vehicle and the Camry. The Ford is already on fire as it comes to rest.

Q. And the fuel that is causing that fire is from the Cherokee and the Thunderbird, initially?

A. All of the fire that occurs before these vehicles come to their rest position, stated a slightly different way, is a result of fuel from the Cherokee.

Q. Okay. You indicated that you did not see an occasion of overpressurization in the tank?

A. That's correct.

Q. Do you see any signs of hydrostatic failure of any type?

A. Well, to me, that's fairly synonymous.

Overpressurization is hydrostatic pressure buildup. I saw none.

There are two holes that I can observe in the tank body proper only. And then, of course, a failure in the fuel filler neck assembly.

Q. Okay. Was there any failure of the fuel cap on the Cherokee in this accident?

A. No, I don't believe so. I'd have to look again at the pictures, but I don't believe so.

MR. FRYHOFER: What do you want to do about lunch, Diane?

MS. OWENS: Whatever you want to do.

THE WITNESS: I would like a lunch.

MR. FRYHOFER: Do you want to do that now, 12:15, and come back at 1:00?

MS. OWENS: Sure.

(A recess was taken from 12:15 p.m. to 1:15 p.m.)

Q. BY MS. OWENS: I want to return for a moment to Exhibit 17A and also 17B, 17A being the engagement of the Thunderbird to the Cherokee at normal bumper positions.

We talked about that, correct?

A. Yes. I call it normal ride height, but that's another way to say it the way you phrased it.

Q. All right. And you've measured from the top of the Thunderbird bumper to the ground as being 22.5 inches?

A. Yes.

Q. And then 17B is a diagram entitled Vehicle Engagement at Impact?

A. Yes.

Q. And the measurement there for the Thunderbird bumper is 20.8?

A. Yes, relative to the Jeep being at normal trim height. The commonality between those two diagrams is that the Cherokee is at the same trim height, and we've changed the bumper height of the Thunderbird, that is, the front bumper of the Thunderbird.

Q. Now, as I understood you before -- I may be wrong, so please correct me if I'm wrong -- the Thunderbird measurement from a -- from the top of the bumper to the ground --

A. Yes.

Q. -- is the measurement shown on 17B of 20.8 inches, similarly, from the top of the bumper to the ground?

A. Yes.

Q. And so that would be a difference of --

A. Something --
Q. -- 1.7?
A. Yes. 1.8, is it?
It's 1.7.
Q. And this is premised on the assumption that the Cherokee's orientation, vis-a-vis the ground, has not changed by the braking of the Cherokee?
A. That is correct.
Q. Do you believe that the Cherokee was braking at the time of impact by the Ford?
A. I have no information one way or the other.
Q. So for purposes of your opinions in this case, you are assuming that the Cherokee bumper was in its normal ride height versus the ground?
A. I'm not making any assumptions relative to that at all.
Q. Mr. Arndt, in the supplemental interrogatory responses that was served upon us by the plaintiffs in this case, there's also an indication that you would testify regarding a defect existing in this fuel system, because the fuel tank was unshielded.
Do you intend to offer any opinions about shielding in this case?
A. Well, in a large sense, that's about not

being adequately protected. I don't -- I'm not going to offer a specific opinion about a lack of shielding of the tank in the present -- in the present design location. I would say that shielding is a good design characteristic.

Q. Do you have an opinion about whether or not, if there had been shielding of this tank, the outcome would have been different in this particular accident?

A. I do.

MR. FRYHOFER: Objection, vague.

Q. BY MS. OWENS: What is that opinion?

A. I assume that you mean by "outcome," fire, and the result.

Q. Breach of the fuel system and a fire and the result.

A. It would have been the same.

Q. Now, are you aware that this model Cherokee came with an optional skid plate for offroad applications?

A. I understand that there is an optional skid plate available for this vehicle.

Q. Do you believe that in this accident the presence of that skid plate would have made any difference in the breach of the fuel system or the

result?

A. It may have changed the extent of deformation and eliminated the breaches in the fuel tank proper, but I don't believe that it would have eliminated the fuel filler failure.

Q. In looking at Exhibit 1, which is your summary of opinions document, which I've copied for all of us at the lunch break, in paragraph number 2, you indicate that the brake dive of the Thunderbird exacerbated the geometry and structural mismatch between the front of the Thunderbird and the rear of the Belli Jeep Cherokee, right?

A. That is correct.

Q. Do you believe in this particular accident that some change in the bumper structure of the Cherokee would have resulted in a different outcome in this accident in terms of the fuel system performance?

A. Well, I suppose one could conceive of some change in the bumper design that would change the outcome, but I'm not -- I'm not really addressing the bumper of the Cherokee, per se. I'm trying to identify its characteristics relative to the world, but it's intruded upon, that's all.

Q. And what are its characteristics relative to the world that it's in?

A. It provides a bumper function for -- I'm not even sure for pushing anymore. Maybe it's historically there. But it does allow the respective structural elements at the rear of the vehicle, that is, the right side and left side frame rails, to be effectively engaged by a rear-moving barrier that's used in the 301 test and allows the vehicle to handle the forces -- nature of that engagement and the energies to meet the standard.

Q. And 301 is the subject of two paragraphs, I believe, in paragraphs 19 and 20?

A. That is correct.

Q. And your opinions as summarized in those paragraphs are that this vehicle met the requirements of FMVSS 301?

A. Well, what I said is Chrysler certified that it met the requirements of FMVSS 301.

Q. Do you have any reason to doubt that certification?

A. No.

Q. And you will not be offering any testimony that it didn't meet 301, will you?

A. I haven't seen any that said it didn't meet it.

Q. And then paragraph 20, you indicate that

one of your opinions is that FMVSS 301 does not sufficiently validate the crash performance design of the 1991 Jeep Cherokee?

A. That's correct.

Q. And is that a criticism of the standard, or the test, or the vehicle, or all of the above?

A. Well, the standard's a minimum standard. It's a recognition that while that is a minimum standard, and while that standard is promulgated by the government as a necessary minimum standard, that using that standard as a crash test methodology to assess the performance of the fuel system is not very realistic when one looks at the larger picture of collisions, because it's rare that there is a collision in the real world that has the crash characteristics of a rigid moving barrier. Not to say that won't happen on occasion, but the fact is that the kind of collision that occurred in this accident is more like the real world, and that one needs to be able to take the reality of what the standard is and isn't, and look at the performance of the vehicle from these different perspectives.

And that is what I'm really addressing with that combination of statements there.

Q. So, as I understand what you've said, this

number 20 is really addressed to the inadequacy of the standard, vis-a-vis, the real world accidents that occur?

A. You could phrase it that way. You know, I'd prefer to say it differently.

I think the standard has some value, in particular, if you look at the historical application of the standard. In cars, it made an enormous difference at an early time. But today, it is not sufficient engineering proof that the fuel system is adequate, and my opinion 29 really kind of goes to the next step of that process in addressing what really may be needed in the final analysis.

Q. You said 29 --

A. Did I say 29? I meant 21.

Q. There aren't 29 --

A. No, there aren't.

Q. -- unless you had a page you didn't give me.

A. No, it was 21. I misspoke.

Q. All right. Well, let me ask you a couple questions about 301 for a minute, if I can.

Have you determined what the energy was involved in this accident between the Thunderbird and the Cherokee compared to the energy involved in the 301

test?

A. I have not made that specific calculation, but I can, and I'm not even sure that's quite the right question -- I'm sorry -- as I begin to answer the question.

In the spirit of trying to get to, I think, what the question's about, let me just go ahead here. You know, I haven't compared the amount of energy absorbed by the Belli vehicle to that absorbed as a result of the 30-mile-per-hour rear barrier standard. I think that really is the comparison one wants to start making.

I can tell you that, based on experience, that the difference is fairly substantial, and that the energy imposed on the Belli vehicle was substantially more than that which would have been as a result of this collision, substantially more than that which would have been imposed on the Belli vehicle as a result of running the standard 301 rear-moving barrier test, rigid barrier test at 30 miles an hour. And all the information's available to make those calculations.

Q. And by "substantially," can you quantify that in any way for me as a range or a percentage?

A. Probably 300 percent more, something on that order. And, again, the number would work it out.

Q. Now, has there been a proposal to add a car-to-car crash to the 301 standard?

A. I have seen some proposed rulemaking, some dialogue around that.

Q. That would be a 50-mile-an-hour car-to-car?

A. I believe that's what's being discussed.

Q. And GM has done some 50-mile-an-hour car-to-car testing?

A. They have.

Q. Okay. And have you had a chance to look at that in previous cases?

A. I've seen some.

Q. Do you know if Ford uses that car-to-car -- any car-to-car testing in validation of their fuel system design?

A. I haven't seen any.

Q. What about any other --

A. That doesn't mean that it's not done.

Q. I understand. You can only say what you've seen.

Have you seen anything from any other manufacturer besides GM that indicates other manufacturers are using any sort of car-to-car testing as a part of their fuel system design program?

A. Not that I can recall.
Q. Can you compare the energy absorbed by the Cherokee in the Belli accident with a 50-mile-an-hour car-to-car impact involving this vehicle?
A. Well, you'd have to make a lot of assumptions. The answer is yes, one could make a comparison. We'd have to define a lot of things before we made that comparison, and that's where the assumption side of it comes into play.
Q. What do we need to define?
A. We need to define the weight of the striking vehicle.
Q. Assume it's the weight of the Thunderbird.
A. Okay.
Q. What else do we have to define?
A. Need to define the nature of the structures of the striking vehicle.
Q. Assume it's a Thunderbird. Can you do that, or would it --
A. I'd have to think about that. I would be hesitant to do that.
Q. Do we need an SUV that has the same bumper height?
A. No. What we need is something that matches the structural crush characteristics that the

vehicle that's striking the Belli vehicle here in this hypothetical situation that has a -- one assumption could be that its structural deformation characteristic is the same.

Q. As the Cherokee?

A. As the Cherokee.

That's one assumption.

Q. Okay.

A. Another assumption is that as a rigid barrier, like a rigid barrier, which is a bit of an anomaly when you talk about a car-to-car, and not very realistic in actuality.

And I suppose another assumption would be that we know accurately the deformation characteristic of the striking vehicle.

All of those are going to give some different result. There's a very common assumption made that energy gets split evenly between the striking vehicle and the struck vehicle.

Q. But that's not necessarily true?

A. It's not necessarily true.

Q. If I ask you: Do you have an opinion whether a 50-mile-an-hour car-to-car crash involving a Cherokee into a Cherokee would be more severe than this accident or less severe than this accident, could you

answer that?

A. Well, in terms of -- I can answer pieces of it.

In terms of the total energy incipient upon the collision event, it's less.

Q. Which is less?

A. The 50-mile-an-hour Cherokee front into the rear of a Cherokee.

Q. Okay.

A. In terms of the geometry and the structural interaction, I don't know. I'd have to kind of look at that.

In terms of the energy absorption characteristics of the respective vehicles, again, one could look at crash test results and see what they are, but I can't really assess that here today.

Q. Do you believe that -- or do you advocate a change to FMVSS 301 in terms of rear impacts?

A. Frankly, I think the standards are not really very effective anymore, particularly that standard. That's probably a compromise that ends up with a test condition that's too general. It's not specific enough to handle individual vehicle design considerations and would just kind of change the playing field and the rules a little bit, but would

probably end up directing energies and resources to a new static level that I think that the best invasion comes without regulation, just allowing the designers to do their job. They do a better job in the long haul.

Q. So do I understand from that you're not advocating a specific change to 301, or you don't opine that it needs to be changed to some -- in some specific way?

A. Well, I haven't thought a lot about it in the context of your question. So, you know, I'd have to be more considerate, I think, in a larger perspective about what I would say about 301.

I'm giving you a sense that I have about the process at this time, and that's all I can do. It's my thoughts about it. I answered the question. It may not be my final position on it.

Q. If you were charged with the responsibility to come up with a standard for a company that was making automotive products in terms of fuel system performance to be tested in a certain way for rear-end collisions, what would you do?

A. Say the question again.

Q. God, I'm not sure I can. I will try again.

If you were charged with the responsibility of coming up with a validation program or a testing standard or both for an automotive products manufacturer to deal with rear-end collisions and the fuel system performance, what would you recommend be done?

A. Well, I'm not sure I'd do it that way. Although I think in the final analysis you need what you're suggesting in your question, I think that's probably approaching it from the wrong direction, given where the knowledge, the technology, and the know-how exists today.

The real question, in my view, is how can I -- how can I as an engineer, or how can I -- I'm not trying to be real personal about this -- how can I as a company providing a safe vehicle design the fuel system in the best possible way. And there's ample information around now to answer that question in a rather straightforward manner by saying: Get the fuel tank into the center of the vehicle out of the many known crush zones; clean up the environment; deal with the filler neck.

And the truth of the matter is, for the proper development program, that is the best one can do, rather than, say, keeping the tank in the back and

saying let's revise the standard. You're never going to remedy a fundamental problem if you keep the tank in the back.

Q. So is it your -- one of your opinions in this case that the simple fact of the location of the tank behind the rear axle makes it defective?

A. That is what I said, yeah. I said that in my opinions.

Q. Do you believe that any vehicle that has a tank -- a fuel tank behind the rear axle is defective?

A. Well, I'd be hesitant to say that. And I haven't looked at every vehicle. I'm concerned fundamentally that rear-mounted tanks are a problem, but there may be circumstances and situations in some vehicles where it's not a problem.

Q. Why do you opine that it was a problem in this vehicle where it might not be in others?

A. Because this vehicle is not unlike a lot of vehicles in some respects in that, as an SUV, for its fully intended range of uses, it tends to be structurally stronger. It tends to have a suspension system, particularly in the 4-by-4 mode, that has the vehicle a little higher. And in the world where cars are being designed for aerodynamic efficiency, and the front of vehicles, not just cars, but the fronts of

vehicles are tending to be aerodynamically-contoured to minimize aerodynamic losses, a vehicle like this SUV is very vulnerable to underride. And it exposes the fuel tank to underride damage that would not be exposed, for example, in a 30-mile-an-hour barrier -- moving-barrier impact, as an example. And there's just not enough space for this vehicle to be protected.

Q. Would it be your opinion in any SUV with a behind-the-axle fuel tank location that the fuel system is defective?

A. I can't answer that.

Q. What vehicles in 1991 were -- what SUVs had behind-the-axle fuel tank locations?

A. I haven't made a specific list of those.

Q. Did any have midship fuel tank locations?

A. I don't know.

Q. Would you agree any location where you put a fuel tank is potentially subject to collision forces?

A. Yes.

Q. Have you ever testified that any vehicle that had a midship location was defective in its design?

A. No.

I need to qualify that answer just a little bit. I've never testified about any midship

tank location that it was defective in design because of location and crush potential.

Q. Does that mean that you have testified that midship tank vehicles were defective in some other aspect of the fuel system?

A. I have dealt with, I think, one case involving subshielding.

Q. Do you remember what vehicle that involved?

A. Yes.

Q. What was it?

A. It was a Chrysler minivan.

Q. Do you remember the name of the case?

A. I'm sorry, I don't.

Q. Were you deposed?

A. Yes.

Q. Any other cases where you can recall testifying that some aspect of the fuel system of the vehicle with a midship tank location was defective?

A. No.

Q. Mr. Arndt, do you believe that a sport utility vehicle with a midship tank and a left-side fill pipe location would have survived this accident without a compromise of the fuel system?

A. I believe that it would have survived. I

would be hesitant to say that it would have survived without some small leakage, but not of the nature that occurred in this accident.

Q. And would that some small leakage have caused a fire, in your view?

A. It's always possible that with fuel leakage there can be a fire. I think the whole nature of the fire would have been so dramatically changed that the opportunity for escape would have been sufficient, if indeed there was a fire.

Q. Where do you believe the potential for leakage or small leakage would be in a midship tank with a left-side fill SUV?

A. Well, one has to always deal with the filler neck, because -- regardless of location. So one has to make sure that it is free to move if the outer panel gets stressed relative to the tank position, that it stays together by design.

And the other, I think, important thing is to ensure in the process of implementing the tank in its midship location, that that environment is clean and free of anything that might move into or around the tank and puncture it. The biggest area of concern would be the rear axle and suspension components, making sure that they're designed in a way to be as

friendly, if that's the proper word, as possible to the tank.

Q. What about the drive shaft?

A. What's the question?

Q. Well, in this hypothetical SUV with the midship tank and the left-side fill, if it was 4-wheel-drive, there would have been a drive shaft going to the rear axle, correct?

A. Yes.

Q. What do you do about a midship tank in that scenario?

A. Put a shield around -- between the edge of the tank and the drive shaft. But drive shafts are relatively smooth objects, at least in the area where they traverse by the fuel tank. And so there is room -- there is tolerance in the design for drive shaft contact. What there is not tolerance for is sharp objects, say a differential hitting the tank.

Q. In this particular case, did you observe the damage to the drive shaft in the Cherokee?

A. I did.

Q. It was -- well, first of all, the rear axle was moved forward, correct?

A. Yes.

Q. And there was an, about, what, 90-degree

bend in the drive shaft?

A. Well, there was a significant lateral displacement if you look at the -- let me rephrase the response.

If you look at the normal alignment, longitudinal alignment of the Cherokee, what you will find is that there was a significant lateral displacement into the driver's side at the rear of the drive shaft, if I remember correctly.

Q. Let me show you the page of your diagrams that's been marked Exhibit 17D, and there's four panels on this. Does the --

A. Upper right-hand corner?

Q. Upper right? Or upper left-hand?

A. Would be the upper right-hand as we look at -- well, either the upper right or the upper left.

Q. Upper right.

A. Either one. Either upper right or upper left give a perspective. But the upper right, as we look at it, provides the best perspective of the lateral displacement of the drive shaft.

Q. Now, if the fuel tank was in a midship location, meaning between the two axles and between the frame rails -- is that a correct -- a good definition of "midship"?

A. Yes.
Q. Could that drive shaft, in this accident, have potentially caused damage to it?
A. Can potentially cause damage.
Q. Do you believe it would have been damaged enough to cause a fire from a fuel system leakage?
A. I think it would be a deformation. I suspect that it won't cause a leakage, because the drive shaft is generally lower than a tank and would, you know, move off the corner. And it tends to be smooth.
Q. By the way, Mr. Arndt, do you believe that a plastic fuel tank would have performed differently in this accident if it had been located in the Cherokee and all other things were the same?
A. No.
When you say "performed differently," I interpret that to mean would it have changed the outcome.
Q. Yes, sir.
A. Would not have.
Q. It would still -- there would still have been a compromise of the fuel system and a fire?
A. Yeah. Probably would have happened a little differently, but it would have been the same

result.

Q. In reviewing the various DaimlerChrysler documents that were provided to you, did you find in those documents a description of what the internal performance standard is for rear-end collisions for this particular vehicle?

A. I think I saw it in there. I'd have to try to find it.

Q. Do you recall what it was?

A. No, not as I sit here right now.

Q. Do you have an opinion about whether it was adequate or inadequate?

A. I'd have to look at it again. I think it's probably very similar to the standard in that respect.

Q. So if it's similar to the Federal Motor Vehicle Safety Standard, then it would be your opinion that it's inadequate?

MR. FRYHOFER: Objection; vague as to "it."

MS. OWENS: Okay. I'll ask it again.

Q. BY MS. OWENS: If we assume, as you've indicated, that it's your recollection that the internal Chrysler standard is similar to the Federal Motor Vehicle Safety Standards in terms of performance

in a rear-end collision, vis-a-vis the fuel system, would it be your opinion that the internal DaimlerChrysler standard is ineffective or insufficient for the same reasons you previously expressed regarding the Federal Motor Vehicle Safety Standard?

A. Well, let me look at the standard, if I can find it. First off, I need to find the standard. Just a moment here. There's several components to the answer to that question. Let me just go to the question of standards first.

It appears to me that Chrysler adopts the federal standards as a dynamic testing criteria. And I would have the same comments about those that I did about the overall federal standard.

In terms of Chrysler's overall design guidelines, I think that they recognize, particularly on the protection side, for example, that that goal -- that design guideline is a good guideline. It represents the proper kind of consideration. It doesn't specify implementation details, however.

MR. FRYHOFER: For the record, I think you referenced -- when you say "the guideline," what are you talking about?

THE WITNESS: I'm talking about fuel system design guidelines, which is a Chrysler document.

There are lots of design guidelines in the document that relate to details of implementation, which is also acknowledgment about the standards.

MS. OWENS: Okay. May I see that for a moment?

THE WITNESS: Sure.

Q. BY MS. OWENS: The documents that you've been referencing are contained within a packet of material that includes the deposition of Lazarus, Mr. Perion, which is marked as Exhibit -- Lazarus is 14; Perion is 18.

It appears that the fuel system design guidelines that you are referencing are marked as Exhibit 12 to the deposition of Mr. Perion?

A. That is correct.

Q. And do you know what case? Is that from the Nelda Sue Butler case?

A. It is.

Q. And this document is highlighted in certain areas?

A. Yes.

Q. Is that your highlighting?

A. Some of it is. Not all of it.

Q. Do you believe, Mr. Arndt, that -- or do you hold the opinion that DaimlerChrysler Corporation

violated its internal standards represented in that document in the design of the fuel system in the 1991 Jeep Cherokee?

A. I don't know that they fully executed the possibilities of the design guideline. In particular, if you examine what was going on in Chrysler in the -- in some of the other product lines, this design guideline is a broad guideline that fits all their products, that it appears that the degree to which or the rigor -- the degree -- the rigor to which it's implemented is not uniformly applied.

Q. Can you answer my question "yes" or "no"?

A. No.

Q. Would you agree with me, Mr. Arndt, that the location of the fuel tank alone does not mean it is defective?

A. I could accept that, yes.

Q. Conversely, is it your opinion that merely the fact of placing the tank behind the rear axle constitutes a defect in design?

A. That's not necessarily true.

Q. Have you ever testified in a case where the fuel tank was behind the axle that that location did not make the design defective?

A. I have never been asked to testify in a

case that would draw that opinion.

Q. In the cases where you have testified and it involved a rear-mounted tank, have you testified in each instance that the fuel system was defective because of the location of the tank?

A. In those cases that I have been asked to testify about collision fire issues that involve tank protection, and if the tank's located in the rear overhang area, it is likely that I've testified that it was defective.

Q. In turning to Exhibit 1 to your deposition, numbered paragraph 3, one of the opinions that you intend to express details the underride, which I think we've already discussed, but it also goes on to indicate that the underride allows the Thunderbird to penetrate deeply into the underbody of the Belli vehicle?

A. That is correct.

Q. How far did the Thunderbird penetrate into the Belli vehicle?

A. The front penetrated up to the rear axle. I don't know what that dimension is, but that's fairly substantial.

Q. Did any part of the Thunderbird actually contact the rear axle?

A. I'd have to look at the graphics to answer that question with certainty.

Q. Did any portion of the Thunderbird physically contact the fuel tank or any other part of the fuel system of the Cherokee?

A. Yes.

Q. And did that physical contact of the Thunderbird to the fuel system result in any breach of the fuel system of the Cherokee?

A. It did.

Q. What areas of the Cherokee fuel system were contacted directly by the Thunderbird?

A. Largely, the underbody. The bottom half of the fuel tank was caught between the top of the front -- top part of the Thunderbird and the underbody floor of the Cherokee. That caused massive deformation and volume reduction of the tank.

There was also relative motion between the tank and the outer body structure on the left-hand side, which, as a result of that contact, there is crushing contact that caused fuel filler neck separation.

And then there are a couple other small holes in the tank that I may have identified the location associated with their fracture. One of them

is associated with a very severe bend and appears to be more a stress-induced failure in the tank. The other hole is a small tear or puncture. I don't know that I have the specific source for that. There may have been some other fuel leakage, although it's not possible to say with certainty because of the degree of engagement of the fuel tank. At least dynamically, some fuel could have been forced out of the sender unit attachment -- sender unit assembly attachment to the tank.

That's all I can define has breaches or potential breaches caused by contact.

Q. Was the sender unit or any part of the sender unit detached from the tank?

A. My observation was that the sender unit remained physically engaged in the cap-meeting surface of the tank, and it seemed, at least in the condition that I observed it, to be fairly rigidly affixed in consideration to all of the fire damage.

Q. So do you believe or hold the opinion that the sender unit in some way was compromised to allow fuel to escape from its point of attachment to the point --

A. I think compromised in the context of the question you're asking is somewhat elusive, because

it's a dynamic phenomena. There may be some relative movements and distortions that upset the seal momentarily or create some stress to create at least a momentary access between the inside and the outside of the tank and would allow for some small leakage. I think that's entirely in the realm of possibility in this case. But in the scheme of the leakages, it's very small.

Q. So do you intend to express any opinion that the design or performance of the sender unit in this accident constitutes a defect?

A. No.

Q. Did you see any indication of seal failure in the tank itself?

A. No.

Q. How far forward was the tank moved?

A. We'd have to measure it off of the drawings.

Q. Do you have Mr. Stevens' drawings that were marked yesterday?

A. I do, I believe. Just one moment.

I have those.

Q. Thank you.

In looking at Exhibits 16, 17, and 18 to Mr. Stevens' deposition yesterday, are those the

depictions of the penetration of the Thunderbird into the Jeep that we've earlier referred to?

A. These are -- yeah, this set of diagrams depicts it. There could be others, but this gives quite a few -- quite a number of views of it.

Q. And does it allow you to determine whether the amount of penetration was greater on the left side of the Cherokee, the center, or the right side?

A. It was likely greater on the left side of the Cherokee.

Q. Were you -- as I understand what you said, you have not noted anywhere in your file the numbers related to the penetrations?

A. I have not.

Q. Did the penetration extend beyond the C-pillar of the Jeep?

A. On the driver's side, yes.

Q. Did the Thunderbird penetrate beyond the fill pipe location on the left quarter panel?

A. Yes.

Q. You've indicated earlier that you believe that there was damage to the filler pipe and that there was filler pipe pull-out, I believe, correct?

A. I don't think I stated it exactly that way.

Q. Okay.

A. I think what I stated -- if I stated it that way, I misspoke.

What I stated was that there was fuel system damage, and that that is likely a result of a failure in the flexible connection for the upper fuel fill pipe and the stub located in the tank.

Q. Okay. Did the upper portion of the fill pipe pull away from the flexible connection --

A. Do you mean by --

Q. -- or was it separated?

A. Do you mean by that did the flexible connection come off of the lower end of the upper fill pipe?

Q. Yes.

A. I couldn't see that. I couldn't make that determination.

Q. Was the upper portion of the filler pipe separated from the stub?

A. I believe the fuel -- I believe that the hose connection with -- hose under the clamp remained on the stub, if I remember correctly. I'd have to check that with some photographs, but I believe that's true.

Q. And I guess what I'm tying to understand,

and may just be I'm not following you, but let me try and ask it again.

Did the filler pipe pull out of the tank?

A. No. Let me -- I can see what the -- I think what the issue is here, I think it's a matter of semantics here.

Q. Okay.

A. Maybe I can go back and quickly resolve this misunderstanding.

The fuel filler system consists of the upper fuel-filled pipe with cap attachment to the outer body, an intermediate rubber hose, and a stub in the tank. The intermediate rubber hose is attached to the lower end of the upper metal pipe and the stub and clamped into place.

What I believe happened is that that flexible connector was separated somewhere or another. Whether it pulled off the upper end of the upper pipe, I don't know. But a failure occurred in that flexible section, the intermediate flexible section.

Q. Let's look at Exhibits 12P -- I'm sorry, 17B and 17C.

And do those show the components we have been discussing?

A. Yes.

Q. These are specific drawings of the Cherokee exemplar fuel tank, correct?
A. Yes.
Q. And they show in red the upper half of the tank?
A. Yes.
Q. And what is the --
A. Well, in that particular exemplar, there was a shield on.
Q. Okay.
A. So the shield got digitized.
Q. There was a skid plate?
A. Yes.
Q. And it shows us the fuel tank straps?
A. Yes.
Q. And then it shows coming out from the tank a green area?
A. That's a flexible hose.
Q. And a yellow area?
A. That's the upper fuel filler pipe.
Q. And the area adjacent to the flexible pipe?
A. That is a small flexible hose that comes out of the tank and connects to the fill pipe. But the upper end is called a filler breather line. It allows

for the air that's displaced during filling to exit the tank.

Q. And is the sending unit shown?

A. The sending unit, just kind of solid green, round device that's on the front face of the tank. You see it in several diagrams here.

Q. Okay. And is the stub that fits into the metal stub -- well, let me ask you this.

Is there a metal stub that the flexible hose connects to inserted into the tank?

A. It's right at this location here.

Q. All right. You're circling it on the --

A. The lower end of this green flexible pipe.

Q. Okay. And from what I understood you to have said a moment ago, the flexible connection failed in some way?

A. Yes.

Q. Whether it burned or was torn or otherwise damaged, it was damaged and failed?

A. It was burned, but it wasn't burned -- it was burned as a consequence of the fire. Burning did not cause the failure.

Q. Okay.

A. It failed prior to the fire as a result of some stress incited into the connecting -- flexible

connecting part of the system that either pulled it off the upper pipe or physically separated the flexible line.

Q. And do you have an opinion about what the failure mode was for that flexible connector?

A. Overstress.

Q. Well, did that overstress result because of direct impact from the Thunderbird?

A. More likely a result of pulling of the tank relative to the upper pipe connection.

Q. What do you mean by that, displacement of the tank forward?

A. Relative displacement between the tank and the upper fuel filler pipe connection at the outer body.

Q. And I think I've already asked you, but you have no specific notation in your file about how far the tank moved, correct?

A. I don't have any specific measurement, but we have sufficient information to answer that question.

Q. Did the upper end of the filler neck that extends through the quarter panel, did it also move relative to its normal location?

A. It remained affixed at the top, but reoriented itself in the collapsed structure.

Q. Do you intend to express an opinion that the flexible hose connector in the fill pipe assembly was defective in its design?

A. No. I would say, however, in the rear-mounted tank that a different filler neck design needs to be implemented.

Q. And how does it need to be different?

A. Well, you either need to put a ball check valve in the filler opening so reverse flow can occur, or you need to make sure that the fill pipe can -- the upper end of the body attachment can freely move away from the outer body panel with the fuel standards so that the intermediate connections do not get stressed to failure.

Q. Is it possible in this case, Mr. Arndt, that the flexible hose was impacted physically by the Thunderbird or some portion of the Thunderbird?

A. I suppose it's possible.

Q. Were there any holes in the metal portions of the fill pipe?

A. Didn't see any, but I didn't see all of it.

Q. Meaning you didn't see the flexible hose?

A. No, no.

I assumed you meant the metal parts of the

pipe.

Q. I do.

A. And I didn't see any in the stub. And I don't recall seeing any in the upper pipe.

(A recess was taken from 2:21 p.m. to 2:27 p.m.)

Q. BY MS. OWENS: Mr. Arndt, I think I may have already asked you this, and I apologize if I'm repeating myself, but just to make sure, do you believe that direct contact between the Thunderbird and the Cherokee fuel tank caused any damage to the fuel tank?

A. Yes.

Q. What damages do you believe it caused?

A. The high degree of deformation.

Q. And that's when it was caught between the Thunderbird and what was the floor pan above it and the Cherokee bumper below it?

A. No. Actually, the tank is -- the tank on the Cherokee is strapped onto the underbody, the rear floor of the Cherokee. And the front portion of the hood radiator cross member, that general area crushed the fuel tank.

Q. And did that crushing of the fuel tank result in a hole or a tear or a breach of the tank?

A. There are two holes that are a consequence

of that deformation.

Q. Can you show me either from the diagrams or from your photographs what those two holes are?

A. In the photographs that are numbered 77 and 78 of the group that are 1 through some 317, I think, there is a hole that is a puncture hole that I referred to. Actually, 76 also contains it.

That hole's likely caused by a rear body cross member fracture which is in the foreground of one of these pictures. Take 76, for example.

The other hole is a very small one, if I remember it correctly. I'm trying to find a picture of it. It's associated with a very tight crease associated with the bending of the tank. It's likely stress induced as a result of bending and deformation.

I have it in 75, but it's not a very good picture.

Q. Okay.

A. Photo 75, maybe photo 89.

I did photograph it in those pictures that were taken at the time of the fuel tank removal, and there will be some really clear photos of it in that grouping, although I can't point to it at this moment.

Q. 75 is one of them, though?

A. Yes. What did I say the other one was?

Q. 76, 77 and 78 are the hole, and you were looking for the tear?

A. Yes. 75.

Q. Okay. And I've also pulled out Exhibit 12 -- or 12 -- no, 17V, which is the CAD depictions of the damage to the tank, correct?

A. Yes.

Q. Okay. So orient me, if you would, as to where the hole that is referenced in photograph 76, 77 and 78 is.

A. Just a moment, please. That hole -- okay. We're going to refer to 17V, as in Victor.

That hole would be -- looking at the lower left-hand diagram in 17V, that hole would be somewhere in this area right here.

How do you want me to denote that?

Q. Any way that you're comfortable denoting it.

A. How about if I just draw a small circle?

Q. That'd be great.

A. I may not be drawing the specific -- at the location, but it's right in this location. Let me draw that in pen. Might show up better.

It's right in the location that I'm indicating this circle.

Q. Okay. And you indicated that one of the rear cross members is depicted in the foreground of photograph 76, for example; is that correct?

A. Yes.

Q. It's also shown in 77?

A. Yes.

Q. And there is a fracture of the metal in that location?

A. Yes.

Q. Do you believe that that fracture area on the rear cross member somehow caused the hole in the tank that you referred to?

A. If I remember correctly, I lined that fracture edge up with the hole.

Q. So --

A. I guess the answer is yes.

Q. Okay. And the other tear that you spoke of is depicted in 75, at least?

A. Let's see here.

Q. That's 76, 77 -- there it is.

A. I'm not sure that -- I think that's suspicious that there's a hole there, but it's very small, the one in 75. 76 is the other hole. As I look at it, it reminds me.

Q. Okay.

A. It's right here, but it's very, very small. Looks like something associated with some just local concentrated deformation.

Q. All right.

A. It's very small.

Q. To clean up our record, 76 and 77 are of the hole associated with the fracture of the rear cross member?

A. Yes.

Q. And 75 and 78 are of the tear?

A. Well, 75 is of a deformation area that's suspicious if there's a hole, but you can't see. If it's there, it's extremely small.

Q. Okay.

A. And 78 is a hole, and it's right in the small deformation area.

Q. And you circled on the photograph?

A. Yes.

Q. And can you use Exhibit 17V, as in Victor, and show me where that hole as depicted in photograph 78 is on the tank?

A. Possibly.

Q. Use an X this time, if you would.

A. Okay. Approximately here with the X.

Q. All right. Thank you.

And which photograph were you looking at?

A. I was looking at photograph number 50 and photograph number 26. You need to mark those, or --

Q. They're already marked.

A. Okay.

Q. I think.

A. We marked them as a group --

Q. Right.

A. -- earlier on.

Q. And as to that tear, Mr. Arndt, do you believe it was caused by contact with another component or simply the result of deformation?

A. It looks like it's deformation. I can't say, with absolute certainty.

Q. So in --

A. Okay.

Q. Okay. In paragraph 4 of Exhibit 1, your summary of opinions, where it indicates that the fuel tank was breached, have we talked now about those, the breaches?

A. Yes.

Q. That would be the hole and the tear?

A. Yes.

Q. And it says it was displaced relative to the filler connection causing filler neck failure, and

we've talked about that, haven't we?

A. We have.

Q. And it was caused to be severely crushed which caused a rapid expulsion of fuel from the damaged fuel system?

A. That's correct.

Q. Now, in terms of the deformation itself, you have opined, I think, that you can account for only one tear in the tank as a direct result of that crush and deformation?

I'm not sure that's a very good question. Shall I try it again?

A. I think it's a good idea.

Q. Okay. Based on what you've discussed with me earlier today, am I correct in understanding that the crush deformation of the tank, in terms of causing damage to the tank itself, produced only that tear that we've discussed and which you've marked as X on Exhibit 17V?

A. Well, what I said is that small tear is a result of deformation.

Q. Of the tank itself?

A. Of the tank itself.

Q. Correct. The hole which you marked by a circle in Exhibit 17V is most likely the result of

interaction with the rear cross member?

A. Yes.

Q. And the deformation and crush to the tank resulted in what you've described as a rapid expulsion of fuel, correct?

A. Resulted in an enormous volume reduction in the tank, which in itself caused an expulsion of fuel.

Q. The tank got squeezed, and it caused the fuel to come out faster than it otherwise would have?

A. That's exactly right.

Q. Have you calculated that rate of expulsion?

A. No.

Q. In paragraph 5, you then go on to say that the ignition source for that fuel could have been either electrical or friction sparks?

A. Correct.

Q. Have you determined which is more likely?

A. No.

Q. And in terms of a time line, Mr. Arndt, have you tried to prepare a time line of what event took place when in terms of this accident sequence?

A. Are you talking -- is that a general question, or is that relative to tank crush and fire

eruption?

Q. Well, I'll start with the general question.

Have you done anything about preparing a time line of this accident sequence?

A. Well, I understand it broadly in my mind, and I could probably do something on a second-by-second basis over the collision to point of rest sequence.

Haven't done that.

Q. All right. You've testified earlier today that you believe and opine that the crash pulse of the initial Thunderbird/Cherokee impact was probably 100 to 110 milliseconds; is that correct?

A. What I said was that the primary crush pulse was 100 to 110 crush pulse.

Q. The crush as opposed to crash?

A. As opposed to the rebound.

Q. Okay. And during that 100 to 110 milliseconds, do you believe that the three areas of damage to the fuel system that you've talked about in paragraph 4 all occurred?

A. Yes.

Q. Can you narrow it down any more than that, say, you know, this happened the first 50 or this happened in the second 50?

A. I would say that the failures, more likely than not, happened in the last half of the pulse -- of the primary deformation pulse, that 100-to-110-millisecond time period.

Q. So between 50 and 110 milliseconds?

A. Yes.

Q. And when do you believe that the ignition of fuel occurred?

A. At the end of the crash pulse, 100 milliseconds, thereabouts. Could have been 200. Kind of placed it at 100. Could have been just a little longer.

Q. Okay. So would your opinion be that most likely at about 100 milliseconds the fire started?

A. Didn't start before 100. Most likely at a hundred or later, but probably wasn't beyond 200.

Q. Okay. And at what time do you believe that the fire traveled into the occupant compartment of the Cherokee?

A. It was inside of the occupant compartment within a half a second after initial impact.

Q. And when did the -- at what point in time in the collision sequence the Cherokee come to rest?

A. Somewhere around three-plus seconds. Something after three seconds. Maybe around four.

Q. And at what point in this time line did the impact with the Camry occur?

A. Sometime before three seconds. I don't have the exact time event, but it's in the calculation somewhere.

Q. And after the fire was in the occupant compartment, which I believe you said was within a half a second after the impact, how long did it continue to burn in the occupant compartment?

A. Until the fire was suppressed by the fire department.

Q. Mr. Stevens yesterday shared with us a page of notes that he took of a conversation with you regarding the flame ball.

A. Yes.

Q. And it should be over there in the --

A. I'm familiar with it.

Q. -- the investigative file.

Here it is. It's Exhibit 12 to the deposition of Mr. Stevens.

A. Yes.

Q. Is that an accurate reflection of your opinions?

A. It's an accurate reflection of the fire that was outside of the vehicle, and it represents my

opinion.

Q. And included in the middle of this page is a height, which is the X-axis, and is the Y-axis time?

A. Yes.

Q. So it would indicate that the maximum height of the flame ball was reached at about a half a second and was maintained for about another tenth of a second?

A. Yes.

Q. And when the flame intruded into the occupants' compartment, do you have any opinion about what the temperature of the flame was or what the temperature of the air was in the occupant compartment?

A. That's a highly variable proposition. Under perfect burning conditions, perfect fuel/air mixtures, temperatures could be well in excess of 2,000 degrees Fahrenheit. And it may very well have been that in some specific areas.

I think my opinion is that a better way to kind of assess that is that it's not that high because the mixing conditions of fuel/air are not perfect, and they're variable. But 1,500 degrees Fahrenheit, probably somewhere around there, maybe a little less. Some areas it could have been hotter, but the bulk of the fire is well in excess of a thousand degrees

Fahrenheit.

Q. And burn injury is a product of time and temperature, correct?

A. Yes.

Q. At a thousand degrees Fahrenheit, how long could a human being breathe that air?

A. Well, if, indeed, the body would allow the air to be taken in to any extent -- to some extent it does happen -- the body will probably react in a way to stop the breathing function. It's just not going to let a lot of thousand-degree-Fahrenheit air into your body. It's much like when you're swimming, and if you take a big gulp of water and it gets in your lungs, your lungs literally shut your breathing down for a finite period of time until you clear it. So the response would be very, very similar.

Just not a whole lot of that high-temperature air is going to get into the body as long as the body can sense it and respond to it.

Q. Do you intend to offer any opinion at trial about what the effect of those temperatures would be on the occupants of the Jeep?

A. Well, at those temperatures, it would be -- external burns would be instantaneous and very serious.

Q. Within a period of how long?

A. Milliseconds when exposed to those temperatures. But really the time response of the fire into the Jeep is longer than that. It's more like a half a second. So for a period of time, these occupants, at least, are going to get subject to some flash fire of order of magnitude six-tenths of a second, three-quarters of a second, maybe a second at the most, subsides and continues to burn.

Q. And if, hypothetically, the occupants were exposed to temperatures of a thousand to 1,500 degrees Fahrenheit for one second, would that be a survivable --

MR. FRYHOFER: Go ahead and finish your question and then I'll object.

Q. BY MS. OWENS: -- accident?

MR. FRYHOFER: I'm going to object on the grounds of lack of foundation and the fact that the witness hasn't been offered in the area of injury causation or the field of medicine.

MS. OWENS: Let me change my question then.

Q. BY MS. OWENS: Do you intend to offer any opinions, Mr. Arndt, about how long the occupants survived after the point of impact?

MR. FRYHOFER: Let me just say we're not -- we are not going to elicit any such opinions from him.

(A discussion was had off the record.)

Q. BY MS. OWENS: What was the -- in your opinion, Mr. Arndt, what was the primary source in terms of the breach of the fuel system for the fuel which ignited and burned in this accident?

A. The largest component of fuel leakage occurred out of the upset filler neck.

Q. So do you have an opinion about whether or not the outcome to the fuel system would have been different had the filler pipe not been displaced relative to the tank?

A. Could you repeat that question, please.

Q. Certainly.

Do you have an opinion about whether or not the outcome to the fuel system from this impact would have been different if the filler pipe had not become separated from the tank, which I understood you earlier to say was a result of relative displacement of the two components?

A. It's possible that it would have been the same.

Q. Do you believe it's more probable than not

it would have been the same?

A. Well, that depends, to some extent, on the quantity of fuel in the tank. With the extent of volume reduction and the dynamic volume reduction, my suspicion is that there would have been another -- the failure would have been transferred to a different place, and there would have been a different failure mode, likely a tearing of the tank due to hydrostatic pressure buildup.

Q. In 17V, the lower left-hand cell is the one that you have marked the holes -- the hole and the tear?

A. I have.

Q. And just to make sure I'm clear, is this a view from the rear?

A. Rear forward. Standing at the back looking forward.

Q. And so the tear and the hole are both on the rear edge of the tank?

A. As crushed, they're at the back edge of the tank.

Q. As uncrushed, where would those areas be?

A. Let's see.

Q. Do you need these, as well?

A. No, I don't think so.

I believe also at the back edge of the tank.

Q. If this vehicle had been equipped with a different design of filler pipes so that it broke away from the upper attachment at the quarter panel to be allowed to move with the tank, do you believe the filler pipe would have been compromised anyway?

A. I haven't made that determination.

Q. So you have no opinion?

A. Not at this time.

Q. How far was the rear bumper of the Cherokee moved forward?

A. Depends upon where you make that measurement.

Q. On the left side.

A. The level of crush on the left side is on the order of 48 inches.

Q. That's just for the bumper?

A. Well, I think that's the max crush. Whether that is the bumper or not, I'm not certain. You'd have to make a determination.

Q. What about the axle? How far was the rear axle moved as a result of this collision?

A. I didn't measure it specifically, but probably in excess of five to six inches to some --

it's somewhat variable.

Q. Have you ever worked on a case, Mr. Arndt, where there was a breach of a fuel tank caused by a broken drive shaft?

A. I have never seen a tank breached by a broken drive shaft.

Q. In addition to the drive shaft in this vehicle, there's also a 4-wheel-drive shaft, isn't there?

A. The front shaft, yes.

Q. That works?

A. It's a short shaft. It goes to the front. Comes out of the transfer case way on the front of this, on the right-hand side.

Q. Did you ever see that 4-wheel-drive shaft in your examinations of this vehicle?

A. I don't recall seeing it.

Q. You have pictures of the underbody, don't you?

A. I do.

Q. Can you look and see for me?

A. Sure.

I cannot identify it in my underbody photographs.

Q. If you want to retain 4-wheel-drive

capacity in a vehicle, does that influence or affect the ability to utilize a midship fuel tank location?

A. I don't think it has to. It could.

Q. In what way could it affect the use of midship location?

A. Depends on where you want to place it. If you place it on the same side as the transfer case, it might limit the amount of space available to put volume and storage.

Q. Capacity is always a consideration of a fuel system designer, isn't it?

A. Definitely.

Q. It's a legitimate criteria, isn't it?

A. I would agree.

Q. Have you ever seen a vehicle where the fuel system had been compromised because of a 4-wheel-drive shaft damaging any components of the fuel system?

A. I haven't observed that.

Q. What was the path or paths by which the fire entered the passenger compartment of the Jeep?

A. Through the breached rear windows. That would be both rear side windows and the back window that is associated with the back door through the upset of the back door relative to its opening or closure

space and through some seam separations in the wheel housing -- rear wheel housing areas at the back.

Q. Do I understand correctly that it is not your intent to testify that there was any defect in the structure of the vehicle which allowed the flame to enter the passenger compartment?

A. I would not offer that opinion.

Q. In paragraph number 8 of Exhibit 1, which is the summary of your opinions, you indicate that one of your opinions is that the secondary impact of the Cherokee to the Toyota caused more fuel spillage; is that correct?

A. Correct.

Q. Could you explain to me how you believe that occurred?

A. We have a diagram that illustrates the nature, at least, of the initial engagement of the Cherokee with the Toyota.

Q. Is that the one Mr. Stevens brought with him yesterday?

A. Maybe. There it is.

Q. Okay. What exhibit number is that, sir?

A. Stevens Exhibit 19.

Q. Okay.

A. As we look at this diagram, we must

remember that the Toyota is stationary at the time this crush interaction is occurring and that the Belli vehicle or the Cherokee is turning clockwise and moving longitudinally, that is, center of gravity is moving down the roadway.

When the collision occurs, the clockwise rotation is stopped and the vehicle spins off of the right rear corner of the Toyota. During this stopping -- rotational stopping action and changing it from clockwise to counterclockwise, there is a force that's applied at about three o'clock at the rear of the vehicle, which is the right -- the left rear, the driver's side. And whatever fuel's left in the tank is caused to dynamically surge out of the tank, primarily the filler neck opening. It spews out on and around the Toyota. Of course, the Cherokee's on fire, and the Toyota is ignited.

Q. And just to be sure I'm clear, you're not stating any opinion that the secondary impact with the Toyota caused any additional damage to the fuel system of the Cherokee, correct?

A. I don't believe that it changed any -- no, it did not cause any additional damage. It did probably impact some of the deformation to the body, the outer left rear body of the Cherokee.

Q. Okay. And in looking at the diagram that was marked as Exhibit 19 to Mr. Stevens' deposition, it indicates that the left rear of the Cherokee impacted about the center line of the rear of the Toyota?

A. That's a fair statement of at least that initial engagement.

Q. Okay. And how did the Jeep continue to move after that initial engagement?

A. Up to this -- right up to the moment before impact occurs between the Cherokee and the Camry, the Cherokee's center of gravity is moving down the roadway, car's skidding sideways, driver's side lead, the car is rotating clockwise. Upon impact, the forces are acting at the back of the vehicle, stops the rotation of the Camry. The center of gravity still wants to continue to kind of go down the roadway. And so for that to happen, the Camry kind of -- I mean the -- without writing on this thing --

Q. The Jeep?

A. -- the Jeep kind of wraps around the corner of the Camry. You can see that deformation in the side door. That is an artifact of that. And the Jeep rotation changes to a counterclockwise rotation. Center of gravity continues to move in a straight line, and the vehicle ultimately starts to rotate to its rest

position.

Q. Moving to paragraph 10 of your opinions, there's indication that Mr. Belli was observed leaving his vehicle on fire and that his wife and infant child were unable to escape the burning Jeep?

A. That's correct.

Q. Do you have any opinion about whether Mrs. Belli and the child were physically able to effect an escape?

A. Well, I can't imagine the infant's able to do that of its own volition. So it would be Mrs. Belli who'd have to do that. I think she was sitting in the left rear seat and was unable, for some reason, to extricate herself. I think some of the witnesses indicate that she was alive for some time, and she may very well have been entrapped between the driver's side seatback, which deflected rearward, and her rear seating position. Her rear seating position was also moved somewhat as a result of the collision damage.

Q. Do you know how much the rear seat was moved in the area where she was sitting?

A. I can imagine that it was sufficient to entrap her. I'd have to -- I don't mean that casually. I mean it based on my observations of the damage. We could measure it from our -- we could determine it from

our measurements. I just don't have the numbers in front of me today.

Q. And when you examined the Cherokee vehicle, was the driver's seat back deflected from its normal position?

A. I observed that it was deflected somewhat from its normal position.

Q. How much?

A. Didn't measure it. Just an observation.

Q. If the driver's seat had remained -- I'm sorry.

If the passenger seat where she was seated had remained in its design location, would the deflection of the driver's seat have been sufficient to entrap her, in your opinion, as you observed the driver's seat?

A. I haven't made that specific determination.

Q. Regarding the design of this filler pipe and its attachment to both the upper end and to the tank, in 1991, were other manufacturers using a similar design?

A. Some were, some weren't.

Q. Can you tell me which ones were?

A. Not as I sit here at this moment.

Q. Can you tell me which ones weren't?
A. No.
Q. Do other manufacturers in this year, 2002, use a similar design?
A. I can't say with absolute certainty. I would be, frankly, surprised to see any rigid attachments to the outer body panel on new cars.
Q. Opinion 13 is that the location of the tank is in a known and predictable crush area which invites collision-induced damage and failures to the fuel system.
Did I read that correctly?
A. Yes.
Q. And what is the basis for that opinion?
A. There are a number of bases. First off, I've observed it many times myself, having examined maybe thousands of fire collisions.
Number two, the literature that I presented to you this morning -- I don't recall how we marked that --
Q. It's Exhibit 4, I believe.
A. -- has numerous citations relative to this very observation and conclusion.
And, third, if we look carefully at the various documents produced in the Butler -- Nelda Sue

Butler matter, you will observe that Chrysler was aware of this, was aware that the fuel tank should not be placed in a crush zone, and was actively considering moving it to a more safer location on a large number of their product lines.

Q. Can you point me to a specific document that you're referring to?

A. Well, let's begin with the literature.

Q. I'm sorry, sir. Let me change my question.

Is there a specific Chrysler document that you're referring to for the last part of your answer?

A. Oh, it will take a few minutes to find them.

Q. Are those the ones we have that are contained in the exhibits we previously marked?

A. Yes. And you will observe many red tabs.

Q. Yes, sir.

A. One of these red tabs -- probably several of these red tabs contain that information.

Q. I just want to make sure we've marked any Chrysler documents you intend to reference in support of any of your opinions.

Have we done that?

A. Yes.

Q. There's not any documents since the Butler file in your office that you haven't pulled out that you would intend to reference at time of trial, are there?

A. I'm referencing only the documents that are contained in the file.

Q. This file?

A. This file here.

Q. Okay.

A. Nothing else.

Q. And that you produced today?

A. That's absolutely correct.

Q. I have seen -- well, strike that.

Would you classify this collision as a severe collision?

A. From the standpoint of speeds and the resultant collision energies involved, yes.

Q. Do you believe that the speeds and resultant energies involved were such that any fuel tank that was behind the axle would fail in this accident?

A. In any vehicle?

Q. Yes, sir.

A. I can't say with certainty.

Q. Okay. What behind-the-axle vehicles for

the 1991 model year are you aware of?

A. I'm aware of what?

Q. What vehicles in 1991 that you know of had behind-the-axle fuel tank locations?

A. I couldn't give you a specific list, but a lot of them did.

Q. Okay. Do you believe that any of those vehicles that you are aware of that were 1991 model year vehicles and had a rear-mounted tank would have survived this accident?

A. Well, I don't know about all of them specifically. My inclination is that those that would promote underride probably wouldn't survive this accident, or there would be a high probability that they wouldn't.

Q. And which vehicles promote underride?

A. Well, any vehicle that doesn't -- that's relatively stiff and doesn't match the bumper of this particular vehicle, that is, a Thunderbird, very, very well.

Q. Would that include pickup trucks or certain pickup trucks?

A. Well, often pickup trucks are sold without bumpers, so possibly underride any light truck, if I can use that phrase.

Q. And your definition of "light truck" would include?

A. 201, what we would generally call a one-ton truck or a vehicle graded less than 10,000 pounds gross vehicle rating.

Q. What about SUVs? Are they likely to promote underride?

A. I think a number of them would.

Q. Is it your opinion, Mr. Arndt, that any accident from the rear in which the occupants would otherwise survive there should be no fire?

A. I wouldn't state it precisely that way.

Q. How would you state it?

A. I would state it this way.

I would say that in order to minimize the possibility of fire, one needs to protect the fuel system as well as the occupants protected. Because only with that kind of design goal in mind do you have any possibility of not having a fire in an otherwise survivable accident.

And it gets to the same thing you asked in your question, but yet phrases it in terms of a design goal that is consistent with recognizing survivability of people.

Q. Do you hold the opinion, Mr. Arndt, that

if the occupants otherwise survive an impact that there should be no compromise of the fuel system?

A. I don't think that I could hold that as a blanket statement.

Q. Why do you believe in this severe accident the fuel system should have survived without compromise?

MR. FRYHOFER: Objection. Assumes facts not in evidence; misstates prior testimony.

THE WITNESS: Well, there are a couple of responses that I have to that question.

One of the things that is interesting about this accident is that all of the occupants did survive in the Cherokee, in spite of whatever severity it was.

Second, the occupants of the Thunderbird were not injured in any significant way. And it has me question the severity of the accident. I'm not clear it's as severe as any of our analysis is stating that it is.

And, third, it's my opinion that there were alternate design remedies for the Cherokee that would have mitigated these burn injuries.

Q. BY MS. OWENS: Well, let's talk about those, if we can.

I'm sorry, were you finished?

A. Sure.

Q. Let's talk about alternate designs. What opinions do you have about what alternate designs would have resulted in a different outcome from the primary collision which occurred in this case?

A. My opinions are that the fuel system should -- is best placed and should be placed in a better protected area of the vehicle, and that the best option available is for a midship location, given a transfer case on the right-hand side of this vehicle, and it would leave the left side of the vehicle some location there in front of the rear axle and on the left-hand side of the vehicle between the drive shaft and the inner frame or subframe.

Q. Just to make sure, the left side would be --

A. The driver's side.

Q. Thank you.

Okay. So that's one opinion about alternative designs?

A. And, further, in terms of implementation details, of course, the environment needs to be clean around the tank installation to minimize the impact of intrusion and metal edges or components that might

compromise the tank. Implementation details are important is another way of saying that.

And the fuel filler neck still needs to be routed to the exterior of the vehicle. And some considerable attention has to be given to the details of that implementation.

At a minimum, the filler needs to be attached to the outer body panel by a breakable upper fuel filler housing rather than the rigid attachment. A rigid fuel filler neck with convolutions where the neck is stabilized in the tank represents a secure method of designing and affixing the fuel filler system.

The fuel filler system does need to anchor at the top of the tank, and the use of a one-way flow valve of the tank fuel filler at the tank inlay provides backup protection. Could even be primary protection for fuel surge, dynamic surge, if the filler neck failed or the cap is taken off.

Q. Anything else?

A. That's fundamentally it.

Q. In the 1991 Cherokee, the filler pipe was in the top half of the tank, wasn't it?

A. It was.

Q. And you believe -- or first of all, let me

ask you: How far down into the fuel tank did the stub extend?

A. Be just a short distance. A matter of fractions of an inch.

Q. So if there was less than half a tank of gas or less than ten gallons in the fuel tank, would that be below the stub of the filler pipe?

A. In a static condition, yes.

Q. We've talked about several defects that you opine exist in the design of the Cherokee fuel system. Have we talked about all of the things that -- about the design that you believe are defective?

A. I believe I've discussed all the elements of the defect.

Q. Let me turn with you, if we could, to paragraph 21 of Exhibit 1.

Do you have that before you?

A. I do.

Q. Okay. It references several things as indicating that they are necessary to establish adequate fuel system crash performance design requirements, correct?

A. That's correct.

Q. One of them is engineering analysis of developmental testing?

A. Correct.
Q. Have you reviewed development testing?
A. Well, I'm thinking of development testing and compliance certification testing. I failed to put that in -- oh, I did.
Q. Compliance testing is next?
A. Yeah. I meant those as kind of a collective group. I've done -- I have looked at some of the testing results.
Q. All right. And have you formed an analysis of those test results?
A. Here's what I've concluded, looking at quite a range of those tests. Those tests, I think, without fail, always show the rear window coming out of the vehicle. In many instances, the side glass comes out. And there's upset of the rear door and its closure.
Q. Does it become unlatched?
A. I can't say with certainty that it comes unlatched or --
Q. But the geometry --
A. Changes sufficiently. There is some gapping, maybe is a better way to say it --
Q. Okay.
A. -- between the door and the body

receptacle side for the door.

Further, what those tests indicate is that while the vehicle seems to be designed to handle the crush imposed on it during the compliance testing, and the development testing fundamentally mimics the compliance testing. It's just a different stage in the process of getting the vehicle ready for sale.

The testing indicates that there is often substantial movement of the tank, even at -- in a 30-mile-an-hour moving rear barrier impact which has delta V of 16, 17 miles an hour, and that it's clear that if the severity is much greater than that which is observed in the test, that there is a high probability of failure of the tank, I think if one takes a look at the -- I guess that's what I would say about the testing. I want to limit my answer to that.

Q. What you would say is that -- it's clear that if there is slight greater energy there would be a fuel system failure?

A. Yes. And if there is a fire, then we've got a lot of openings, consistently a lot of openings for the combustion and fire to find its way into the vehicle. That's the path for the hazard to travel through.

Q. And we have marked -- or we have not

marked, but you have with you today three videotapes of crash tests indicating that of the vehicle crash tests, referenced by -- they are numbered 3597, 3790, 3860, 3918, 3960, 5211, 5241, 5282, 5309, 5383, 5682, 6062 and 6146, correct?

A. That's correct.

Q. And this has an exhibit label on it or a marking indicating in red that it's Exhibit 6 --

MS. LAWRENCE: Gilberg's.

Q. BY MS. OWENS: -- from Gilberg's deposition.

And then there's a videotape that's labeled AMC crash test, which is marked as Exhibit 4 to Mr. Gilberg's deposition. And there's an impact sled test video -- oh, boy, with a lot of numbers on there, which I'm going to suggest that we somehow put on a copy machine and attach as an exhibit so I don't have to read them all on the record.

A. That's a great idea.

MR. FRYHOFER: That's fine.

Q. BY MS. OWENS: Now, in addition to those, I'm putting these two videotapes, Mr. Arndt, back in your box 3 of 3.

In addition to those videos -- well, let me put it this way.

To the extent that you have reviewed written reports of crash tests, would those correlate with the videos that you have reviewed, or is it a different subset of tests that are the written tests?

A. I'd have to check again. I think I have some of those dynamic tests that were produced by Chrysler, not the earlier AMC tests.

Q. Okay.

A. But, actually, I think the videos are more probative than the test reports themselves --

Q. Okay.

A. -- because they show the dynamic situation, whereas on the test reports, unless there's some real obvious failure, are not going to provide a clear picture of what's happening in the crash event.

Q. In any of the tests which you looked at involving the Cherokee, was there a failure of the fuel system?

A. I did not observe a failure in any of the tests that -- if there was -- if there were any, they were small, I believe. I didn't see anything.

Q. In paragraph 21, the next indication is that you need to look at real-world accidents to establish design performance criteria, correct?

A. Yes.

Q. And have you looked at any real-world accidents other than this one that would help you assess the performance of the Cherokee vehicle in a rear-end collision?

A. I've looked at hundreds, if not thousands, of real-world crashes. Not thousands or hundreds of Cherokees. I think that all of these crashes, in one way or another, build a log of information about what goes on when fuel systems are in vulnerable locations, I think, and the fact that most real-world crashes are not configured like a rear rigid moving-barrier test. I think that's the point of looking at the real-world crashes, in my opinion, is that the rigid barrier development compliance tests have a very real limited application in terms of validating the ultimate performance of the vehicle on the road.

Q. Mr. Arndt, have you looked at any other real-world accidents that you can recall as we sit here today that involve rear impacts and Cherokee vehicles?

A. I believe I indicated earlier today that I didn't recall specifics.

Q. Have you looked at any field performance data in any form relating to the Cherokee vehicle?

A. I have not.

Q. Have you looked at any statistics from

FARS for this case?

A. I have not looked at the FARS data.

Q. Or from NASS?

A. No.

Q. Does that sort of field performance data or statistical data form any basis for any opinion that you hold in this case?

A. No.

Q. Would you agree, field performance data is a legitimate tool to allow assessment of the design of a vehicle?

A. Can play a useful role in many respects.

Q. And then you also indicate that the scientific literature, which you've provided a list -- a bibliography of which you have provided us today also contains information allowing proper design of a fuel system?

A. Well, what I said is that it's a rather robust dialogue about the issues of fuel system crash performance and failure mode technologies and all sorts of things.

Q. Do you believe, Mr. Arndt, that for model year 1991, Chrysler Corporation should have moved the fuel tank to a midship location?

A. I believe that that was an appropriate

action, yes.

Q. Do you believe it was negligent not to do so?

A. I think when one looks at the -- yes, I do.

Q. Do you have any basis to opine that the engineers who were making those decisions at the time were acting in bad faith?

A. All I can say is this: There was quite a high level of awareness within Chrysler around fuel system protection. There are numerous citations and quotes and dialogues in their various technical meetings that recognized that need for improved protection. There is a clear indication that there was a decision process going on around fuel tank protection. And whether or not the engineers made a yes or no decision about that is unclear from looking at the documents.

Q. You disagree with the decision that the Chrysler engineers made about where to locate a fuel tank in this vehicle, correct?

A. Well, you're misphrasing what I said. I disagree with the decision that Chrysler made.

Q. Okay.

A. I'm not suggesting that the engineers made

the decision. I think the engineers understood and had defined the problems and the issues and the solutions quite well.

Q. Is there anything that you have seen in your file that documents that someone other than the engineering community made the decision about location of the fuel system in the Cherokee?

A. There's no clear evidence that I can see about who made the decision.

Q. Is there anything in your -- the files that you have reviewed or the documents that you have reviewed that indicates it was someone other than the engineers?

A. I told you my opinions are based on the material that is presented in this file. I've answered the question.

Q. Respectfully, sir, I'd like a "yes" or "no" answer to that question.

A. There's no information in this file that allows that determination.

Q. So there's no information that tells you it wasn't the engineers, correct?

A. Nor is there information that tells that it was the engineers, either.

Q. Was --

A. That's correct.
Q. Thank you.
Have you ever owned a Cherokee vehicle?
A. No.
Q. Has anyone in your family ever owned or driven a Cherokee vehicle?
A. No.
Q. In paragraph 22, there is a discussion about technology which would remedy the defects that you believe existed in the 1991 Jeep Cherokee, correct?
A. Yes.
Q. Have we discussed those remedies?
A. Yes, we have.
Q. Is a fuel tank in the midship area more susceptible to a compromise in a side impact collision than in a frontal or rear collision?
A. Actually, my experience in that is limited, but that they tend to be more -- they are compromised more in severe frontal collisions.
Q. Would you agree that any fuel tank location provides advantages and has disadvantages in certain types of impacts?
A. I can see that as being a true statement.
Q. Regarding Mr. Stevens' animation, have you reviewed it -- I'm sorry, strike that.

Regarding the animation that has been the result of input from various people in this case, have you reviewed that?

A. I have.

Q. Does it convey any of the opinions that you intend to express in this matter in pictorial form?

A. It does.

Q. Which opinions of yours does it convey?

A. Conveys the nature of the fire, the initial fire when it occurred, and the overall transport of that fire from point of impact to point of rest for that relatively short time period of a few seconds.

Q. And, as I recall, the content of Mr. Stevens' note of his conversation with you, which we've previously marked as an exhibit to his deposition, there is an indication that the flame ball extended 60 to 80 feet in the air?

A. That's correct.

Q. Is that based on any sort of calculation, or simply on the witness statements?

A. It's based on the witness statements.

Q. And does that animation accurately depict certain of your opinions in this matter?

A. It does.

Q. Did you have any input into the creation of that animation other than describing the shape and size of the flame ball for Mr. Stevens?

A. Yes.

Q. What other input did you provide?

A. We have a -- when we prepare such an animation, we have an ongoing dialogue about what it is that we want to display. First, an accurate representation of the collision event itself, just the kinematics of it. That's the motion -- time/motion aspects of it. And we talk about how best to do that.

I have had those conversations with Mr. Stevens, and Mr. Stevens is really the focal point for coordinating a lot of different inputs in this matter. I was just one of many.

And, finally, I was more specifically involved in talking with Mr. Stevens, assimilating the witness statements about the fire, looking at whatever evidence we had, and then describing what I believe to be the nature of the fire.

Q. Do you intend to offer any opinions, Mr. Arndt, about the conduct of DaimlerChrysler Corporation as warranting the position of punitive damages in this case?

A. If you're asking am I going to tell you

what was in Chrysler's management's mind, no. All I can do is speak to what I see in the documents and what I perceive that I believe those documents to reflect.

Q. And --

A. That is what I will do.

Q. And do you believe from what you have seen in the documents evidence of any malice on the part of any employee of Chrysler or DaimlerChrysler Corporation?

A. Well, that's just another form of the same question. I think I've addressed that, and I think there's a large body of understanding and knowledge in Chrysler about what the key elements of -- key goals are of fuel system crash performance. All I can do is point that out, describe my interpretation of it. That's what I will do.

Q. What is your interpretation of it? Does your interpretation --

A. I've already told you.

Q. I'll ask another question.

Does your interpretation of what you have read lead you to the opinion that the employees of DaimlerChrysler Corporation or Chrysler Corporation acted with evil intent?

MR. FRYHOFER: Objection, seeks legal

conclusion.

THE WITNESS: I can't get in their minds.

Q. BY MS. OWENS: Okay.

A. That's a mind question. I'm not there.

Q. And I understand that your testimony is you think the design was defective, correct?

A. Correct.

Q. You think they were negligent in choosing this design?

A. That's correct.

Q. You disagree with their decision?

A. That's correct.

Q. You believe that the internal documents you have reviewed indicate that they had knowledge that there were dangers in placing a fuel tank in a behind-the-axle location?

A. It's more than that. That they knew the safer location, that they had moved a fair amount of their product line along that path, and they hadn't done it with this vehicle.

Q. Did you see anything in the documents you've reviewed or the deposition testimony you've reviewed that explains or attempts to explain why this Cherokee vehicle was not moved along that path?

A. I did not see any specific information

along that line.

Q. Okay. I believe you've indicated, Mr. Arndt, that the Belli accident involved energy that was 300 percent more than the energy absorbed by the vehicle in a FMVSS 301 rear-moving barrier test?

MR. FRYHOFER: Objection, misstates prior testimony.

Q. BY MS. OWENS: Does that misstate your prior testimony, sir?

A. Let me say what I said.

Q. Okay.

A. It's not completely correct.

What I said is that the energy absorbed by the Cherokee -- the Belli vehicle, in this accident, is on the order of 300 percent or more energy than was involved in a rear moving-barrier impact. I did not relate it to all of the energy in the collision, because some of it belongs to the Thunderbird.

Q. Yes, sir. If the energy absorbed by the Cherokee in an impact was on the order of 500 percent of the energy absorbed by a vehicle from a FMVSS 301 rear impact occurred, would you believe that that vehicle should also have a fuel system which was not compromised in that level of severity outside?

MR. FRYHOFER: Objection, lack of

foundation; assumes facts not in evidence.

THE WITNESS: Well, if, indeed, the energy --

Q. BY MS. OWENS: It is a hypothetical.

A. I understand.

If, indeed, given -- this is a hypothetical -- but let's assume that if, indeed, it was 500 percent and it's -- I still believe that the fuel tank would have survived in an alternate location in this accident.

Q. And I guess -- let me ask you to assume for my hypothetical that it's a rear-mounted tank in a Cherokee vehicle and it had an accident where it absorbed energy 500 percent greater than a 301 rear test would cause it to absorb.

Are you with me?

A. I hear you.

Q. If the fuel system was compromised in that accident, would you believe that its design was defective and inadequate?

MR. FRYHOFER: Objection, lack of foundation; assumes facts not in evidence; incomplete hypothetical.

THE WITNESS: I don't know. I'm not sure that that's a survivable accident at all.

Q. BY MS. OWENS: And that's what I'm trying to understand, Mr. Arndt, is, you know, what your criteria is. Is it that the accident is otherwise survivable?

A. I thought I told you that very distinctly and very clearly in an earlier answer. And what I said was that given the dire consequences -- I don't think I used those exact words -- but the dire consequences of fuel system failure where occupants survive, it's mandatory that the fuel system be protected as well as the occupants.

MR. FRYHOFER: Do y'all want to take a break? The witness seems like he's kind of tired, needs to walk around or something.

MS. OWENS: I think I really have, literally, like one more question.

MR. FRYHOFER: Okay.

THE WITNESS: No, I'm just tired of sitting. I'm not tired.

But go ahead.

MR. FRYHOFER: Well, I'm tired if you're not.

MS. OWENS: You've caused me to forget what it is.

MR. FRYHOFER: Okay. Well --

Q. BY MS. OWENS: Have you reviewed or do you know of any statistics, Mr. Arndt, that would tell us what the likelihood of survival of an occupant is at this level of severity of an accident?

A. Statistics that I recall would indicate that the survivability in this level of severity is high. Crash-induced injury of some sort is beginning to show up on the statistical scale.

Q. Meaning AIS 1's and 2's?

A. Yes. Maybe a few 3's. There's not a lot of data, frankly.

Q. Have we discussed all the opinions that you have in this matter, Mr. Arndt?

A. I believe so.

Q. Have we discussed the bases that you would utilize to support those opinions?

A. Yes.

MS. OWENS: I think that's all the questions I have. Thank you for your time, sir.

MR. FRYHOFER: How long are you going to have?

MR. FINE: Five minutes, ten minutes.

MR. FRYHOFER: Do you want to take a break before he starts?

I want to take a break.

(A recess was taken from 4:07 p.m. to 4:23 p.m.)

EXAMINATION

BY MR. FINE:

Q. Mr. Arndt, my name is Sandy Fine. I represent Mr. Muleta, the driver of the Toyota Camry in this case.

How you holding up over there?

A. I'm doing great.

Q. Okay. You graduated from USC in 1962; is that correct?

A. No, not correct.

Q. Please explain your educational background for me.

A. I graduated in 1959 from North Dakota State University with a degree in mechanical engineering/aeronautical engineering. I did some graduate study at USC, but that did not lead to a degree. I stopped that graduate study in 1962.

Q. All right. How old are you, sir?

A. I'm 65.

Q. I noticed in your CV you've got a lot of publications on here. It looks like the majority of your publications were -- looks like your last

publication was 1973. Then it appears there's two reports at the very end where it says "Summary Report of Ford ESV Tests," and then "Report on Low Speed and high Speed Crash Test of Ford ESV's (40-50 MPH)," the last two.

Do you know when those are from?

A. About the same time period.

Q. Have you published anything since 1973?

A. Nope.

Q. Okay. Exhibit No. 12 is your dictation, I believe, from when you visited the vehicles on what date? Was that in April or May? Do you recall when you made this?

A. It was September.

Q. Is this right, September 26, 2001? That is when you actually did this?

A. Yes.

Q. Okay. Did you make any other notes or dictations regarding any of the other vehicles?

A. No.

Q. You did not. Okay.

There is a couple of discs, I believe, marked as No. 8, which is Frederick E. Arndt, L.L.C. -- I'm sorry, No. 18 is Fuel Tank Removal, and No. 19 is the inspection.

Does one of these two tapes contain all your photographs, such as I'm looking at number 227 here that you have labeled? Is this photograph on one of the discs somewhere?

A. No.

Q. It's on one of these discs that we got yesterday?

MS. OWENS: No, we didn't get these yesterday. Those are today.

THE WITNESS: Let me see those discs there.

Oh, yeah. Right here it is.

Q. BY MR. FINE: So these are the photographs of the disc -- I'm sorry.

These are discs containing the photographs I have in my hand; is that correct?

A. Correct.

Q. And on those discs, are they numbered -- are there numbers that correspond with these photographs?

A. No.

Q. There are not. Okay.

Would you look at the photographs that are marked 282, 283 and 285.

MS. OWENS: He can't. You've got them.

Q. BY MR. FINE: Would you look at these, please.

Is that you in these photographs?

A. That is me.

Q. Can you tell me what you're doing in those photographs, please?

A. I was -- looks like I was dictating.

Q. Okay. And if you recall the date?

A. Either April 30th or May 1st.

Q. Is it on the back there, I believe?

A. May 1st.

Q. Those are from your May 1st investigation, you were walking around the Camry; is that correct?

A. That's correct.

Q. And it appears you are making dictation?

A. I'm clear I'm making dictation.

Q. And you do not have any notes from that dictation, do you?

A. I don't.

Q. Do you have the tapes from that dictation?

A. I ought to.

Q. Okay.

A. I don't know where they are right now.

Q. Okay. Is that something you would have back at your office, or you would have saved?

A. I wouldn't destroy it as a normal course, if it's not transcribed.

Q. Okay. So do you believe these tapes are still back at your office somewhere?

A. I don't know. I'm surprised that I don't have it transcribed. I don't know where it is right now.

Q. Is that something you could possibly look for?

A. Of course I will, absolutely.

Q. Okay. Do you think there might also be tapes regarding the Thunderbird?

A. It's possible.

Q. I didn't see any pictures of your dictating the Thunderbird. Just happened to be -- who took those photographs?

A. Don Stevens was taking these.

Q. Just happened to be that Mr. Stevens caught you at three lovely poses as you dictated around the camera?

A. Correct.

Q. Could you look at the front of those pictures again. I'm sorry, I'm still referring to those pictures.

Do you know if the Camry, following its

collision with the Jeep Cherokee, struck anything during its subsequent movement, the front?

A. It has some front -- appears to have some front deformation. I'm not real clear. I'd have to look at some other photos to answer that with certainty.

Q. Okay. Would those other photos be the photos that we have contained here?

A. I don't know. I don't know if it hit anything else. I don't recall that it did at all.

Q. Do you have any idea of what the damage from that front end would be from?

A. This is fire damage here. The lights are released as a result of fire, something -- post accident handling or a combination of both.

Q. Are you able to say whether all of the damage to the front end of the Camry is fire damage?

A. Not with certainty. Certainly, lots of it is. Most of it, most likely.

Q. If I misstate what you say, please correct me. I thought you had said earlier that as part of your accident reconstruction, which you may have done in this case, that you, when you visited vehicles, you attempted to understand the nature of the damage to the vehicles.

Is that correct?

A. Yes.

Q. Did you happen to undertake to determine what may have caused the damage to the front end of the Camry, either before or after the accident, during your investigation?

A. Well, if, indeed, there is damage to this, it's insignificant and possibly not important. I just don't remember that there was any damage to the Camry that was accident related, at the front I should say.

Q. You think also we can get a copy of the discs that were marked as No. 19 and No. 20? Can we get a copy of those?

A. Yes.

MR. FINE: That's all I have.

MS. OWENS: Okay. Let's see if we can go through the exhibits.

Have you got 12?

THE WITNESS: Are we talking about Don Stevens' exhibits also?

MR. FRYHOFER: Did you number the --

MS. OWENS: The ones that were marked yesterday as Stevens, we just referred to them by the Stevens number.

MR. FRYHOFER: Well, let's get the Stevens

ones straight.

MS. OWENS: That is part of Stevens right there.

THE WITNESS: Should we start with Stevens' first just to get those out of the way?

MR. FRYHOFER: I think we've gotten the Stevens stuff out of there, I believe, haven't we? I tried to look through it and pull it out if I saw it.

MS. OWENS: Okay. Well, I know those --

MR. FRYHOFER: We'll know.

MS. LAWRENCE: CV, No. 1, and 2 -- you kept 1 and 2 from yesterday, correct?

THE COURT REPORTER: Correct.

MS. OWENS: I know we marked that.

THE WITNESS: These are all Stevens here.

Here's 4.

MS. LAWRENCE: Did you mark three pages collectively as 22?

Here it is.

MS. OWENS: Okay.

THE WITNESS: Are three marked?

MS. OWENS: Yes. 22.

MS. LAWRENCE: 20 and 21.

THE WITNESS: There's 21.

MS. OWENS: 20 was the disc.

MS. LAWRENCE: So we're up to 1 through 5.
You have 1 and 2.
MS. OWENS: And 4 was another folder.
THE WITNESS: 4 is here.
MS. LAWRENCE: 4 is the police report. 5 is correspondence, so we need to find that. We need to figure out what No. 5 was. Is there anything right there? Hang on, I've got my notes. Was it photographs?
MR. FRYHOFER: Are those still Don's exhibits?
MS. LAWRENCE: Yes.
MR. FRYHOFER: Was 5 the fire?
MS. OWENS: Handwritten note. It was part of 4, and I think we did separately mark it. I'm sorry, it was part of that investigative file, which isn't 4. I keep thinking it was 4, but it wasn't.
MS. OWENS: There's 4, there's 3.
MR. FRYHOFER: Could it have been some other CD? I don't think so.
MS. OWENS: I don't think so. I think he only brought the one.
21 is correspondence.
MS. LAWRENCE: You marked a 5, but then you never talked about it. So in my copy, if I find

something marked 5, that's something I can look at when I get it all back. Because I was writing them down as you were talking about them, and you never said 5.

MS. LAWRENCE: On to you, Mr. Arndt.

MS. OWENS: That's today. He brought that. That was 2.

All right. 1 is his notes, and I gave the court reporter a copy of those.

MS. LAWRENCE: And 2 is CV; 3 is going to be testimony list --

THE WITNESS: Which I'll e-mail to you tomorrow.

MS. OWENS: And, actually, I put a blank yellow sheet in here somewhere to say 3.

Yeah, there it is. So there's 3 so we'll know what that is.

MS. LAWRENCE: 5 was index of discovery.

MS. OWENS: 4 I've got.

MR. FRYHOFER: Could 5 have been the Ron Kirk file that Don had?

MS. OWENS: Might have been, don't know.

What was 4?

MS. LAWRENCE: 4 is this.

MS. OWENS: Here's 5.

MS. LAWRENCE: 6 is witness statements; 7,

I think, was the CD.

MS. OWENS: Well, I've got two -- I've got a CD 8 and hard copy 8. I've got 9; I've got 20, that is a CD. That's yesterday's 20. Was it just photographs? We're looking for your photographs.

What are these?

THE WITNESS: We marked those as a composite.

MS. OWENS: 7.

MS. LAWRENCE: So that's 7, all of them are 7?

MS. OWENS: Yeah, four sets of those.

If you've got them on CD --

MS. LAWRENCE: I'll make sure that he's given them all to me on CD.

MS. OWENS: Except I think his last photograph was 314, and I think this is 334.

THE WITNESS: Maybe I made a mistake.

MS. OWENS: Okay.

MS. LAWRENCE: Yeah, and this one says it goes up through --

MS. OWENS: That's 19 and 20.

MS. LAWRENCE: 7, 8, 9, 10.

MS. OWENS: 10 is another CD that says it's the deposition exhibits of Mr. Stevens.

MS. LAWRENCE: This is the same as yesterday's 20, but we'll keep it in here separately.

MS. OWENS: Okay. 11 is index. 12 is -- this is, yeah, this is a copy that's -- she can have that copy.

12 is inspection notes. 13 is the Steven Lazarus deposition and exhibits -- I'm sorry, not Lazarus deposition, because here it jumped out at me.

MS. LAWRENCE: I think you marked the exhibits as 13 and deposition as 14.

MS. OWENS: Okay. 15, Andrew Foster deposition and exhibits. 16 is Leonard Baker deposition and exhibits. 17A through V are the CAD drawings, the CAD drawings he brought with him today. 18 is the deposition of Mr. Perion with exhibits.

MS. LAWRENCE: You lost me at 19. All the photographs we believe --

MS. OWENS: And 20 is another index of materials in his file. We're done.

So as I understand it --

MS. LAWRENCE: Well, if this is it, I can put these in my briefcase and take them home. I don't need to FedEx them. I have room.

MR. FRYHOFER: Okay.

MS. LAWRENCE: So they will not leave my

possession.

MS. OWENS: Are you going to get Stevens, too?

MS. LAWRENCE: Yes, in either my briefcase or suitcase.

MR. FRYHOFER: That's just stuff that wasn't marked.

MS. LAWRENCE: Hand me that video. You didn't mark this, but you said you wanted a copy of that.

MS. OWENS: Yeah. Just copy the front.

MS. LAWRENCE: You want to mark it?

MS. OWENS: Sure. We'll make that Exhibit 22. Just copy the front sleeve that says what tests are on it.

(Exhibit No. 22 was marked for purposes of identification.)

MS. OWENS: All right. As I understand, the court reporter is taking with her today copies of Exhibits 1 and 12, and 1 and 2.

MS. LAWRENCE: Gary McDowell's photographs?

MS. OWENS: If they're on CD, I'd like to have them.

MS. LAWRENCE: He told us all he has is

negatives.

MS. OWENS: Then I would like to get a duplicate copy. If you want to scan them, put them on CD, if you want to send me the copies, that's fine. Whichever is easiest for you. Obviously, a CD is cheaper if we could do it that way.

MS. OWENS: Correct. So what we're putting on the record is that the court reporter has 1 and 12 of Arndt and 1 and 2 of Stevens. Everything else is in the possession of the plaintiffs, and they are going to copy it -- plaintiffs' attorneys, and they are going to copy it and provide a copy to the court reporter and send the originals back to Mr. Arndt and copies to me. Mr. Fine has indicated he does not want copies of the exhibits.

(Signature was reserved.)

MS. OWENS: We'll stipulate he can do it before any Notary Public.

(The deposition was concluded at 4:30 p.m.)

_____

FREDERICK E. ARNDT

STATE OF ARIZONA)
)ss.
COUNTY OF MARICOPA)

I HEREBY CERTIFY that the foregoing deposition was taken by me pursuant to Notice; that I was then and there a Notary Public and Certified Court Reporter in the State of Arizona, and by virtue thereof authorized to administer an oath; that the witness before testifying was duly sworn by me to testify to the whole truth and nothing but the truth; that the questions propounded by counsel and the answers of the witness thereto were taken down by me in shorthand and thereafter transcribed through computer-aided transcription under my direction, and the foregoing typewritten pages contain a full, true, and accurate transcript of all proceedings had upon the taking of said deposition, all done to the best of my skill and ability.

I FURTHER CERTIFY that I am in no way related to nor employed by any of the parties hereto, nor am I in any way interested in the outcome hereof.

DATED at Phoenix, Arizona, this 31st day of October, 2002.

_____
AMY MERRIFIELD, RPR
AZ CCR #50097
IL CSR #84-4027

My commission expires: March 15, 2004


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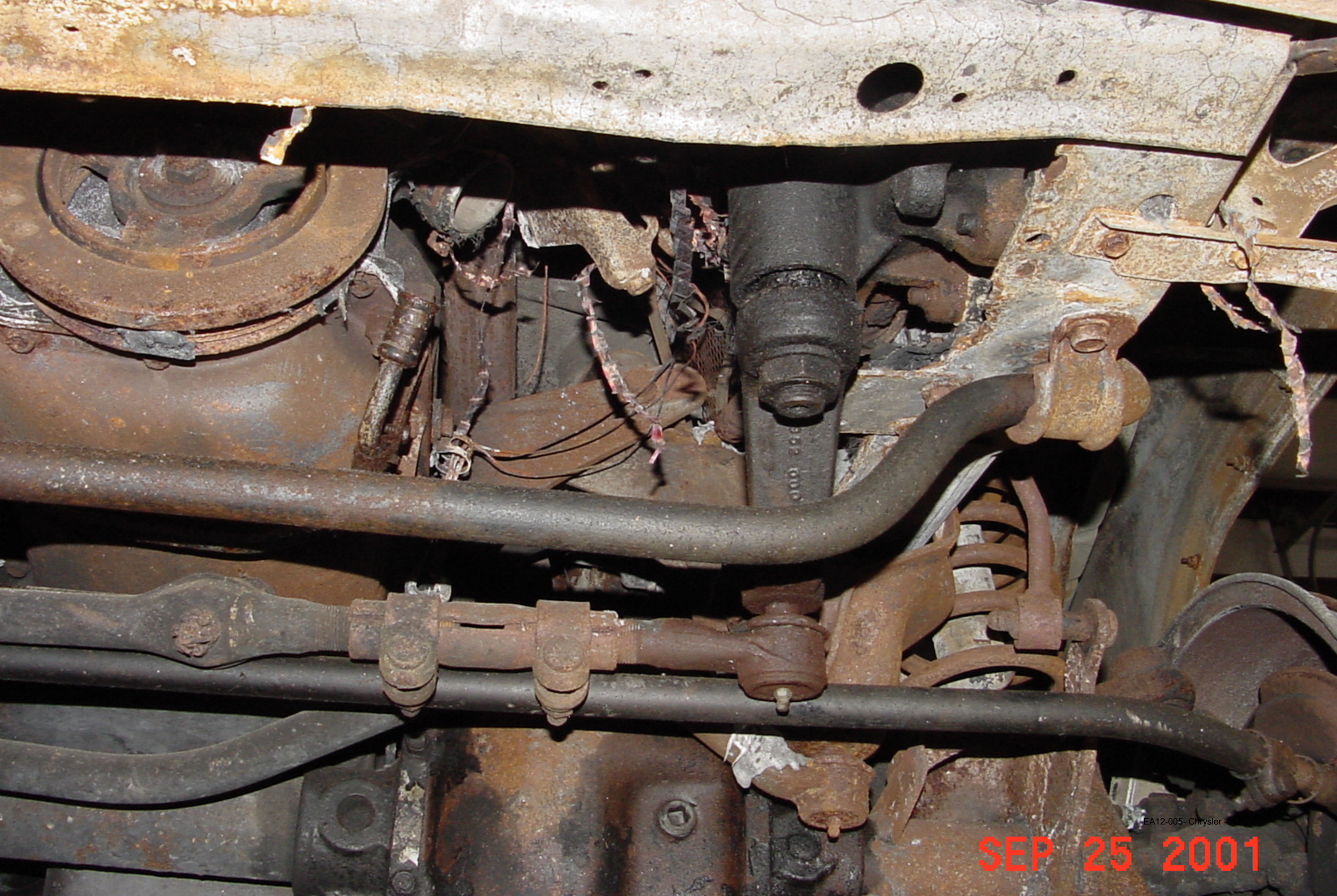
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